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MEMO

DATE	February 27, 2023	**PROJECT NO.**	1909-5877-2
RE	Site 2, National Capital Business Park 4120 Russell Road, City of Ottawa Transportation Impact Assessment Memorandum		
TO	Wally Dubyk, C.E.T. (City of Ottawa)		
CC	Jennifer Murray, MBA, P.Eng		
FROM	Peter Apasnore, MASc., P.Eng, PTOE Aidan Hallsworth, EIT (C.F. Crozier & Associates Inc.)		

Dear Wally,

C.F. Crozier & Associates Inc. (Crozier) was retained by Avenue 31 Capital Inc. to provide transportation engineering services in support of the development application for a proposed warehouse located in the National Capital Business Park, City of Ottawa.

This Transportation Impact Assessment Memo (TIA) provides an update to previous work undertaken in support of the National Capital Business Park (NCBP) lands with a focus on the Site 2 development proposal. A Master TIA for the full National Capital Business Park was prepared by Novatech in May 2020 which analyzed the transportation impacts of all the NCBP sites, including the subject site herein. Given only minor changes have been made to the current Site 2 development plan compared to those outlined in the NCBP Master TIA, a full assessment of transportation impacts is redundant in this case. Per the email correspondence between Wally Dubyk (City of Ottawa) and Peter Apasnore (Crozier), included within **Appendix A**, a TIA Memo with the agreed upon scope was confirmed as sufficient in assessing the transportation impacts associated with the Site 2 development proposal. The TIA Memo analyzes the following elements:

- Discussion on TIA Steps 1 and 2, and performing the Exemptions Review (Module 2.3)
- TIA Step 3 – Forecasting
    - Update to Volume Forecasts for the boundary road network
    - Trip Generation Forecasts during the weekday a.m. and p.m. peak hours;

- TIA Step 4 – Analysis
  - Module 4.1 – Development Design
  - Module 4.2 – Parking
  - Module 4.3 – Boundary Street Design (resummarized from NCBP Master TIA)
  - Module 4.4 – Access Intersections Design
  - Module 4.5 – Transportation Demand Management
  - Module 4.6 – Neighbourhood Traffic Management
  - Module 4.7 – Transit
  - Module 4.9 – Updated Intersection Traffic Operations and Design

This Transportation Impact Assessment Memorandum was originally submitted to the City of Ottawa on December 20, 2022. Following receipt of comments, the memo has been revised to incorporate the requested changes. A comments responses letter is submitted separately to highlight how each comment was addressed for ease of City review.

1.0 BACKGROUND

The subject site is partially located within the property known as 4120 Russell Road and is located in the planned National Capital Business Park, within the City of Ottawa. The subject site is bounded by light industrial buildings to the north and west, vacant lands for the future National Capital Business Park Site 1 development to the east, and a stormwater pond / Hunt Club Road to the south. The lands are designated "Urban Employment Area" per the City of Ottawa Official Plan, reflecting the generally industrial nature of the surrounding areas. **Figure 1** outlines the site location.

Per the latest Site Plan by Ware Malcomb (dated November 19, 2022, included as **Appendix B**), the proposed development includes a single warehouse building with a combined total Gross Floor Area (GFA) of 18,763m^2 split into four separate units. A parking supply of 158 spaces is proposed for the combined site, along with associated loading facilities for the operation of the warehouse located at the rear of the building. Three full-moves access connections to the planned Last Mile Drive are proposed, with Last Mile Drive ultimately providing connections to Hunt Club Road and Russell Road.

As previously noted, the site is located within the planned National Capital Business Park, an industrial business park development located along Russell Road. Previously, a Master Transportation Impact Assessment (NCBP Master TIA) was prepared for all three of the planned sites within the business park (Novatech, May 2020). The NCBP Master TIA provided a comprehensive assessment of the transportation impacts associated with the planned developments, including the proposed development herein.

Within the NCBP Master TIA, the plans for the Site 2 development proposal were assumed to be very similar to the current develpoment proposal herein. Two warehouse buildings with a combined GFA of 17,400 m^2 was assumed for the Master TIA study, or an approximately 7% difference in GFA compared to the current development proposal. Given the minor difference in GFA, transportation impacts to the surrounding network associated with the Site 2 development proposal are expected to be relatively similar to those identified within the NCBP Master TIA. Accordingly, the recommended transportation improvements in the NCBP Master TIA, including the proposed Last Mile Drive access road, have been incorporated within this Memo. This Transportation Impact Assessment (TIA) Memo updates the previous work in the NCBP Master TIA with more up-to-date traffic volume forecasts, traffic operational analyses, safety assessment of the proposed site accesses and the proposed parking supply to provide a

current assessment of the Site 2 development proposal to support the Site Plan application process.

It is noted that Transportation Impact Assessments for the National Capital Business Park Site 1 and Site 3 have been previously completed. The approved NCBP Site 1 TIA was completed in December 2020 by Novatech, and the approved NCBP Site 3 TIA was completed by Crozier in January 2021.

Refer to **Appendix C** for relevant excerpts of the NCBP Master TIA, NCBP Site 1 TIA and NCBP Site 3 TIA.

2.0 SCREENING AND SCOPING STEPS DISCUSSION

Typically, the Screening and Scoping steps are included within the TIA process. However, as discussed in **Section 1.0**, a TIA Memorandum with a reduced scope was confirmed with the City. Given the TIA Memo scope has been established through email correspondence, only the exemptions review within the Scoping TIA step has been included to ensure that the required TIA elements are included within this TIA memorandum.

The exemptions review examines possible exemptions that may be applied to the Analysis TIA steps for the proposed development herein. **Table 1** presents a summary review of the development and network conditions as well as the associated exemption status.

Table 1: Potential Exemptions Review

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**	**Exempt[1]**
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	Not 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**	**Exempt**

Note 1: Transportation Demand Management is still considered herein given the development is expected to accommodate approximately 55 employees, or near the threshold.

Therefore, the TIA Analysis section will include a review of circulation and access, parking supply and demand, Transportation Demand Management, and Neighbourhood Traffic Management.

As no established zoning trip volumes for the site were available for confirmation, it is concluded that "Network Concept" is exempt, similar to the master TIA prepared by Novatech. However, any changes to the surrounding network that may be warranted will be noted herein. The boundary road network used in this assessment is outlined in **Figure 2**.

3.0 STEP 3 – FORECASTING

3.1 Trip Generation and Mode Share

Trip generation for the proposed development was forecasted for the peak hours using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition and the City of Ottawa TRANS Trip Generation Manual given that the TRANS Trip Generation Manual does not have trip generation rates for employment type land uses.

The proposed development includes an 18,763 m^2 GFA warehouse building, therefore, this area was used for determining future trips at the site. LUC 150 "Warehousing" was applied to the warehouse building GFA. The average rate methodology was applied for the forecast given the coefficient of determination for the fitted curve methodology was deemed too low for the auto vehicle trip generation forecast. In addition to forecasting passenger vehicle trips, truck trips were also forecast using a similar methodology to the ITE passenger vehicles forecast.

Table 2 outlines the results of the ITE trip generation forecast for the proposed development.

Table 2: Site ITE Trip Generation

Building	ITE Land Use Category	Gross Floor Area (GFA)	Peak Hour	Number of Trips		
				Inbound	Outbound	Total
Total Passenger Vehicle Trip Generation						
Industrial Building D (Site 2)	LUC 150: Warehousing	18,763 m^2 (201,967 ft^2)	A.M.	26	8	34
			P.M.	10	26	36
Truck Trip Generation						
Industrial Building D (Site 2)	LUC 150: Warehousing	18,763 m^2 (201,967 ft^2)	A.M.	2	2	4
			P.M.	3	3	6
Total Trips			A.M.	28	10	38
			P.M.	13	29	42

It is noted that the NCBP Master TIA forecasted a slightly higher number of vehicle trips, as shown in **Table 3**, due to the study utilizing an older version of the ITE Trip Generation Manual with higher trip generation rates for the warehousing land use. While the current plans likely results in a small increase in future vehicle trips at the site compared to the Site 2 plans outlined in the NCBP Master TIA, the actual impact of site trips as forecasted in the NCBP Master TIA is expected to be similar under the current development proposal plan. It is noted that the decrease in trip rates is generally reflective of the trend that the increase in automation of typical industrial facilities has resulted in a decrease in industrial trip generation rates between successive editions of the ITE Trip Generation Manual.

Table 3: Site Auto Trip Generation per NCBP Master TIA

Building	ITE Land Use Category	Gross Floor Area (GFA)	Peak Hour	Number of Trips		
				Inbound	Outbound	Total
Total Passenger Vehicle Trip Generation						
Site 2	LUC 150: Warehousing	17,400 m² (187,300 ft²)	A.M.	37	11	48
			P.M.	13	37	50

The site ITE trip generation forecast in **Table 2** was applied to the preferred trip generation forecast methodology of the City of Ottawa, using the guidance of the TRANS Trip Generation Manual. The City's TIA Guidelines provide methodology for forecasting person trips using the ITE auto trip generation, 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.
- Assume an average vehicle occupancy of 1.15 for the purposes of translating auto trips to person trips.

The methodology above equates to the TRANS Trip Generation Manual Person-Trip conversion factor of 1.28, which was used to calculate person trips at the site. Truck trips are primarily a separate component which is not broken into person trips, therefore, truck trips are considered separately and reintroduced as a component of auto-trips at the end of the person trip generation calculation. Based on the conversion, a total of 43 and 46 person trips (excluding truck trips) are forecast for the proposed development during the a.m. and p.m. peak hours, respectively.

Next, modal split for the development proposal used the same modal share targets identified in the Master TIA, and similarly what has been used in the NCBP Site 1 TIA and the NCBP Site 3 TIA in support of the respective developments. **Table 4** outlines the modal split and the corresponding forecasted person trips for each travel mode.

Table 4: Site Person Trips by Travel Mode

Travel Mode	Modal Share Target	A.M. Peak Hour Trips			P.M. Peak Hour Trips		
		In	Out	Total	In	Out	Total
	Person Trips	33	10	43	13	33	46
Auto Driver	70%	24	6	30	9	23	32
Auto Passenger	15%	5	2	7	2	5	7
Transit	10%	3	1	4	1	4	5
Active Transport	5%	1	1	2	1	1	2

Therefore, the full build-out of the proposed development is expected to generate a total of 34 and 38 two-way vehicle trips in the a.m. and p.m. peak hours, respectively, which includes the 4 and 6 two-way truck trips forecast by ITE Trip Generation. Given that the proposed development is solely industrial use, no material trip adjustments due to pass-by or synergy between tenants is expected, and as such, no trip reductions were applied.

3.2 Trip Distribution and Assignment

The development generated trips were distributed based on the existing travel and settlement patterns similar to Section 5.1 of the NCBP Master TIA study. This is also the same method used in the NCBP Site 1 TIA and the NCBP Site 3 TIA. The general distributions are noted below.

- 10% To/from the north via Russell Road (Alta Vista)
- 10% to/from the south / east (Russell Road south, Hwy 417 E)
- 5% to/from the south (East Barrhaven and Airport via Ramsayville Road)
- 40% to/from the north/west (Hwy 417 W)
- 15% to/from the west via Walkley Road (Alta Vista, Baseline Road)
- 20% to/from the west via Hunt Club (Nepean)

Similar to the NCBP Master TIA, a single distribution pattern was assumed for the passenger car and truck trips as the truck trips make a small portion of the total trips and patterns are not expected to differ significantly given the location of the development.

Given the layout of the site and the proposed site accesses along Last Mile Drive, passenger car and truck trips were assigned to the accesses based on the internal layout of the parking and loading areas onsite, as well as with consideration to the most convenient access connection for trips that ultimately connect to either Russell Road or Hunt Club Road. Truck trips travelling to Hunt Club Road were assigned to the western access (Site Access Ensure1), while truck trips travelling to Russell Road were assigned to the eastern most access (Site Access #3). Most passenger vehicle parking is located near the middle site access (Site Access #2), therefore, 90% of passenger car trips were assigned to Site Access #2, with the remainder of passenger car trips being assigned to Site Access #1.

Figures 3 and 4 outline the trip distribution and assignment, respectively, for the proposed development.

3.3 Background Growth

Background Growth was applied similarly to the NCBP Master TIA, the NCBP Site 1 TIA and the NCBP Site 3 TIA. Per the excerpts presented in **Appendix C.1**, the NCBP Master TIA established a growth rate of -0.5% to 1.5% per year on arterial roadways within the study area based on a review of the City's Regional traffic forecast model. Further, per Exhibit 2.10 of the TMP (2013), the 'Inner Suburbs' (where the site is located) are projected to have a population and employment growth rates of approximately 0.3% and 1.2% per year, respectively. Similar to the master TIA and to reflect the site's proposed use as employment based, a 1% annual background growth rate was applied to traffic along Russell Road, Hunt Club Road, Hawthorne Road, and the Hwy 417 Off-ramp.

3.4 Background Developments

All background developments from the NCBP Master TIA were incorporated in the volume forecast herein, however, updates have been made based on the most current traffic volume forecasts available. The background developments incorporated in the analysis herein are as follows:

- NCBP Sites 1 and 3. These two developments are the other sites included in the NCBP Master TIA. Subsequent to the NCBP Master TIA, the Site 1 and Site 3 developments had their own respective TIAs completed and approved. As such, the forecasts from the NCBP Site 1 TIA (by Novatech, December 2020) and from the NCBP Site 3 TIA (Crozier, January 2021) were used instead of the NCBP Master TIA forecasts to develop a more accurate volume forecast for this study. Excerpts are included in **Appendix C.2** and **Appendix C.3**, respectively.

- Building F per the NCBP Master TIA was incorporated herein as a background development with the NCBP sites 1 and 3. Excerpts are included within **Appendix C.1.**

- 3500 Hawthorne Road – A gas station with convenience store and a fast food restaurant with drive-through. Based on the TIA prepared by Stantec (2017), the site is forecast to generate 21 and 24 net new two-way auto trips during the AM and PM peak hours, respectively. The TIS recommended modifying the southbound right turn channel to create a 'Smart' channel. Excerpts are included within **Appendix C.5**.

- 2390 Stevenage Drive – An additional approximately 13,000 m^2 of industrial use added to the approximately 10,000 m^2. Excerpts are included within **Appendix C.6.**

- 2480 Walkley Road – Reconfiguration of the existing Giant Tiger with an estimated addition of 69 and 56 new two-way auto trips during the AM and PM peak hours, respectively. Excerpts are included within **Appendix C.7.**

- 2510 Walkley Road – A retail showroom (929 m^2 GFA) and warehouse (2,323 m^2 GFA). Excerpts are included within **Appendix C.8.**

In addition, similar to the NCBP Site 1 and NCBP Site 3 TIAs, the newly built Hydro-Ottawa (2711 Hunt Club Road) trips based on the Traffic Impact Study by Castleglenn in May 2016 were added to analysis herein. Given the building is already existing, the development trips were included to the 2022 existing and all future study horizons herein. Relevant excerpts for the Hydro-Ottawa site are in **Appendix C.4**.

Background development traffic volumes are presented in **Figure 5**. Excerpts of all the background developments are included in **Appendix C**.

3.5 Traffic Volume Forecast

The existing conditions traffic for the study horizons was determined through growing the turning movement count data at the existing study intersections using the growth rates in **Section 3.3** to projected 2022 levels and adding the Hydro-Ottawa trips. The 2022 existing traffic volumes are presented in **Figure 6**.

The future background traffic for the study horizons were determined as a sum of the grown turning movements counts and the traffic generated by the background developments outlined in **Figure 5**. The 2026 and 2031 future background traffic volumes are presented in **Figure 7** and **Figure 8**, respectively.

The future total traffic volumes were determined as a sum of the future background traffic volumes and the site generated trips. **Figures 9 and 10** define the 2026 and 2031 future total traffic volumes within the boundary road network.

3.6 Demand Rationalization

The City's TIA Guidelines notes that if the forecasted traffic demand for an intersection or turning movement exceeds 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. Given the forecasted volumes and the operational analysis (section 5 – Analysis), the volume-to-capacity ratios are generally at or below one, therefore, demand rationalization is not required for this assessment. Details of the operational measures of effectiveness and recommendations to mitigate capacity issues are presented in the Analysis Section below.

4.0 STEP 4 – ANALYSIS

The analysis section discusses the outcome of the transportation assessment process and identifies the necessary mitigation measures to support the development proposal, as required. The Analysis TIA step includes a transportation design review of the site plan, which considers the access configuration, parking supply, and internal site circulation for all applicable transportation modes. In addition, this section assesses the development proposal impacts to the surrounding multi-modal transportation network and recommends improvements, if warranted.

4.1 Development Design

This section reviews the site plan of the development proposal from a transportation engineering perspective and considers impacts to all transportation modes.

4.1.1 Design for Sustainable Modes

A few measures are included which follow the City of Ottawa Planning and Design Guidelines to enhance employee dependence on sustainable travel to the proposed industrial development.

The site plan in **Appendix B** outlines how the development proposal incorporates transportation infrastructure elements within the overall plan. The pedestrian sidewalks included within the development proposal are located adjacent to the building along the north and west sides where vehicle parking is located, along with from Last Mile Drive to near the entrances of the two central tenant office spaces within the warehouse buildings. These pedestrian facilities allow for the minimization of vehicle and pedestrian interactions, creating a safer pedestrian environment. Further, along with vehicle parking being ideally situated, the bicycle parking supply is proposed to be located near the main building entrances, which also minimizes walking distance for cyclists after they have dismounted from their bikes.

The site satisfies the required measures per the Transportation Demand Management (TDM) – Supportive Development Design and Infrastructure Checklist. The TDM checklist is included in **Appendix D**.

It is noted that given the nearest transit stop (Russell Road and Belgreen Drive) is over 400m away from the subject site, 0% of the building entrances are within 400m walking distance to the nearest bus stop. However, walking distance is generally minimized with building entrances located to optimize direct access to the planned bus stop infrastructure along Last Mile Drive. It is expected that OC-Transpo services will be extended through the future Last Mile Drive similar to existing services on the adjacent Belgreen Drive and Stevenage Drive located north of the site.

4.1.2 Circulation and Access

Based on a review of the Site Plan in **Appendix B**, ample drive-aisle width and parking lot space has been provided to allow for proper internal circulation. The internal roadways and parking areas are planned in such a way passenger car and truck interactions will be limited to the accesses, which optimizes overall vehicle circulation within the site.

Furthermore, the site accesses have adequate radii to support the trucks expected at the site as shown on the site plan in **Appendix B**. The site plan shows feasible maneuverability for a WB-330 double semi-trailer, representing the most constrained vehicle profile expected onsite. Therefore, it is expected that the site accesses will be functionally and operationally adequate based on the vehicle maneuvering diagrams displayed on the Site Plan.

4.2 Parking Review

The site is located in area "C – suburban" and the applicable zoning by-law parking requirements for the proposed development are summarized in **Table 5**. Section 101(7), Row N95 "Warehousing" of Table 101 of the City's zoning by-law parking requirement was used to determine parking requirements for the entire site. Though, there are small office spaces located in each of the four proposed industrial units, these offices are expected to function as ancillary spaces to the main warehouse and will be used by warehousing employees. Therefore, no additional parking is calculated for the office components.

Table 5: Parking Summary

Land Use	Gross Floor Area (GFA)	By-Law Parking Rate	Total Parking Required	Parking Supply
Warehousing	18,763 m^2	0.8 per 100 m^2 for the first 5000 m^2 GFA, 0.4 per 100 m^2 thereafter	95 parking spaces	158 parking spaces

The vehicle parking supply therefore exceeds the parking spaces required by the City of Ottawa Zoning By-Law No. 2008-250. The parking supply provided is adequate given the location of the site at the periphery of the City of Ottawa urban area.

In addition, the site provides the required barrier-free accessible parking spaces. Further, the development will provide the required bicycle parking supply of at least 9 spaces, satisfying the By-Law requirement of 1 per 2000m^2 for warehousing uses according to Table 111A(h) of Section 111 of the Zoning By-Law.

Furthermore, the development proposal was compared against the Zoning By-Law requirements for loading. The development proposal is industrial in nature, therefore, row "(a)" of the Table 113A loading requirements were used for the assessment. A minimum loading space

requirement of two spaces is applicable to the proposed development. There is excess loading space supply proposed at rear of the building, which satisfies the City of Ottawa Zoning By-Law requirements for loading.

4.3 Boundary Street Design

The boundary roadways of Russell Road and Hunt Club Road were evaluated using the City of Ottawa Multi-Modal Level of Service (MMLOS) Guidelines within the NCBP Master TIA. The results of this assessment have been resummarized herein for convenience. It is noted that no change in the boundary roadways which would alter the MMLOS assessment has been recorded since the date of the NCBP Master TIA. As such, the assessment is still considered accurate as of the date of this memorandum. It is noted however that Vehicle Level of Service has been updated due to more up to date volume forecasts. The results of the updated Vehicle Level of Service assessment and other traffic operations assessment elements are included in **Section 4.9** – Intersection Design.

The NCBP Master TIA MMLOS assessment included evaluation of the Pedestrian Level of Service (PLOS), Bicycle Level of Service (BLOS) and Truck Level of Service (TkLOS). Since neither Russell Road nor Hunt Club Road have been identified as a transit priority corridor, Transit Level of Service (TLOS) was not evaluated for the boundary roadways. **Table 6** summarizes the MMLOS assessment on the boundary roadways.

Table 6: MMLOS Summary

Roadway	Horizon	PLOS	BLOS	TkLOS
Russell Road	**Existing**	F	F	C
	Target	C	E	B
Hunt Club Road	**Existing**	F	E	A
	Target	C	C	B

The results of the MMLOS evaluation demonstrate that the PLOS and BLOS are deficient on both boundary roadways, while TkLOS on Russell Road may also need improvement. In order to improve the existing MMLOS to the desired, the following transportation infrastructure improvements as already captured in the previous Mater TIA may be considered by the City:

- Urbanization of Russell Road between Hawthorne Road and Hunt Club Road overpass. Urbanization may include reducing the posted speed limit from 80 km/h to 50 km/h and introduction of a pedestrian 2 m sidewalk (or 3 m multi-use path) and a 2 m boulevard.

- There already appears to be a sidewalk and an onstreet cycling lane on Hunt Club Road for the segment west of Last Mile Drive, which should be satisfactory for the proposed site. Potential speed limit reduction for the subject segment may also be considered in future.

- For Russell Road, widening the lane widths to at least 3.7m to satisfy the TkLOS requirements.

Annex 1 of the City of Ottawa's Official Plan () identifies a 30 m right of way (ROW) protection for Russell Road between Hawthorne Road and the Greenbelt boundary, and a 42.5m to 50m ROW protection for Hunt Club Road near Last Mile Drive. Therefore, the improvements identified above are feasible if the City choses to implement them. If the noted improvements are implemented, the TIA LOS targets would be met.

4.4 Access Intersection Review

The geometrics and spacings of the site accesses were reviewed as part of the Access Intersection Review. The requirements of the City of Ottawa Private Approach By-Law No. 2003-447 and the Transportation Association of Canada Geometric Design Guide for Canadian Roads (TAC-GDGCR) were used for the assessment.

Tables 7 and 8 summarize the findings from the access review against the requirements of the City of Ottawa Private Approach By-Law No. 2003-447 for roadway frontage and access spacing, respectively. It is noted that access spacing requirements for both local streets and industrial driveways outlined in the TAC-GDGCR Figures 8.8.2 and 8.9.2, respectively, are less stringent than the City of Ottawa Private Approach By-Law Requirements.

Table 7: Private Approach By-Law Roadway Frontage Evaluation

Clause No.	Roadway (Frontage)	Maximum # of two-way private approaches	Satisfied?
S25.(1)(a-b)	Last Mile Drive (~450m)	5	Yes (3 accesses)

Table 8: Private Approach By-Law Access Spacing Evaluation

Clause No.	Access	Viewing Direction relative to the Access	Distance Required to nearest Street / Private Access		Distance Provided to nearest Street / Private Access		Satisfied?
			Street	Access	Street	Access	
S25.(1)(m)	Site Access #3 at Last Mile Drive (Eastern Access)	East	30m		>100m	>80m[1]	Yes
		West			>100m	>70m	Yes
	Site Access #2 at Last Mile Drive (Central Access)	East			>100m	>70m	Yes
		West / South			>100m	>100m	Yes
	Site Access #1 at Last Mile Drive (West / South Access)	North / East			>100m	>100m	Yes
		South			>100m	>100m[2]	Yes

Note 1: Nearest access is the western most access of the NCBP Site 1 development.
Note 2: Nearest access is the planned Hydro Ottawa connection to Last Mile Drive.

The driveway widths of the existing site accesses are in conformance with the Private Approach Zoning By-Law S25.(1)(c), which specifies that driveway widths shall not exceed the 9m requirement except at the site accesses to accommodate heavy vehicles and fire trucks to access the site as required, in accordance with S25.(1)(e). The Site Access #1 width of 12m and the site access radii included in the develpoment proposal are required to accommodate the WB-330 and WB-20 design vehicles expected onsite, as evidenced by the vehicle maneuvering diagrams displayed on the Site Plan in **Appendix B**.

Finally, the sight distance present at the site accesses is expected to be sufficient to accommodate safe turning movements, using the TAC-GDGCR Section 9.9 sight distance assessment presented in **Table 9**. Sight Distance was evaluated using the Site Plan in **Appendix B** and the approved plans for Last Mile Drive as described in the Site 1 TIA by Novatech (December 2020, excerpts in **Appendix C**). The intersection sight distance is conservative and captures stopping sight distance. Per the TAC-GDGCR, minimum required intersection sight distance is calculated using equation 9.9.1 as outlined below:

*ISD = 0.278 * V major * tg*

Where;
ISD = Intersection Sight Distance
V major = design speed of roadway (km/h)
tg = assumed time gap for vehicles to turn from stop onto roadway (s)

Given the large trucks are expected onsite, the "Combination truck (WB 19 and WB 20)" time gap was used for the assessment at Site Access #1 and Site Access #3. The standard passenger vehicle time gap was used at Site Access #2 given that trucks are not expected to use this access (refer to discussion in **Section 3.2**). It is expected that Last Mile Drive will have a posted speed of 50 km/h and therefore an assumed design speed of 60 km/h was used for assessment. This assumption is conservative given the roadway design shows several crest and sag curves with K-values of 9 and 11, which is associated with design speeds of about 40-50 km/h per TAC-GDGCR Section 3.3. A 50 km/h design speed was however used for the left turn egress at Site access #1 due to the expected impact of the Last Mile Drive horizontal curvature on speeds of associated southbound through traffic.

The vertical curvature was also assessed at the request of the City. The assessment used standard driver eye heights of 1.05m and 2.3m for passenger cars and trucks, respectively. An object height of 0.6m, corresponding to the headlights of a passenger car which must be visible during nighttime conditions, was also used for the assessment. These heights are in accordance with the TAC-GDGCR Section 2.0 "Design Controls, Classification and Consistency".

Table 9: Sight Distance Analysis

Feature	Site Access #1 at Last Mile Drive	Site Access #2 at Last Mile Drive	Site Access #3 at Last Mile Drive
Access Type	Full-Moves	Full-Moves	Full-Moves
Assumed Speed Limit	50 km/h	50 km/h	50 km/h
Assumed Design Speed	60 km/h[1]	60 km/h	60 km/h
Time Gap	11.5 s (looking north)[2] 10.5 s (looking south)[3]	7.5 s (looking east)[2] 6.5 s (looking west)[3]	11.5 s (looking east)[2] 10.5 s (looking west)[3]
Sight Distance Required	160m (looking north) 180m (looking south)	130m (looking east) 110m (looking west)	195m (looking east) 180m (looking west)
Available Sight Distance [4]	~160m (looking north) >200m (looking south)	~90m (looking east)[5] ~180m (looking west)	>200m (looking east) >200m (looking west)
Minimum Sight Distance Satisfied?	Yes	No	Yes

Note 1: As noted above, a design speed of 50km/h was used for looking north given the horizontal curvature in the roadway will reduce traffic speeds.
Note 2: Time gap for left-turning vehicles 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 3: Time gap for right-turning vehicles from a stop onto a two-lane highway with no median and with a grade less than 3%. Value from Table 9.9.5 in the GDGCR.
Note 4: Available sight distance captures both horizontal and vertical constraints based a review of Last Mile Drive drawings.
Note 5: Approximately 90m of sight distance is available looking east from site access #2 due to a constraint resulting from a vertical crest and sag curves east of the access. The constraint applies to westbound traffic on Last Mile Drive and is expected to result in lower operating speeds, making the 90m available sight distance functionally adequate.

Except at the site access #2 looking east, the minimum sight distance requirements are satisfied.

The available sight distance at site access #2 satisfies a 60km/h design speed except for the lost visibility of a 115m segment between approximately 90m to 205m east of the access. This segment includes a crest curve and two sag curves with K-values varying between 9 to 11, representing a 40 km/h design speed and stopping sight distance of approximately 50m until westbound traveling vehicles clear the sags and have visibility beyond the crest curve. Therefore, the available 90m sight distance is expected to be adequate and will not result in a traffic safety issue. Further, it is expected that advisory or regulatory signage will be considered for the vertical curvature at this location and for the horizontal curvature at the road on the northwest corner of the site.

Therefore, all three proposed site access connections to Last Mile Drive can be supported from a sight distance perspective. The measured sight distances were verified based on a review of the Last Mile Drive drawings, included in **Appendix G**. The drawings include a sight distance check of the horizontal and vertical curvature along Last Mile drive, ensuring that both horizontal and vertical constraints on sightlines have been accounted for in the sight distance assessment.

The operational assessment of the site accesses are included in **Section 4.9** – Intersection Design, which covers the Intersection Control and Design elements of this Analysis Section module by identifying the recommended intersection control for the site accesses.

4.5 Transportation Demand Management

To support sustainable transportation, the site proposes TDM measures including internal sidewalks, accessible path connections onsite and is expected to provide bicycle parking that meets the 9 space requirement per the City's Zoning By-law. Further, the completed TDM Measures checklist and the TDM-Supportive Development Design and Infrastructure Checklist per Sections 4.5.3 and 4.1.1, respectively, of the City's TIA Guidelines is included within **Appendix D.**

4.6 Neighbourhood Traffic Management

The proposed development relies upon the proposed future Last Mile Drive for access, which is designated as a local road in the City of Ottawa Official Plan (2022). Last Mile Drive ultimately connects to Russell Road and Hunt Club Road, both of which are Arterial roadways. As such, only Last Mile Drive is required to be evaluated against the Neighbourhood Traffic Management guidance.

The City of Ottawa TIA Guidelines identifies a maximum threshold of 1,000 vehicles per day, or 120 vehicles during the peak hour for determining potential need for a comprehensive neighbourhood traffic management (NTM) plan. Based on the 2031 future total traffic projection, a total of approximately 139 and 152 two-way traffic volumes are projected at the Last Mile Drive road segment just north of Hunt Club Road, which, based on the 2031 future total traffic projection, is expected to be the busiest stretch of Last Mile Drive. Therefore, the volume projection exceeds the TIA thresholds for neighbourhood traffic management for a local roadway.

However, the thresholds outlined in the TIA guidelines are particularly low and are likely more appropriate for residential neighbourhood contexts rather than for an employment area which are required to accommodate a high number of vehicle movements. Further, as presented in **Section 4.9** herein, no operational issues attributable to traffic volumes is forecasted all through to the 2031 horizon. Therefore, NTM is not relevant to the adequate operation of the proposed Last Mile Drive intersections at the site accesses, at Hunt Club Road and at Russell Road.

4.7 Transit

Table 10 outlines the estimated additional transit ridership on the existing OC Transpo routes or any new future transit routes in the area.

Table 10: Proposed Development Transit Trips

Time Period	Trips	
	Inbound	Outbound
A.M. Peak	3	1
P.M. Peak	1	4

Due to the minimal transit trip generation, identifying transit capacity changes is not required to support the proposed development.

4.8 Review of Network Concept

As discussed in **Section 2.0**, the Review of Network Concept module is exempt from the TIA process for this development proposal given the development proposal generates less than 200 peak-hour person-trips.

4.9 Intersection Operations and Design

This section review the auto traffic operations at the study intersections for the existing conditions, future background, and future total scenarios as part of the MMLOS evaluation. The assessment serves an update to previous analysis work undertaken in the separate NCBP Master TIA, the Site 1 NCBP TIA and the Site 3 NCBP TIA studies, of which certain volume forecasts from each study have all been incorporated into this traffic analysis update. The forecast methodology for the traffic assessment has been described in detail in **Section 3.5**. Level of Service Definitions per the Highway Capacity Manual are included in **Appendix E**.

4.9.1 Existing Intersection Operations

The auto traffic operations at the study intersections were analyzed based on of the projected 2022 existing traffic volumes illustrated in **Figure 6. Table 11** outlines the operational measures of effectiveness at the study intersections under the 2022 existing traffic volumes. Detailed capacity analysis is included in **Appendix F**.

Table 11: 2022 Existing Traffic Operations Summary

Intersection	Control	Peak Hour	Level of Service	Average Delay per Vehicle(s)	V/C Ratio[1]	95th %ile Queues > Storage Length
Hawthorne Road and Russell Road	Signal	A.M.	B	14.4 s	**0.87 (WBR)**	None
		P.M.	A	6.6 s	0.41 (SBL)	None
Hawthorne Road and Hunt Club Road	Signal	A.M.	E	61.9 s	**0.97 (EBL)** **0.96 (WBT)** **0.99 (NBT)**	#186.1m > 90m (EBL) 98.4m > 50m (WBL)
		P.M.	D	48.5 s	**0.86 (EBL)** **0.91 (EBT)** **0.94 (WBL)**	#98.4m > 90m (EBL) #198.5m > 50m (WBL)

Note 1: V/C Ratio – illustrates the maximum and other volume to capacity ratios greater than 0.85.
The Level of Service (LOS) of a signalized intersection is based on the average control delay per vehicle. The LOS of a stop-controlled intersection is based on the delay associated with the critical minor road approach.
#: the 95th percentile volume exceeds capacity; queue may be longer.

As presented in **Table 11**, under 2022 existing conditions, the intersection of Hawthorne Road and Russell Road is forecast to operate below capacity at a Level of Service (LOS) "B" or better during the a.m. and p.m. peak hours.

The intersection of Hawthorne Road and Hunt Club Road is projected to operate at a LOS "E" and "D" during the a.m. and p.m. peak hours, respectively. Per the 95th percentile queues, the eastbound and westbound left turn queues are projected to occasionally exceed the storage lanes during the peak hours. The intersection is operationally constrained during the peak hours, which is typical of high volume arterial-arterial intersections. Therefore, given the capacity constraints at the Hawthorne Road and Hunt Club Road intersection, it is recommended that the City monitor the intersection and revise the signal timing plans as required to maintain adequate

traffic operations. This recommendation is consistent with similar recommendations made in previous NCBP TIAs.

4.9.2 Future Background Intersection Operations

The future background traffic operations at the study intersections were analyzed based on the 2026 and 2031 future background traffic volumes illustrated in **Figures 7 and 8**. **Tables 12 and 13** outlines the operational measures of effectiveness at the study intersections in the 2026 and 2031 future background scenarios, respectively. Detailed capacity analysis is included in **Appendix F**.

Table 12: 2026 Future Background Operations Summary

Intersection	Control	Peak Hour	Level of Service	Average Delay per Vehicle(s)	V/C Ratio[1]	95th %ile Queues > Storage Length
Hawthorne Road and Russell Road	Signal	A.M.	B	13.7 s	0.85 (WBR)	None
		P.M.	A	7.8 s	0.56 (SBL)	None
Hawthorne Road and Hunt Club Road	Signal	A.M.	E	56.3 s	**0.96 (EBL)** **0.93 (WBT)** **0.92 (NBT)** **0.88 (WBL)**	#168.1m > 90m (EBL) #105.1m > 50m (WBL)
		P.M.	D	52.6 s	**0.95 (EBT)** **0.96 (WBL)** **0.94 (SBL)** **0.88 (EBL)**	#107.8m > 90m (EBL) #190.3m > 50m (WBL)
Hunt Club Road and Last Mile Drive	Signal	A.M.	A	6.5 s	0.58 (WBT)	None
		P.M.	A	7.2 s	0.59 (WBT)	None
Last Mile Drive/ Building F and Russel Road	Stop	A.M.	C	16.6 s	0.143 (NBLTR)	None
		P.M.	B	13.7 s	0.067 (NBLTR)	None

Note 1: V/C Ratio – illustrates the maximum and other volume to capacity ratios greater than 0.85.
The Level of Service (LOS) of a signalized intersection is based on the average control delay per vehicle. The LOS of a stop-controlled intersection is based on the delay associated with the critical minor road approach.
#: the 95th percentile volume exceeds capacity; queue may be longer.

Table 13: 2031 Future Background Operations Summary

Intersection	Control	Peak Hour	Level of Service	Average Delay per Vehicle(s)	V/C Ratio[1]	95th %ile Queues > Storage Length
Hawthorne Road and Russell Road	Signal	A.M.	B	16.3 s	0.83 (WBR)	None
		P.M.	A	8.2 s	0.61 (SBL)	None
Hawthorne Road and Hunt Club Road	Signal	A.M.	E	62.1 s	**0.99 (EBL)** **0.99 (WBT)** **0.95 (NBT)** **0.88 (WBL)**	#180.3m > 90m (EBL) 108.8m > 50m (WBL)
		P.M.	E	58.4 s	**1.01 (EBT)** **1.00 (SBL)** **0.99 (WBL)** **0.89 (EBL)**	#113.1m > 90m (EBL) #204.8m > 50m (WBL) #82.7m > 80m (SBL)
Hunt Club Road and Last Mile Drive	Signal	A.M.	A	6.8 s	0.60 (WBT)	None
		P.M.	A	7.5 s	0.62 (WBT)	None
Last Mile Drive/ Building F and Russel Road	Stop	A.M.	C	17.3 s	0.151 (NBLTR)	None
		P.M.	B	14 s	0.07 (NBLTR)	None

Ditto Notes **Table 12**.

Under 2026 and 2031 future background conditions, the existing study intersections are projected to operate similarly compared to the 2022 existing conditions. The intersection of Hawthorne Road and Russell Road is forecast to operate below capacity at a LOS "B" or better during the a.m. and p.m. peak hours. The intersection of Hawthorne Road and Hunt Club Road is projected to operate at a LOS "E" or better during the peak hours, with high volume-to-capacity ratios for several movements and 95th percentile queues occasionally exceeding the storage lengths of some of the auxiliary turn lanes. Similar to existing conditions, given the capacity constraints at the Hawthorne Road and Hunt Club Road intersection, it is recommended that the City monitor the intersection and revise the signal timing plans as required to maintain adequate traffic operations.

The future Last Mile Drive study intersections are forecast to operate acceptably under future background conditions, at a LOS "C" or better during the peak hours. Neither the forecasted volume-to-capacity ratios or the 95th percentile queues indicate operational constraints at the Last Mile Drive study intersections.

4.9.3 Future Total Intersection Operations

The future total traffic operations at the study intersections were analyzed based on the 2026 and 2031 future total traffic volumes illustrated in **Figures 9 and 10**. **Tables 14 and 15** outline the operational measures of effectiveness at the study intersections for the 2026 and 2031 future total scenarios, respectively. Detailed capacity analysis is included in **Appendix F**.

Table 14: 2026 Future Total Operations Summary

Intersection	Control	Peak Hour	Level of Service	Average Delay per Vehicle(s)	V/C Ratio[1]	95th %ile Queues > Storage Length
Hawthorne Road and Russell Road	Signal	A.M.	B	15.1s	0.82 (WBR)	None
		P.M.	A	7.9s	0.57 (SBL)	None
Hawthorne Road and Hunt Club Road	Signal	A.M.	E	56.4s	**0.96 (EBL)** **0.93 (WBT)** **0.92 (NBT)** **0.88 (WBL)**	#168.7m > 90m (EBL) #105.1m > 50m (WBL)
		P.M.	D	52.6s	**0.96 (WBL)** **0.95 (EBT)** **0.95 (SBL)** **0.88 (EBL)**	#108.1m > 90m (EBL) #190.3m > 50m (WBL)
Hunt Club Road and Last Mile Drive	Signal	A.M.	A	7.6s	0.60 (WBT)	None
		P.M.	A	7.6s	0.59 (WBT)	None
Last Mile Drive/ Building F and Russel Road	Stop	A.M.	C	16.9s	0.159 (NBLTR)	None
		P.M.	B	13.9s	0.10 (NBLTR)	None
Last Mile Drive & Site Access #1	Stop	A.M.	A	9.1s	0.001(NBLTR)	None
		P.M.	A	9.0s	0.004(NBLTR)	None
Site Access #2 & Last Mile Drive	Stop	A.M.	A	8.9s	0.006 (NBLTR)	None
		P.M.	A	8.8s	0.022(NBLTR)	None
Site Access #3 & Last Mile Drive	Stop	A.M.	A	8.7s	0.001(NBLTR)	None
		P.M.	A	8.6s	0.001(NBLTR)	None

Note 1: V/C Ratio – illustrates the maximum and other volume to capacity ratios greater than 0.85.
The Level of Service (LOS) of a signalized intersection is based on the average control delay per vehicle. The LOS of a stop-controlled intersection is based on the delay associated with the critical minor road approach.
#: the 95th percentile volume exceeds capacity; queue may be longer.

Table 15: 2031 Future Total Operations Summary

Intersection	Control	Peak Hour	Level of Service	Average Delay per Vehicle(s)	V/C Ratio[1]	95th %ile Queues > Storage Length
Hawthorne Road and Russell Road	Signal	A.M.	B	16.3s	0.84 (WBR)	None
		P.M.	A	8.3s	0.62 (SBL)	#63.8m > 60m (SBL)
Hawthorne Road and Hunt Club Road	Signal	A.M.	E	62.1s	**0.99 (EBL)** **0.99 (WBT)** **0.96 (NBT)** **0.88 (WBL)**	#180.8m > 90m (EBL) 108.8m > 50m (WBL)
		P.M.	E	58.5s	**1.02 (EBT)** **1.00 (SBL)** **0.99 (WBL)** **0.89 (EBL)**	#113.1m > 90m (EBL) #204.8m > 50m (WBL) #82.7m > 80m (SBL)
Hunt Club Road and Last Mile Drive	Signal	A.M.	A	8.0s	0.63 (WBT)	None
		P.M.	A	8.0s	0.62 (WBT)	None
Last Mile Drive/ Building F and Russel Road	Stop	A.M.	C	17.7s	0.167 (NBLTR)	None
		P.M.	B	14.3s	0.104 (NBLTR)	None
Last Mile Drive & Site Access #1	Stop	A.M.	A	9.1s	0.001(NBLTR)	None
		P.M.	A	9.0s	0.004(NBLTR)	None
Site Access #2 & Last Mile Drive	Stop	A.M.	A	8.9s	0.006 (NBLTR)	None
		P.M.	A	8.8s	0.022(NBLTR)	None
Site Access #3 & Last Mile Drive	Stop	A.M.	A	8.7s	0.001(NBLTR)	None
		P.M.	A	8.6s	0.001(NBLTR)	None

Ditto Notes **Table 14**.

Under 2026 and 2031 future total conditions, the study intersections are expected to operate similarly compared to the corresponding 2026 and 2031 future background conditions. The study intersections are expected to operate at unchanged level of service during the a.m. and p.m. peak hours. A maximum control delay increment of 0.4s and volume-to-capacity ratio increase of 0.03 is forecast during the ultimate 2031 future total scenario. These operational metrics indicate that additional site traffic as a result of the development proposal does not meaningfully impact traffic operations at the surrounding study intersections.

In addition, the proposed site access connections to Last Mile Drive were evaluated. The site accesses are projected to operate with significant reserve capacity at a LOS "A" during the peak hours, with no volume-to-capacity ratios exceeding 0.1 for any movement.

5.0 CONCLUSION AND RECOMMENDATIONS

This Transportation Impact Assessment (TIA) Memorandum has assessed the transportation impacts of the proposed National Capital Business Park "Site 2" industrial development at the 4120 Russell Road property in the City of Ottawa. The analysis contained within this Memo has resulted in the following key findings:

- The proposed development is expected to generate:
    - approximately 30 and 32 total two-way passenger car trips during the weekday a.m. and p.m. peak hours, respectively.
    - approximately 4 and 6 total two-way truck trips during the weekday a.m. and p.m. peak hours, respectively.
    - approximately 43 and 46 total person trips during the weekday a.m. and p.m. peak hours, respectively.

- Under all study horizons, the existing study intersections are projected to operate at the Level of Services (LOS) below.

    - Hawthorne Road and Russell Road is forecast to operate below capacity at a LOS "B" or better during the a.m. and p.m. peak hours.

    - Hawthorne Road and Hunt Club Road is projected to operate at a LOS "E" or better during the peak hours. Several movements are approaching or are at capacity based on the volume-to-capacity ratios, and the 95th percentile queues indicate that some of the auxiliary turning lane storages may be exceeded occasionally during the peak hours. These operational metrics are typical of high volume arterial on arterial intersections, and it is expected that traffic operations will become significantly more acceptable outside the peak hours.

- Under the ultimate 2031 horizon future background and future total conditions, the following study intersections are projected to operate at the following Level of Services:

    - Hunt Club Road and Last Mile Drive is projected to operate below capacity at a LOS "A" during the peak hours.

    - Russell Road and Last Mile Drive is forecast to operate acceptably at a LOS "C" and LOS "B" during the a.m. and p.m. peak hours, respectively.

- Under future total conditions, the proposed site access connections to Last Mile Drive are forecast to operate acceptably at a LOS "A", thus, no operational constraints.

- The three proposed site accesses to the future Last Mile Drive are expected to adequately accommodate development traffic without significant issues related to sight-lines, access spacing, corner clearance, access conflicts, and truck maneuverability. Though some constraints are expected for access #1 and #2, these are associated with the roadway alignment and given operating speeds on Last Mile Drive are similarly impacted, no safety issues are forecast. Further, external road improvements or turn lanes are not warranted at the proposed site accesses to the development.

- A few measures including internal sidewalks, onsite accessible path connections, bicycle parking supply (to be provided) and a site design being largely consistent with the City's

TDM guidelines is proposed to support sustainable travel modes and transportation demand management.

- Given a few turning movements are near capacity at the study intersections of Hawthorne Road with Hunt Club Road and Russell Road , it is recommended that the City monitor the intersections and revise the signal timing plans as required to maintain adequate traffic operations. This recommendation applies to both current and future conditions with or without the proposed NCBP development.

The development proposal can be supported from a traffic operations and safety perspective given the findings of this TIA Memo. The traffic operations metrics indicate that the site does not meaningfully impact traffic operations on the surrounding road network. The nearby transportation network is expected to adequately accommodate travel demands from the development proposal, including for non-vehicular travel modes. Furthermore, no functional or safety concerns from a transportation perspective were identified. We trust that this TIA Memo addresses any transportation concerns related to the development proposal. Should you have any questions or wish to discuss further, please feel free to give us a call.

Sincerely,

C.F. CROZIER & ASSOCIATES INC.

Peter Apasnore, MASc., P.Eng., PTOE
Project Manager, Transportation

C.F. CROZER & ASSOCIATES INC.

Aidan Hallsworth, EIT
Engineering Intern, Transportation

/AH

Encl.

Figures:
Figure 1 – Site Location
Figure 2 – Boundary Road Network
Figure 3 – Site Trip Distribution
Figure 4 – Site Trip Assignment
Figure 5 – Background Developments Traffic Volumes
Figure 6 – 2022 Existing Traffic Volumes
Figure 7 – 2026 Future Background Traffic Volumes
Figure 8 – 2031 Future Background Traffic Volumes
Figure 9 – 2026 Future Total Traffic Volumes
Figure 10 – 2031 Future Total Traffic Volumes

Appendicies:
Appendix A – Correspondence
Appendix B – Site Plan
Appendix C – National Capital Business Park Background TIA Excerpts
Appendix D – Transportation Demand Management Checklists
Appendix E – Level of Service Definitions
Appendix F – Detailed Capacity Analysis Reports
Appendix G – Sight Distance Figures

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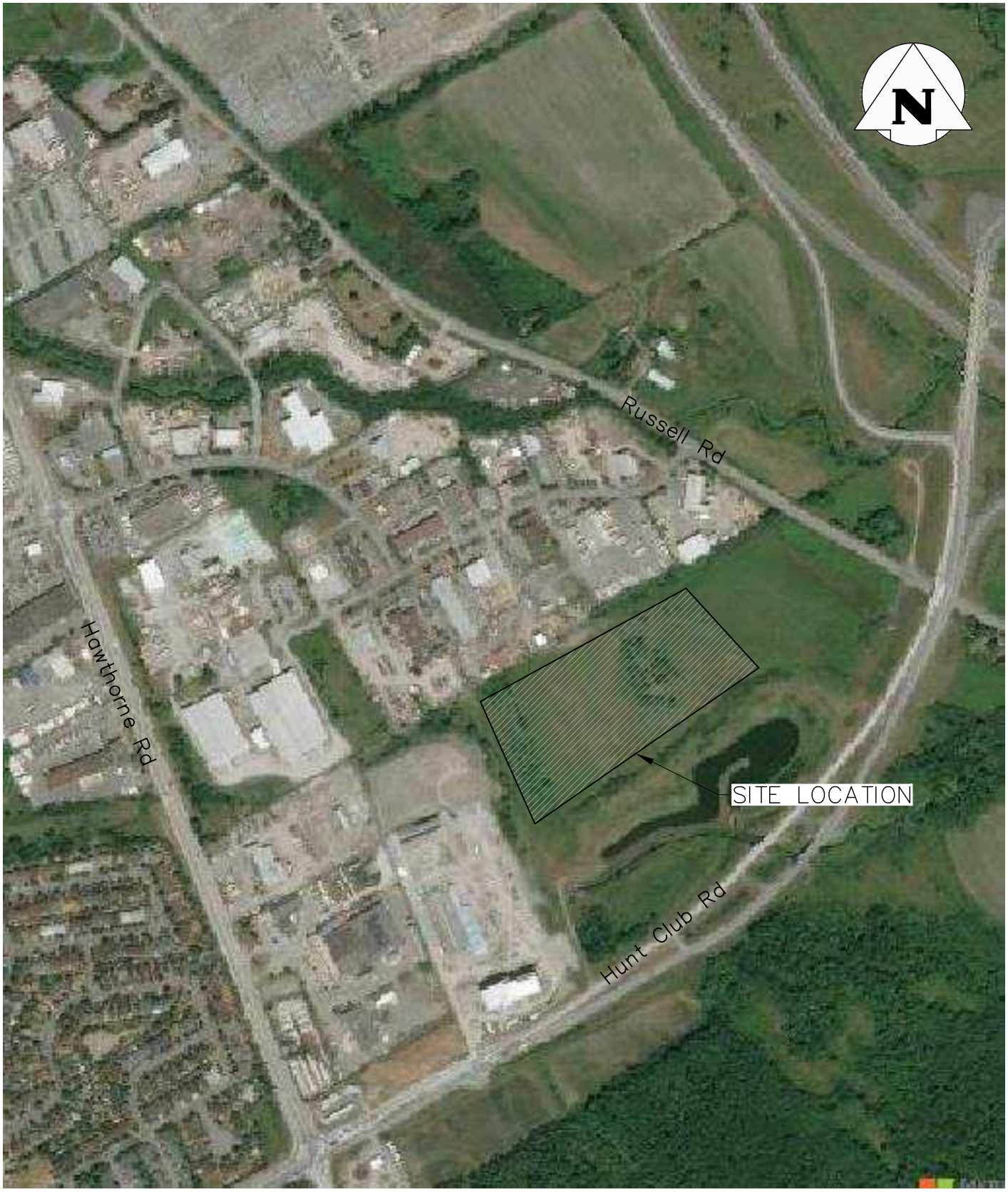
FIGURES



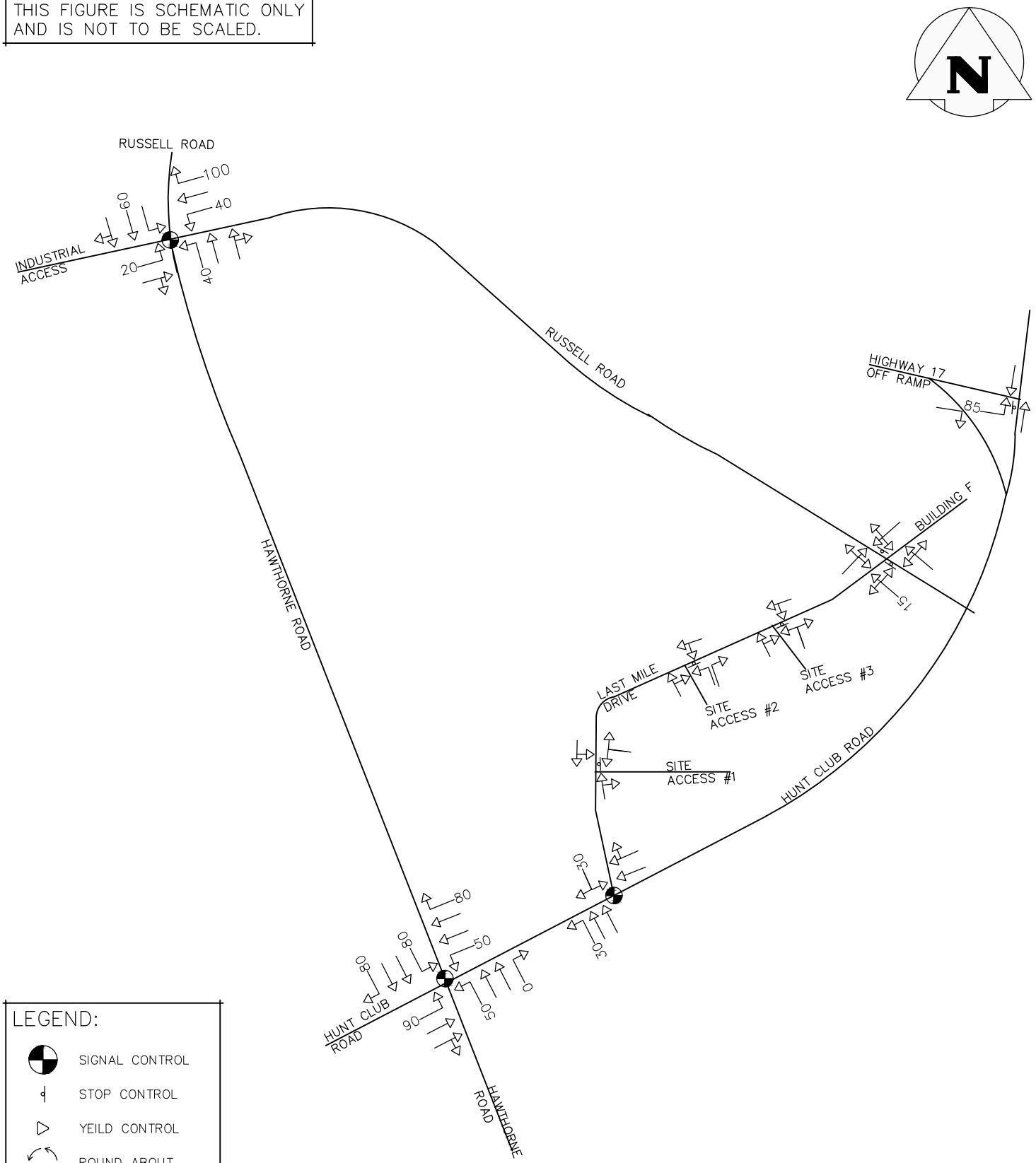
NATIONAL CAPITAL BUSINESS PARK (SITE 2). CITY OF OTTAWA

SITE LOCATION

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 600
TORONTO, ON M5B 1M4
416-477-3392 T
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
I.A.	I.A.	1909-5877-2	
Date	Check	Scale	Dwg.
2022/12/08	A.H.	N.T.S	FIG 1

NOTE:
THIS FIGURE IS SCHEMATIC ONLY AND IS NOT TO BE SCALED.



LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YEILD CONTROL
- ROUND ABOUT
- AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

NATIONAL CAPITAL BUSINESS PARK (SITE 2). CITY OF OTTAWA

BOUNDARY ROAD NETWORK

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2022/12/08	A.H	N.T.S	FIG 2

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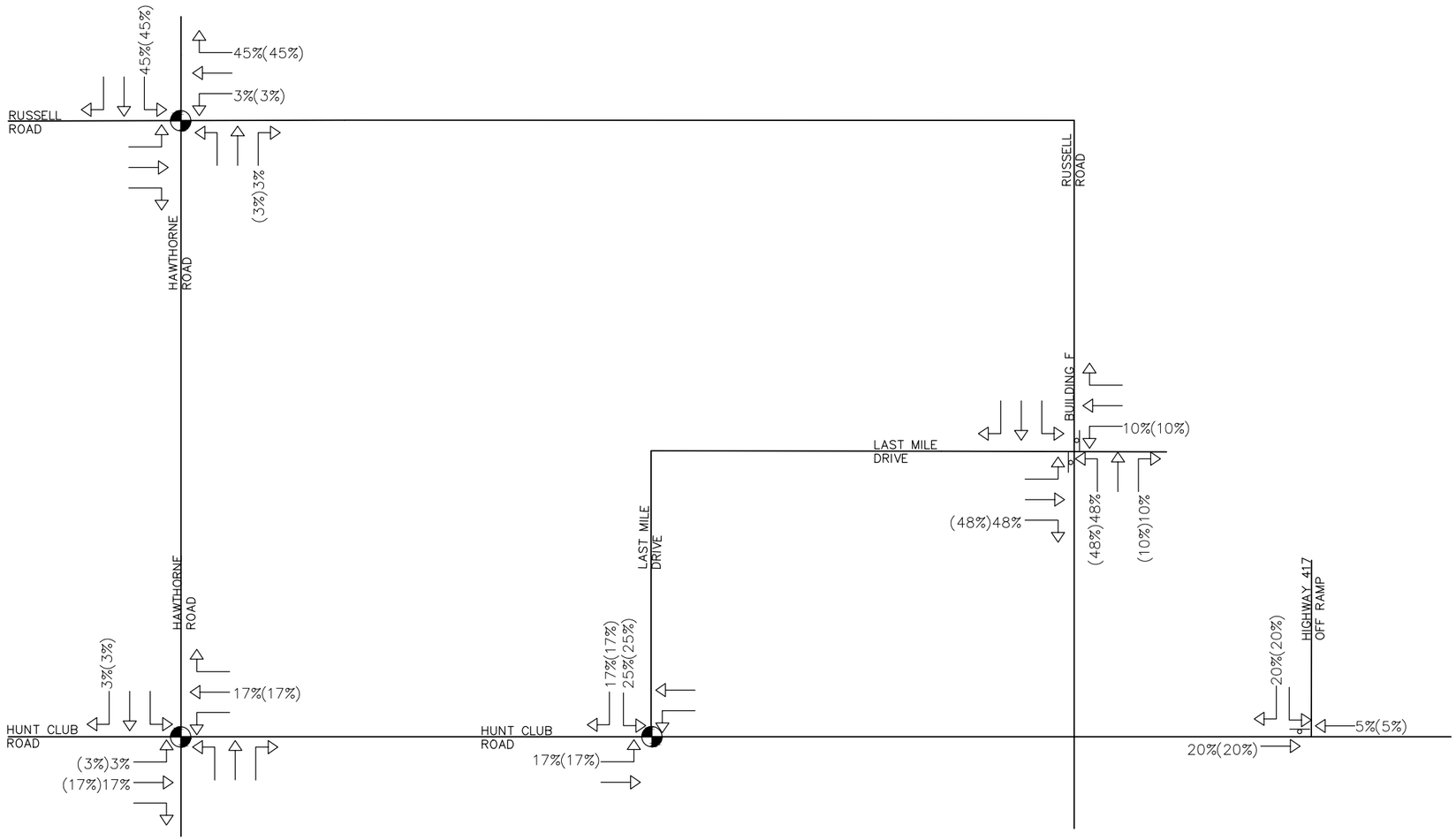

LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YEILD CONTROL
- ROUND ABOUT
- AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

NATIONAL CAPITAL BUSINESS PARK
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SITE TRIP DISTRIBUTION

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2022/12/08	A.H	N.T.S	FIG 3

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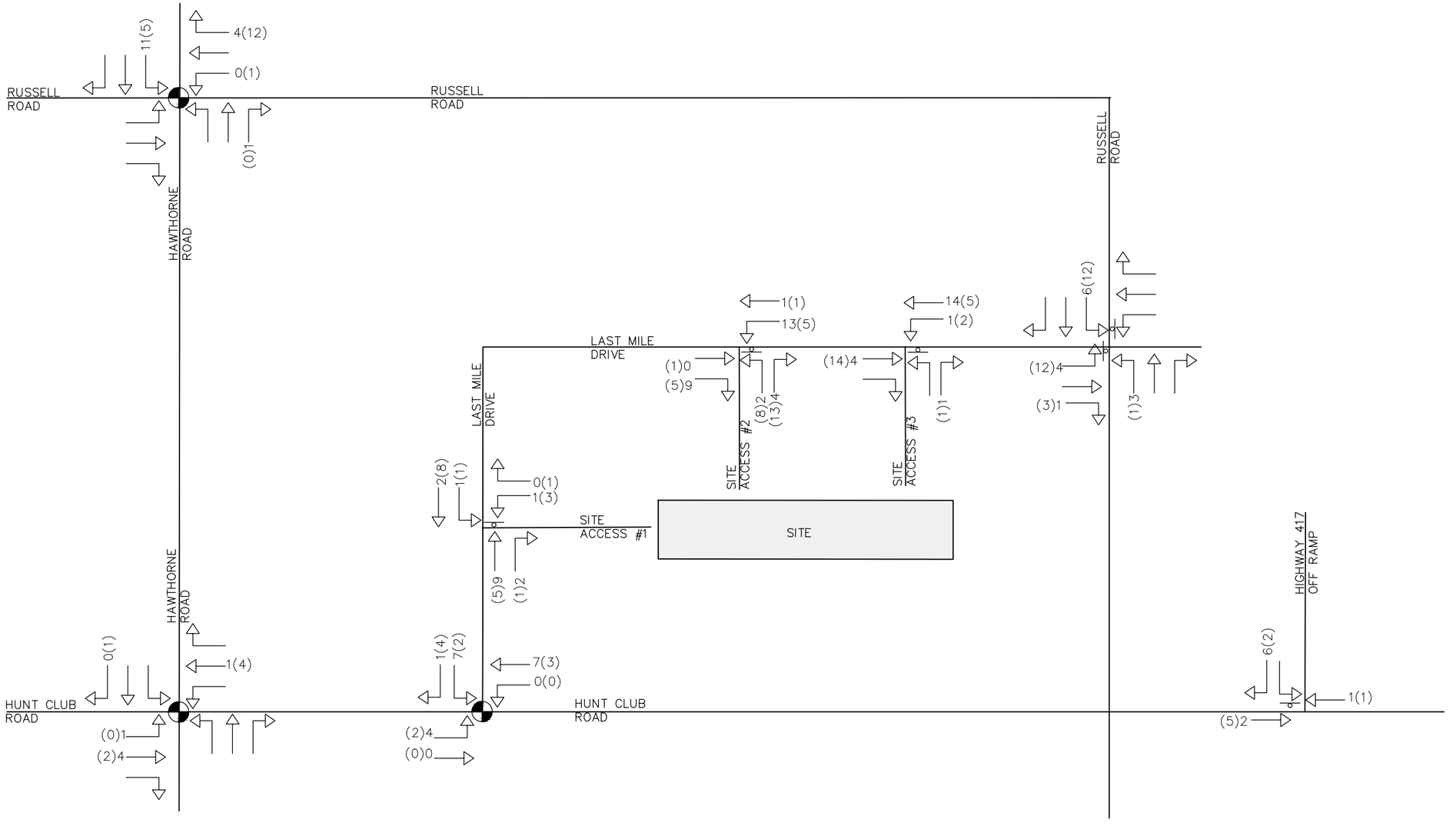

LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YEILD CONTROL
- ROUND ABOUT
- AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

NATIONAL CAPITAL BUSINESS PARK
(SITE 2). CITY OF OTTAWA

SITE TRIP ASSIGNMENT

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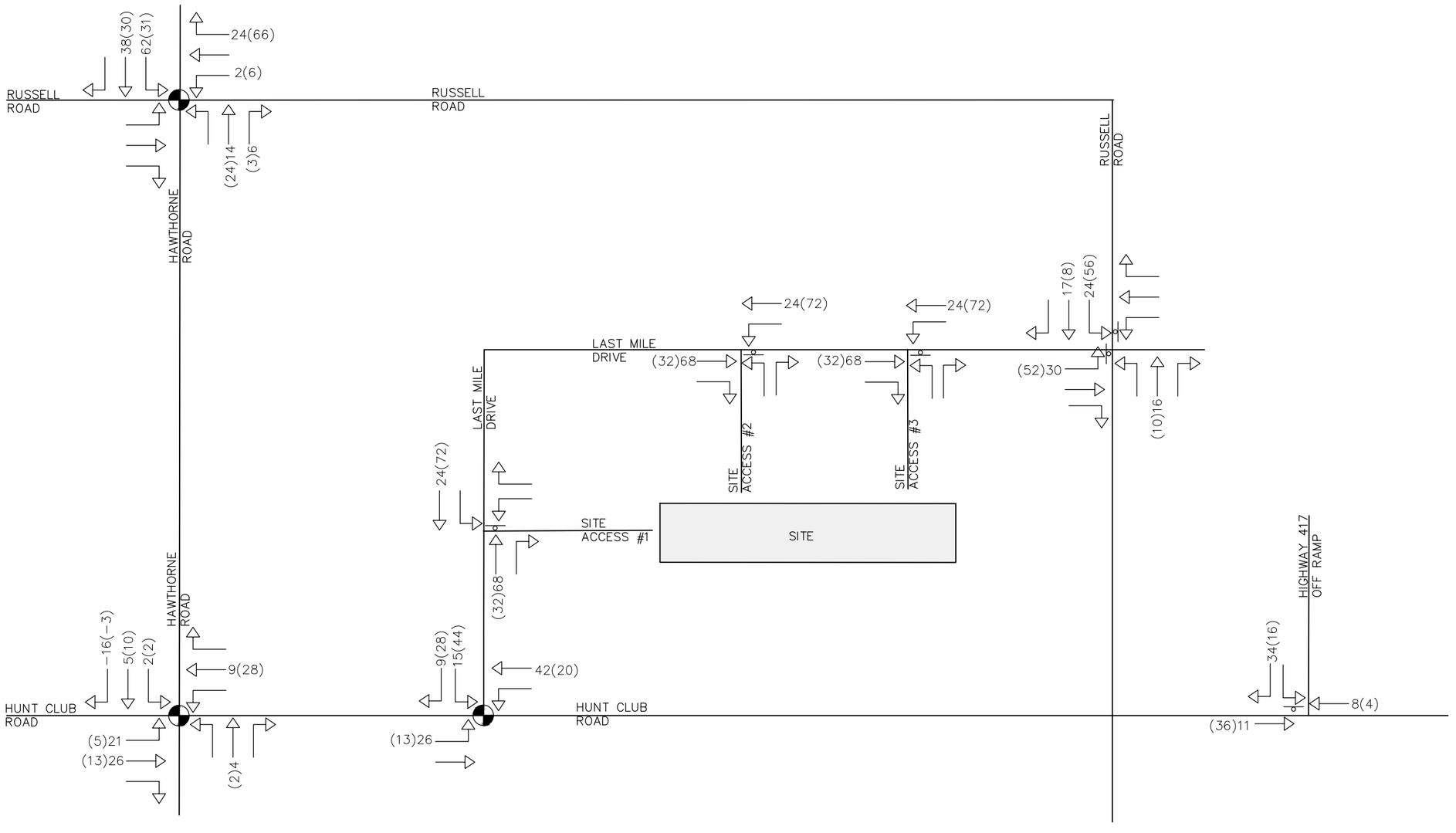

LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YEILD CONTROL
- ROUND ABOUT
- AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

NATIONAL CAPITAL BUSINESS PARK (SITE 2). CITY OF OTTAWA

BACKGROUND DEVELOPMENTS TRAFFIC VOLUMES

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Drawn	Design	Project No.	
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2022/12/08	A.H	N.T.S	FIG 5

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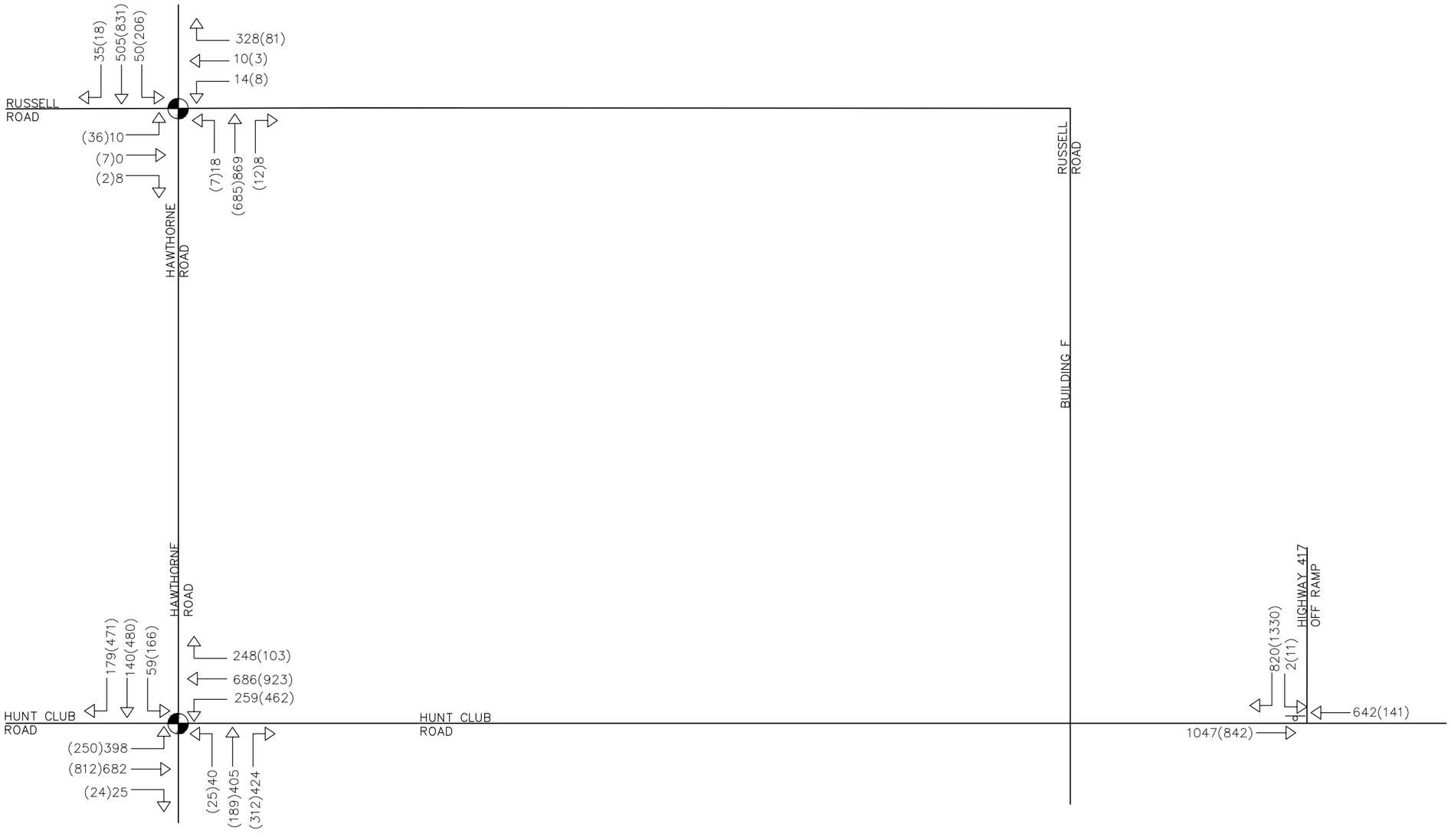

LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YEILD CONTROL
- ROUND ABOUT
- AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

NATIONAL CAPITAL BUSINESS PARK (SITE 2). CITY OF OTTAWA

2022 EXISTING TRAFFIC VOLUMES

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Drawn	Design	Project No.	
I.A	I.A	1909-5877-2	
Date	Check	Scale	Dwg.
2022/12/08	A.H	N.T.S	FIG 6

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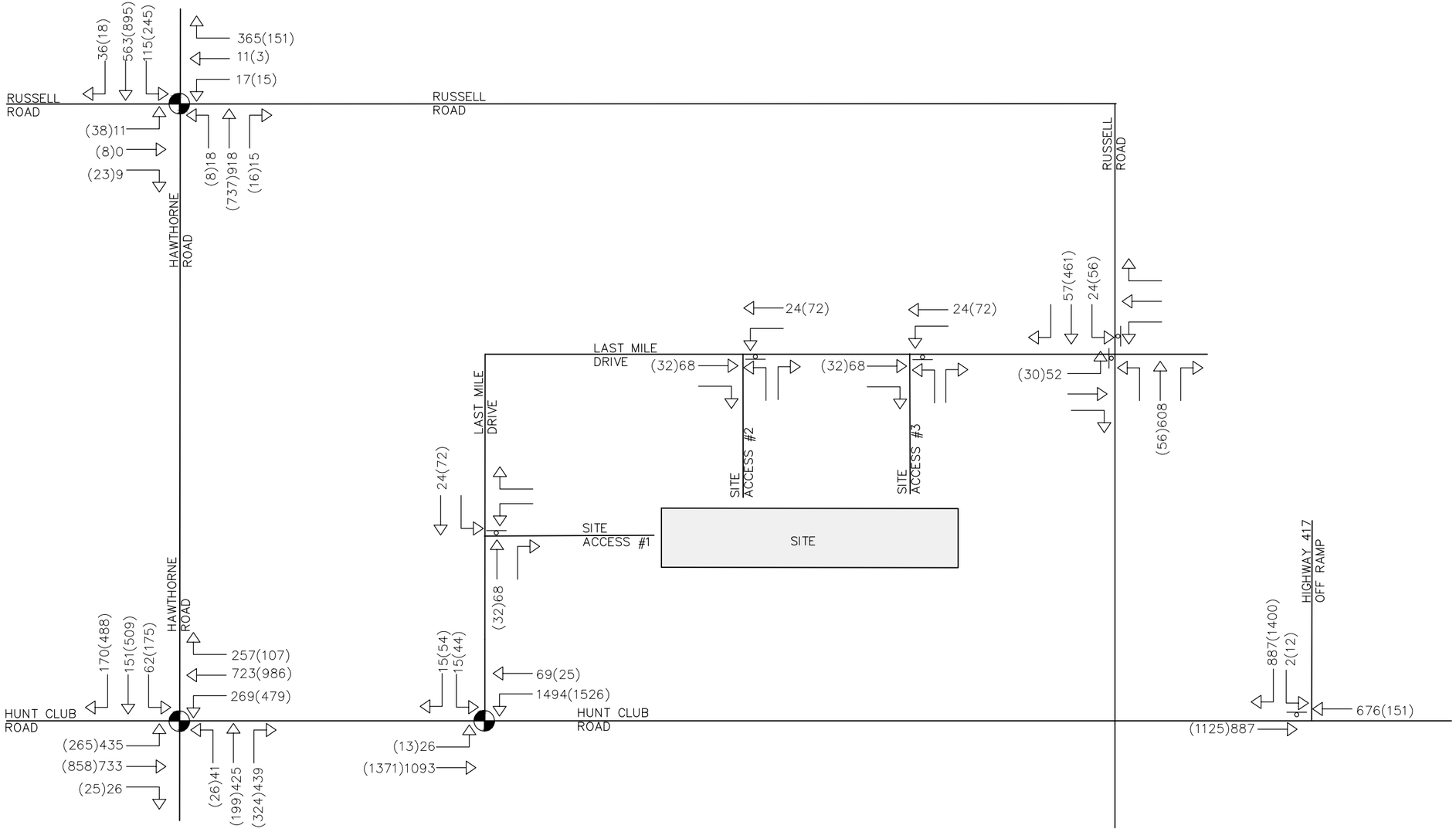

LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YEILD CONTROL
- ROUND ABOUT
- AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

NATIONAL CAPITAL BUSINESS PARK (SITE 2). CITY OF OTTAWA

2026 FUTURE BACKGROUND TRAFFIC VOLUMES

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211 YONGE STREET
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416-477-3392 T
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Drawn	Design	Project No.	
I.A	I.A	1909-5877-2	
Date	Check	Scale	Dwg.
2022/12/08	A.H	N.T.S	FIG 7

NOTE:
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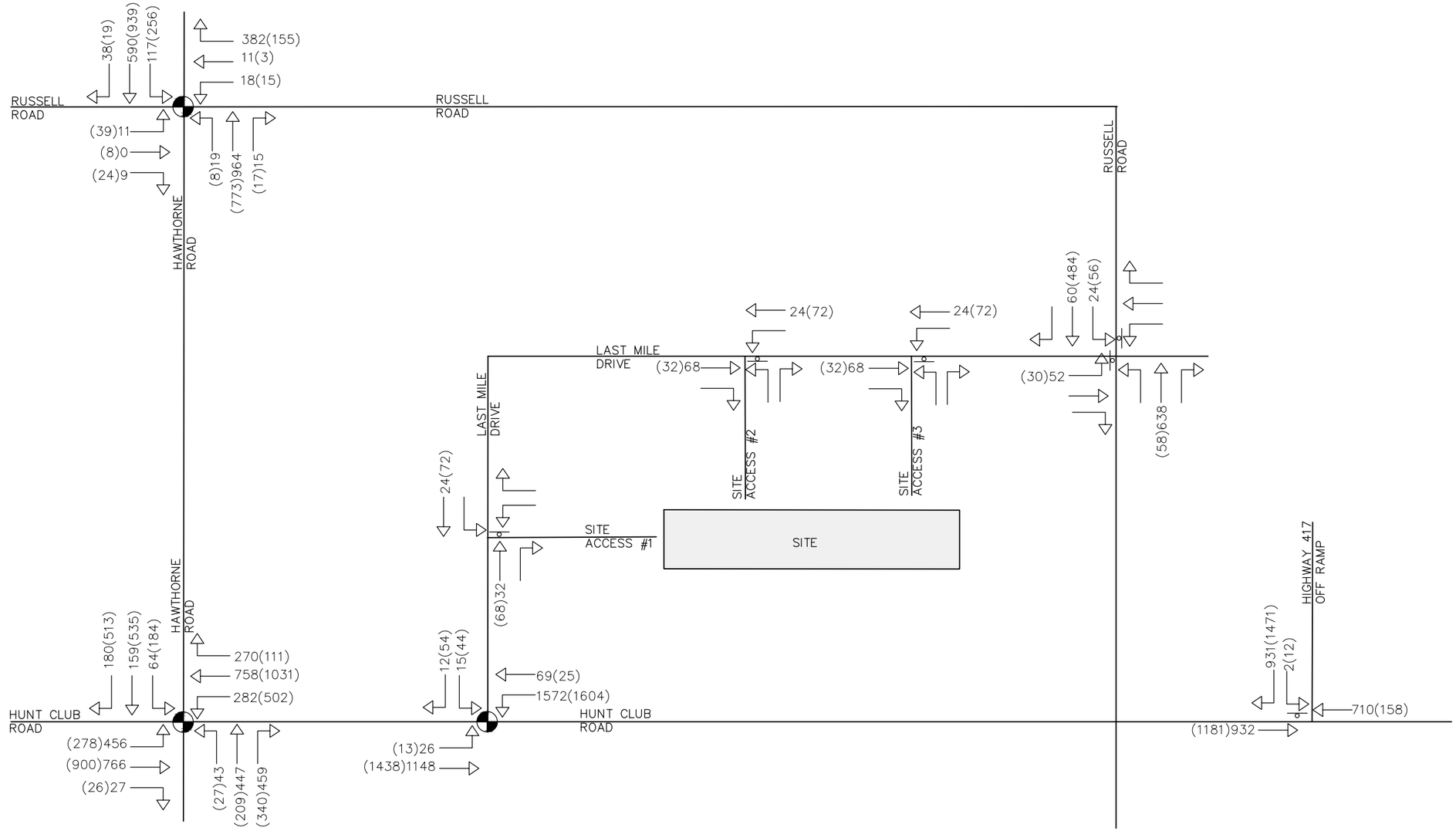


LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YEILD CONTROL
- ROUND ABOUT
- AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

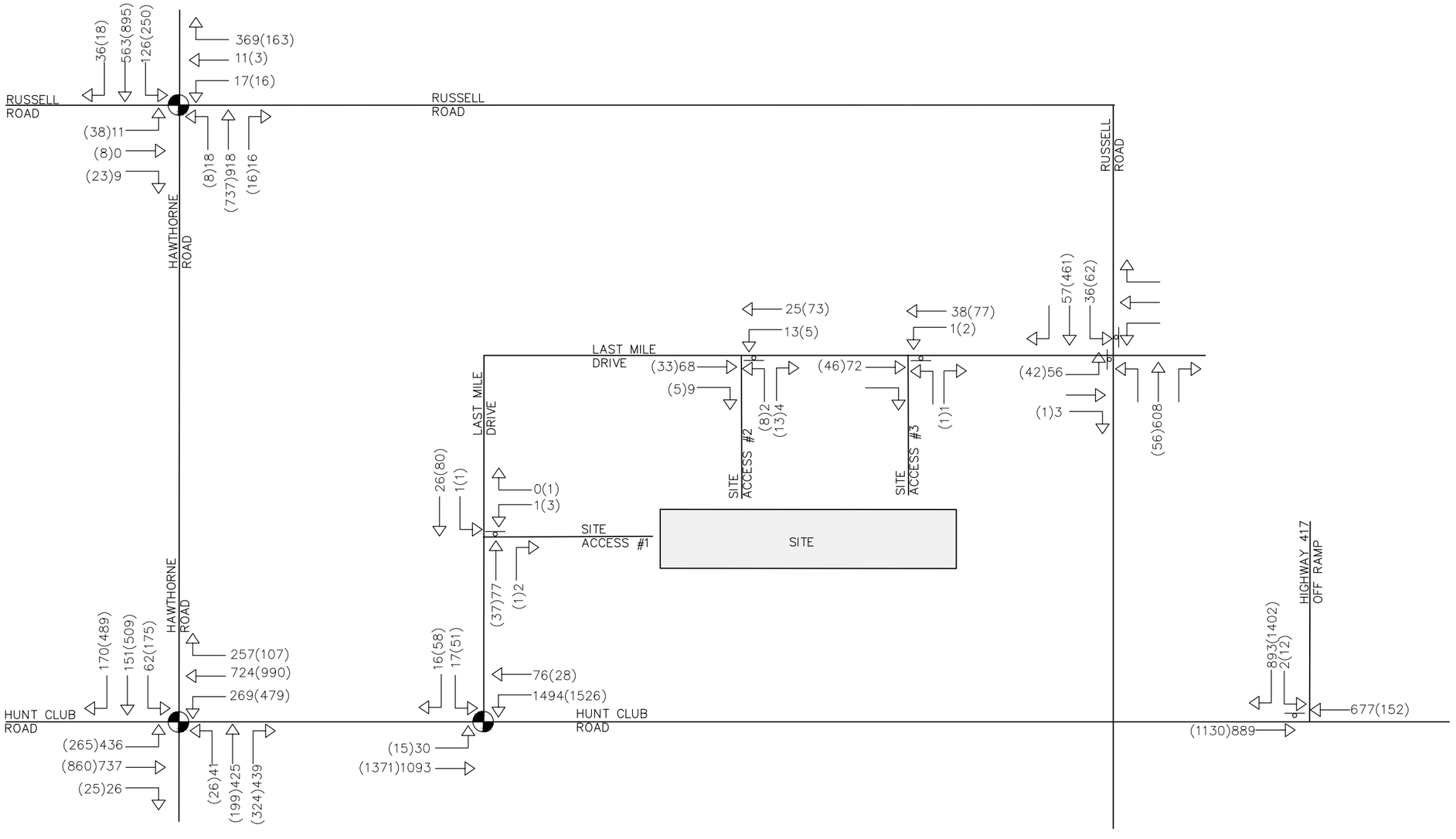
NATIONAL CAPITAL BUSINESS PARK (SITE 2). CITY OF OTTAWA

2031 FUTURE BACKGROUND TRAFFIC VOLUMES

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 600
TORONTO, ON M5B 1M4
416-477-3392 T
WWW.CFCROZIER.CA

Drawn	Design	Project No.
I.A	I.A	1909-5877-2
Date	Check	Scale	Dwg.
2022/12/08	A.H	N.T.S	FIG 8

NOTE:
THIS FIGURE IS SCHEMATIC ONLY AND IS NOT TO BE SCALED.



LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YEILD CONTROL
- ROUND ABOUT
- AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

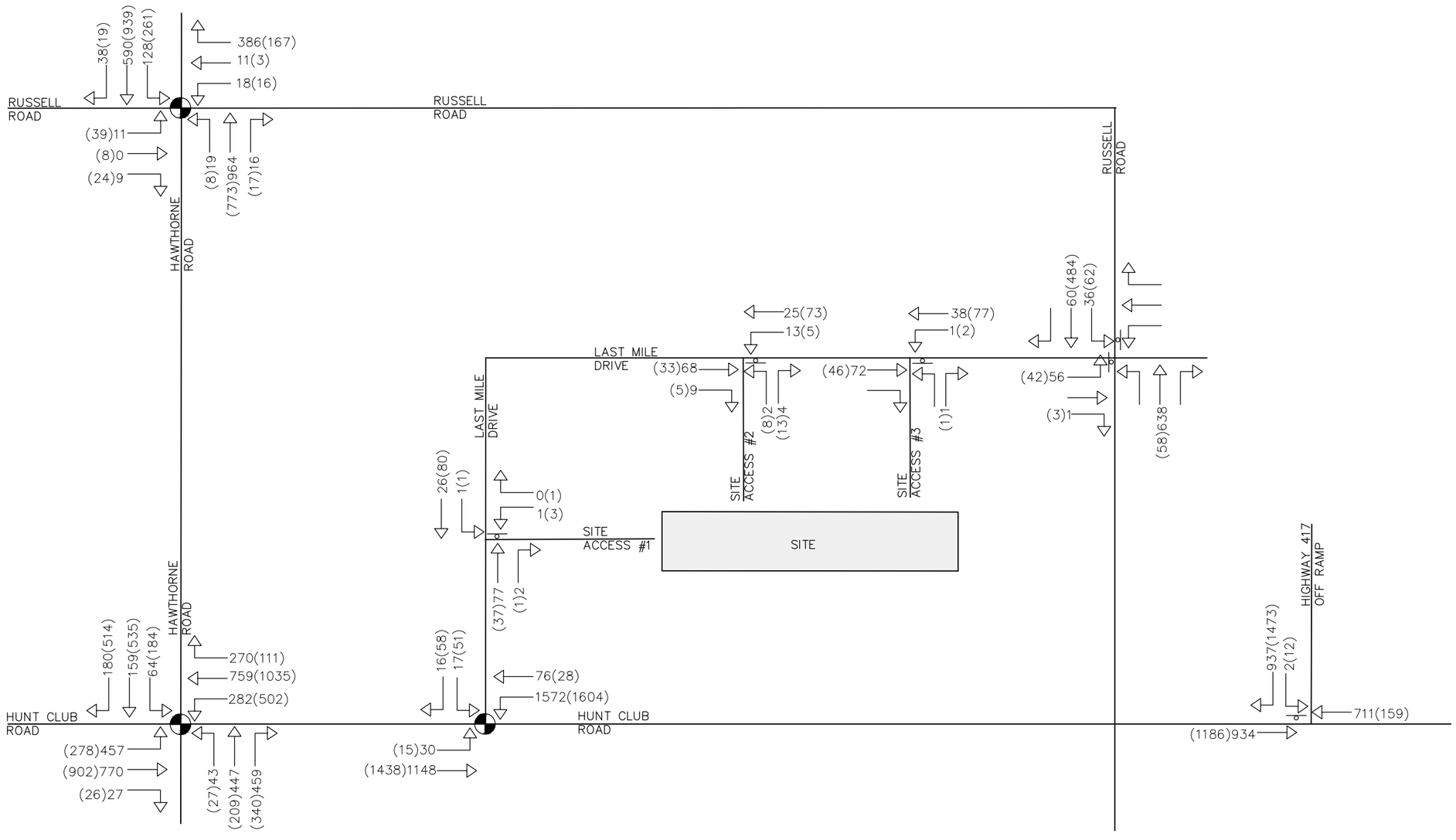
NATIONAL CAPITAL BUSINESS PARK (SITE 2). CITY OF OTTAWA

2026 FUTURE TOTAL TRAFFIC VOLUMES

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 600
TORONTO, ON M5B 1M4
416-477-3392 T
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
I.A	I.A	1909-5877-2	
Date	Check	Scale	Dwg.
2022/12/08	A.H	N.T.S	FIG 9

NOTE:
THIS FIGURE IS SCHEMATIC ONLY AND IS NOT TO BE SCALED.



LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YEILD CONTROL
- ROUND ABOUT
- AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

NATIONAL CAPITAL BUSINESS PARK (SITE 2). CITY OF OTTAWA

2031 FUTURE TOTAL TRAFFIC VOLUMES

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 600
TORONTO, ON M5B 1M4
416-477-3392 T
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
I.A	I.A	1909-5877-2	
Date	Check	Scale	Dwg.
2022/12/08	A.H	N.T.S	FIG 10

APPENDIX A

Correspondence

Aidan Hallsworth

From: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Sent: Tuesday, November 22, 2022 10:36 AM
To: Peter Apasnore
Subject: RE: NCBP Site 2

Hi Peter,

A TIA Memorandum for building D will suffice.

Thank you,

Wally Dubyk Transportation Project Manager
Transportation Review
Planning, Real Estate and Economic Development Department
Wally.Dubyk@ottawa.ca

From: Peter Apasnore <papasnore@cfcrozier.ca>
Sent: November 22, 2022 10:23 AM
To: Dubyk, Wally <Wally.Dubyk@ottawa.ca>
Cc: Jennifer Murray <jmurray@ave31.com>; Aidan Hallsworth <ahallsworth@cfcrozier.ca>
Subject: NCBP Site 2

We understand the comment highlighted below was provided by the City with regards to a TIA for the NCBP Site 2 (attached). Just so we understand the requested scope properly, are you looking for an updated TIA report similar to the one previously submitted for Site-3 (with all steps) or given the smaller scale of Site-2 relative to the entire NCBP, will a scoped TIS Memo with the following suffice?

- Focusing on only updated traffic forecast and analysis
- Assess only the proposed Last Mile Drive intersections with Hunt Club and Russell Road as well as the proposed 3 site accesses
- Complete exemptions review, as well as Design Review Component and Network Impact Components reviews

Transportation Engineering Services
An updated TIA specific to building D must be provided. This building-specific TIA was completed for "Site 1" or "Building C" (the building to the east) in August 2020. A similar site-specific TIA should be completed for Building D. It should include Chapter 4 Analysis, with applicable modules for the Design Review Component and Network Impact Component, where not already examined in sufficient specificity as part of Ref: R-2020-015 TIA.

Please review and advise.

Thank you,

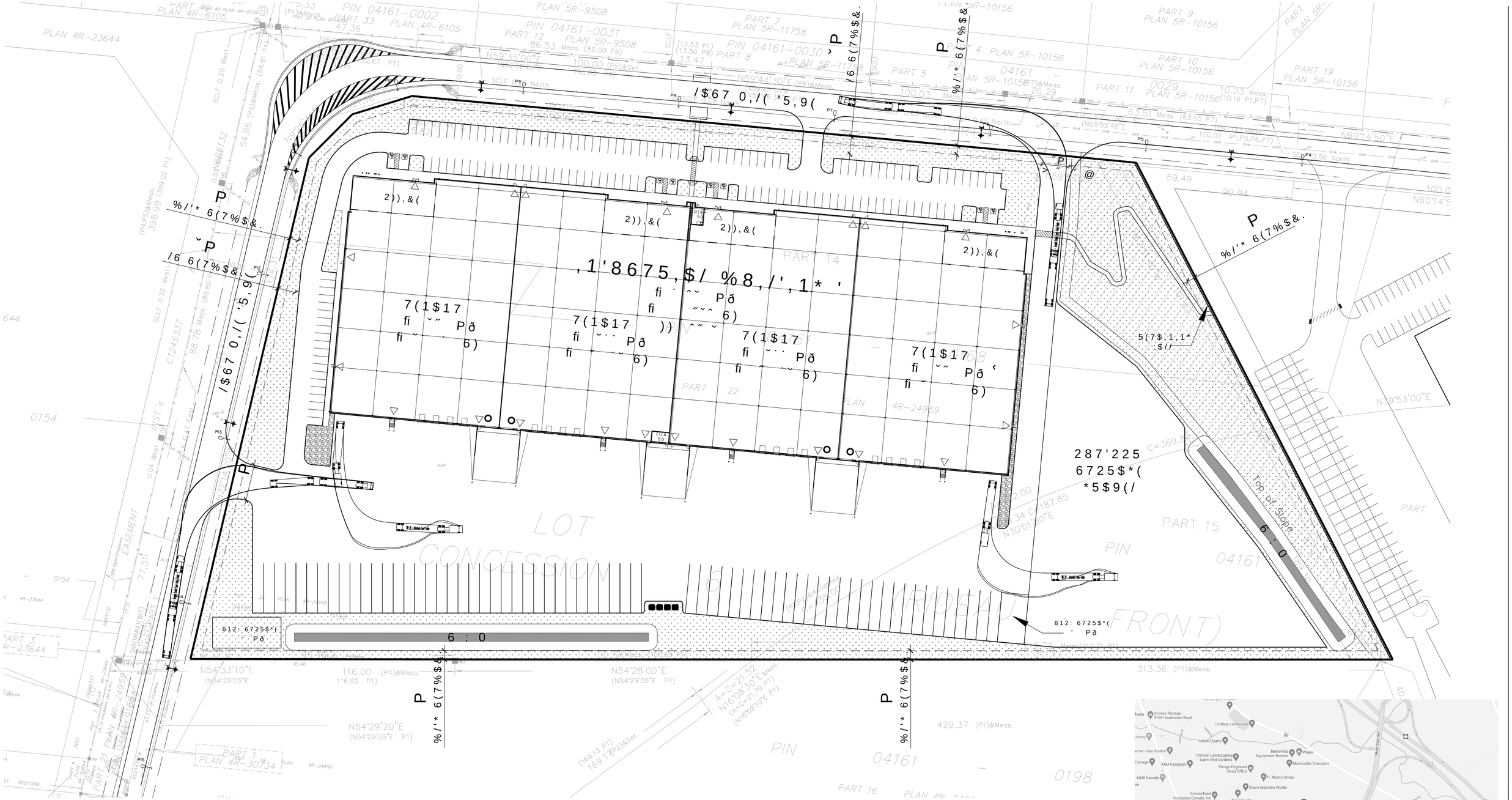
Peter Apasnore, M.A.Sc., P.Eng., PTOE | Project Engineer
211 Yonge Street, Suite 600 | Toronto, ON M5B 1M4
T: 416.477.3392

Crozier Connections:

Read our latest news and announcements here.

APPENDIX B

Site Plan



1:500

0 5m 10m 25m 50m

NORTH

scheme: 01E

Conceptual Site Plan - Enlarged First Level

1100 LAST MILE DR. - NCBP BUILDING D

Ottawa, ON, CAN

WARE MALCOMB

TOR21-0035-02

11.19.2022

SHEET

1

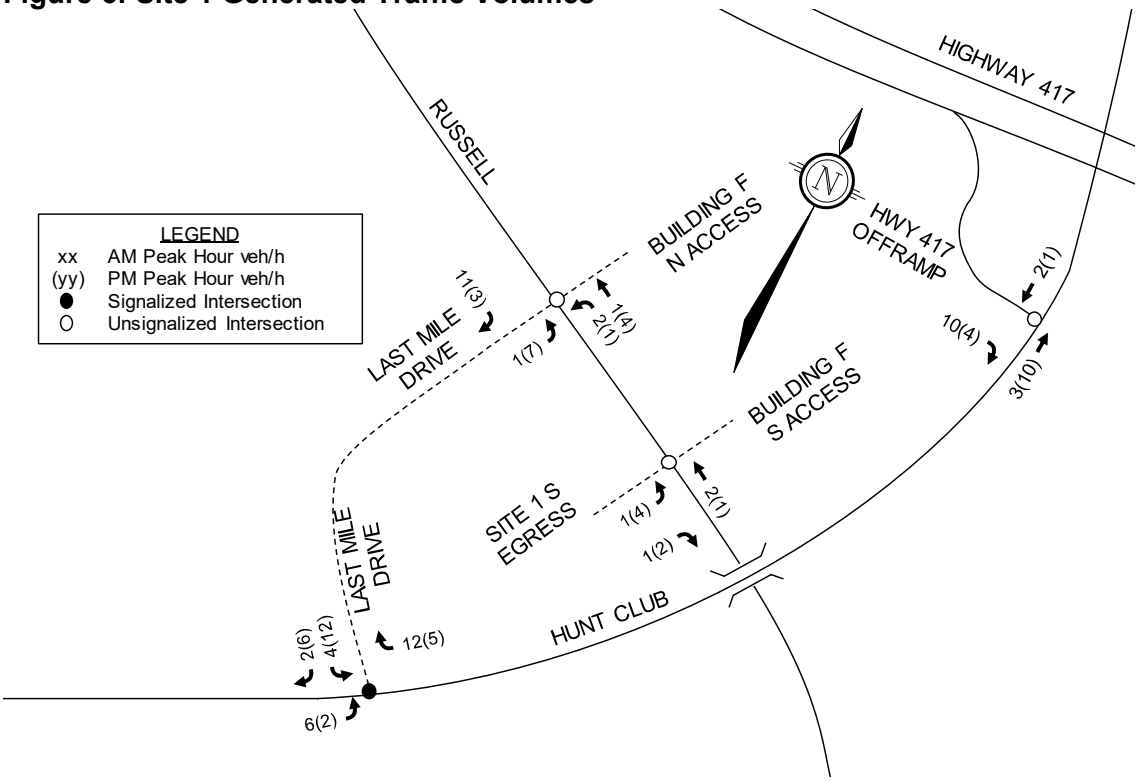
APPENDIX C

National Capital Business Park Background TIA – Reports Excerpts

APPENDIX C.1

National Capital Business Park Master TIA Excerpts

Figure 6: Site 1 Generated Traffic Volumes



5.2 Background Traffic

5.2.1 General Background Traffic Growth Rate

A rate of background growth has been established through a review of the City of Ottawa's 2013 TMP and Strategic Long-Range Model (comparing snapshots of 2011 and 2031 AM peak volumes). The snapshots (See **Appendix D**) suggest a growth rate of -0.5% to 1.5% per year on arterial roadways within the study area. For the 'Inner Suburbs' area of Ottawa, Exhibit 2.10 of the 2013 TMP projects population and employment growth rates of approximately 0.3% and 1.2% per year, respectively. To reflect the study area's development as an employment area, a 1% annual background growth rate has been applied to traffic along Russell Road, Hunt Club Road, and the Hwy 417 ramp. This growth rate is consistent with the recent Giant Tiger TIA approximately 1km to the north and the Master Concept TIA for this development.

5.2.2 Other Area Development

There are other developments planned within the area including:

- National Capital Business Park, Sites 2 and 3 (4055 and 4120 Russell Road) – Additional warehouse development is planned for this area. A TIA was prepared (Novatech, May 2020) for the Master Concept of the overall development. The TIA estimated that Site 2 would generate 43 and 44 two-way vehicle trips during the AM and PM peak hour, respectively, and that Site 3 would generate 694 and 687 two-way vehicle trips during the AM and PM peak hours, respectively.
- 3500 Hawthorne Road – A gas station with convenience store and a fast food restaurant with drive-through. A TIS was prepared (Stantec 2017) and estimated the site would generate 21

5.0 Forecasting

5.1 Development-Generated Traffic

5.1.1 Trip Generation

The proposed development is planned to be completed with three subareas consisting of:

Site 1- one warehouse with 8,325m^2 (89,610ft^2);
Site 2- two warehouses with 17,400m^2 (187,300ft^2); and,
Site 3- three warehouses with 75,685m^2 (814,700ft^2).

Trips generated by the proposed site development were estimated using *Trip Generation*, *10th Edition* (Institute of Transportation Engineers, Washington, 2017). Person trips were estimated (See **Table 3**) using an ITE Trip to Person Trip conversion factor of 1.28, consistent with the City of Ottawa TIA Guidelines.

Table 3: Person Trip Generation

Land Use[1]	Units[2]	Person Trips Generated[3]					
		AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Site 1							
Warehouse (ITE 150)	89.6	35	11	46	13	36	49
Site 2							
Warehouse (ITE 150)	187.3	47	14	61	17	47	64
Site 3							
Warehouse (ITE 150)	120.2	39	12	51	15	39	54
High-Cube Parcel Hub Warehouse (ITE 156)	694.5	470	469	939	631	297	928
Total Development Trip Generation Sites 1-3		591	506	1097	676	419	1095

Notes:
1. Trip Generation for the associated Land Use from *Trip Generation 10th Edition* (Institute of Transportation Engineers, Washington, 2017). Trips have been increased by 28% to account for 10% non-auto mode share and average vehicle occupancy of 1.15.
2. Units are 1,000 ft^2 of GFA.
3. Person trips per hour for peak hours.

The modal shares for the proposed development are anticipated to be generally consistent with the existing modal shares (See **Table 4**) outlined in the *2011 TRANS O-D Survey Report*, specific to the Hunt Club region which indicate the modal share values for the trips to/from and within the Hunt Club district. An increase to the auto driver share has been applied based on the location of the subject site, as the site is somewhat removed from significant residential development with minimal active transportation connections and transit service. The projected person trips by modal share for this full development are shown in **Table 4**.

Table 4: Person Trips by Modal Share

Travel Mode	Existing Modal Share	Target Modal Share	AM Peak			PM Peak		
			IN	OUT	TOT	IN	OUT	TOT
Site 1								
Person Trips			*35*	*11*	*46*	*13*	*36*	*49*
Auto Driver	60%	**70%**	**24**	**7**	**31**	**9**	**25**	**34**
Auto Passenger	15%	**15%**	5	2	7	2	5	7
Transit	15%	**10%**	4	1	5	1	4	5
Active Trips	10%	**5%**	2	1	3	1	2	3
Site 2								
Person Trips			*47*	*14*	*61*	*17*	*47*	*64*
Auto Driver	60%	**70%**	**33**	**10**	**43**	**11**	**33**	**44**
Auto Passenger	15%	**15%**	7	2	9	3	7	10
Transit	15%	**10%**	5	1	6	2	5	7
Active Trips	10%	**5%**	2	1	3	1	2	3
Site 3								
Person Trips			*509*	*481*	*990*	*646*	*336*	*982*
Auto Driver	60%	**70%**	**357**	**337**	**694**	**452**	**235**	**687**
Auto Passenger	15%	**15%**	76	72	148	97	50	147
Transit	15%	**10%**	51	48	99	65	34	99
Active Trips	10%	**5%**	25	24	49	32	17	49
Total Development								
Person Trips			*591*	*506*	*1097*	*676*	*419*	*1095*
Auto Driver	60%	**70%**	**414**	**354**	**768**	**472**	**293**	**765**
Auto Passenger	15%	**15%**	88	76	164	102	62	164
Transit	15%	**10%**	60	50	110	68	43	111
Active Trips	10%	**5%**	29	26	55	34	21	55

Full Buildout of the proposed development is estimated to generate 768 two-way vehicle trips during the AM peak hour and 765 two-way vehicle trips during the PM peak hour.

5.1.2 Trip Distribution / Assignment

The overall distribution of trips generated by the development has been estimated (see below) based on the observed volumes along the study area roadways as well as a review of the existing settlement patterns.

- 10% to/from the north via Russell Road (Alta Vista)
- 10% to/from the south / east (Russell Road south, Hwy 417 E)
- 5% to/from the south (East Barrhaven and Airport via Ramsayville Road)
- 40% to/from the north/west (Hwy 417 W)
- 15% to/from the west via Walkley Road (Alta Vista, Baseline Road)
- 20% to/from the west via Hunt Club (Nepean)

Trips have been assigned based on the assumptions presented in **Table 5**.

Table 5: Trip Assignment Assumptions

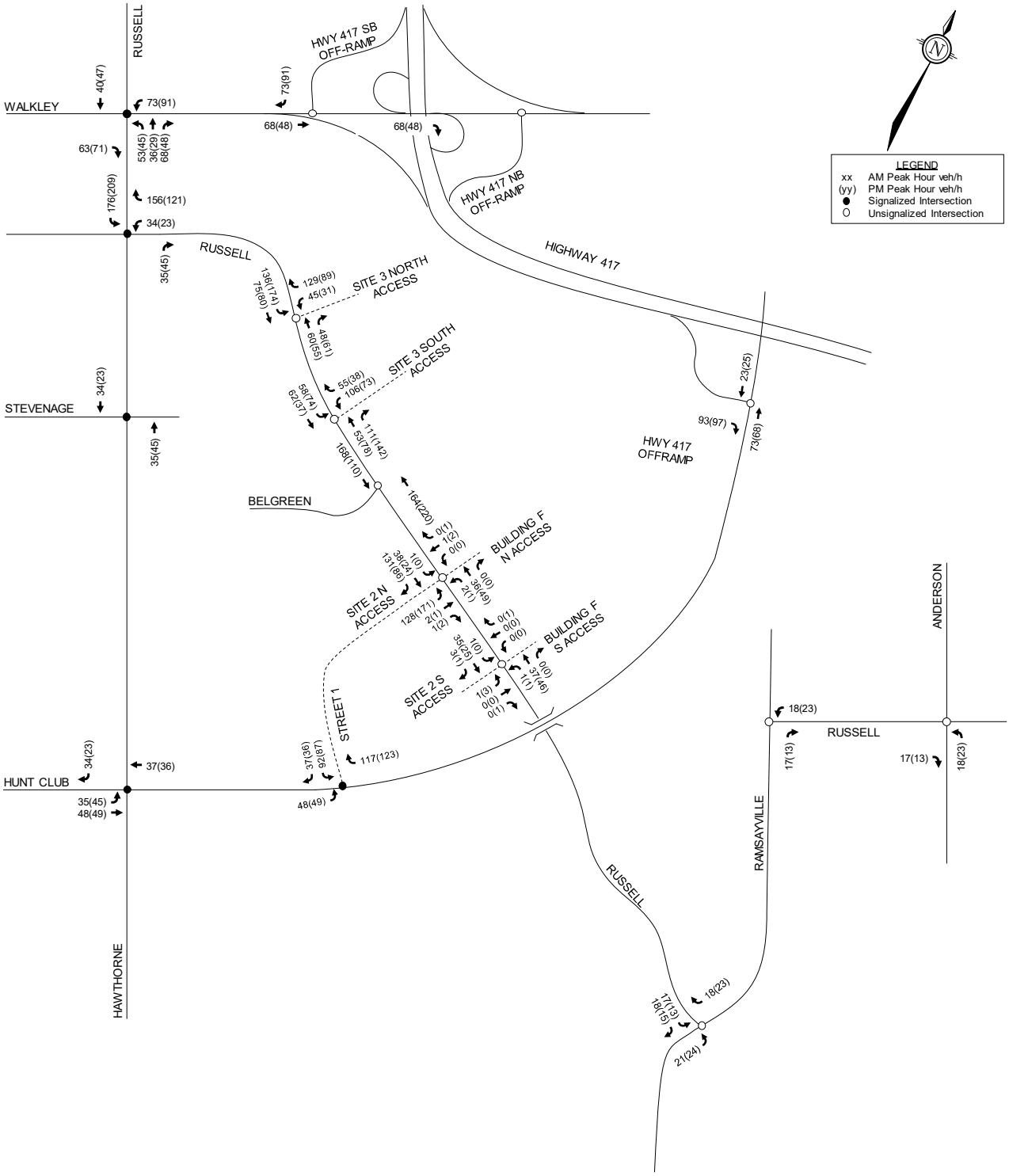
	Buildings A & B	Buildings D & E	Buildings C & F
Trip Breakdown	The parcel hub (Building A) accounts for ~95% of all the Site 3 trips	These buildings account for all the Site 2 trips	Building F is ~1% of all Site 3 trips Building C is all the Site 1 trips
Hwy 417[1,2]	50% of trips will use the Hunt Club interchange and the Street 1 connection to Hunt Club	100% of trips will use the Hunt Club interchange and the Street 1 connection to Hunt Club	80% of trips will use the Hunt Club interchange and the Street 1 connection to Hunt Club
Hunt Club W	50% of trips will use the Street 1 connection to Hunt Club, remainder will use Hawthorne to Russell	100% of trips will use the Street 1 connection to Hunt Club	100% of trips will use the Street 1 connection to Hunt Club
To / from north on Russell	70% of trips will use the north driveway	100% of trips will use the north driveway	60% of trips will use the north driveway
To / from south on Russell	30% of trips will use the north driveway	100% of trips will use the north driveway	20% of trips will use the north driveway

Notes: 1. All Highway 417 trips from and to the west not assigned to the Hunt Club Street 1 connection were assigned to the Walkley Road interchange.

Notes: 2. All Highway 417 trips from and to the east not assigned to the Hunt Club Street 1 connection were assigned to the Anderson Road interchange.

Site generated traffic volumes for the three sub area sites have been assigned to the study area intersections and are shown in **Figure 5**.

Figure 5: Site Generated Traffic Volumes



5.2 Background Traffic

5.2.1 General Background Traffic Growth Rate

A rate of background growth has been established through a review of the City of Ottawa's 2013 TMP and Strategic Long Range Model (comparing snapshots of 2011 and 2031 AM peak volumes). The snapshots (See **Appendix D**) suggest a growth rate of -0.5% to 1.5% per year on arterial roadways within the study area. For the 'Inner Suburbs' area of Ottawa, Exhibit 2.10 of the 2013 TMP projects population and employment growth rates of approximately 0.3% and 1.2% per year, respectively. To reflect the study area's development as an employment area, a 1% annual background growth rate has been applied to traffic along Walkley Road, Russell Road, Hunt Club Road, Hawthorne Road, the Hwy 417 ramps, and Ramsayville Road between Russell Road North and Russell Road South. A 0% growth rate has been applied to all other roadways within the study area. This growth rate is consistent with the recent Giant Tiger TIA approximately 1km to the north.

5.2.2 Other Area Development

There are other developments planned within the area including:

- 3500 Hawthorne Road – A gas station with convenience store and a fast food restaurant with drive-through. A TIS was prepared (Stantec 2017) and estimated the site would generate 21 and 24 net new two-way auto trips during the AM and PM peak hours, respectively. The TIS recommended modifying the southbound right turn channel to create a 'Smart' channel. The City has accepted this study and registered an agreement for the development.
- 2510 Walkley Road – A retail showroom (929m^2) and warehouse (2,323m^2). A TIA was prepared (Parsons 2018) and estimates the site will generate 15 and 30 two-way vehicle trips during the AM and PM peak hours, respectively.
- 2390 Stevenage Drive – An additional approximately 13,000m^2 of industrial use added to the approximately 10,000m^2. A TIA was prepared (Parsons 2018) and estimated the site would generate 55 and 58 new two-way auto trips during the AM and PM peak hours, respectively.
- 2480 Walkley Road – Reconfiguration of the existing Giant Tiger site to become the headquarters. A TIA was prepared (Novatech 2019) and estimated the site would generate 69 and 56 new two-way auto trips during the AM and PM peak hours, respectively.

The traffic volumes projected by the buildout of each of these developments from their associated traffic studies are shown in **Figure 6** with relevant excerpts of the traffic studies included in **Appendix F**. Each background development is anticipated to be complete by 2023.

5.2.3 Demand Rationalization

In existing conditions, some movements at the study area intersections operate outside of City Guidelines in the weekday AM and PM peak hours. Existing intersection performance is part of the Intersection MMLOS review included in **Appendix G**. Future intersection performance of the study area is included in **Section 6.6**.

5.2.4 Future Background and Total Traffic Volume Projections

Future Background Traffic Volumes have been projected for the 2023, 2028, and 2033 (See **Figures 7, 8, and 9**, respectively) and include the annual background growth and background development trips. Total Traffic Volumes have been projected for the Study Area intersections for the weekday

APPENDIX C.2

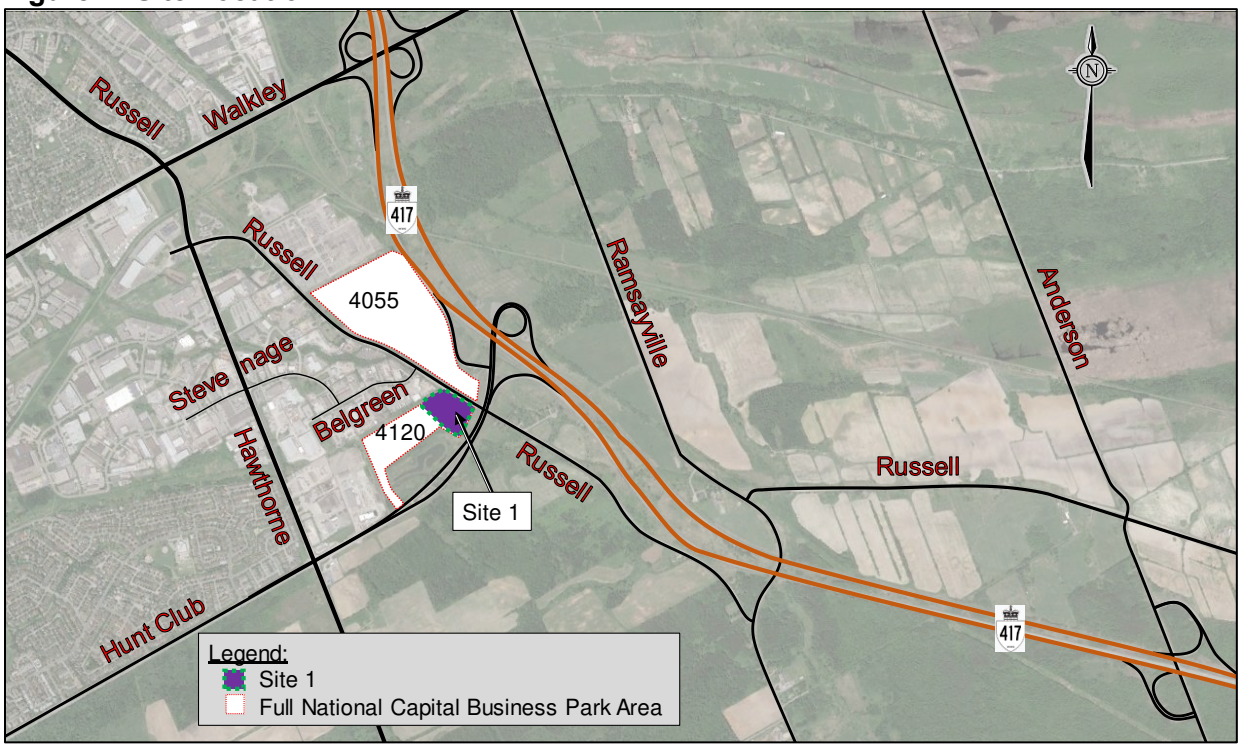
National Capital Business Park Site 1 TIA Excerpts

1.0 SITE LOCATION

This Transportation Impact Assessment (TIA) Report has been prepared in support of a Site Plan Application for Building 'C' at Site 1 of the National Capital Business Park. Site 1 is a portion of Civic #4120 Russell Road located west of the Hunt Club / Hwy 417 interchange (See **Figure 1**). Site 1 is currently vacant.

The general area is characterized by a combination of various commercial and industrial land uses, including an existing hydro substation immediately north of 4055 Russell Road and a newly constructed Hydro Ottawa office just to the west of 4120 Russell Road.

Figure 1: Site Location



2.0 PROPOSED DEVELOPMENT

The subject site is designated as 'Urban Employment Area' on Schedule 'B' of the City of Ottawa's Official Plan and zoned IH (Heavy Industrial). Site 1 (See **Appendix A**) is planned to be completed by 2023 and includes one warehouse with 13,538m^2 (145,717ft^2). Site 1 includes 128 vehicular spaces, 8 accessible spaces, 24 bicycle parking spaces, 54 loading spaces, and 26 trailer parking spaces.

A TIA was prepared (Novatech, May 2020) for the Master Concept of warehouse development on the full Business park area (**Figure 1**).

A new public road (Last Mile Drive) is proposed between Hunt Club Road and Russell Road. While Last Mile Drive is expected to be constructed concurrent with Site 1, it is not required for Site 1 and not tied to site plan approval. As discussed with City staff, an RMA is being filed under separate cover with the right-of-way conveyed through a road opening. The functional design is included in

5.0 Forecasting

5.1 Development-Generated Traffic

5.1.1 Trip Generation

The proposed development is planned to be one warehouse with 13,538m^2 (145,717ft^2). Trips generated by the proposed site development were estimated using *Trip Generation*, *10th Edition* (Institute of Transportation Engineers, Washington, 2017). Person trips were estimated (See **Table 3**) using an ITE Trip to Person Trip conversion factor of 1.28, consistent with the City of Ottawa TIA Guidelines.

Table 3: Person Trip Generation

Land Use[1]	Units[2]	Person Trips Generated[3]					
		AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Site 1							
Warehouse (ITE 150)	145.7	42	13	55	16	42	58

Notes:
1. Trip Generation for the associated Land Use from *Trip Generation 10th Edition* (Institute of Transportation Engineers, Washington, 2017). Trips have been increased by 28% to account for 10% non-auto mode share and average vehicle occupancy of 1.15.
2. Units are 1,000 ft^2 of GFA.
3. Person trips per hour for peak hours.

The modal shares for the proposed development are anticipated to be generally consistent with the existing modal shares (See **Table 4**) outlined in the *2011 TRANS O-D Survey Report*, specific to the Hunt Club region which indicate the modal share values for the trips to/from and within the Hunt Club district. An increase to the auto driver share has been applied based on the location of the subject site, as the site is somewhat removed from significant residential development with minimal active transportation connections and transit service. Since there is no transit service outbound in the AM peak and inbound in the PM peak, no transit trips were assumed for those directions. The projected person trips by modal share are shown in **Table 4**.

Table 4: Person Trips by Modal Share

Travel Mode	Existing Modal Share	Target Modal Share	AM Peak			PM Peak		
			IN	OUT	TOT	IN	OUT	TOT
		Person Trips	*42*	*13*	*55*	*16*	*42*	*58*
Auto Driver	60%	70%	**30**	**10**	**40**	**13**	**30**	**43**
Auto Passenger	15%	15%	6	2	8	2	6	8
Transit	15%	10%	4	0	4	0	4	4
Active	10%	5%	2	1	3	1	2	3

Site 1 is estimated to generate 40 two-way vehicle trips during the AM peak hour and 43 two-way vehicle trips during the PM peak hour.

5.1.2 Trip Distribution / Assignment

The overall distribution of trips generated by the development has been estimated (see below) based on the observed volumes along the study area roadways as well as a review of the existing settlement patterns.

- 10% to/from the north via Russell Road (Alta Vista)
- 10% to/from the south / east (Russell Road south, Hwy 417 E)
- 5% to/from the south (East Barrhaven and Airport via Ramsayville Road)
- 40% to/from the north/west (Hwy 417 W)
- 15% to/from the west via Walkley Road (Alta Vista, Baseline Road)
- 20% to/from the west via Hunt Club (Nepean)

Accesses to Last Mile Drive and Russell Road are all full movement.

Trips have been assigned based on the assumptions presented in **Table 5**.

Table 5: Trip Assignment Assumptions

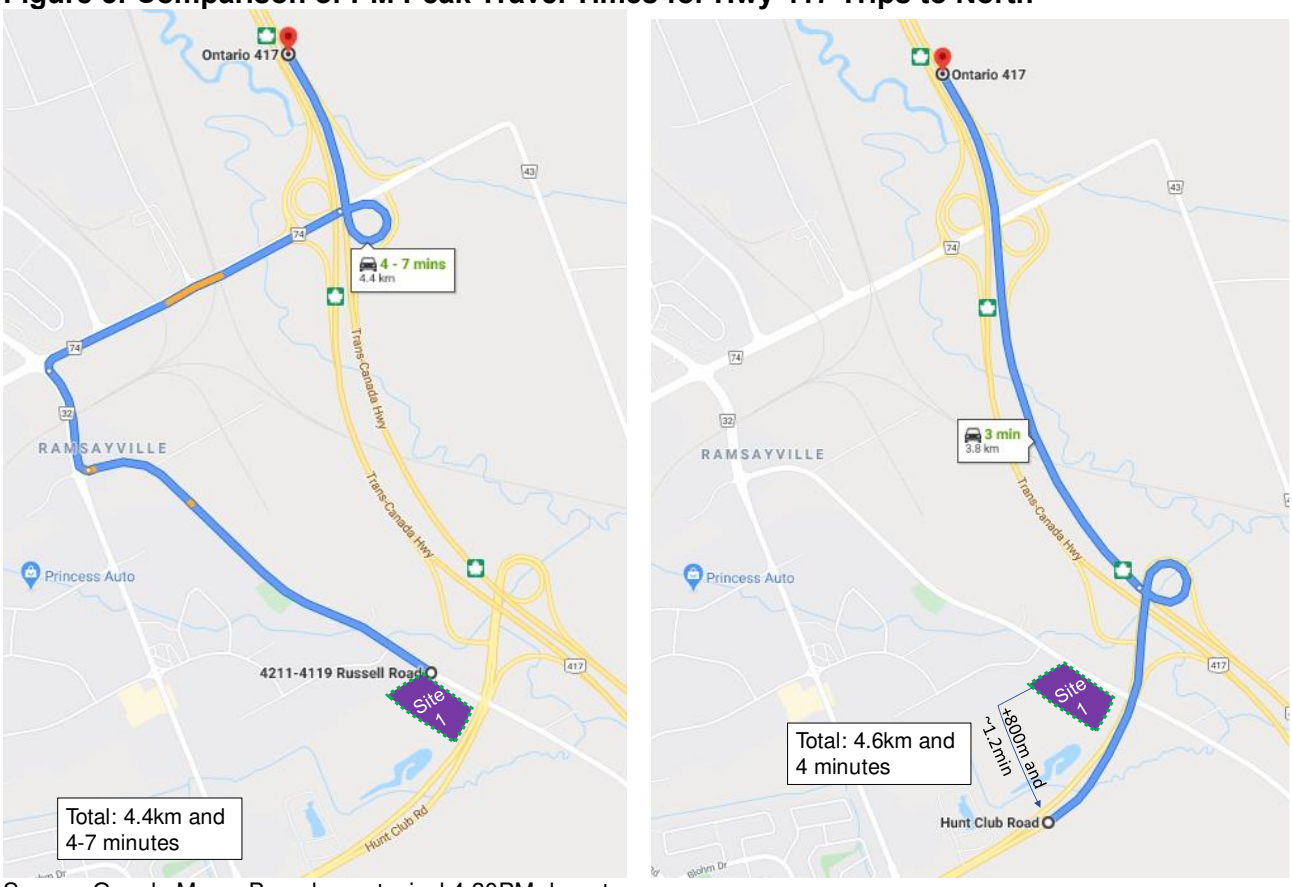
	Site 1
Hwy 417[1,2]	80% of trips will use the Hunt Club interchange and the Last Mile Drive connection to Hunt Club
Hunt Club W	100% of trips will use the Last Mile Drive connection to Hunt Club
To / from north on Russell	60% of trips will enter from Last Mile Drive 60% of trips out will use Last Mile Drive
To / from south on Russell	20% of trips will enter from Last Mile Drive 20% of trips out will use Last Mile Drive

Notes: 1. All Highway 417 trips from and to the west not assigned to the Hunt Club / Last Mile Drive connection are assumed to use the Walkley Road interchange.

Notes: 2. All Highway 417 trips from and to the east not assigned to the Hunt Club / Last Mile Drive connection are assumed to use the Anderson Road interchange.

While the total distance traveled by vehicles coming from the north on Hwy 417 who use the Hunt Club Road/Last Mile Drive route may be slightly further than those who use the Walkley connection, the total travel time during peak periods is expected to be the same or less for trips via Hunt Club Road. **Figure 5** compares the PM peak period travel times for a trip from Site 1 via Walkley Road and via Hunt Club Road. A peak period trip from Site 1 may decrease from about 7 minutes (via Walkley) to about 4 minutes (via Hunt Club) under existing congestion.

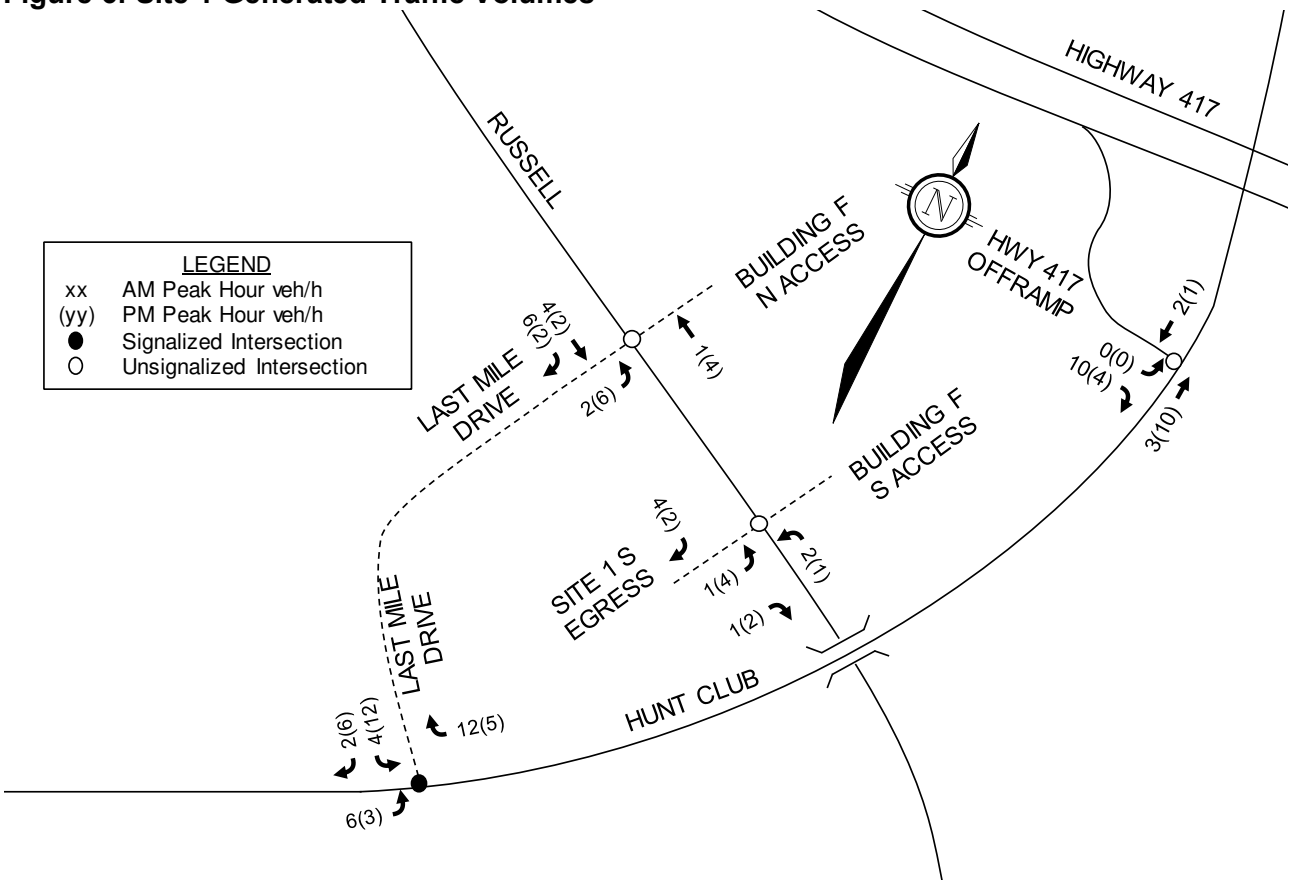
Figure 5: Comparison of PM Peak Travel Times for Hwy 417 Trips to North



Source: Google Maps, Based on a typical 4:30PM departure

Site generated traffic volumes have been assigned to the study area intersections and are shown in **Figure 6**.

Figure 6: Site 1 Generated Traffic Volumes



5.2 Background Traffic

5.2.1 General Background Traffic Growth Rate

A rate of background growth has been established through a review of the City of Ottawa's 2013 TMP and Strategic Long-Range Model (comparing snapshots of 2011 and 2031 AM peak volumes). The snapshots (See **Appendix D**) suggest a growth rate of -0.5% to 1.5% per year on arterial roadways within the study area. For the 'Inner Suburbs' area of Ottawa, Exhibit 2.10 of the 2013 TMP projects population and employment growth rates of approximately 0.3% and 1.2% per year, respectively. To reflect the study area's development as an employment area, a 1% annual background growth rate has been applied to traffic along Russell Road, Hunt Club Road, and the Hwy 417 ramp. This growth rate is consistent with the recent Giant Tiger TIA approximately 1km to the north and the Master Concept TIA for this development.

5.2.2 Other Area Development

There are other developments planned within the area including:

- National Capital Business Park, Sites 2 and 3 (4055 and 4120 Russell Road) – Additional warehouse development is planned for this area. A TIA was prepared (Novatech, May 2020) for the Master Concept of the overall development. The TIA estimated that Site 2 would generate 43 and 44 two-way vehicle trips during the AM and PM peak hour, respectively, and

that Site 3 would generate 694 and 687 two-way vehicle trips during the AM and PM peak hours, respectively.

- 3500 Hawthorne Road – A gas station with convenience store and a fast food restaurant with drive-through. A TIS was prepared (Stantec 2017) and estimated the site would generate 21 and 24 net new two-way auto trips during the AM and PM peak hours, respectively. The TIS recommended modifying the southbound right turn channel to create a 'Smart' channel. The City has accepted this study and registered an agreement for the development.
- 2510 Walkley Road – A retail showroom (929m^2) and warehouse (2,323m^2). A TIA was prepared (Parsons 2018) and estimates the site will generate 15 and 30 two-way vehicle trips during the AM and PM peak hours, respectively.
- 2390 Stevenage Drive – An additional approximately 13,000m^2 of industrial use added to the approximately 10,000m^2. A TIA was prepared (Parsons 2018) and estimated the site would generate 55 and 58 new two-way auto trips during the AM and PM peak hours, respectively.
- 2480 Walkley Road – Reconfiguration of the existing Giant Tiger site to become the headquarters. A TIA was prepared (Novatech 2019) and estimated the site would generate 69 and 56 new two-way auto trips during the AM and PM peak hours, respectively.

A Traffic Impact Study and Addendum were completed (Castleglenn, 2016) for the now constructed Hydro Ottawa site. That study envisioned that when the current applicant site was developed, the Hydro Ottawa right-in, right-out driveway would be removed and share a new signalized access to the east. The Hydro Ottawa TIS estimated trip generation for the NCC lands for two scenarios:

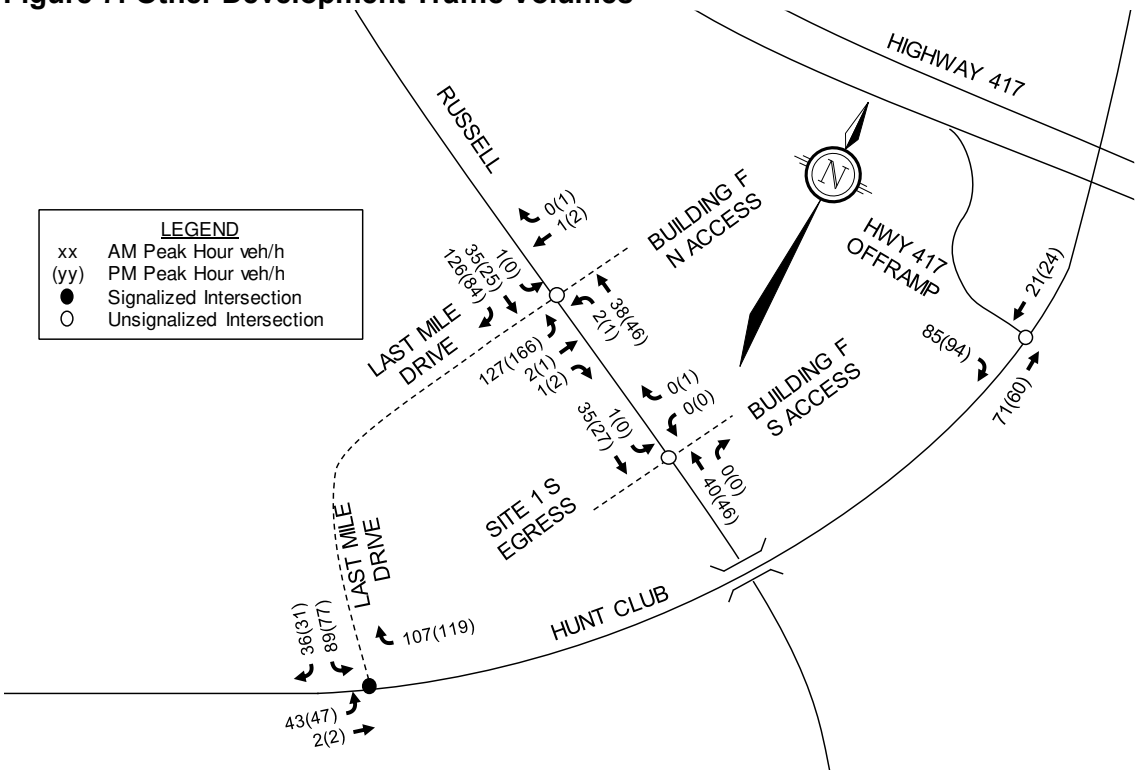
- Under a low scenario (light industrial development) the NCC lands would generate an estimated 258 AM peak hour and 272 PM peak hour vehicle trips; and,
- Under a high scenario (office development) the NCC lands would generate an estimated 480 AM peak hour and 415 PM peak hour vehicle trips.

The Hydro Ottawa TIS concluded that the Hunt Club intersection would operate with satisfactory level of service under both volume scenarios. The Master Concept TIA (Novatech, May 2020) projected a two-way volume at the Hunt Club Road / Last Mile Drive intersection of about 300 vehicles during each of the AM and PM peak hours.

Hydro Ottawa trips that were assigned to the shared intersection in the Hydro Ottawa TIS have been assigned to that intersection for this TIA.

The additional traffic volumes projected by the buildout of each of these developments from their associated traffic studies are shown in **Figure 7** with relevant excerpts of the traffic studies included in **Appendix F**. Each background development is anticipated to be complete by 2023.

Figure 7: Other Development Traffic Volumes

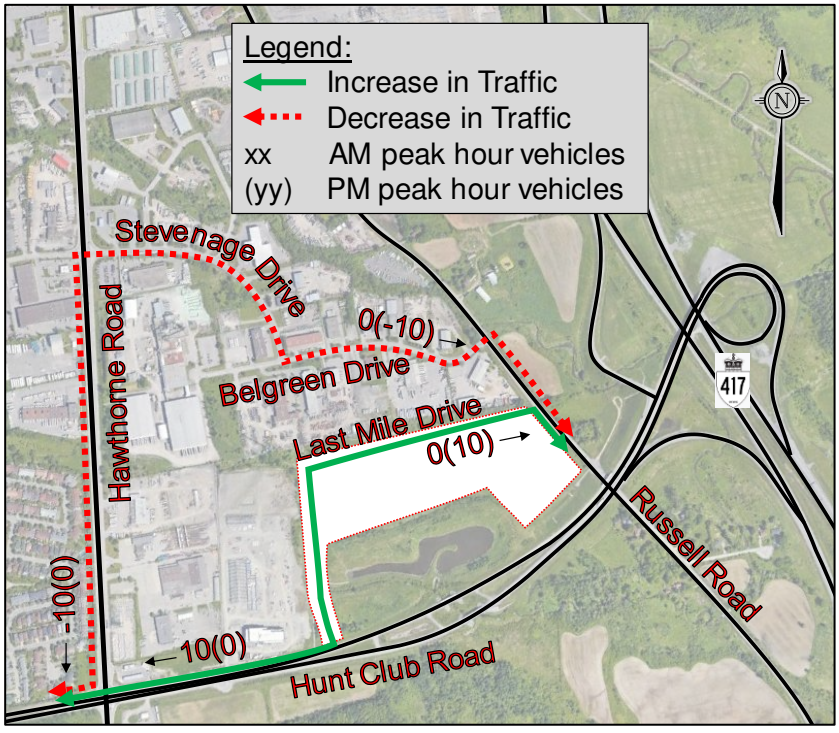


5.2.3 Diverted Belgreen Drive Trips

With the construction of Last Mile Drive, some traffic that currently uses Belgreen Drive to access Hawthorne Road / Hunt Club Road may shift to Last Mile Drive (See **Figure 8**).

Upon review of the existing volumes at the Hawthorne / Stevenage intersection (See **Appendix D**) there are about 58 WBL vehicles at the Hawthorne Stevenage intersection during the AM peak hour and 59 NBR vehicles during the PM peak hour. Ten of these vehicles (about 17%) are assumed to be diverted to the Last Mile Drive connection. No vehicles were assumed to be diverted in the off-peak direction due to the low volumes at Belgreen Drive (10AM NBL and 22PM EBR).

Figure 8: Diversion Routes for Belgreen trips to Last Mile



APPENDIX C.3

National Capital Business Park Site 3 TIA Excerpts

1.0 Introduction

1.1 Background

C.F. Crozier & Associates Inc. (Crozier) was retained by Avenue 31 Capital Inc. to prepare a Transportation Impact Assessment (TIA) in support of the Site Plan Application for the proposed industrial development at 4055 Russell Road in the City of Ottawa. The proposed development forms part of the National Capital Business Park (4055 and 4120 Russell Road) developments for which a master TIA dated May 2020 was prepared by Novatech.

The purpose of this TIA study is to assess the site specific requirements as well as impacts of the proposed development on the boundary road network and to recommend required mitigation measures, if warranted. The TIA was conducted in accordance with the City of Ottawa's "Transportation Impact Assessment Guidelines (2017)". A terms of reference correspondence between Peter Apasnore (Crozier) and Wally Dubyk (City of Ottawa) further confirmed the scope of the TIA. As confirmed with the City, given their familiarity with the National Capital Business Park developments, the Screening and Scoping step was not required, instead it is summarized in this TIA report. The terms of reference and correspondence with the City are presented in **Appendix A.**

The subject property is within the Ministry of Transportation of Ontario (MTO) Permit Controlled Area and is subject to MTO review and approval, therefore, the study further conforms to the MTO's "Traffic Impact Study Guideline" (September 2014), specifically for the Highway 417 Offramp.

An original TIA was submitted in May 2021. This TIA addresses City comments related to the Second TIA submission (dated October 2021).

1.2 Subject Property

The subject property covers an area of approximately 24.1 hectares and currently consist largely of vacant vegetated land with a few isolated detached buildings. The site is bound by Russell Road to the west, Trans-Canada Highway to the east, a Hydro substation to the north, and a creek/ Hunt Club Road to the south.

As aforementioned, the subject site forms part of the National Capital Business Park developments and is referred to as "Site 3" in the master TIA dated May 2020 prepared by Novatech.

The surrounding area is characterized by commercial and industrial land uses, including an existing hydro substation north of the subject site and a newly constructed Hydro Ottawa office west of 4120 Russell Road. Refer to **Figure 1** for the site location and surrounding area.

Figure 1: Site Location

1.3 Development Proposal

Based on the conceptual site plan prepared by Ware Malcomb (dated May 7, 2021) as used in the first TIA submission, the proposed development includes three industrial buildings (with offices) as listed below:

- Industrial Building A1 has a total Gross Floor Area (GFA) of 59,425 m^2, with 2,412 m^2 GFA being office space. A total of 140 trailer parking spaces, 265 surface level car parking spaces and associated loading docks are proposed.
- Industrial Building A2 has a total of 11,718 m^2 GFA, of which 786 m^2 GFA is office. A total of 125 surface level car parking spaces and associated loading docks are proposed.
- Industrial Building B has a total of 15,657 m^2 GFA, of which 1,289 m^2 GFA is office. A total of 166 surface level car parking spaces and associated loading docks are proposed.
- Two full moves site access connections to Russel Road. One is expected to serve the entire development and the other mainly serves the trailer trucks at Building A1.

It is noted that a most recent site plan (dated May 13, 2021) included minor changes to the building GFA's as listed below:

- Building A1: total of 59,323 m^2 Gross Floor Area (GFA)
- Building A2: total of 12,141 m^2 GFA
- Building B: total of 15,500.5 m^2 GFA

As presented above the current site plan results in a total industrial GFA of 86,965 m^2, thus, 165 more compared to the original site plan used in the first submission TIA. Given the immaterial nature of the site plan change, the original analysis is maintained in this TIA.

Similar to the remaining National Capital Business Park developments, the proposed development has an anticipated build out by 2023. Refer to **Appendix B** for the conceptual site plan.

2.0 Screening

The City's TIA Guidelines contain a screening form highlighting the criteria based on which a TIA is required for a proposed development. There are three triggers, which includes the trip generation, location, and safety. A TIA study is required if at least one of the triggers is satisfied.

Trip Generation Trigger – the proposed industrial development has a total GFA that exceeds 5,000 m^2 and is anticipated to generate over 60 person trips/peak hour. Therefore, this trigger is satisfied.

Location Triggers – The site proposes main access connections to Russell Road which is not part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks. Additionally, the subject property is not located in a Design Priority Area (DPA) or Transit-Oriented Development (TOD) zone. Therefore, this trigger is not satisfied.

Safety Triggers – This trigger is satisfied as the development proposes new connections onto Russell Road, which has a posted speed limit of 80 km/h.

4.0 Forecasting

The proposed development will result in new traffic turning movements on the boundary road network that would otherwise not exist. This section presents the generated trips and trip assignment through the study intersections. The forecasting and trip assignment methodology conforms to modules 3.1 and 3.2 of the TIA Guidelines.

4.1 Auto Trip Generation

Trip generation for the proposed development was forecasted using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition.

Though the master TIA study used LUC 156 "High-Cube Parcel Hub Warehouse" for building A1, the proponent has noted that the use of the subject building is expected to be a typical industrial warehouse similar to the other two buildings (A2 and B). Therefore, the trip generation rates for Land Use Category (LUC) 150 "Warehousing" were applied to the proposed buildings A1, A2 and B to generate both the total auto trips and truck trips.

Conservatively, the greater trip generation between the fitted curve equation and average rate methodologies were used. **Table 6** outlines the total auto trip and truck trip generation for the proposed development.

Table 6: Site Auto-Trip Generation

Building	ITE Land Use Category	Gross Floor Area (GFA)	Peak Hour	Number of Trips		
				Inbound	Outbound	Total
Total Auto Trip Generation						
All three Buildings (A1, A2 and B)	LUC 150: Warehousing	86,800 m² (934,307 ft²)	A.M.	122	37	159
			P.M.	48	130	178
Truck Trip Generation						
All three Buildings (A1, A2 and B)	LUC 150: Warehousing	86,800 m² (934,307 ft²)	A.M.	10	9	19
			P.M.	15	13	28
Total Trips			A.M.	119	42	141
			P.M.	58	129	159

Given the assumption of LUC 156 "High-Cube Parcel Hub Warehouse" for building A1 in the master TIA, their trip generation forecast was overestimated as presented in **Table 7**.

Table 7: Site Auto-Trip Generation per Master TIA

Travel Mode	ITE Land Use Category	Gross Floor Area (GFA)	Peak Hour	Number of Trips		
				Inbound	Outbound	Total
Total Auto Trip Generation						
Site 3 (per master TIA)	LUC 150: Warehousing	11,167 m² (120,200 ft²)	A.M.	30	9	39
			P.M.	12	30	42
	LUC 156: High-Cube Parcel Hub Warehouse	64,521 m² (694,500 ft²)	A.M.	367	366	733
			P.M.	493	232	725
Total Trips			A.M.	397	375	772
			P.M.	505	262	767

Comparing **Tables 6 and 7**, the current proposal for the site results in a lower trip generation and is expected to have a lesser overall impact to the boundary road network than captured in the master TIA. Section 5 further discusses traffic operations at boundary study intersections.

4.2 Person Trips and Modal Shares

The City's TIA Guidelines provide methodology for forecasting person trips using the ITE auto trip generation, 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.
- 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 6** to forecast the person trips presented in **Table 8**. **Table 8** further outlines the modal splits of the person trips based on the target modal shares identified in section 5.1 of the master TIA study. The master TIA study notes that the modal split for the National Capital Business Park developments is expected to be consistent with the existing modal shares of the 2011 TRANS O-D Survey Report for the Hunt Club district. However, target modal split for the site's surrounding area were determined by adjusting the existing modal splits (10% increase of auto driver split) to account for the site being located in an area with comparatively less dense active transportation connections and transit service.

Table 8: Person Trips by Travel Mode

Travel Mode	Modal Share		A.M. Peak Hour Trips			P.M. Peak Hour Trips		
	Existing	Target	In	Out	Total	In	Out	Total
		Person Trips	156	47	203	61	166	227
Auto Driver	60%	70%	109	33	142	43	116	159
Auto Passenger	15%	15%	23	7	30	9	25	34
Transit	15%	10%	16	5	20	6	17	23
Active Transport	10%	5%	8	2	10	3	8	11

The full build-out of the proposed development is expected to generate a total of 161 and 187 two-way auto trips during the weekday a.m. and p.m. peak hours, respectively, which includes the 19 and 28 two-way truck trips (Table 6) during the weekday a.m. and p.m. peak hour, respectively. Given that the proposed development is solely industrial use, no material trips due to pass-by or synergy between the buildings is expected. Therefore, no internal trip synergy reductions or pass-by trip reductions were applied.

APPENDIX C.4

Hydro-Ottawa- Background Development Excerpts

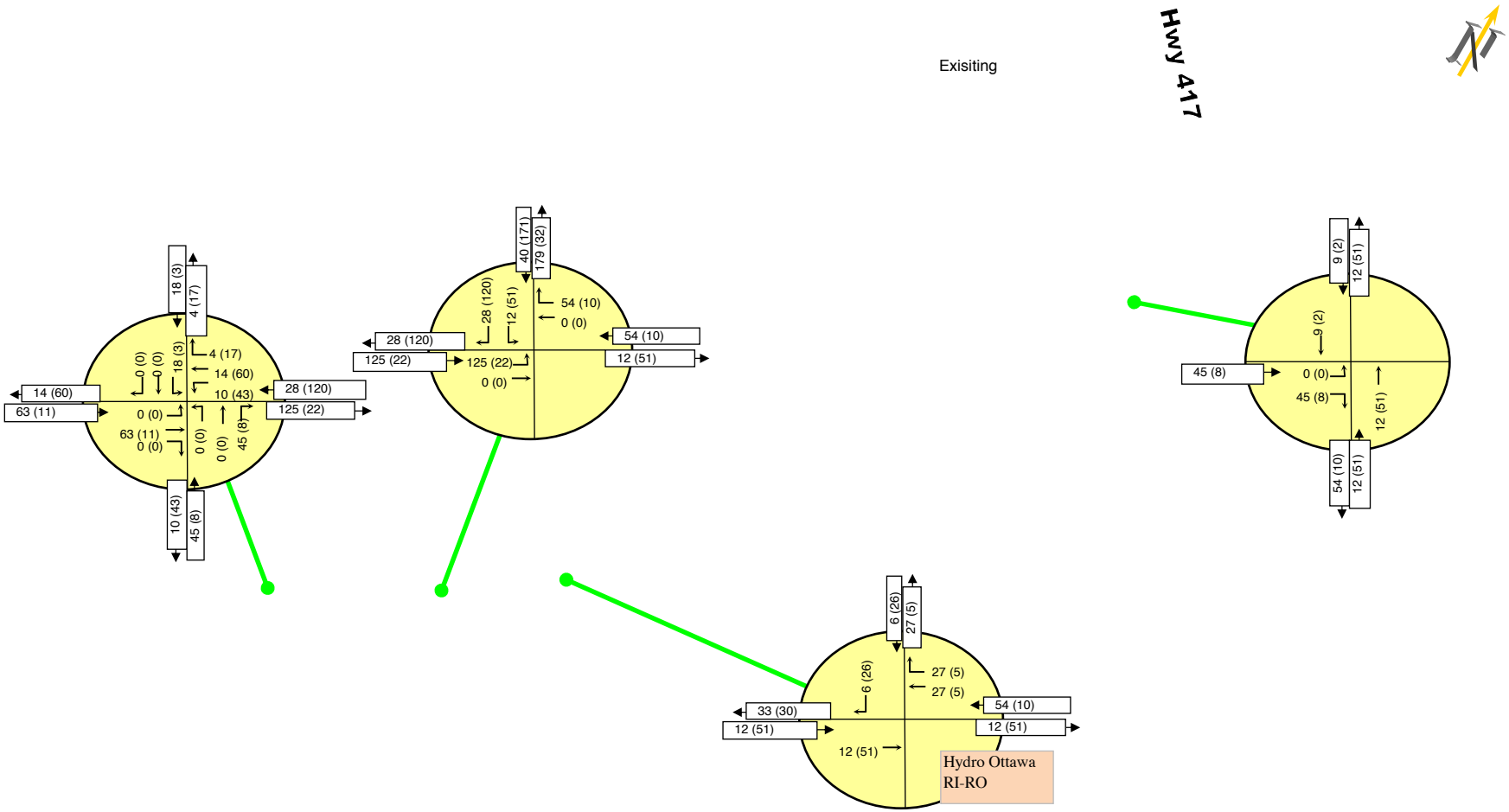


Exhibit E-1: Site Generated Traffic Volumes

Morning Peak Hour (Afternoon Peak Hour)

APPENDIX C.5

3500 Hawthorne Road – Background Development Excerpts

3.3 SITE TRAFFIC GENERATION

3.3.1 Land Use and Trip Generation Rates

The *Institute of Transportation Engineers (ITE) Trip Generation Manual (9th Edition)* was used to estimate traffic generated by the subject site. The ITE land use codes 945 – Gas Station with Convenience Market and 934 – Fast-Food Restaurant with Drive-Through Window were thought to be most representative of the proposed land uses.

Table 1 summarizes the anticipated site trips.

Table 1 Trips Generated by the Proposed Commercial Development

ITE LAND USE			MORNING PEAK HOUR			AFTERNOON PEAK HOUR		
			In	Out	Total	In	Out	Total
ITE Trip Generation Rates								
945 – Gas Station with Convenience Market	Gross Floor Area (1000's ft²)	1.3	41.89	41.07	82.13	48.74	48.74	97.47
934 – Fast-Food Restaurant with Drive-Through Window	Gross Floor Area (1000's ft²)	1.4	23.16	22.26	45.42	16.98	15.67	32.65
Trips Generated								
945 – Gas Station with Convenience Market	Trip Gen		54	53	107	63	63	126
934 – Fast-Food Restaurant with Drive-Through Window	Trip Gen		32	31	63	24	22	46
Pass-By and Internal Capture								
945 – Gas Station with Convenience Market	Auto Trips		54	53	107	63	63	126
	Pass-By	80%	43	43	86	51	51	102
	Internal Capture	0%	0	0	0	0	0	0
	Net New Auto Trips		11	10	21	12	12	24
934 – Fast-Food Restaurant with Drive-Through Window	Auto Trips		32	31	63	24	22	46
	Pass-By	50%	16	16	32	12	11	23
	Internal Capture	50%	16	16	32	12	11	23
	Net New Auto Trips		0	0	0	0	0	0
Net New Auto Trips								
Total Development	Auto Trips		86	84	170	87	85	172
	Pass-By Trips		59	59	118	63	62	125
	Internal Capture Trips		16	15	31	12	11	23
	Net New Auto Trips		11	10	21	12	12	24

3.3.2 Pass-By and Internal Capture

Pass-by trips are considered intermediate stops between an origin and a destination. They are site trips that are drawn from existing traffic volumes on the road network that are "passing-by" the site. While the overall total number of trips generated by a given development remains the same, the pass-by site trips are deducted from existing / background volumes and added to the site access locations to reflect this.

Based on a combination of technical sources and professional judgement, it was assumed that the gas station and convenience store will have a pass-by rate of 80% while the fast food restaurant will have a pass-by rate of 50%.

Figure 8 illustrates the pass-by trips the proposed development is anticipated to generate.

When predicting site trips that are associated with different land use types on the same site, the interaction between those land use types must be accounted for to reflect the synergy between uses. Internal capture trips – also referred to as "shared-use" trips - are trips which are shared between two or more uses on the same site. A portion of the generated trips for each individual land use, therefore, are drawn from the adjacent land uses on the same site and primarily by the "anchor" land use. Internal capture adjustments were made to account for vehicles that visit more than one use within the subject commercial development. Since these trips are contained within the subject site, accounting for each trip separately on the roadway network would result in "double-counting". For this reason, land uses that may have associated shared-use trips between one another ultimately have their net new trips adjusted.

Within the proposed commercial development, the trips that are subject to internal capture adjustments are the trips generated from the fast food restaurant. No adjustments were made to the gas station as this land use is considered to be the site anchor. An assumed internal capture rate of 50% was assumed for the fast food restaurant.

Following the application of the pass-by and internal capture adjustments, the commercial development is expected to generate approximately 21 and 24 net new auto trips (two-way) during the AM and PM peak hours, respectively.

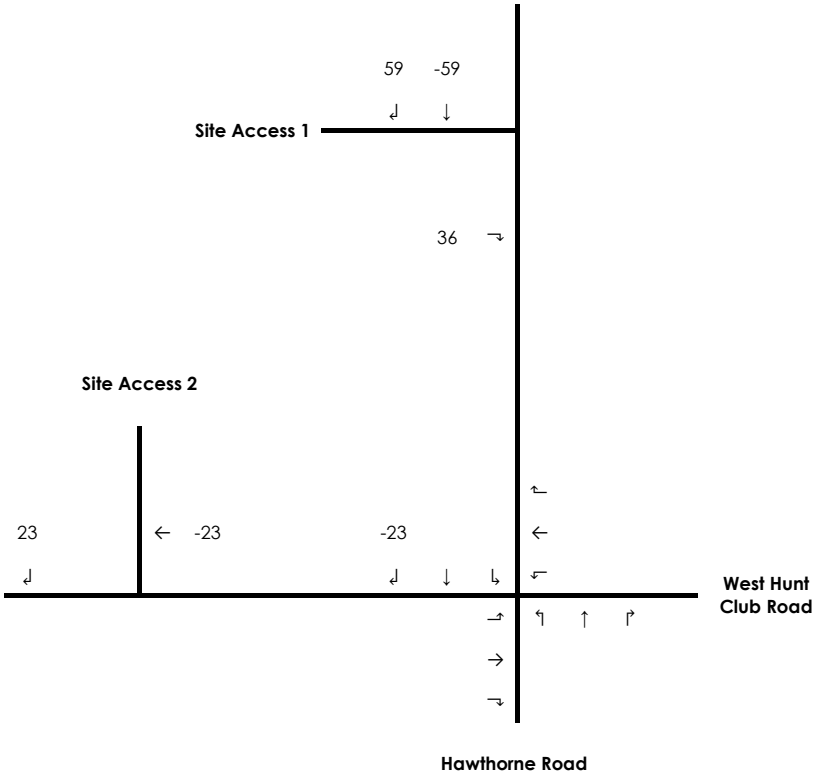
Figure 9 illustrates the net new site trips the proposed commercial development is anticipated to generate.

3.3.3 Traffic Distribution and Assignment

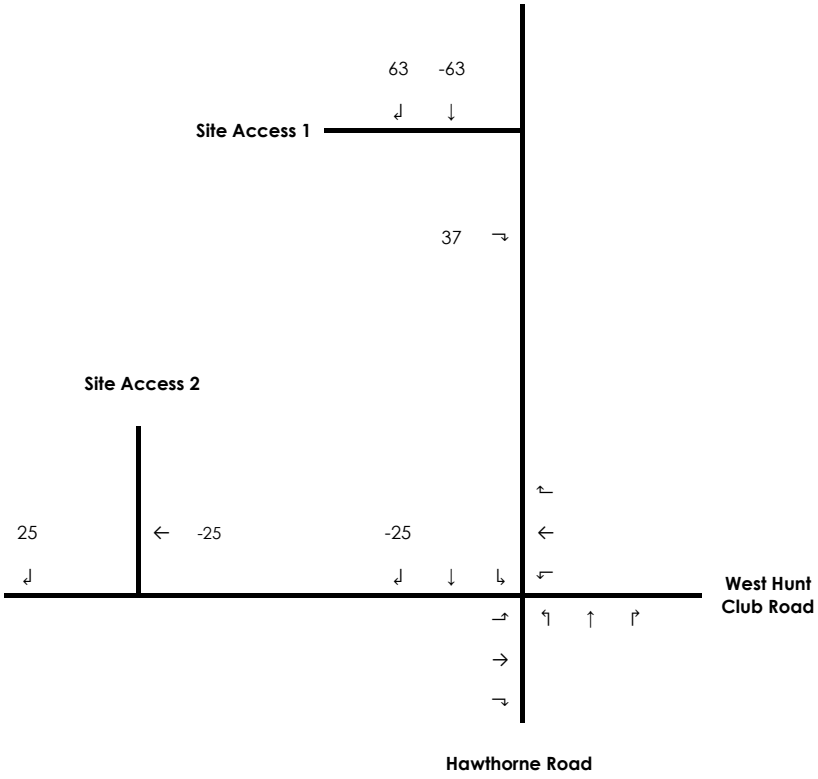
The distribution of traffic to / from the study area was determined through examination of the current traffic patterns at the Hunt Club Road at Hawthorne Road intersection.

Figure 10 illustrates the total site traffic volumes the proposed commercial development is anticipated to generate.

AM Peak Hour



PM Peak Hour

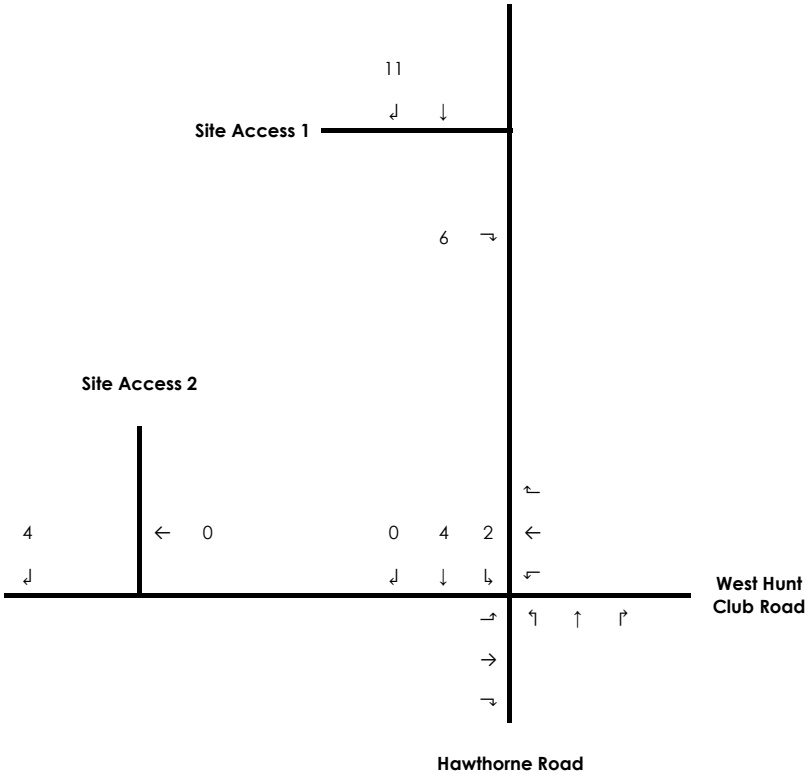


3500 Hawthorne Road

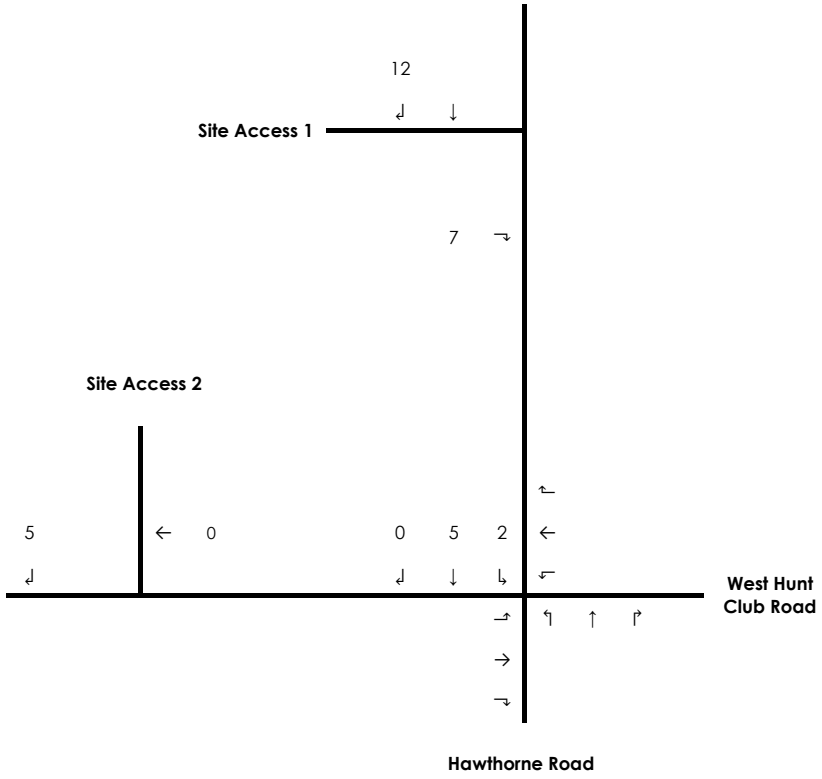
Figure 8

Pass-By Volumes

AM Peak Hour



PM Peak Hour

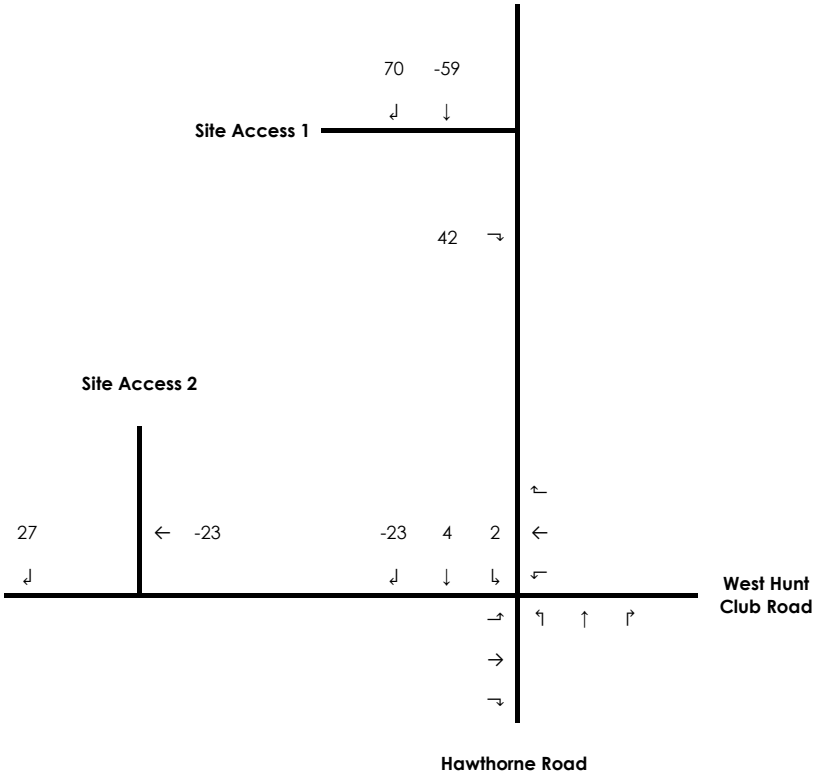


3500 Hawthorne Road

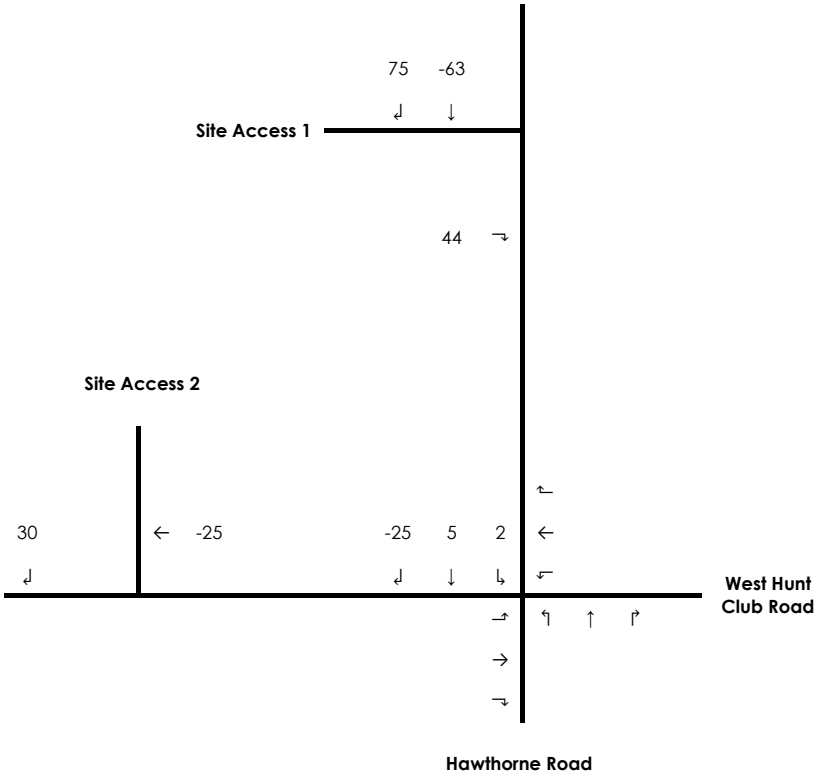
Figure 9

Net New Site Traffic Volumes

AM Peak Hour



PM Peak Hour



3500 Hawthorne Road

Figure 10

Total Site Traffic Volumes

APPENDIX C.6

2390 Stevenage Drive – Background Development Excerpts

8. DEVELOPMENT GENERATED TRAVEL DEMAND

8.1. TRIP GENERATION AND MODE SHARES

8.1.1. TRIP GENERATION

Appropriate trip generation rates for the proposed development were obtained from the ITE Trip Generation Manual, 10th Edition and are summarized in Table 3.

Table 3: ITE Trip Generation Manual, 10th Ed. Vehicle Trip Generation Rates for Warehousing Land Use

Land Use	Data Source	Fitted Curve Equation	
		AM Peak	PM Peak
Warehousing	ITE 150	T= 0.12(x) + 25.32	T= 0.12(x) + 27.82

As ITE trip generation surveys only record vehicle trips and typically reflect highly suburban locations (with little to no access by travel modes other than private automobiles), adjustment factors appropriate to the Ottawa study area context were applied to attain estimates of person trips for the subject development.

Using the ITE Trip Generation rate, the total amount of vehicle trips generated by the proposed development were projected and the results are summarized in Table 4. To convert ITE vehicle trip rates to person trips, an auto occupancy factor and a non-auto trip factor were applied to the ITE vehicle trip rates. Our review of available literature suggests that a combined factor of approximately 1.3 is considered reasonable to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%. As such, the person trip generation for the subject development is summarized in Table 4.

Table 4: Site Person Trip Generation

Land Use	Data Source	Area	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
			In	Out	Total	In	Out	Total
Warehousing	ITE 150	256,106 ft²	55	17	72	20	55	75

8.1.2. MODE SHARES

Using the Person-Trips projected in Table 4 and the modal share percentages from the 2011 NCR Household Origin – Destination Survey for Hunt Club, the modal share for the proposed development is summarized in Table 5.

Table 5: Site Trip Generation by Mode of Transportation

Travel Mode	Mode Share	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	76%	42	13	55	16	42	58
Auto Passenger	10%	6	2	8	2	6	8
Transit	14%	7	2	9	2	7	9
Non-motorized	0%	0	0	0	0	0	0
Total Person Trips	100%	55	17	72	20	55	75
Less Pass-by (0%)		0	0	0	0	0	0
Total 'New' Auto Trips		**42**	**13**	**55**	**16**	**42**	**58**

As shown in Table 5, based on the Modified ITE's Person-Trip Generation method and the 2011 NCR Household Origin – Destination Survey for Hunt Club, the proposed site is projected to generate approximately 70-75 two-way person-trips per hour during the weekday peak hours. Approximately 55 two-way vehicles per hour will be accessing/leaving the site during

the weekday peak hours and 10 two-way trips will be made by transit. Considering the heavy industrial character of the area and adjacent transportation network, no active mode trips are expected during the peak hours for this site.

8.2. TRIP DISTRIBUTION

Considering the existing traffic distribution at Hawthorne/Stevenage intersection, the site trip distribution is outlined next:

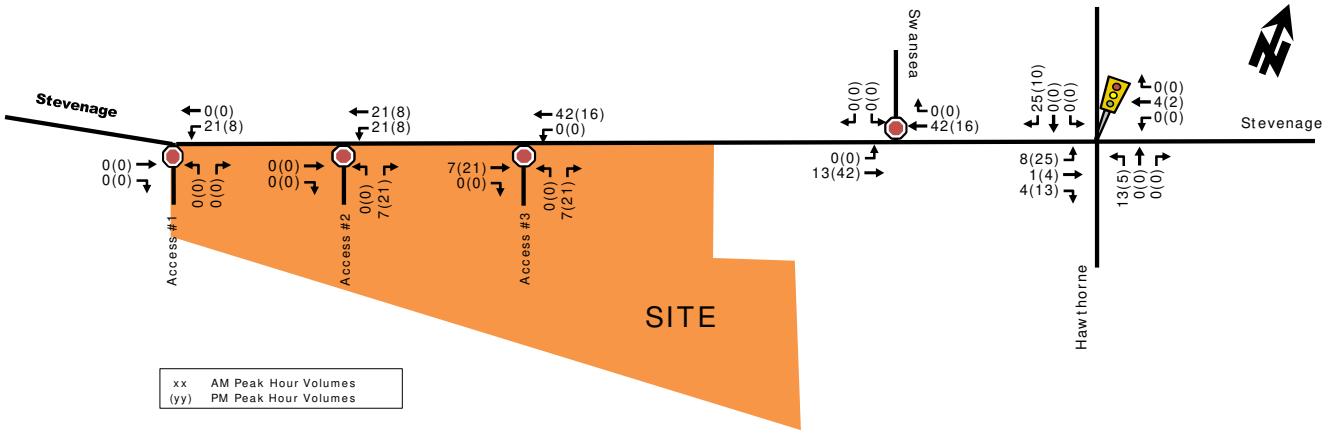
- 60% To/From the North;
- 30% To/From the South; and
- 10% To/From the East

100%

8.3. TRIP ASSIGNMENT

Based on this distribution, site-generated traffic at full build-out (2020) was assigned to the existing adjacent network and is illustrated in Figure 8.

Figure 8: Full Build-Out Site-Generated Traffic (year 2020)



9. BACKGROUND NETWORK TRAVEL DEMAND

9.1. TRANSPORTATION NETWORK PLANS

The transportation network changes have been discussed within Section 4.1 and none are anticipated to impact the transportation analysis for this development.

9.2. BACKGROUND GROWTH

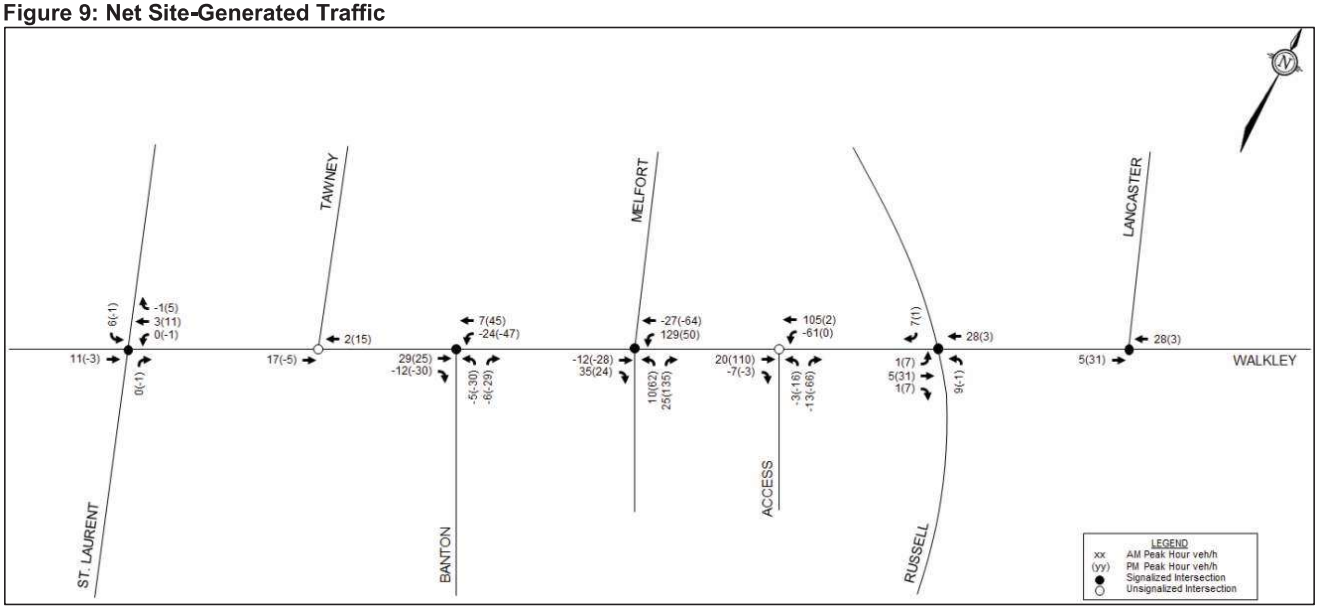
Regarding background traffic growth, historical traffic count data for years 2007, 2012, and 2015 was provided by the City of Ottawa at the Hawthorne/Hunt Club intersection. Detailed analysis of trends at Hunt Club/Hawthorne intersection indicated low reliability of data, most likely due to the recent (2014) construction of the Hunt Club/Highway 417 interchange. For this reason, and given our knowledge of the area, a 2% annual growth rate has been assumed. This growth rate is consistent with the City of Ottawa intersection traffic growth rates.

With respect to Stevenage Drive, given a low level of new development has been observed within the past 5 years, a 0% growth will be assumed for the analysis horizon.

APPENDIX C.7

2480 Walkley Road – Background Development Excerpts

Figure 9: Net Site-Generated Traffic



APPENDIX C.8

2510 Walkley Road – Background Development Excerpts

reduction in traffic volumes through the Walkley/Russell intersection and on Russell Road adjacent to the site. We are also not aware of any other meaningful new development projects in close proximity to the site.

3.0 STUDY AREA AND TIME PERIODS

As the proposed development is an extremely low traffic generator (10 veh/h and 30 veh/h during morning and afternoon peak hours respectively) and as its only traffic impact is on the immediate adjacent section of southbound Russell Road, the study area is the Walkley/Russell intersection and Russell Road adjacent to the site.

Again, as site-generated traffic is very low and spread out throughout the day, only the weekday morning and afternoon peak hours are analyzed as this is when background traffic on Russell Road is highest. As the project is expected to be built in 2018 and operational in 2018/19, and as site traffic is so low (it does not meet the TIA Guidelines trip generation trigger), no horizon year analysis was considered necessary. If there are any real or perceived traffic operations issues associated with the proposed development, they can be fully assessed based on current volumes.

4.0 EXEMPTIONS REVIEW

Based on the type and size of the proposed development for which a Site Plan Application is being submitted, the following identifies which analyses are required and which are exempt in further analysis/modules, according to the City's new TIA Guidlines.

Design Review Component:

Development Design

- Circulation and Access ..... REQUIRED
- New Street Networks..... EXEMPT

Parking

- Parking Supply ..... REQUIRED
- Spillover Parking ..... EXEMPT

Network Impact Component:

Development Design

- Transportation Demand Management .... EXEMPT
- Neighbourhood Traffic Management ..... EXEMPT
- Network Concept ..... EXEMPT

In summary, as this submission accompanies a Site Plan Application for a very low traffic generator, the only items that need any level of assessment are on-site operation and the design of the site driveway connection to Russell Road.

5.0 DEVELOPMENT GENERATED TRAFFIC

5.1 Vehicle Trip Generation

Using appropriate trip generation rates (Table 1) from a number of relevant land uses identified in the 9th Edition ITE Trip Generation Manual, the resultant two-way peak hour site-trip generation for the proposed 2,323 m^2 tile warehouse and 929 m^2 retail showroom is estimated to be in the range of 10 to 35 veh/h two-way total.

Table 1: Peak Hour Trip Generation Rates

Land Use	Average Rate AM (PM)	Trip Generation Two-Way AM (PM)
General Light Industrial	0.92 (0.97)	33 (35) veh/h
Manufacturing	0.73 (0.73)	26 (26) veh/h
Warehousing	0.30 (0.32)	11 (12) veh/h

Our familiarity with other Ottawa area tile warehouses is that the estimated peak hour vehicle trip generation using the ITE trip rates is in the correct range. For analysis purposes, we are assuming 10 veh/h in and 5 veh/h out during the morning peak hour and 15 veh/h in and 15 veh/h out during the afternoon peak hour.

Weekend peak hour trip generation is determined to be the same as the afternoon peak hour, however, as Saturday traffic is less than weekday traffic on Russell Road adjacent to the site, this time period was not assessed.

5.2 Modal Shares

Given the site's location, somewhat remote from any significant residential development, combined with the type and weight of products being sold, we do not foresee any patron walking/cycling component. For similar reasons, even though there are adjacent bus routes, we foresee very low, if any, transit ridership. We would expect transit ridership would be primarily employees and would be in the 0 to 3 person range during peak hours, as summarized in Table 2.

Table 2: Future Mode Share Targets for the Development

Travel Mode	Mode Share Target	Rationale
Transit	15%	Some employees may use transit but no customers due to products sold.
Walking	0%	Due to somewhat remote location, type of business and products sold.
Cycling	0%	Due to somewhat remote location, type of business and products sold.
Auto Passenger	20%	Often 2 persons/car looking at product.
Auto Driver	65%	Highly car-oriented due to location, and type of product sold.

5.3 Trip Distribution and Assignment

As the proposed site driveway is on Russell Road and would be restricted to right-in/right-out only, trip distribution and assignment is quite straight-forward. It has been assumed that site-generated traffic at the Russel l/Walkley and Russell/Hawthorne intersections would distribute similar to the distribution of existing volumes at this intersection as depicted in Figure 5.

Figure 5: Site-Generated Traffic Assignment

5.4 Pass-By Traffic

Due to the site's location and type of products it sells, it is considered a "destination" site and we do not foresee any pass-by traffic.

APPENDIX D

TDM-SDDIC and TDM Measures Checklists

National Capital Buisness Park Site 2, 4120 Russell Road

TDM-Supportive Development Design and Infrastructure Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☑ Sidewalk along north Building frontage. Crosswalks included from Last Mile Drive sidewalks across parking area to sidewalk around Building perimeter.
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☑ Building entrances located close to Street, minimizing distance to transit service on Russell Road. Refer to Site Plan
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☑ Building entrances located close to Street, walkways provided. Refer to Site Plan

National Capital Buisness Park Site 2, 4120 Russell Road

TDM-supportive design & infrastructure measures: *Non-residential developments*			Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks *(see Official Plan policy 4.3.10)*	☑ To be provided as applicable for site location.
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps *(see Official Plan policy 4.3.10)*	☑ To be provided as applicable for site location.
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians *(see Official Plan policy 4.3.11)*	☑ To be provided as applicable for site location.
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☑
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☐
	1.3	**Amenities for walking & cycling**	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☐
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐

National Capital Buisness Park Site 2, 4120 Russell Road

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑ At least 9 Bicycle Parking Spaces to be provided, as required / specified in the City of Ottawa Zoning By-Law.
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☑ Bicycle parking supply is expected to adequately accommodate peak demands.
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☐ Not Applicable
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☐
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐
	2.4	**Bicycle repair station**	
BETTER	2.4.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐

National Capital Buisness Park Site 2, 4120 Russell Road

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐

National Capital Buisness Park Site 2, 4120 Russell Road

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑ Noted. Justification of parking supply provided in Section 4.2.
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☐
	7.	**OTHER**	
	7.1	**On-site amenities to minimize off-site trips**	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	☐

National Capital Buisness Park Site 2, 4120 Russell Road

TDM Measures Checklist:

Non-Residential Developments (office, institutional, retail or industrial)

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
	1.	**TDM PROGRAM MANAGEMENT**	
	1.1	**Program coordinator**	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☑ To be considered by proponent or future tenants.
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
	2.	**WALKING AND CYCLING**	
	2.1	**Information on walking/cycling routes & destinations**	
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances	☑ To be provided as applicable for site location.
	2.2	**Bicycle skills training**	
		Commuter travel	
BETTER ★	2.2.1	Offer on-site cycling courses for commuters, or subsidize off-site courses	☐
	2.3	**Valet bike parking**	
		Visitor travel	
BETTER	2.3.1	Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	☐

National Capital Buisness Park Site 2, 4120 Russell Road

			TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		3.	**TRANSIT**	
		3.1	**Transit information**	
BASIC		3.1.1	Display relevant transit schedules and route maps at entrances	☑ To be coordinated with OC Transpo & STO.
BASIC		3.1.2	Provide online links to OC Transpo and STO information	☑ To be provided by proponent or future tenant.
BETTER		3.1.3	Provide real-time arrival information display at entrances	☐
		3.2	**Transit fare incentives**	
			Commuter travel	
BETTER		3.2.1	Offer preloaded PRESTO cards to encourage commuters to use transit	☐
BETTER	★	3.2.2	Subsidize or reimburse monthly transit pass purchases by employees	☐
			Visitor travel	
BETTER		3.2.3	Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	☐
		3.3	**Enhanced public transit service**	
			Commuter travel	
BETTER		3.3.1	Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	☐
			Visitor travel	
BETTER		3.3.2	Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	☐
		3.4	**Private transit service**	
			Commuter travel	
BETTER		3.4.1	Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for shift changes, weekends)	☐
			Visitor travel	
BETTER		3.4.2	Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for festivals, concerts, games)	☐

National Capital Buisness Park Site 2, 4120 Russell Road

			TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		4.	**RIDESHARING**	
		4.1	**Ridematching service**	
			Commuter travel	
BASIC	★	4.1.1	Provide a dedicated ridematching portal at OttawaRideMatch.com	☑ To be explored by future tenants.
		4.2	**Carpool parking price incentives**	
			Commuter travel	
BETTER		4.2.1	Provide discounts on parking costs for registered carpools	☐
		4.3	**Vanpool service**	
			Commuter travel	
BETTER		4.3.1	Provide a vanpooling service for long-distance commuters	☐
		5.	**CARSHARING & BIKESHARING**	
		5.1	**Bikeshare stations & memberships**	
BETTER		5.1.1	Contract with provider to install on-site bikeshare station for use by commuters and visitors	☐
			Commuter travel	
BETTER		5.1.2	Provide employees with bikeshare memberships for local business travel	☐
		5.2	**Carshare vehicles & memberships**	
			Commuter travel	
BETTER		5.2.1	Contract with provider to install on-site carshare vehicles and promote their use by tenants	☐
BETTER		5.2.2	Provide employees with carshare memberships for local business travel	☐
		6.	**PARKING**	
		6.1	**Priced parking**	
			Commuter travel	
BASIC	★	6.1.1	Charge for long-term parking (daily, weekly, monthly)	☐
BASIC		6.1.2	Unbundle parking cost from lease rates at multi-tenant sites	☐
			Visitor travel	
BETTER		6.1.3	Charge for short-term parking (hourly)	☐

National Capital Buisness Park Site 2, 4120 Russell Road

			TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		7.	**TDM MARKETING & COMMUNICATIONS**	
		7.1	**Multimodal travel information**	
			Commuter travel	
BASIC	★	7.1.1	Provide a multimodal travel option information package to new/relocating employees and students	☑ To be provided.
			Visitor travel	
BETTER	★	7.1.2	Include multimodal travel option information in invitations or advertising that attract visitors or customers (e.g. for festivals, concerts, games)	☐
		7.2	**Personalized trip planning**	
			Commuter travel	
BETTER	★	7.2.1	Offer personalized trip planning to new/relocating employees	☐
		7.3	**Promotions**	
			Commuter travel	
BETTER		7.3.1	Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes	☐
		8.	**OTHER INCENTIVES & AMENITIES**	
		8.1	**Emergency ride home**	
			Commuter travel	
BETTER	★	8.1.1	Provide emergency ride home service to non-driving commuters	☐
		8.2	**Alternative work arrangements**	
			Commuter travel	
BASIC	★	8.2.1	Encourage flexible work hours	☑ As applicable for the development.
BETTER		8.2.2	Encourage compressed workweeks	☐
BETTER	★	8.2.3	Encourage telework	☐
		8.3	**Local business travel options**	
			Commuter travel	
BASIC	★	8.3.1	Provide local business travel options that minimize the need for employees to bring a personal car to work	☐
		8.4	**Commuter incentives**	
			Commuter travel	
BETTER		8.4.1	Offer employees a taxable, mode-neutral commuting allowance	☐
		8.5	**On-site amenities**	
			Commuter travel	
BETTER		8.5.1	Provide on-site amenities/services to minimize mid-day or mid-commute errands	☐

APPENDIX E

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

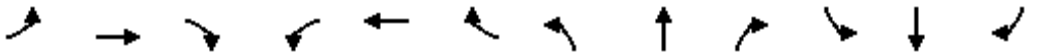
Signalized Intersections

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 F

Detailed Capacity Analysis Reports



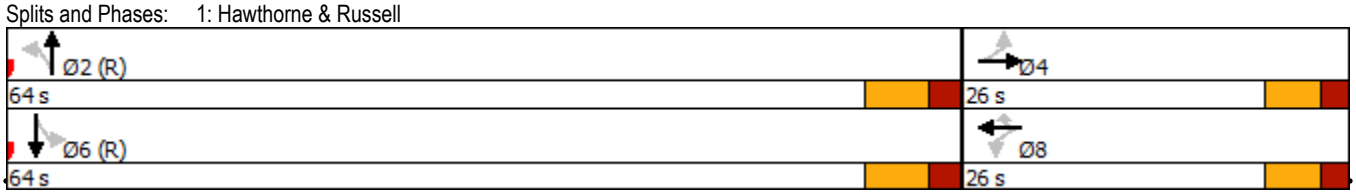
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	8	14	10	328	18	869	8	50	505	35
Future Volume (vph)	10	0	8	14	10	328	18	869	8	50	505	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0		0.0	40.0		100.0	40.0		0.0	60.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				1.00	
Frt		0.850				0.850		0.999			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1276	1278	0	1488	1790	1522	1701	3104	0	1488	2984	0
Flt Permitted	0.750			0.752			0.425			0.268		
Satd. Flow (perm)	1007	1278	0	1178	1790	1522	757	3104	0	420	2984	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		343				149		2			16	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		87.3			183.0			1801.8			224.3	
Travel Time (s)		6.3			13.2			92.7			11.5	
Confl. Peds. (#/hr)							5					5
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 (%)	40%	5%	25%	20%	5%	5%	5%	15%	10%	20%	19%	8%
Adj. Flow (vph)	11	0	9	16	11	364	20	966	9	56	561	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	9	0	16	11	364	20	975	0	56	600	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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	
Trailing Detector (m)	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	
Detector 1 Size(m)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Detector 2 Position(m)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	25.7	25.7		25.7	25.7	25.7	26.5	26.5		26.5	26.5	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	64.0	64.0		64.0	64.0	
Total Split (%)	28.9%	28.9%		28.9%	28.9%	28.9%	71.1%	71.1%		71.1%	71.1%	
Maximum Green (s)	20.3	20.3		20.3	20.3	20.3	57.5	57.5		57.5	57.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.2	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.3	2.3		2.3	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7	5.7	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	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	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		3	3	
Act Effct Green (s)	17.6	17.6		17.6	17.6	17.6	60.2	60.2		60.2	60.2	
Actuated g/C Ratio	0.20	0.20		0.20	0.20	0.20	0.67	0.67		0.67	0.67	
v/c Ratio	0.06	0.02		0.07	0.03	0.87	0.04	0.47		0.20	0.30	
Control Delay	28.3	0.0		28.5	27.6	42.2	6.3	8.6		8.9	6.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	28.3	0.0		28.5	27.6	42.2	6.3	8.6		8.9	6.9	
LOS	C	A		C	C	D	A	A		A	A	
Approach Delay		15.6			41.3			8.6			7.1	
Approach LOS		B			D			A			A	
Queue Length 50th (m)	1.4	0.0		2.0	1.4	32.7	1.1	38.5		3.3	19.6	
Queue Length 95th (m)	5.3	0.0		6.7	5.2	#72.8	3.4	50.8		8.8	27.4	
Internal Link Dist (m)		63.3			159.0			1777.8			200.3	
Turn Bay Length (m)	20.0			40.0		100.0	40.0			60.0		
Base Capacity (vph)	227	553		265	403	458	505	2075		280	2000	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.05	0.02		0.06	0.03	0.79	0.04	0.47		0.20	0.30	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 23 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 14.4 Intersection LOS: B
Intersection Capacity Utilization 70.3% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Hawthorne & Russell

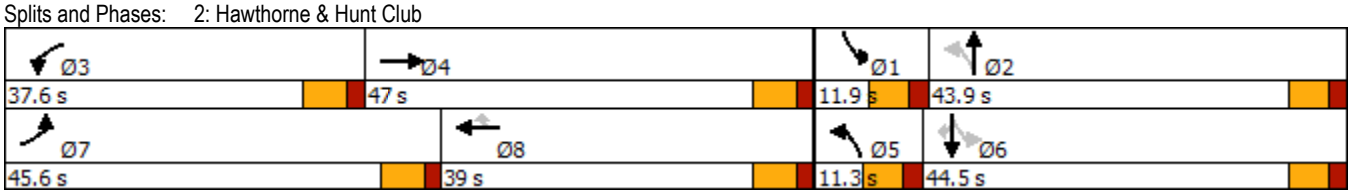


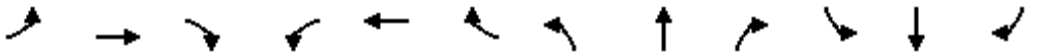
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	398	682	25	259	686	248	40	405	424	59	140	179
Future Volume (vph)	398	682	25	259	686	248	40	405	424	59	140	179
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	90.0		0.0	50.0		80.0	50.0		0.0	80.0		80.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor								0.99				
Frt		0.995				0.850		0.923				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1639	3337	0	1595	3402	1440	1488	2959	0	1191	2748	1278
Flt Permitted	0.950			0.950			0.653			0.099		
Satd. Flow (perm)	1639	3337	0	1595	3402	1440	1023	2959	0	124	2748	1278
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				188		183				199
Link Speed (k/h)		80			80			70			70	
Link Distance (m)		444.4			1367.9			619.0			1801.8	
Travel Time (s)		20.0			61.6			31.8			92.7	
Confl. Peds. (#/hr)									3	3		
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 (%)	9%	6%	20%	12%	5%	11%	20%	12%	9%	50%	30%	25%
Adj. Flow (vph)	442	758	28	288	762	276	44	450	471	66	156	199
Shared Lane Traffic (%)												
Lane Group Flow (vph)	442	786	0	288	762	276	44	921	0	66	156	199
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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	18.6
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)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	18.6
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)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	Prot	NA		Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	20.0		5.0	20.0	20.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.4	32.4		11.4	32.4	32.4	11.3	32.3		11.3	32.3	32.3
Total Split (s)	45.6	47.0		37.6	39.0	39.0	11.3	43.9		11.9	44.5	44.5
Total Split (%)	32.5%	33.5%		26.8%	27.8%	27.8%	8.0%	31.3%		8.5%	31.7%	31.7%
Maximum Green (s)	39.2	40.6		31.2	32.6	32.6	5.0	37.6		5.6	38.2	38.2
Yellow Time (s)	4.6	4.6		4.6	4.6	4.6	4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.8	1.8		1.8	1.8	1.8	2.1	2.1		2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4		6.4	6.4	6.4	6.3	6.3		6.3	6.3	6.3
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	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	Ped		None	Ped	Ped	None	None		None	None	None
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		0			0	0		2			0	0
Act Effct Green (s)	38.8	42.9		28.5	32.6	32.6	42.6	37.6		44.9	40.5	40.5
Actuated g/C Ratio	0.28	0.31		0.20	0.23	0.23	0.30	0.27		0.32	0.29	0.29
v/c Ratio	0.97	0.77		0.89	0.96	0.58	0.13	0.99		0.80	0.20	0.39
Control Delay	86.2	50.4		82.0	77.1	20.6	32.0	68.5		91.8	39.5	7.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	86.2	50.4		82.0	77.1	20.6	32.0	68.5		91.8	39.5	7.5
LOS	F	D		F	E	C	C	E		F	D	A
Approach Delay		63.3			66.4			66.8			32.5	
Approach LOS		E			E			E			C	
Queue Length 50th (m)	112.0	98.3		70.5	102.3	18.9	7.5	104.5		11.5	16.2	0.0
Queue Length 95th (m)	#173.1	121.2		#110.8	#139.1	46.4	15.6	#147.1		#33.3	25.2	17.7
Internal Link Dist (m)		420.4			1343.9			595.0			1777.8	
Turn Bay Length (m)	90.0			50.0		80.0	50.0			80.0		80.0
Base Capacity (vph)	458	1024		355	791	479	327	928		82	794	510
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.97	0.77		0.81	0.96	0.58	0.13	0.99		0.80	0.20	0.39

Intersection Summary			
Area Type:	Other		
Cycle Length: 140.4			
Actuated Cycle Length: 140			
Natural Cycle: 120			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 61.9		Intersection LOS: E	
Intersection Capacity Utilization 95.0%		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: Hawthorne & Hunt Club



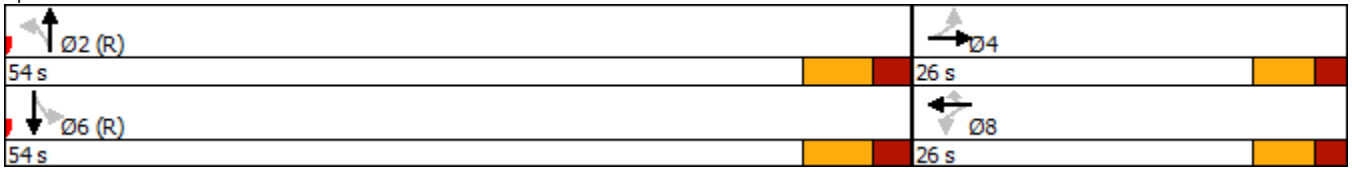


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	7	22	8	3	81	7	685	12	206	831	18
Future Volume (vph)	36	7	22	8	3	81	7	685	12	206	831	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0		0.0	40.0		100.0	40.0		0.0	60.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00					0.99						
Frt		0.886				0.850		0.997			0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1466	0	1768	1139	1508	1232	3289	0	1639	3270	0
Flt Permitted	0.756			0.738			0.328			0.387		
Satd. Flow (perm)	1291	1466	0	1374	1139	1488	425	3289	0	667	3270	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22				81		4			5	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		87.3			183.0			1801.8			224.3	
Travel Time (s)		6.3			13.2			92.7			11.5	
Confl. Peds. (#/hr)	1					1						
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 (%)	10%	25%	10%	1%	65%	6%	45%	8%	25%	9%	9%	5%
Adj. Flow (vph)	36	7	22	8	3	81	7	685	12	206	831	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	29	0	8	3	81	7	697	0	206	849	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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	
Trailing Detector (m)	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	
Detector 1 Size(m)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Detector 2 Position(m)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	25.7	25.7		25.7	25.7	25.7	26.5	26.5		26.5	26.5	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	54.0	54.0		54.0	54.0	
Total Split (%)	32.5%	32.5%		32.5%	32.5%	32.5%	67.5%	67.5%		67.5%	67.5%	
Maximum Green (s)	20.3	20.3		20.3	20.3	20.3	47.5	47.5		47.5	47.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.2	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.3	2.3		2.3	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7	5.7	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	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	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0		1	1	1	0	0		0	0	
Act Effct Green (s)	12.0	12.0		12.0	12.0	12.0	60.2	60.2		60.2	60.2	
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.75	0.75		0.75	0.75	
v/c Ratio	0.19	0.12		0.04	0.02	0.28	0.02	0.28		0.41	0.34	
Control Delay	30.4	15.0		26.9	26.3	9.4	5.4	5.0		9.3	5.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	30.4	15.0		26.9	26.3	9.4	5.4	5.0		9.3	5.4	
LOS	C	B		C	C	A	A	A		A	A	
Approach Delay		23.5			11.4			5.0			6.1	
Approach LOS		C			B			A			A	
Queue Length 50th (m)	4.6	0.9		1.0	0.4	0.0	0.2	14.5		9.4	18.8	
Queue Length 95th (m)	10.4	6.2		3.8	2.1	9.0	1.8	32.4		32.9	41.5	
Internal Link Dist (m)		63.3			159.0			1777.8			200.3	
Turn Bay Length (m)	20.0			40.0		100.0	40.0			60.0		
Base Capacity (vph)	327	388		348	289	438	320	2477		502	2463	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.11	0.07		0.02	0.01	0.18	0.02	0.28		0.41	0.34	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 16 (20%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 6.6		Intersection LOS: A	
Intersection Capacity Utilization 57.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Hawthorne & Russell



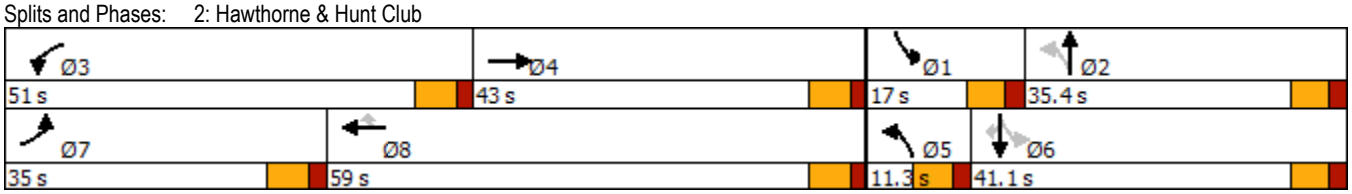
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	812	24	462	923	103	25	189	312	166	480	471
Future Volume (vph)	250	812	24	462	923	103	25	189	312	166	480	471
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	90.0		0.0	50.0		80.0	50.0		0.0	80.0		80.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00				0.99		1.00		
Frt		0.996				0.850		0.907				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1595	3422	0	1654	3468	1141	1717	2808	0	1609	3247	1522
Flt Permitted	0.950			0.950			0.423			0.180		
Satd. Flow (perm)	1595	3422	0	1653	3468	1141	765	2808	0	305	3247	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				119		259				463
Link Speed (k/h)		80			80			70			70	
Link Distance (m)		444.4			1367.9			619.0			1801.8	
Travel Time (s)		20.0			61.6			31.8			92.7	
Confl. Peds. (#/hr)			1	1					1	1		
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 (%)	12%	4%	1%	8%	3%	40%	4%	25%	8%	11%	10%	5%
Adj. Flow (vph)	250	812	24	462	923	103	25	189	312	166	480	471
Shared Lane Traffic (%)												
Lane Group Flow (vph)	250	836	0	462	923	103	25	501	0	166	480	471
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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	18.6
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)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	18.6
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)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	Prot	NA		Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	20.0		5.0	20.0	20.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.4	32.4		11.4	32.4	32.4	11.3	32.3		11.3	32.3	32.3
Total Split (s)	35.0	43.0		51.0	59.0	59.0	11.3	35.4		17.0	41.1	41.1
Total Split (%)	23.9%	29.4%		34.8%	40.3%	40.3%	7.7%	24.2%		11.6%	28.1%	28.1%
Maximum Green (s)	28.6	36.6		44.6	52.6	52.6	5.0	29.1		10.7	34.8	34.8
Yellow Time (s)	4.6	4.6		4.6	4.6	4.6	4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.8	1.8		1.8	1.8	1.8	2.1	2.1		2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4		6.4	6.4	6.4	6.3	6.3		6.3	6.3	6.3
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	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	Ped		None	Ped	Ped	None	None		None	None	None
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		1			0	0		1			0	0
Act Effct Green (s)	25.0	36.5		40.7	52.2	52.2	27.4	22.4		39.2	33.3	33.3
Actuated g/C Ratio	0.18	0.27		0.30	0.38	0.38	0.20	0.16		0.29	0.24	0.24
v/c Ratio	0.86	0.91		0.94	0.69	0.20	0.13	0.74		0.87	0.61	0.65
Control Delay	81.1	63.8		74.6	40.2	4.6	37.2	32.5		79.0	50.6	9.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	81.1	63.8		74.6	40.2	4.6	37.2	32.5		79.0	50.6	9.1
LOS	F	E		E	D	A	D	C		E	D	A
Approach Delay		67.8			48.4			32.7			37.3	
Approach LOS		E			D			C			D	
Queue Length 50th (m)	64.4	117.2		119.4	113.1	0.0	4.7	31.6		33.9	60.8	1.7
Queue Length 95th (m)	#102.6	#156.6		#177.9	136.0	8.6	11.2	50.0		#61.9	78.4	31.2
Internal Link Dist (m)		420.4			1343.9			595.0			1777.8	
Turn Bay Length (m)	90.0			50.0		80.0	50.0			80.0		80.0
Base Capacity (vph)	338	931		547	1357	519	189	809		191	839	736
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.74	0.90		0.84	0.68	0.20	0.13	0.62		0.87	0.57	0.64

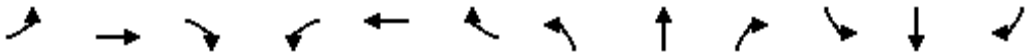
Intersection Summary

Area Type: Other
Cycle Length: 146.4
Actuated Cycle Length: 136.1
Natural Cycle: 120
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 48.5 Intersection LOS: D
Intersection Capacity Utilization 98.8% 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: 2: Hawthorne & Hunt Club



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	9	17	11	365	18	918	15	115	563	36
Future Volume (vph)	11	0	9	17	11	365	18	918	15	115	563	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0		0.0	40.0		100.0	40.0		0.0	60.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				1.00	
Frt		0.850				0.850		0.998			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1276	1278	0	1488	1790	1522	1701	3102	0	1488	2986	0
Flt Permitted	0.750			0.752			0.421			0.274		
Satd. Flow (perm)	1007	1278	0	1178	1790	1522	750	3102	0	429	2986	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		289				126		3			12	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		87.3			183.0			1801.8			224.3	
Travel Time (s)		6.3			13.2			92.7			11.5	
Confl. Peds. (#/hr)							5					5
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 (%)	40%	5%	25%	20%	5%	5%	5%	15%	10%	20%	19%	8%
Adj. Flow (vph)	11	0	9	17	11	365	18	918	15	115	563	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	9	0	17	11	365	18	933	0	115	599	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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	
Trailing Detector (m)	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	
Detector 1 Size(m)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Detector 2 Position(m)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	

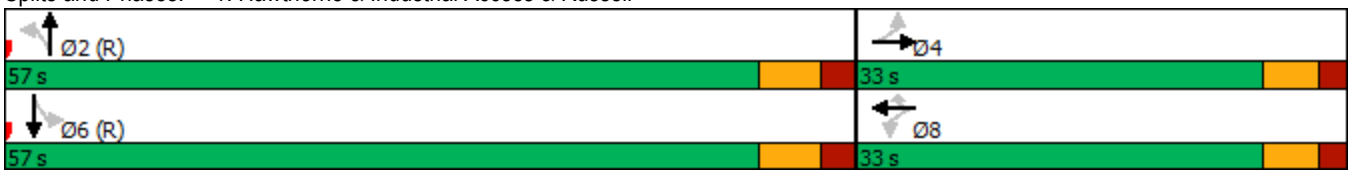


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	25.7	25.7		25.7	25.7	25.7	26.5	26.5		26.5	26.5	
Total Split (s)	33.0	33.0		33.0	33.0	33.0	57.0	57.0		57.0	57.0	
Total Split (%)	36.7%	36.7%		36.7%	36.7%	36.7%	63.3%	63.3%		63.3%	63.3%	
Maximum Green (s)	27.3	27.3		27.3	27.3	27.3	50.5	50.5		50.5	50.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.2	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.3	2.3		2.3	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7	5.7	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	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	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	1	1		1	1	1	1	1		1	1	
Act Effct Green (s)	21.0	21.0		21.0	21.0	21.0	56.8	56.8		56.8	56.8	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.63	0.63		0.63	0.63	
v/c Ratio	0.05	0.02		0.06	0.03	0.81	0.04	0.48		0.43	0.32	
Control Delay	23.5	0.1		23.8	22.9	34.6	8.8	10.8		16.9	9.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	23.5	0.1		23.8	22.9	34.6	8.8	10.8		16.9	9.0	
LOS	C	A		C	C	C	A	B		B	A	
Approach Delay		12.9			33.8			10.8			10.3	
Approach LOS		B			C			B			B	
Queue Length 50th (m)	1.3	0.0		2.1	1.3	35.9	1.0	38.7		8.7	21.2	
Queue Length 95th (m)	4.7	0.0		6.3	4.6	61.1	3.9	60.4		25.4	34.8	
Internal Link Dist (m)		63.3			159.0			1777.8			200.3	
Turn Bay Length (m)	20.0			40.0		100.0	40.0			60.0		
Base Capacity (vph)	305	588		357	542	549	473	1958		270	1888	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.04	0.02		0.05	0.02	0.66	0.04	0.48		0.43	0.32	

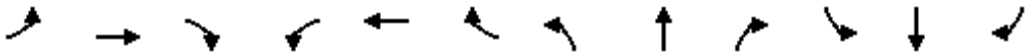
Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 23 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 15.0	Intersection LOS: B

Intersection Capacity Utilization 74.4% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Hawthorne & Industrial Access & Russell



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	435	733	26	269	723	257	41	425	439	62	151	170
Future Volume (vph)	435	733	26	269	723	257	41	425	439	62	151	170
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	90.0		0.0	50.0		80.0	50.0		0.0	80.0		80.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor								0.99				
Frt		0.995				0.850		0.924				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1639	3338	0	1595	3402	1440	1488	2962	0	1191	2748	1278
Flt Permitted	0.950			0.950			0.656			0.100		
Satd. Flow (perm)	1639	3338	0	1595	3402	1440	1028	2962	0	125	2748	1278
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				203		183				175
Link Speed (k/h)		80			80			70			70	
Link Distance (m)		444.4			483.3			619.0			1801.8	
Travel Time (s)		20.0			21.7			31.8			92.7	
Confl. Peds. (#/hr)									3	3		
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 (%)	9%	6%	20%	12%	5%	11%	20%	12%	9%	50%	30%	25%
Adj. Flow (vph)	435	733	26	269	723	257	41	425	439	62	151	170
Shared Lane Traffic (%)												
Lane Group Flow (vph)	435	759	0	269	723	257	41	864	0	62	151	170
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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	18.6
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)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	18.6
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)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0	20.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.4	32.4		11.4	32.4	32.4	11.3	32.3		11.3	32.3	32.3
Total Split (s)	46.0	48.2		35.8	38.0	38.0	11.4	44.9		11.5	45.0	45.0
Total Split (%)	32.8%	34.3%		25.5%	27.1%	27.1%	8.1%	32.0%		8.2%	32.1%	32.1%
Maximum Green (s)	39.6	41.8		29.4	31.6	31.6	5.1	38.6		5.2	38.7	38.7
Yellow Time (s)	4.6	4.6		4.6	4.6	4.6	4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.8	1.8		1.8	1.8	1.8	2.1	2.1		2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4		6.4	6.4	6.4	6.3	6.3		6.3	6.3	6.3
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	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	Ped		None	Ped	Ped	None	None		None	None	None
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		1			1	1		1			1	1
Act Effct Green (s)	38.3	43.3		26.6	31.6	31.6	42.7	37.6		44.2	40.1	40.1
Actuated g/C Ratio	0.28	0.31		0.19	0.23	0.23	0.31	0.27		0.32	0.29	0.29
v/c Ratio	0.96	0.72		0.88	0.93	0.53	0.12	0.92		0.78	0.19	0.34
Control Delay	82.0	47.5		82.1	71.5	15.7	31.2	54.0		88.7	38.9	7.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	82.0	47.5		82.1	71.5	15.7	31.2	54.0		88.7	38.9	7.0
LOS	F	D		F	E	B	C	D		F	D	A
Approach Delay		60.1			62.3			53.0			32.8	
Approach LOS		E			E			D			C	
Queue Length 50th (m)	109.2	92.7		66.1	96.5	11.2	6.9	92.7		10.7	15.6	0.0
Queue Length 95th (m)	#168.1	114.3		#105.1	#131.0	36.3	14.8	#127.6		#30.6	24.3	15.1
Internal Link Dist (m)		420.4			459.3			595.0			1777.8	
Turn Bay Length (m)	90.0			50.0		80.0	50.0			80.0		80.0
Base Capacity (vph)	470	1048		339	778	486	334	960		80	797	495
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.93	0.72		0.79	0.93	0.53	0.12	0.90		0.78	0.19	0.34

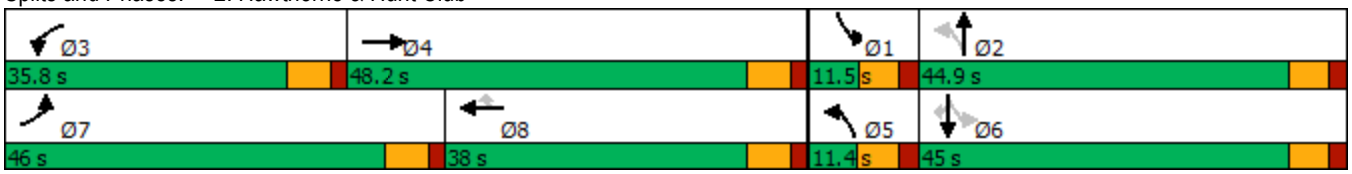
Intersection Summary			
Area Type:	Other		
Cycle Length: 140.4			
Actuated Cycle Length: 138.2			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 56.3		Intersection LOS: E	
Intersection Capacity Utilization 99.3%		ICU Level of Service F	

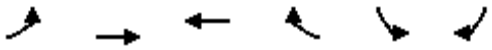
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

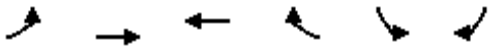
Queue shown is maximum after two cycles.

Splits and Phases: 2: Hawthorne & Hunt Club





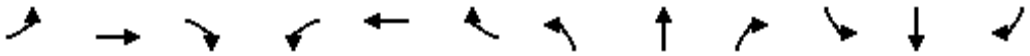
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	26	1093	1494	69	15	15
Future Volume (vph)	26	1093	1494	69	15	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0			0.0	30.0	0.0
Storage Lanes	1			0	0	0
Taper Length (m)	10.0				10.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.993		0.932	
Flt Protected	0.950				0.976	
Satd. Flow (prot)	1701	3402	3378	0	1629	0
Flt Permitted	0.950				0.976	
Satd. Flow (perm)	1701	3402	3378	0	1629	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6		15	
Link Speed (k/h)		80	80		50	
Link Distance (m)		483.3	877.4		161.8	
Travel Time (s)		21.7	39.5		11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	1093	1494	69	15	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	1093	1563	0	30	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		4.0	4.0		4.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		2.0	2.0		2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	18.6	93.0	93.0		18.6	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	18.6	5.5	5.5		18.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		87.5	87.5			
Detector 2 Size(m)		5.5	5.5			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		4	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	
Minimum Split (s)	11.4	24.3	25.6		32.7	
Total Split (s)	11.6	57.2	45.6		32.8	
Total Split (%)	12.9%	63.6%	50.7%		36.4%	
Maximum Green (s)	5.2	50.8	39.2		27.0	
Yellow Time (s)	4.6	4.6	4.6		3.7	
All-Red Time (s)	1.8	1.8	1.8		2.1	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.4	6.4	6.4		5.8	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	None	C-Min	C-Min		None	
Walk Time (s)			7.0		7.0	
Flash Dont Walk (s)			11.0		19.0	
Pedestrian Calls (#/hr)			0		0	
Act Effct Green (s)	6.9	78.2	72.4		6.6	
Actuated g/C Ratio	0.08	0.87	0.80		0.07	
v/c Ratio	0.20	0.37	0.58		0.22	
Control Delay	41.9	2.6	8.2		29.0	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	41.9	2.6	8.2		29.0	
LOS	D	A	A		C	
Approach Delay		3.5	8.2		29.0	
Approach LOS		A	A		C	
Queue Length 50th (m)	4.0	20.6	37.0		2.3	
Queue Length 95th (m)	10.8	31.9	115.5		9.6	
Internal Link Dist (m)		459.3	853.4		137.8	
Turn Bay Length (m)	30.0				30.0	
Base Capacity (vph)	131	2957	2717		499	
Starvation Cap Reductn	0	0	0		0	
Spillback Cap Reductn	0	0	0		0	
Storage Cap Reductn	0	0	0		0	
Reduced v/c Ratio	0.20	0.37	0.58		0.06	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 6.5	Intersection LOS: A
Intersection Capacity Utilization 60.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Hunt Club & Last Mile Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	57	24	0	608	0	52	0	0	0	0	0
Future Volume (vph)	0	57	24	0	608	0	52	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
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		0.960										
Flt Protected								0.950				
Satd. Flow (prot)	0	1719	0	0	1790	0	0	1701	0	0	1790	0
Flt Permitted								0.950				
Satd. Flow (perm)	0	1719	0	0	1790	0	0	1701	0	0	1790	0
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		448.2			179.8			60.0			43.4	
Travel Time (s)		20.2			8.1			4.3			3.1	
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
Adj. Flow (vph)	0	57	24	0	608	0	52	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	81	0	0	608	0	0	52	0	0	0	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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.2

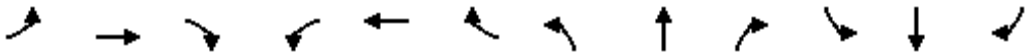
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	57	24	0	608	0	52	0	0	0	0	0
Future Vol, veh/h	0	57	24	0	608	0	52	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	57	24	0	608	0	52	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	608	0	0	81	0	0	677	677	69	677	689	608
Stage 1	-	-	-	-	-	-	69	69	-	608	608	-
Stage 2	-	-	-	-	-	-	608	608	-	69	81	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	956	-	-	1498	-	-	363	371	986	363	365	490
Stage 1	-	-	-	-	-	-	934	832	-	478	481	-
Stage 2	-	-	-	-	-	-	478	481	-	934	822	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	956	-	-	1498	-	-	363	371	986	363	365	490
Mov Cap-2 Maneuver	-	-	-	-	-	-	363	371	-	363	365	-
Stage 1	-	-	-	-	-	-	934	832	-	478	481	-
Stage 2	-	-	-	-	-	-	478	481	-	934	822	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	16.6	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	363	956	-	-	1498	-	-	-
HCM Lane V/C Ratio	0.143	-	-	-	-	-	-	-
HCM Control Delay (s)	16.6	0	-	-	0	-	-	0
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	8	23	15	3	151	8	737	16	245	895	18
Future Volume (vph)	38	8	23	15	3	151	8	737	16	245	895	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0		0.0	40.0		100.0	40.0		0.0	60.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00					0.99						
Frt		0.889				0.850		0.997			0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1468	0	1768	1139	1508	1232	3286	0	1639	3270	0
Flt Permitted	0.756			0.737			0.299			0.364		
Satd. Flow (perm)	1291	1468	0	1372	1139	1488	388	3286	0	628	3270	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23				151		5			4	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		87.3			183.0			1801.8			224.3	
Travel Time (s)		6.3			13.2			92.7			11.5	
Confl. Peds. (#/hr)	1					1						
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 (%)	10%	25%	10%	1%	65%	6%	45%	8%	25%	9%	9%	5%
Adj. Flow (vph)	38	8	23	15	3	151	8	737	16	245	895	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	31	0	15	3	151	8	753	0	245	913	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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	
Trailing Detector (m)	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	
Detector 1 Size(m)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Detector 2 Position(m)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	

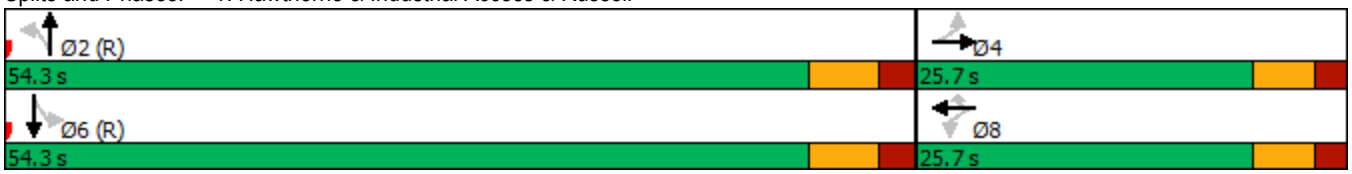


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	25.7	25.7		25.7	25.7	25.7	26.5	26.5		26.5	26.5	
Total Split (s)	25.7	25.7		25.7	25.7	25.7	54.3	54.3		54.3	54.3	
Total Split (%)	32.1%	32.1%		32.1%	32.1%	32.1%	67.9%	67.9%		67.9%	67.9%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	47.8	47.8		47.8	47.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.2	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.3	2.3		2.3	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7	5.7	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	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	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	1	1		1	1	1	1	1		1	1	
Act Effct Green (s)	12.0	12.0		12.0	12.0	12.0	55.8	55.8		55.8	55.8	
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.70	0.70		0.70	0.70	
v/c Ratio	0.20	0.13		0.07	0.02	0.43	0.03	0.33		0.56	0.40	
Control Delay	30.7	15.2		27.8	26.3	9.0	5.5	5.7		13.8	6.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	30.7	15.2		27.8	26.3	9.0	5.5	5.7		13.8	6.2	
LOS	C	B		C	C	A	A	A		B	A	
Approach Delay		23.7			11.0			5.7			7.8	
Approach LOS		C			B			A			A	
Queue Length 50th (m)	4.9	1.0		1.9	0.4	0.0	0.3	16.0		12.7	20.8	
Queue Length 95th (m)	10.8	6.6		5.7	2.1	12.1	2.0	35.6		#48.1	45.5	
Internal Link Dist (m)		63.3			159.0			1777.8			200.3	
Turn Bay Length (m)	20.0			40.0		100.0	40.0			60.0		
Base Capacity (vph)	322	384		343	284	485	270	2293		437	2281	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.12	0.08		0.04	0.01	0.31	0.03	0.33		0.56	0.40	

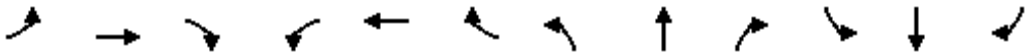
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 16 (20%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 7.8		Intersection LOS: A	

Intersection Capacity Utilization 60.8% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Hawthorne & Industrial Access & Russell



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	858	25	479	986	107	26	199	324	175	509	488
Future Volume (vph)	265	858	25	479	986	107	26	199	324	175	509	488
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	90.0		0.0	50.0		80.0	50.0		0.0	80.0		80.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00				0.99		1.00		
Frt		0.996				0.850		0.907				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1595	3422	0	1654	3468	1141	1717	2806	0	1609	3247	1522
Flt Permitted	0.950			0.950			0.393			0.146		
Satd. Flow (perm)	1595	3422	0	1653	3468	1141	710	2806	0	247	3247	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				166		251				470
Link Speed (k/h)		80			80			70			70	
Link Distance (m)		444.4			485.0			619.0			1801.8	
Travel Time (s)		20.0			21.8			31.8			92.7	
Confl. Peds. (#/hr)			1	1					1	1		
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 (%)	12%	4%	1%	8%	3%	40%	4%	25%	8%	11%	10%	5%
Adj. Flow (vph)	265	858	25	479	986	107	26	199	324	175	509	488
Shared Lane Traffic (%)												
Lane Group Flow (vph)	265	883	0	479	986	107	26	523	0	175	509	488
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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	18.6
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)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	18.6
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)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0	20.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.4	32.4		11.4	32.4	32.4	11.3	32.3		11.3	32.3	32.3
Total Split (s)	36.4	44.4		50.4	58.4	58.4	11.3	33.5		18.1	40.3	40.3
Total Split (%)	24.9%	30.3%		34.4%	39.9%	39.9%	7.7%	22.9%		12.4%	27.5%	27.5%
Maximum Green (s)	30.0	38.0		44.0	52.0	52.0	5.0	27.2		11.8	34.0	34.0
Yellow Time (s)	4.6	4.6		4.6	4.6	4.6	4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.8	1.8		1.8	1.8	1.8	2.1	2.1		2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4		6.4	6.4	6.4	6.3	6.3		6.3	6.3	6.3
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	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	Ped		None	Ped	Ped	None	None		None	None	None
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		1			1	1		1			1	1
Act Effct Green (s)	26.7	38.2		42.6	54.0	54.0	27.3	22.2		40.4	33.9	33.9
Actuated g/C Ratio	0.19	0.27		0.30	0.38	0.38	0.19	0.16		0.29	0.24	0.24
v/c Ratio	0.88	0.95		0.96	0.74	0.20	0.15	0.80		0.94	0.65	0.67
Control Delay	83.7	69.8		78.9	42.7	1.2	38.4	38.7		94.5	53.2	10.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	83.7	69.8		78.9	42.7	1.2	38.4	38.7		94.5	53.2	10.1
LOS	F	E		E	D	A	D	D		F	D	B
Approach Delay		73.0			50.9			38.7			41.4	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	68.2	124.4		126.5	124.6	0.0	4.9	36.8		36.3	65.7	3.8
Queue Length 95th (m)	#107.8	#165.9		#190.3	149.3	1.1	11.7	56.2		#74.1	84.1	35.7
Internal Link Dist (m)		420.4			461.0			595.0			1777.8	
Turn Bay Length (m)	90.0			50.0		80.0	50.0			80.0		80.0
Base Capacity (vph)	342	931		521	1335	541	173	748		186	802	730
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.77	0.95		0.92	0.74	0.20	0.15	0.70		0.94	0.63	0.67

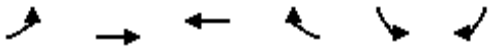
Intersection Summary			
Area Type:	Other		
Cycle Length: 146.4			
Actuated Cycle Length: 140.3			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 52.6		Intersection LOS: D	
Intersection Capacity Utilization 102.3%		ICU Level of Service G	

Analysis Period (min) 15

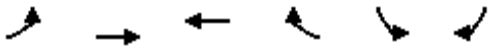
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Hawthorne & Hunt Club



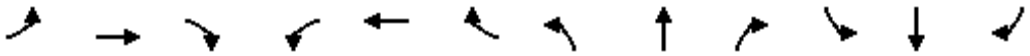
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	13	1371	1526	25	44	54
Future Volume (vph)	13	1371	1526	25	44	54
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0			0.0	30.0	0.0
Storage Lanes	1			0	0	0
Taper Length (m)	10.0				10.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.998		0.926	
Flt Protected	0.950				0.978	
Satd. Flow (prot)	1701	3402	3395	0	1622	0
Flt Permitted	0.950				0.978	
Satd. Flow (perm)	1701	3402	3395	0	1622	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			2		54	
Link Speed (k/h)		80	80		50	
Link Distance (m)		485.0	886.2		155.3	
Travel Time (s)		21.8	39.9		11.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	13	1371	1526	25	44	54
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	1371	1551	0	98	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		4.0	4.0		4.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		2.0	2.0		2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	18.6	93.0	93.0		18.6	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	18.6	5.5	5.5		18.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		87.5	87.5			
Detector 2 Size(m)		5.5	5.5			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		4	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	
Minimum Split (s)	11.4	24.4	24.4		31.8	
Total Split (s)	11.4	58.2	46.8		31.8	
Total Split (%)	12.7%	64.7%	52.0%		35.3%	
Maximum Green (s)	5.0	51.8	40.4		26.0	
Yellow Time (s)	4.6	4.6	4.6		3.7	
All-Red Time (s)	1.8	1.8	1.8		2.1	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.4	6.4	6.4		5.8	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	None	C-Min	C-Min		None	
Walk Time (s)			7.0		7.0	
Flash Dont Walk (s)			11.0		19.0	
Pedestrian Calls (#/hr)			0		0	
Act Effct Green (s)	6.3	73.0	70.2		8.3	
Actuated g/C Ratio	0.07	0.81	0.78		0.09	
v/c Ratio	0.11	0.50	0.59		0.49	
Control Delay	40.8	4.6	7.9		27.9	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	40.8	4.6	7.9		27.9	
LOS	D	A	A		C	
Approach Delay		4.9	7.9		27.9	
Approach LOS		A	A		C	
Queue Length 50th (m)	2.0	33.1	41.3		6.7	
Queue Length 95th (m)	7.0	56.2	122.6		19.2	
Internal Link Dist (m)		461.0	862.2		131.3	
Turn Bay Length (m)	30.0				30.0	
Base Capacity (vph)	118	2759	2648		506	
Starvation Cap Reductn	0	0	0		0	
Spillback Cap Reductn	0	0	0		0	
Storage Cap Reductn	0	0	0		0	
Reduced v/c Ratio	0.11	0.50	0.59		0.19	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 7.2	Intersection LOS: A
Intersection Capacity Utilization 61.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Hunt Club & Last Mile Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	461	56	0	56	0	30	0	0	0	0	0
Future Volume (vph)	0	461	56	0	56	0	30	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
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										
Flt Protected								0.950				
Satd. Flow (prot)	0	1764	0	0	1790	0	0	1701	0	0	1790	0
Flt Permitted								0.950				
Satd. Flow (perm)	0	1764	0	0	1790	0	0	1701	0	0	1790	0
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		190.2			170.3			78.3			58.1	
Travel Time (s)		8.6			7.7			5.6			4.2	
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
Adj. Flow (vph)	0	461	56	0	56	0	30	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	517	0	0	56	0	0	30	0	0	0	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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.2%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.7

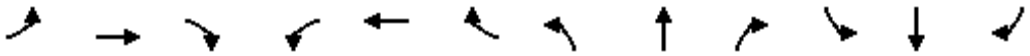
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	461	56	0	56	0	30	0	0	0	0	0
Future Vol, veh/h	0	461	56	0	56	0	30	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	461	56	0	56	0	30	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	56	0	0	517	0	0	545	545	489	545	573	56
Stage 1	-	-	-	-	-	-	489	489	-	56	56	-
Stage 2	-	-	-	-	-	-	56	56	-	489	517	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1530	-	-	1034	-	-	445	442	573	445	426	1002
Stage 1	-	-	-	-	-	-	555	544	-	949	842	-
Stage 2	-	-	-	-	-	-	949	842	-	555	529	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1530	-	-	1034	-	-	445	442	573	445	426	1002
Mov Cap-2 Maneuver	-	-	-	-	-	-	445	442	-	445	426	-
Stage 1	-	-	-	-	-	-	555	544	-	949	842	-
Stage 2	-	-	-	-	-	-	949	842	-	555	529	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	13.7	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	445	1530	-	-	1034	-	-	-
HCM Lane V/C Ratio	0.067	-	-	-	-	-	-	-
HCM Control Delay (s)	13.7	0	-	-	0	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	9	18	11	382	19	964	15	117	590	38
Future Volume (vph)	11	0	9	18	11	382	19	964	15	117	590	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0		0.0	40.0		100.0	40.0		0.0	60.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				1.00	
Frt		0.850				0.850		0.998			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1276	1278	0	1488	1790	1522	1701	3102	0	1488	2986	0
Flt Permitted	0.750			0.752			0.404			0.254		
Satd. Flow (perm)	1007	1278	0	1178	1790	1522	720	3102	0	398	2986	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		271				112		3			12	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		87.3			183.0			1801.8			224.3	
Travel Time (s)		6.3			13.2			92.7			11.5	
Confl. Peds. (#/hr)							5					5
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 (%)	40%	5%	25%	20%	5%	5%	5%	15%	10%	20%	19%	8%
Adj. Flow (vph)	11	0	9	18	11	382	19	964	15	117	590	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	9	0	18	11	382	19	979	0	117	628	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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	
Trailing Detector (m)	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	
Detector 1 Size(m)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Detector 2 Position(m)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	

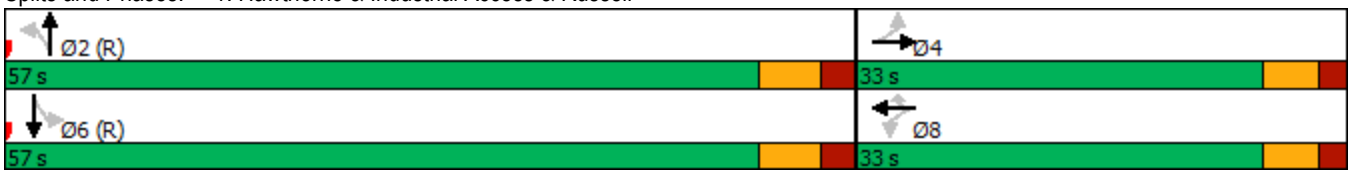


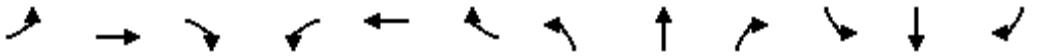
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	25.7	25.7		25.7	25.7	25.7	26.5	26.5		26.5	26.5	
Total Split (s)	33.0	33.0		33.0	33.0	33.0	57.0	57.0		57.0	57.0	
Total Split (%)	36.7%	36.7%		36.7%	36.7%	36.7%	63.3%	63.3%		63.3%	63.3%	
Maximum Green (s)	27.3	27.3		27.3	27.3	27.3	50.5	50.5		50.5	50.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.2	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.3	2.3		2.3	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7	5.7	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	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	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	1	1		1	1	1	1	1		1	1	
Act Effct Green (s)	22.2	22.2		22.2	22.2	22.2	55.6	55.6		55.6	55.6	
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25	0.62	0.62		0.62	0.62	
v/c Ratio	0.04	0.02		0.06	0.02	0.83	0.04	0.51		0.48	0.34	
Control Delay	23.1	0.1		23.5	22.5	37.9	9.0	11.7		19.7	9.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	23.1	0.1		23.5	22.5	37.9	9.0	11.7		19.7	9.7	
LOS	C	A		C	C	D	A	B		B	A	
Approach Delay		12.8			36.8			11.7			11.2	
Approach LOS		B			D			B			B	
Queue Length 50th (m)	1.3	0.0		2.1	1.3	39.8	1.2	45.1		10.0	24.5	
Queue Length 95th (m)	4.7	0.0		6.5	4.6	68.1	4.1	64.7		28.2	36.7	
Internal Link Dist (m)		63.3			159.0			1777.8			200.3	
Turn Bay Length (m)	20.0			40.0		100.0	40.0			60.0		
Base Capacity (vph)	305	576		357	542	539	444	1917		245	1849	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.04	0.02		0.05	0.02	0.71	0.04	0.51		0.48	0.34	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 23 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 16.3	Intersection LOS: B

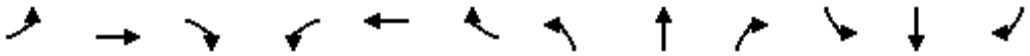
Intersection Capacity Utilization 76.8% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Hawthorne & Industrial Access & Russell





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	456	766	27	282	758	270	43	447	459	64	159	180
Future Volume (vph)	456	766	27	282	758	270	43	447	459	64	159	180
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	90.0		0.0	50.0		80.0	50.0		0.0	80.0		80.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor								0.99				
Frt		0.995				0.850		0.924				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1639	3338	0	1595	3402	1440	1488	2962	0	1191	2748	1278
Flt Permitted	0.950			0.950			0.651			0.097		
Satd. Flow (perm)	1639	3338	0	1595	3402	1440	1020	2962	0	122	2748	1278
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				189		183				180
Link Speed (k/h)		80			80			70			70	
Link Distance (m)		444.4			483.3			619.0			1801.8	
Travel Time (s)		20.0			21.7			31.8			92.7	
Confl. Peds. (#/hr)									3	3		
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 (%)	9%	6%	20%	12%	5%	11%	20%	12%	9%	50%	30%	25%
Adj. Flow (vph)	456	766	27	282	758	270	43	447	459	64	159	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	456	793	0	282	758	270	43	906	0	64	159	180
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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	18.6
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)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	18.6
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)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0	20.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.4	32.4		11.4	32.4	32.4	11.3	32.3		11.3	32.3	32.3
Total Split (s)	46.0	46.8		37.2	38.0	38.0	11.3	45.0		11.4	45.1	45.1
Total Split (%)	32.8%	33.3%		26.5%	27.1%	27.1%	8.0%	32.1%		8.1%	32.1%	32.1%
Maximum Green (s)	39.6	40.4		30.8	31.6	31.6	5.0	38.7		5.1	38.8	38.8
Yellow Time (s)	4.6	4.6		4.6	4.6	4.6	4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.8	1.8		1.8	1.8	1.8	2.1	2.1		2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4		6.4	6.4	6.4	6.3	6.3		6.3	6.3	6.3
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	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	Ped		None	Ped	Ped	None	None		None	None	None
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		1			1	1		1			1	1
Act Effct Green (s)	39.6	43.1		28.1	31.6	31.6	43.7	38.7		45.1	41.1	41.1
Actuated g/C Ratio	0.28	0.31		0.20	0.23	0.23	0.31	0.28		0.32	0.29	0.29
v/c Ratio	0.99	0.77		0.88	0.99	0.57	0.13	0.95		0.83	0.20	0.36
Control Delay	88.7	50.8		82.3	84.2	20.2	31.4	59.8		99.4	39.1	7.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	88.7	50.8		82.3	84.2	20.2	31.4	59.8		99.4	39.1	7.4
LOS	F	D		F	F	C	C	E		F	D	A
Approach Delay		64.6			70.6			58.6			34.5	
Approach LOS		E			E			E			C	
Queue Length 50th (m)	116.5	99.6		69.1	102.5	17.2	7.3	100.4		11.1	16.5	0.0
Queue Length 95th (m)	#180.3	122.7		#108.8	#141.1	44.5	15.4	#139.5		#32.8	25.4	16.8
Internal Link Dist (m)		420.4			459.3			595.0			1777.8	
Turn Bay Length (m)	90.0			50.0		80.0	50.0			80.0		80.0
Base Capacity (vph)	462	1025		349	765	470	334	949		77	803	501
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.99	0.77		0.81	0.99	0.57	0.13	0.95		0.83	0.20	0.36

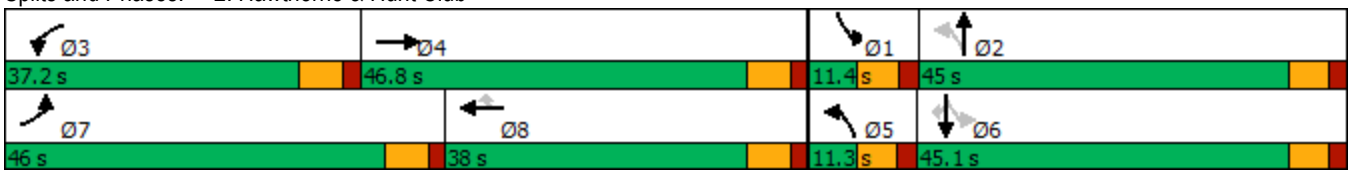
Intersection Summary			
Area Type:	Other		
Cycle Length: 140.4			
Actuated Cycle Length: 140.4			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 62.1		Intersection LOS: E	
Intersection Capacity Utilization 102.9%		ICU Level of Service G	

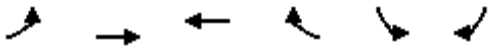
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

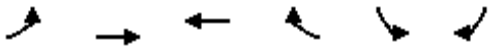
Queue shown is maximum after two cycles.

Splits and Phases: 2: Hawthorne & Hunt Club





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	26	1148	1572	69	15	15
Future Volume (vph)	26	1148	1572	69	15	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0			0.0	30.0	0.0
Storage Lanes	1			0	0	0
Taper Length (m)	10.0				10.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.994		0.932	
Flt Protected	0.950				0.976	
Satd. Flow (prot)	1701	3402	3381	0	1629	0
Flt Permitted	0.950				0.976	
Satd. Flow (perm)	1701	3402	3381	0	1629	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			6		15	
Link Speed (k/h)		80	80		50	
Link Distance (m)		483.3	877.4		161.8	
Travel Time (s)		21.7	39.5		11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	1148	1572	69	15	15
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	1148	1641	0	30	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		4.0	4.0		4.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		2.0	2.0		2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	18.6	93.0	93.0		18.6	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	18.6	5.5	5.5		18.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		87.5	87.5			
Detector 2 Size(m)		5.5	5.5			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		4	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	
Minimum Split (s)	11.4	24.3	25.6		32.7	
Total Split (s)	11.4	57.3	45.9		32.7	
Total Split (%)	12.7%	63.7%	51.0%		36.3%	
Maximum Green (s)	5.0	50.9	39.5		26.9	
Yellow Time (s)	4.6	4.6	4.6		3.7	
All-Red Time (s)	1.8	1.8	1.8		2.1	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.4	6.4	6.4		5.8	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	None	C-Min	C-Min		None	
Walk Time (s)			7.0		7.0	
Flash Dont Walk (s)			11.0		19.0	
Pedestrian Calls (#/hr)			0		0	
Act Effct Green (s)	6.9	78.2	72.4		6.6	
Actuated g/C Ratio	0.08	0.87	0.80		0.07	
v/c Ratio	0.20	0.39	0.60		0.22	
Control Delay	41.9	2.7	8.7		29.0	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	41.9	2.7	8.7		29.0	
LOS	D	A	A		C	
Approach Delay		3.6	8.7		29.0	
Approach LOS		A	A		C	
Queue Length 50th (m)	4.0	22.2	40.7		2.3	
Queue Length 95th (m)	10.8	34.2	126.9		9.6	
Internal Link Dist (m)		459.3	853.4		137.8	
Turn Bay Length (m)	30.0				30.0	
Base Capacity (vph)	131	2957	2720		497	
Starvation Cap Reductn	0	0	0		0	
Spillback Cap Reductn	0	0	0		0	
Storage Cap Reductn	0	0	0		0	
Reduced v/c Ratio	0.20	0.39	0.60		0.06	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 6.8	Intersection LOS: A
Intersection Capacity Utilization 62.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Hunt Club & Last Mile Drive

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	60	24	0	638	0	52	0	0	0	0	0
Future Volume (vph)	0	60	24	0	638	0	52	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
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		0.961										
Flt Protected								0.950				
Satd. Flow (prot)	0	1721	0	0	1790	0	0	1701	0	0	1790	0
Flt Permitted								0.950				
Satd. Flow (perm)	0	1721	0	0	1790	0	0	1701	0	0	1790	0
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		448.2			179.8			60.0			43.4	
Travel Time (s)		20.2			8.1			4.3			3.1	
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
Adj. Flow (vph)	0	60	24	0	638	0	52	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	84	0	0	638	0	0	52	0	0	0	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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.2

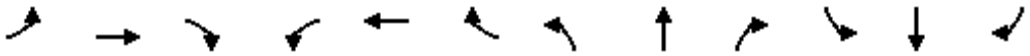
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	60	24	0	638	0	52	0	0	0	0	0
Future Vol, veh/h	0	60	24	0	638	0	52	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	60	24	0	638	0	52	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	638	0	0	84	0	0	710	710	72	710	722	638
Stage 1	-	-	-	-	-	-	72	72	-	638	638	-
Stage 2	-	-	-	-	-	-	638	638	-	72	84	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	932	-	-	1494	-	-	345	355	982	345	349	471
Stage 1	-	-	-	-	-	-	930	829	-	460	466	-
Stage 2	-	-	-	-	-	-	460	466	-	930	819	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	932	-	-	1494	-	-	345	355	982	345	349	471
Mov Cap-2 Maneuver	-	-	-	-	-	-	345	355	-	345	349	-
Stage 1	-	-	-	-	-	-	930	829	-	460	466	-
Stage 2	-	-	-	-	-	-	460	466	-	930	819	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	17.3	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	345	932	-	-	1494	-	-	-
HCM Lane V/C Ratio	0.151	-	-	-	-	-	-	-
HCM Control Delay (s)	17.3	0	-	-	0	-	-	0
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	8	24	15	3	155	8	773	17	256	939	19
Future Volume (vph)	39	8	24	15	3	155	8	773	17	256	939	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0		0.0	40.0		100.0	40.0		0.0	60.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00					0.99						
Frt		0.887				0.850		0.997			0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1466	0	1768	1139	1508	1232	3286	0	1639	3270	0
Flt Permitted	0.756			0.736			0.283			0.348		
Satd. Flow (perm)	1291	1466	0	1370	1139	1488	367	3286	0	600	3270	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24				155		5			4	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		87.3			183.0			1801.8			224.3	
Travel Time (s)		6.3			13.2			92.7			11.5	
Confl. Peds. (#/hr)	1					1						
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 (%)	10%	25%	10%	1%	65%	6%	45%	8%	25%	9%	9%	5%
Adj. Flow (vph)	39	8	24	15	3	155	8	773	17	256	939	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	32	0	15	3	155	8	790	0	256	958	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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	
Trailing Detector (m)	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	
Detector 1 Size(m)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Detector 2 Position(m)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	

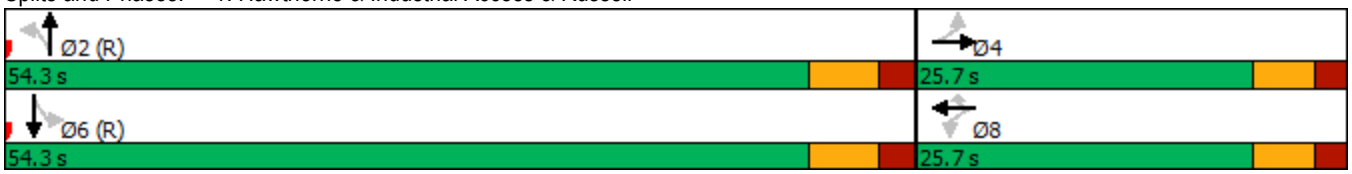


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	25.7	25.7		25.7	25.7	25.7	26.5	26.5		26.5	26.5	
Total Split (s)	25.7	25.7		25.7	25.7	25.7	54.3	54.3		54.3	54.3	
Total Split (%)	32.1%	32.1%		32.1%	32.1%	32.1%	67.9%	67.9%		67.9%	67.9%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	47.8	47.8		47.8	47.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.2	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.3	2.3		2.3	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7	5.7	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	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	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	1	1		1	1	1	1	1		1	1	
Act Effct Green (s)	12.0	12.0		12.0	12.0	12.0	55.8	55.8		55.8	55.8	
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.70	0.70		0.70	0.70	
v/c Ratio	0.20	0.13		0.07	0.02	0.44	0.03	0.34		0.61	0.42	
Control Delay	30.8	15.0		27.8	26.3	9.1	5.6	5.8		16.4	6.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	30.8	15.0		27.8	26.3	9.1	5.6	5.8		16.4	6.4	
LOS	C	B		C	C	A	A	A		B	A	
Approach Delay		23.7			11.0			5.8			8.5	
Approach LOS		C			B			A			A	
Queue Length 50th (m)	5.0	1.0		1.9	0.4	0.0	0.3	17.0		14.1	22.4	
Queue Length 95th (m)	11.0	6.7		5.7	2.1	12.2	2.0	37.7		#62.3	48.6	
Internal Link Dist (m)		63.3			159.0			1777.8			200.3	
Turn Bay Length (m)	20.0			40.0		100.0	40.0			60.0		
Base Capacity (vph)	322	384		342	284	488	256	2293		418	2281	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.12	0.08		0.04	0.01	0.32	0.03	0.34		0.61	0.42	

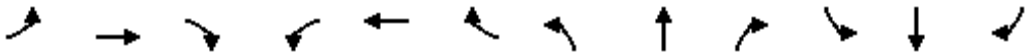
Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 16 (20%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 8.2	Intersection LOS: A

Intersection Capacity Utilization 62.6% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Hawthorne & Industrial Access & Russell



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	278	900	26	502	1031	111	27	209	340	184	535	513
Future Volume (vph)	278	900	26	502	1031	111	27	209	340	184	535	513
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	90.0		0.0	50.0		80.0	50.0		0.0	80.0		80.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00				0.99		1.00		
Frt		0.996				0.850		0.907				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1595	3422	0	1654	3468	1141	1717	2806	0	1609	3247	1522
Flt Permitted	0.950			0.950			0.372			0.127		
Satd. Flow (perm)	1595	3422	0	1653	3468	1141	672	2806	0	215	3247	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				166		249				480
Link Speed (k/h)		80			80			70			70	
Link Distance (m)		444.4			485.0			619.0			1801.8	
Travel Time (s)		20.0			21.8			31.8			92.7	
Confl. Peds. (#/hr)			1	1					1	1		
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 (%)	12%	4%	1%	8%	3%	40%	4%	25%	8%	11%	10%	5%
Adj. Flow (vph)	278	900	26	502	1031	111	27	209	340	184	535	513
Shared Lane Traffic (%)												
Lane Group Flow (vph)	278	926	0	502	1031	111	27	549	0	184	535	513
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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	18.6
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)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	18.6
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)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0	20.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.4	32.4		11.4	32.4	32.4	11.3	32.3		11.3	32.3	32.3
Total Split (s)	37.4	44.4		50.2	57.2	57.2	11.3	33.0		18.8	40.5	40.5
Total Split (%)	25.5%	30.3%		34.3%	39.1%	39.1%	7.7%	22.5%		12.8%	27.7%	27.7%
Maximum Green (s)	31.0	38.0		43.8	50.8	50.8	5.0	26.7		12.5	34.2	34.2
Yellow Time (s)	4.6	4.6		4.6	4.6	4.6	4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.8	1.8		1.8	1.8	1.8	2.1	2.1		2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4		6.4	6.4	6.4	6.3	6.3		6.3	6.3	6.3
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	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	Ped		None	Ped	Ped	None	None		None	None	None
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		1			1	1		1			1	1
Act Effct Green (s)	27.9	38.0		43.8	54.0	54.0	27.7	22.7		41.5	34.9	34.9
Actuated g/C Ratio	0.20	0.27		0.31	0.38	0.38	0.19	0.16		0.29	0.24	0.24
v/c Ratio	0.89	1.01		0.99	0.79	0.21	0.16	0.84		1.00	0.67	0.70
Control Delay	85.4	84.2		86.1	45.7	1.6	38.6	43.3		108.2	54.2	11.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	85.4	84.2		86.1	45.7	1.6	38.6	43.3		108.2	54.2	11.3
LOS	F	F		F	D	A	D	D		F	D	B
Approach Delay		84.5			55.1			43.1			44.4	
Approach LOS		F			E			D			D	
Queue Length 50th (m)	71.6	~140.2		~138.3	134.5	0.0	5.1	41.5		38.4	69.6	7.0
Queue Length 95th (m)	#113.1	#178.9		#204.8	160.6	1.9	11.9	61.6		#82.7	88.6	42.5
Internal Link Dist (m)		420.4			461.0			595.0			1777.8	
Turn Bay Length (m)	90.0			50.0		80.0	50.0			80.0		80.0
Base Capacity (vph)	347	914		508	1313	535	167	728		184	801	737
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.80	1.01		0.99	0.79	0.21	0.16	0.75		1.00	0.67	0.70

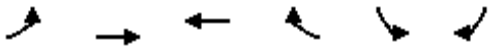
Intersection Summary			
Area Type:	Other		
Cycle Length: 146.4			
Actuated Cycle Length: 142.5			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 58.4		Intersection LOS: E	
Intersection Capacity Utilization 106.3%		ICU Level of Service G	

Analysis Period (min) 15

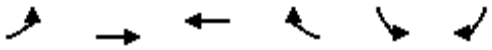
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Hawthorne & Hunt Club



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	13	1438	1604	25	44	54
Future Volume (vph)	13	1438	1604	25	44	54
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0			0.0	30.0	0.0
Storage Lanes	1			0	0	0
Taper Length (m)	10.0				10.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.998		0.926	
Flt Protected	0.950				0.978	
Satd. Flow (prot)	1701	3402	3395	0	1622	0
Flt Permitted	0.950				0.978	
Satd. Flow (perm)	1701	3402	3395	0	1622	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			2		54	
Link Speed (k/h)		80	80		50	
Link Distance (m)		485.0	886.2		155.3	
Travel Time (s)		21.8	39.9		11.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	13	1438	1604	25	44	54
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	1438	1629	0	98	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		4.0	4.0		4.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		2.0	2.0		2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	18.6	93.0	93.0		18.6	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	18.6	5.5	5.5		18.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		87.5	87.5			
Detector 2 Size(m)		5.5	5.5			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		4	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	
Minimum Split (s)	11.4	24.4	24.4		31.8	
Total Split (s)	11.4	58.2	46.8		31.8	
Total Split (%)	12.7%	64.7%	52.0%		35.3%	
Maximum Green (s)	5.0	51.8	40.4		26.0	
Yellow Time (s)	4.6	4.6	4.6		3.7	
All-Red Time (s)	1.8	1.8	1.8		2.1	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.4	6.4	6.4		5.8	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	None	C-Min	C-Min		None	
Walk Time (s)			7.0		7.0	
Flash Dont Walk (s)			11.0		19.0	
Pedestrian Calls (#/hr)			0		0	
Act Effct Green (s)	6.3	73.0	70.2		8.3	
Actuated g/C Ratio	0.07	0.81	0.78		0.09	
v/c Ratio	0.11	0.52	0.62		0.49	
Control Delay	40.8	4.8	8.5		27.9	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	40.8	4.8	8.5		27.9	
LOS	D	A	A		C	
Approach Delay		5.1	8.5		27.9	
Approach LOS		A	A		C	
Queue Length 50th (m)	2.0	36.1	45.2		6.7	
Queue Length 95th (m)	7.0	61.0	134.5		19.2	
Internal Link Dist (m)		461.0	862.2		131.3	
Turn Bay Length (m)	30.0				30.0	
Base Capacity (vph)	118	2759	2648		506	
Starvation Cap Reductn	0	0	0		0	
Spillback Cap Reductn	0	0	0		0	
Storage Cap Reductn	0	0	0		0	
Reduced v/c Ratio	0.11	0.52	0.62		0.19	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 7.5	Intersection LOS: A
Intersection Capacity Utilization 63.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Hunt Club & Last Mile Drive

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	484	56	0	58	0	30	0	0	0	0	0
Future Volume (vph)	0	484	56	0	58	0	30	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
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		0.986										
Flt Protected								0.950				
Satd. Flow (prot)	0	1765	0	0	1790	0	0	1701	0	0	1790	0
Flt Permitted								0.950				
Satd. Flow (perm)	0	1765	0	0	1790	0	0	1701	0	0	1790	0
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		190.2			170.3			78.3			58.1	
Travel Time (s)		8.6			7.7			5.6			4.2	
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
Adj. Flow (vph)	0	484	56	0	58	0	30	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	540	0	0	58	0	0	30	0	0	0	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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

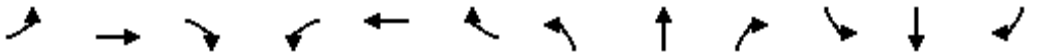
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	484	56	0	58	0	30	0	0	0	0	0
Future Vol, veh/h	0	484	56	0	58	0	30	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	484	56	0	58	0	30	0	0	0	0	0

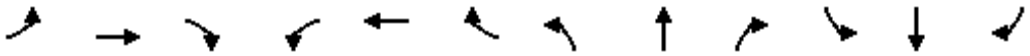
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	58	0	0	540	0	0	570	570	512	570	598	58
Stage 1	-	-	-	-	-	-	512	512	-	58	58	-
Stage 2	-	-	-	-	-	-	58	58	-	512	540	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1527	-	-	1013	-	-	428	427	556	428	412	1000
Stage 1	-	-	-	-	-	-	539	532	-	946	841	-
Stage 2	-	-	-	-	-	-	946	841	-	539	516	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1527	-	-	1013	-	-	428	427	556	428	412	1000
Mov Cap-2 Maneuver	-	-	-	-	-	-	428	427	-	428	412	-
Stage 1	-	-	-	-	-	-	539	532	-	946	841	-
Stage 2	-	-	-	-	-	-	946	841	-	539	516	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	14	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	428	1527	-	-	1013	-	-	-
HCM Lane V/C Ratio	0.07	-	-	-	-	-	-	-
HCM Control Delay (s)	14	0	-	-	0	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	9	17	11	369	18	918	16	126	563	36
Future Volume (vph)	11	0	9	17	11	369	18	918	16	126	563	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0		0.0	40.0		100.0	40.0		0.0	60.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				1.00	
Frt		0.850				0.850		0.997			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1276	1278	0	1488	1790	1522	1701	3099	0	1488	2986	0
Flt Permitted	0.750			0.752			0.422			0.275		
Satd. Flow (perm)	1007	1278	0	1178	1790	1522	752	3099	0	431	2986	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		297				131		3			12	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		87.3			183.0			1801.8			224.3	
Travel Time (s)		6.3			13.2			92.7			11.5	
Confl. Peds. (#/hr)							5					5
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 (%)	40%	5%	25%	20%	5%	5%	5%	15%	10%	20%	19%	8%
Adj. Flow (vph)	11	0	9	17	11	369	18	918	16	126	563	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	9	0	17	11	369	18	934	0	126	599	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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	
Trailing Detector (m)	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	
Detector 1 Size(m)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Detector 2 Position(m)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	

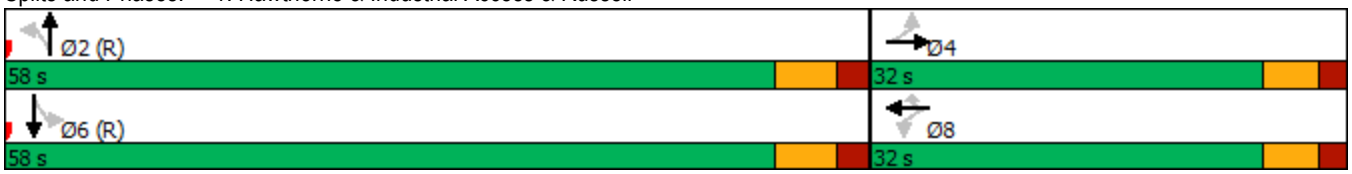


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	25.7	25.7		25.7	25.7	25.7	26.5	26.5		26.5	26.5	
Total Split (s)	32.0	32.0		32.0	32.0	32.0	58.0	58.0		58.0	58.0	
Total Split (%)	35.6%	35.6%		35.6%	35.6%	35.6%	64.4%	64.4%		64.4%	64.4%	
Maximum Green (s)	26.3	26.3		26.3	26.3	26.3	51.5	51.5		51.5	51.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.2	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.3	2.3		2.3	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7	5.7	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	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	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	1	1		1	1	1	1	1		1	1	
Act Effct Green (s)	20.6	20.6		20.6	20.6	20.6	57.2	57.2		57.2	57.2	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.64	0.64		0.64	0.64	
v/c Ratio	0.05	0.02		0.06	0.03	0.82	0.04	0.47		0.46	0.31	
Control Delay	24.1	0.1		24.4	23.5	35.8	8.4	10.5		17.5	8.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	24.1	0.1		24.4	23.5	35.8	8.4	10.5		17.5	8.8	
LOS	C	A		C	C	D	A	B		B	A	
Approach Delay		13.3			35.0			10.5			10.3	
Approach LOS		B			C			B			B	
Queue Length 50th (m)	1.3	0.0		2.1	1.3	35.7	1.0	38.7		9.8	21.2	
Queue Length 95th (m)	4.8	0.0		6.4	4.7	62.2	3.8	58.7		28.2	33.7	
Internal Link Dist (m)		63.3			159.0			1777.8			200.3	
Turn Bay Length (m)	20.0			40.0		100.0	40.0			60.0		
Base Capacity (vph)	294	583		344	523	537	478	1971		274	1903	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.04	0.02		0.05	0.02	0.69	0.04	0.47		0.46	0.31	

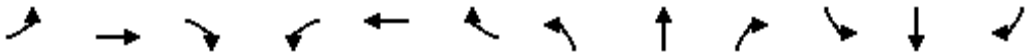
Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 23 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 15.1	Intersection LOS: B

Intersection Capacity Utilization 74.7% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Hawthorne & Industrial Access & Russell



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	436	737	26	269	724	257	41	425	439	62	151	170
Future Volume (vph)	436	737	26	269	724	257	41	425	439	62	151	170
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	90.0		0.0	50.0		80.0	50.0		0.0	80.0		80.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor								0.99				
Frt		0.995				0.850		0.924				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1639	3338	0	1595	3402	1440	1488	2962	0	1191	2748	1278
Flt Permitted	0.950			0.950			0.656			0.100		
Satd. Flow (perm)	1639	3338	0	1595	3402	1440	1028	2962	0	125	2748	1278
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				203		183				175
Link Speed (k/h)		80			80			70			70	
Link Distance (m)		444.4			483.3			619.0			1801.8	
Travel Time (s)		20.0			21.7			31.8			92.7	
Confl. Peds. (#/hr)									3	3		
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 (%)	9%	6%	20%	12%	5%	11%	20%	12%	9%	50%	30%	25%
Adj. Flow (vph)	436	737	26	269	724	257	41	425	439	62	151	170
Shared Lane Traffic (%)												
Lane Group Flow (vph)	436	763	0	269	724	257	41	864	0	62	151	170
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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	18.6
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)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	18.6
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)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0	20.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.4	32.4		11.4	32.4	32.4	11.3	32.3		11.3	32.3	32.3
Total Split (s)	46.0	48.2		35.8	38.0	38.0	11.4	44.9		11.5	45.0	45.0
Total Split (%)	32.8%	34.3%		25.5%	27.1%	27.1%	8.1%	32.0%		8.2%	32.1%	32.1%
Maximum Green (s)	39.6	41.8		29.4	31.6	31.6	5.1	38.6		5.2	38.7	38.7
Yellow Time (s)	4.6	4.6		4.6	4.6	4.6	4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.8	1.8		1.8	1.8	1.8	2.1	2.1		2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4		6.4	6.4	6.4	6.3	6.3		6.3	6.3	6.3
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	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	Ped		None	Ped	Ped	None	None		None	None	None
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		1			1	1		1			1	1
Act Effct Green (s)	38.4	43.4		26.6	31.6	31.6	42.7	37.6		44.3	40.2	40.2
Actuated g/C Ratio	0.28	0.31		0.19	0.23	0.23	0.31	0.27		0.32	0.29	0.29
v/c Ratio	0.96	0.73		0.88	0.93	0.53	0.12	0.92		0.78	0.19	0.34
Control Delay	82.4	47.6		82.2	71.8	15.7	31.2	54.0		88.7	38.9	7.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	82.4	47.6		82.2	71.8	15.7	31.2	54.0		88.7	38.9	7.0
LOS	F	D		F	E	B	C	D		F	D	A
Approach Delay		60.2			62.5			53.0			32.8	
Approach LOS		E			E			D			C	
Queue Length 50th (m)	109.5	93.3		66.1	96.7	11.2	6.9	92.7		10.7	15.6	0.0
Queue Length 95th (m)	#168.7	115.3		#105.1	#131.3	36.3	14.8	#127.6		#30.6	24.3	15.1
Internal Link Dist (m)		420.4			459.3			595.0			1777.8	
Turn Bay Length (m)	90.0			50.0		80.0	50.0			80.0		80.0
Base Capacity (vph)	470	1049		339	778	486	334	960		80	797	495
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.93	0.73		0.79	0.93	0.53	0.12	0.90		0.78	0.19	0.34

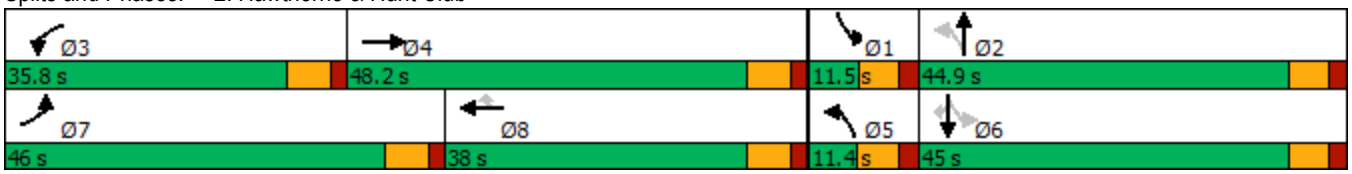
Intersection Summary			
Area Type:	Other		
Cycle Length: 140.4			
Actuated Cycle Length: 138.3			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 56.4		Intersection LOS: E	
Intersection Capacity Utilization 99.4%		ICU Level of Service F	

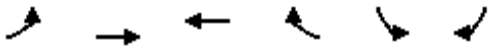
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

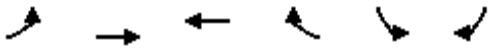
Queue shown is maximum after two cycles.

Splits and Phases: 2: Hawthorne & Hunt Club





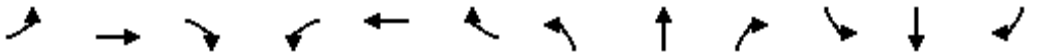
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	30	1093	1494	76	17	16
Future Volume (vph)	30	1093	1494	76	17	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0			0.0	30.0	0.0
Storage Lanes	1			0	0	0
Taper Length (m)	10.0				10.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.993		0.935	
Flt Protected	0.950				0.975	
Satd. Flow (prot)	1701	3402	3378	0	1632	0
Flt Permitted	0.950				0.975	
Satd. Flow (perm)	1701	3402	3378	0	1632	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			7		16	
Link Speed (k/h)		80	80		50	
Link Distance (m)		483.3	877.4		161.8	
Travel Time (s)		21.7	39.5		11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	1093	1494	76	17	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	30	1093	1570	0	33	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		4.0	4.0		4.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		2.0	2.0		2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	18.6	93.0	93.0		18.6	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	18.6	5.5	5.5		18.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		87.5	87.5			
Detector 2 Size(m)		5.5	5.5			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		4	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	
Minimum Split (s)	11.4	24.3	25.6		32.7	
Total Split (s)	11.6	57.3	45.7		32.7	
Total Split (%)	12.9%	63.7%	50.8%		36.3%	
Maximum Green (s)	5.2	50.9	39.3		26.9	
Yellow Time (s)	4.6	4.6	4.6		3.7	
All-Red Time (s)	1.8	1.8	1.8		2.1	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.4	6.4	6.4		5.8	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	None	C-Min	C-Min		None	
Walk Time (s)			7.0		7.0	
Flash Dont Walk (s)			11.0		19.0	
Pedestrian Calls (#/hr)			0		0	
Act Effct Green (s)	7.1	78.1	69.5		6.7	
Actuated g/C Ratio	0.08	0.87	0.77		0.07	
v/c Ratio	0.22	0.37	0.60		0.24	
Control Delay	42.2	2.7	10.0		29.3	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	42.2	2.7	10.0		29.3	
LOS	D	A	A		C	
Approach Delay		3.7	10.0		29.3	
Approach LOS		A	A		C	
Queue Length 50th (m)	4.6	20.8	77.7		2.6	
Queue Length 95th (m)	11.9	32.3	118.5		10.4	
Internal Link Dist (m)		459.3	853.4		137.8	
Turn Bay Length (m)	30.0				30.0	
Base Capacity (vph)	134	2953	2609		499	
Starvation Cap Reductn	0	0	0		0	
Spillback Cap Reductn	0	0	0		0	
Storage Cap Reductn	0	0	0		0	
Reduced v/c Ratio	0.22	0.37	0.60		0.07	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 7.6	Intersection LOS: A
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Hunt Club & Last Mile Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	57	36	3	608	0	56	0	1	0	0	0
Future Volume (vph)	0	57	36	3	608	0	56	0	1	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
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		0.948						0.998				
Flt Protected								0.953				
Satd. Flow (prot)	0	1697	0	0	1790	0	0	1703	0	0	1790	0
Flt Permitted								0.953				
Satd. Flow (perm)	0	1697	0	0	1790	0	0	1703	0	0	1790	0
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		448.2			179.8			60.0			43.4	
Travel Time (s)		20.2			8.1			4.3			3.1	
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
Adj. Flow (vph)	0	57	36	3	608	0	56	0	1	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	93	0	0	611	0	0	57	0	0	0	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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	57	36	3	608	0	56	0	1	0	0	0
Future Vol, veh/h	0	57	36	3	608	0	56	0	1	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	57	36	3	608	0	56	0	1	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	608	0	0	93	0	0	689	689	75	690	707	608
Stage 1	-	-	-	-	-	-	75	75	-	614	614	-
Stage 2	-	-	-	-	-	-	614	614	-	76	93	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	956	-	-	1483	-	-	356	365	978	355	356	490
Stage 1	-	-	-	-	-	-	927	827	-	474	478	-
Stage 2	-	-	-	-	-	-	474	478	-	926	812	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	956	-	-	1483	-	-	355	364	978	354	355	490
Mov Cap-2 Maneuver	-	-	-	-	-	-	355	364	-	354	355	-
Stage 1	-	-	-	-	-	-	927	827	-	474	477	-
Stage 2	-	-	-	-	-	-	473	477	-	925	812	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	16.9	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	359	956	-	-	1483	-	-	-
HCM Lane V/C Ratio	0.159	-	-	-	0.002	-	-	-
HCM Control Delay (s)	16.9	0	-	-	7.4	0	-	0
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	0	77	2	1	26
Future Volume (vph)	1	0	77	2	1	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.997			
Flt Protected	0.950					0.998
Satd. Flow (prot)	1701	0	1785	0	0	1787
Flt Permitted	0.950					0.998
Satd. Flow (perm)	1701	0	1785	0	0	1787
Link Speed (k/h)	50		50			50
Link Distance (m)	61.3		151.8			95.2
Travel Time (s)	4.4		10.9			6.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	0	77	2	1	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	79	0	0	27
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.0		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	2.0		2.0			2.0
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 14.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	0	77	2	1	26
Future Vol, veh/h	1	0	77	2	1	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	1	0	77	2	1	26

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	106	78	0	0	79	0
Stage 1	78	-	-	-	-	-
Stage 2	28	-	-	-	-	-
Critical Hdwy	6.45	6.25	-	-	4.15	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	884	974	-	-	1500	-
Stage 1	938	-	-	-	-	-
Stage 2	987	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	883	974	-	-	1500	-
Mov Cap-2 Maneuver	883	-	-	-	-	-
Stage 1	938	-	-	-	-	-
Stage 2	986	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	883	1500	-
HCM Lane V/C Ratio	-	-	0.001	0.001	-
HCM Control Delay (s)	-	-	9.1	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	68	9	13	25	2	4
Future Volume (vph)	68	9	13	25	2	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.984				0.910	
Flt Protected				0.983	0.984	
Satd. Flow (prot)	1762	0	0	1760	1603	0
Flt Permitted				0.983	0.984	
Satd. Flow (perm)	1762	0	0	1760	1603	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	164.7			48.8	46.2	
Travel Time (s)	11.9			3.5	3.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	68	9	13	25	2	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	77	0	0	38	6	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	4.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	2.0			2.0	2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		14	24		24	14
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			

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	68	9	13	25	2	4
Future Vol, veh/h	68	9	13	25	2	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	68	9	13	25	2	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	77	0	124	73
Stage 1	-	-	-	-	73	-
Stage 2	-	-	-	-	51	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1503	-	864	981
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	964	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1503	-	856	981
Mov Cap-2 Maneuver	-	-	-	-	856	-
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	955	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.5	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	935	-	-	1503	-
HCM Lane V/C Ratio	0.006	-	-	0.009	-
HCM Control Delay (s)	8.9	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	72	0	1	38	0	1
Future Volume (vph)	72	0	1	38	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.999		
Satd. Flow (prot)	1790	0	0	1789	1549	0
Flt Permitted				0.999		
Satd. Flow (perm)	1790	0	0	1789	1549	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	48.8			223.9	45.5	
Travel Time (s)	3.5			16.1	3.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	0	1	38	0	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	0	0	39	1	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	4.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	2.0			2.0	2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	14.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	72	0	1	38	0	1
Future Vol, veh/h	72	0	1	38	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	72	0	1	38	0	1

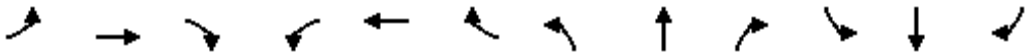
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	72	0	112	72
Stage 1	-	-	-	-	72	-
Stage 2	-	-	-	-	40	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1509	-	878	982
Stage 1	-	-	-	-	943	-
Stage 2	-	-	-	-	975	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1509	-	877	982
Mov Cap-2 Maneuver	-	-	-	-	877	-
Stage 1	-	-	-	-	943	-
Stage 2	-	-	-	-	974	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	982	-	-	1509	-
HCM Lane V/C Ratio	0.001	-	-	0.001	-
HCM Control Delay (s)	8.7	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

1: Hawthorne & Industrial Access & Russell

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	8	23	16	3	163	8	737	16	250	895	18
Future Volume (vph)	38	8	23	16	3	163	8	737	16	250	895	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0		0.0	40.0		100.0	40.0		0.0	60.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00					0.99						
Frt		0.889				0.850		0.997			0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1468	0	1768	1139	1508	1232	3286	0	1639	3270	0
Flt Permitted	0.756			0.737			0.299			0.364		
Satd. Flow (perm)	1291	1468	0	1372	1139	1488	388	3286	0	628	3270	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23				163		5			4	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		87.3			183.0			1801.8			224.3	
Travel Time (s)		6.3			13.2			92.7			11.5	
Confl. Peds. (#/hr)	1					1						
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 (%)	10%	25%	10%	1%	65%	6%	45%	8%	25%	9%	9%	5%
Adj. Flow (vph)	38	8	23	16	3	163	8	737	16	250	895	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	31	0	16	3	163	8	753	0	250	913	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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	
Trailing Detector (m)	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	
Detector 1 Size(m)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Detector 2 Position(m)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	

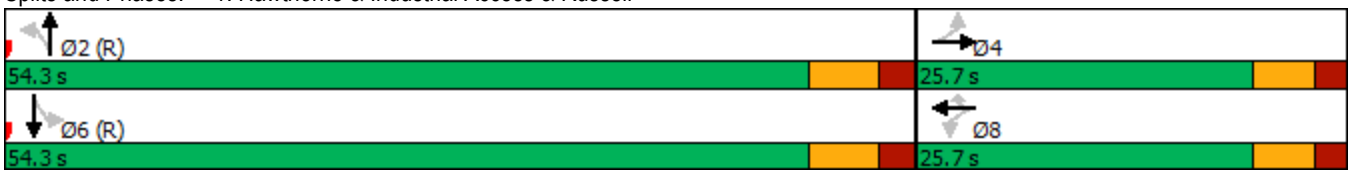


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	25.7	25.7		25.7	25.7	25.7	26.5	26.5		26.5	26.5	
Total Split (s)	25.7	25.7		25.7	25.7	25.7	54.3	54.3		54.3	54.3	
Total Split (%)	32.1%	32.1%		32.1%	32.1%	32.1%	67.9%	67.9%		67.9%	67.9%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	47.8	47.8		47.8	47.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.2	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.3	2.3		2.3	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7	5.7	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	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	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	1	1		1	1	1	1	1		1	1	
Act Effct Green (s)	12.0	12.0		12.0	12.0	12.0	55.8	55.8		55.8	55.8	
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.70	0.70		0.70	0.70	
v/c Ratio	0.20	0.13		0.08	0.02	0.45	0.03	0.33		0.57	0.40	
Control Delay	30.7	15.2		27.9	26.3	9.1	5.5	5.7		14.2	6.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	30.7	15.2		27.9	26.3	9.1	5.5	5.7		14.2	6.2	
LOS	C	B		C	C	A	A	A		B	A	
Approach Delay		23.7			11.0			5.7			7.9	
Approach LOS		C			B			A			A	
Queue Length 50th (m)	4.9	1.0		2.0	0.4	0.0	0.3	16.0		13.1	20.8	
Queue Length 95th (m)	10.8	6.6		5.9	2.1	12.6	2.0	35.6		#52.1	45.5	
Internal Link Dist (m)		63.3			159.0			1777.8			200.3	
Turn Bay Length (m)	20.0			40.0		100.0	40.0			60.0		
Base Capacity (vph)	322	384		343	284	494	270	2293		437	2281	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.12	0.08		0.05	0.01	0.33	0.03	0.33		0.57	0.40	

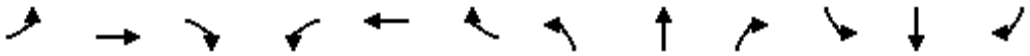
Intersection Summary		
Area Type:	Other	
Cycle Length: 80		
Actuated Cycle Length: 80		
Offset: 16 (20%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 70		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.57		
Intersection Signal Delay: 7.9	Intersection LOS: A	

Intersection Capacity Utilization 61.1% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Hawthorne & Industrial Access & Russell



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	860	25	479	990	107	26	199	324	175	509	489
Future Volume (vph)	265	860	25	479	990	107	26	199	324	175	509	489
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	90.0		0.0	50.0		80.0	50.0		0.0	80.0		80.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00				0.99		1.00		
Frt		0.996				0.850		0.907				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1595	3422	0	1654	3468	1141	1717	2806	0	1609	3247	1522
Flt Permitted	0.950			0.950			0.390			0.146		
Satd. Flow (perm)	1595	3422	0	1653	3468	1141	705	2806	0	247	3247	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				166		251				469
Link Speed (k/h)		80			80			70			70	
Link Distance (m)		444.4			485.0			619.0			1801.8	
Travel Time (s)		20.0			21.8			31.8			92.7	
Confl. Peds. (#/hr)			1	1					1	1		
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 (%)	12%	4%	1%	8%	3%	40%	4%	25%	8%	11%	10%	5%
Adj. Flow (vph)	265	860	25	479	990	107	26	199	324	175	509	489
Shared Lane Traffic (%)												
Lane Group Flow (vph)	265	885	0	479	990	107	26	523	0	175	509	489
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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	18.6
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)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	18.6
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)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0	20.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.4	32.4		11.4	32.4	32.4	11.3	32.3		11.3	32.3	32.3
Total Split (s)	36.3	44.5		50.4	58.6	58.6	11.3	33.5		18.0	40.2	40.2
Total Split (%)	24.8%	30.4%		34.4%	40.0%	40.0%	7.7%	22.9%		12.3%	27.5%	27.5%
Maximum Green (s)	29.9	38.1		44.0	52.2	52.2	5.0	27.2		11.7	33.9	33.9
Yellow Time (s)	4.6	4.6		4.6	4.6	4.6	4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.8	1.8		1.8	1.8	1.8	2.1	2.1		2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4		6.4	6.4	6.4	6.3	6.3		6.3	6.3	6.3
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	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	Ped		None	Ped	Ped	None	None		None	None	None
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		1			1	1		1			1	1
Act Effct Green (s)	26.6	38.3		42.6	54.2	54.2	27.3	22.2		40.3	33.8	33.8
Actuated g/C Ratio	0.19	0.27		0.30	0.39	0.39	0.19	0.16		0.29	0.24	0.24
v/c Ratio	0.88	0.95		0.96	0.74	0.20	0.15	0.80		0.95	0.65	0.68
Control Delay	83.9	69.6		78.9	42.6	1.2	38.5	38.7		95.9	53.4	10.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	83.9	69.6		78.9	42.6	1.2	38.5	38.7		95.9	53.4	10.3
LOS	F	E		E	D	A	D	D		F	D	B
Approach Delay		72.9			50.8			38.7			41.8	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	68.3	124.6		126.5	125.1	0.0	4.9	36.8		36.4	65.8	4.2
Queue Length 95th (m)	#108.1	#166.1		#190.3	149.7	1.1	11.7	56.2		#74.5	84.2	36.5
Internal Link Dist (m)		420.4			461.0			595.0			1777.8	
Turn Bay Length (m)	90.0			50.0		80.0	50.0			80.0		80.0
Base Capacity (vph)	341	934		521	1339	542	173	748		185	799	728
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.78	0.95		0.92	0.74	0.20	0.15	0.70		0.95	0.64	0.67

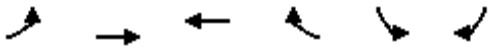
Intersection Summary			
Area Type:	Other		
Cycle Length: 146.4			
Actuated Cycle Length: 140.3			
Natural Cycle: 130			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 52.6		Intersection LOS: D	
Intersection Capacity Utilization 102.4%		ICU Level of Service G	

Analysis Period (min) 15

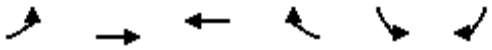
\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Hawthorne & Hunt Club



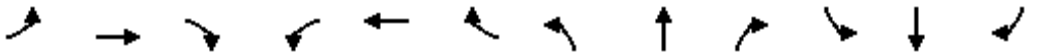
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	15	1371	1526	28	51	58
Future Volume (vph)	15	1371	1526	28	51	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0			0.0	30.0	0.0
Storage Lanes	1			0	0	0
Taper Length (m)	10.0				10.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.997		0.928	
Flt Protected	0.950				0.977	
Satd. Flow (prot)	1701	3402	3392	0	1623	0
Flt Permitted	0.950				0.977	
Satd. Flow (perm)	1701	3402	3392	0	1623	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			3		58	
Link Speed (k/h)		80	80		50	
Link Distance (m)		485.0	886.2		155.3	
Travel Time (s)		21.8	39.9		11.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	1371	1526	28	51	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	1371	1554	0	109	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		4.0	4.0		4.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		2.0	2.0		2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	18.6	93.0	93.0		18.6	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	18.6	5.5	5.5		18.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		87.5	87.5			
Detector 2 Size(m)		5.5	5.5			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		4	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	
Minimum Split (s)	11.4	24.4	24.4		31.8	
Total Split (s)	11.4	58.2	46.8		31.8	
Total Split (%)	12.7%	64.7%	52.0%		35.3%	
Maximum Green (s)	5.0	51.8	40.4		26.0	
Yellow Time (s)	4.6	4.6	4.6		3.7	
All-Red Time (s)	1.8	1.8	1.8		2.1	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.4	6.4	6.4		5.8	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	None	C-Min	C-Min		None	
Walk Time (s)			7.0		7.0	
Flash Dont Walk (s)			11.0		19.0	
Pedestrian Calls (#/hr)			0		0	
Act Effct Green (s)	6.4	72.6	69.8		8.7	
Actuated g/C Ratio	0.07	0.81	0.78		0.10	
v/c Ratio	0.12	0.50	0.59		0.52	
Control Delay	40.9	4.8	8.3		28.6	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	40.9	4.8	8.3		28.6	
LOS	D	A	A		C	
Approach Delay		5.2	8.3		28.6	
Approach LOS		A	A		C	
Queue Length 50th (m)	2.3	34.1	42.4		7.8	
Queue Length 95th (m)	7.6	58.3	126.4		20.9	
Internal Link Dist (m)		461.0	862.2		131.3	
Turn Bay Length (m)	30.0				30.0	
Base Capacity (vph)	120	2745	2631		510	
Starvation Cap Reductn	0	0	0		0	
Spillback Cap Reductn	0	0	0		0	
Storage Cap Reductn	0	0	0		0	
Reduced v/c Ratio	0.13	0.50	0.59		0.21	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 7.6	Intersection LOS: A
Intersection Capacity Utilization 62.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Hunt Club & Last Mile Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	461	62	1	56	0	42	0	3	0	0	0
Future Volume (vph)	0	461	62	1	56	0	42	0	3	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
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						0.991				
Flt Protected					0.999			0.955				
Satd. Flow (prot)	0	1762	0	0	1789	0	0	1695	0	0	1790	0
Flt Permitted					0.999			0.955				
Satd. Flow (perm)	0	1762	0	0	1789	0	0	1695	0	0	1790	0
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		190.2			170.3			78.3			58.1	
Travel Time (s)		8.6			7.7			5.6			4.2	
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
Adj. Flow (vph)	0	461	62	1	56	0	42	0	3	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	523	0	0	57	0	0	45	0	0	0	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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 39.6%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	461	62	1	56	0	42	0	3	0	0	0
Future Vol, veh/h	0	461	62	1	56	0	42	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	461	62	1	56	0	42	0	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	56	0	0	523	0	0	550	550	492	552	581	56
Stage 1	-	-	-	-	-	-	492	492	-	58	58	-
Stage 2	-	-	-	-	-	-	58	58	-	494	523	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1530	-	-	1028	-	-	441	439	571	440	421	1002
Stage 1	-	-	-	-	-	-	553	543	-	946	841	-
Stage 2	-	-	-	-	-	-	946	841	-	551	526	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1530	-	-	1028	-	-	441	439	571	437	421	1002
Mov Cap-2 Maneuver	-	-	-	-	-	-	441	439	-	437	421	-
Stage 1	-	-	-	-	-	-	553	543	-	946	840	-
Stage 2	-	-	-	-	-	-	945	840	-	548	526	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	13.9	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	448	1530	-	-	1028	-	-	-
HCM Lane V/C Ratio	0.1	-	-	-	0.001	-	-	-
HCM Control Delay (s)	13.9	0	-	-	8.5	0	-	0
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	3	1	37	1	1	80
Future Volume (vph)	3	1	37	1	1	80
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.966		0.996			
Flt Protected	0.964					0.999
Satd. Flow (prot)	1667	0	1783	0	0	1789
Flt Permitted	0.964					0.999
Satd. Flow (perm)	1667	0	1783	0	0	1789
Link Speed (k/h)	50		50			50
Link Distance (m)	61.3		160.0			97.2
Travel Time (s)	4.4		11.5			7.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	3	1	37	1	1	80
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	38	0	0	81
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.0		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	2.0		2.0			2.0
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 15.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	1	37	1	1	80
Future Vol, veh/h	3	1	37	1	1	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	3	1	37	1	1	80

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	120	38	0	0	38	0
Stage 1	38	-	-	-	-	-
Stage 2	82	-	-	-	-	-
Critical Hdwy	6.45	6.25	-	-	4.15	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	868	1025	-	-	1553	-
Stage 1	977	-	-	-	-	-
Stage 2	934	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	867	1025	-	-	1553	-
Mov Cap-2 Maneuver	867	-	-	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	933	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	902	1553	-
HCM Lane V/C Ratio	-	-	0.004	0.001	-
HCM Control Delay (s)	-	-	9	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	33	5	5	73	8	13
Future Volume (vph)	33	5	5	73	8	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.982				0.916	
Flt Protected				0.997	0.981	
Satd. Flow (prot)	1758	0	0	1785	1609	0
Flt Permitted				0.997	0.981	
Satd. Flow (perm)	1758	0	0	1785	1609	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	164.7			43.6	46.2	
Travel Time (s)	11.9			3.1	3.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	33	5	5	73	8	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	0	0	78	21	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	4.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	2.0			2.0	2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		14	24		24	14
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			

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	33	5	5	73	8	13
Future Vol, veh/h	33	5	5	73	8	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	33	5	5	73	8	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	38	0	119	36
Stage 1	-	-	-	-	36	-
Stage 2	-	-	-	-	83	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1553	-	870	1028
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	933	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1553	-	867	1028
Mov Cap-2 Maneuver	-	-	-	-	867	-
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	930	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	960	-	-	1553	-
HCM Lane V/C Ratio	0.022	-	-	0.003	-
HCM Control Delay (s)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	46	0	2	77	0	1
Future Volume (vph)	46	0	2	77	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.999		
Satd. Flow (prot)	1790	0	0	1789	1549	0
Flt Permitted				0.999		
Satd. Flow (perm)	1790	0	0	1789	1549	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	43.6			212.9	34.2	
Travel Time (s)	3.1			15.3	2.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	46	0	2	77	0	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	46	0	0	79	1	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	4.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	2.0			2.0	2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	16.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	46	0	2	77	0	1
Future Vol, veh/h	46	0	2	77	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	46	0	2	77	0	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	46	0	127	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	81	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1543	-	860	1015
Stage 1	-	-	-	-	969	-
Stage 2	-	-	-	-	935	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1543	-	859	1015
Mov Cap-2 Maneuver	-	-	-	-	859	-
Stage 1	-	-	-	-	969	-
Stage 2	-	-	-	-	934	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1015	-	-	1543	-
HCM Lane V/C Ratio	0.001	-	-	0.001	-
HCM Control Delay (s)	8.6	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

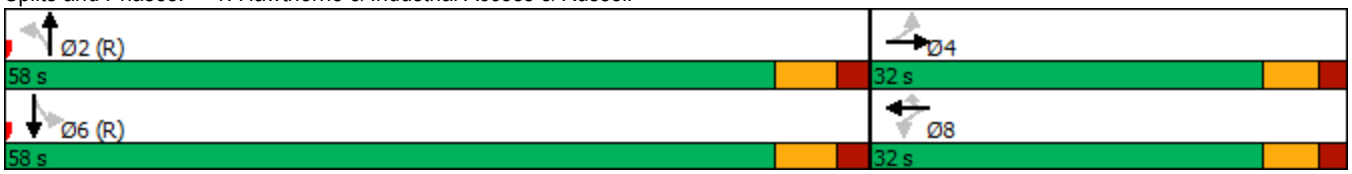
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	0	9	18	11	386	19	964	16	128	590	38
Future Volume (vph)	11	0	9	18	11	386	19	964	16	128	590	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0		0.0	40.0		100.0	40.0		0.0	60.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				1.00	
Frt		0.850				0.850		0.998			0.991	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1276	1278	0	1488	1790	1522	1701	3102	0	1488	2986	0
Flt Permitted	0.750			0.752			0.405			0.255		
Satd. Flow (perm)	1007	1278	0	1178	1790	1522	722	3102	0	400	2986	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		279				118		3			12	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		87.3			183.0			1801.8			224.3	
Travel Time (s)		6.3			13.2			92.7			11.5	
Confl. Peds. (#/hr)							5					5
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 (%)	40%	5%	25%	20%	5%	5%	5%	15%	10%	20%	19%	8%
Adj. Flow (vph)	11	0	9	18	11	386	19	964	16	128	590	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	9	0	18	11	386	19	980	0	128	628	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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	
Trailing Detector (m)	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	
Detector 1 Size(m)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Detector 2 Position(m)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	25.7	25.7		25.7	25.7	25.7	26.5	26.5		26.5	26.5	
Total Split (s)	32.0	32.0		32.0	32.0	32.0	58.0	58.0		58.0	58.0	
Total Split (%)	35.6%	35.6%		35.6%	35.6%	35.6%	64.4%	64.4%		64.4%	64.4%	
Maximum Green (s)	26.3	26.3		26.3	26.3	26.3	51.5	51.5		51.5	51.5	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.2	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.3	2.3		2.3	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7	5.7	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	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	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	1	1		1	1	1	1	1		1	1	
Act Effct Green (s)	21.9	21.9		21.9	21.9	21.9	55.9	55.9		55.9	55.9	
Actuated g/C Ratio	0.24	0.24		0.24	0.24	0.24	0.62	0.62		0.62	0.62	
v/c Ratio	0.04	0.02		0.06	0.03	0.84	0.04	0.51		0.52	0.34	
Control Delay	23.7	0.1		24.1	23.2	38.6	8.6	11.4		20.9	9.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	23.7	0.1		24.1	23.2	38.6	8.6	11.4		20.9	9.4	
LOS	C	A		C	C	D	A	B		C	A	
Approach Delay		13.1			37.6			11.4			11.3	
Approach LOS		B			D			B			B	
Queue Length 50th (m)	1.3	0.0		2.1	1.3	39.5	1.2	45.4		11.4	24.6	
Queue Length 95th (m)	4.8	0.0		6.6	4.7	#69.9	4.0	62.8		31.2	35.6	
Internal Link Dist (m)		63.3			159.0			1777.8			200.3	
Turn Bay Length (m)	20.0			40.0		100.0	40.0			60.0		
Base Capacity (vph)	294	570		344	523	528	448	1927		248	1859	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.04	0.02		0.05	0.02	0.73	0.04	0.51		0.52	0.34	

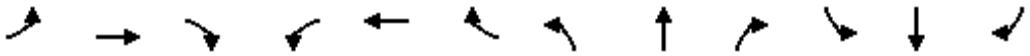
Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 23 (26%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 16.3		Intersection LOS: B	

Intersection Capacity Utilization 77.1% 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: 1: Hawthorne & Industrial Access & Russell



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	457	770	27	282	759	270	43	447	459	64	159	180
Future Volume (vph)	457	770	27	282	759	270	43	447	459	64	159	180
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	90.0		0.0	50.0		80.0	50.0		0.0	80.0		80.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor								0.99				
Frt		0.995				0.850		0.924				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1639	3338	0	1595	3402	1440	1488	2962	0	1191	2748	1278
Flt Permitted	0.950			0.950			0.651			0.098		
Satd. Flow (perm)	1639	3338	0	1595	3402	1440	1020	2962	0	123	2748	1278
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				189		182				180
Link Speed (k/h)		80			80			70			70	
Link Distance (m)		444.4			483.3			619.0			1801.8	
Travel Time (s)		20.0			21.7			31.8			92.7	
Confl. Peds. (#/hr)									3	3		
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 (%)	9%	6%	20%	12%	5%	11%	20%	12%	9%	50%	30%	25%
Adj. Flow (vph)	457	770	27	282	759	270	43	447	459	64	159	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	457	797	0	282	759	270	43	906	0	64	159	180
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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	18.6
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)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	18.6
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)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0	20.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.4	32.4		11.4	32.4	32.4	11.3	32.3		11.3	32.3	32.3
Total Split (s)	46.0	46.9		37.2	38.1	38.1	11.3	44.9		11.4	45.0	45.0
Total Split (%)	32.8%	33.4%		26.5%	27.1%	27.1%	8.0%	32.0%		8.1%	32.1%	32.1%
Maximum Green (s)	39.6	40.5		30.8	31.7	31.7	5.0	38.6		5.1	38.7	38.7
Yellow Time (s)	4.6	4.6		4.6	4.6	4.6	4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.8	1.8		1.8	1.8	1.8	2.1	2.1		2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4		6.4	6.4	6.4	6.3	6.3		6.3	6.3	6.3
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	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	Ped		None	Ped	Ped	None	None		None	None	None
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		1			1	1		1			1	1
Act Effct Green (s)	39.6	43.2		28.1	31.7	31.7	43.6	38.6		45.0	41.0	41.0
Actuated g/C Ratio	0.28	0.31		0.20	0.23	0.23	0.31	0.27		0.32	0.29	0.29
v/c Ratio	0.99	0.78		0.88	0.99	0.57	0.13	0.96		0.82	0.20	0.36
Control Delay	89.2	50.9		82.3	83.5	20.1	31.5	60.5		97.4	39.2	7.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	89.2	50.9		82.3	83.5	20.1	31.5	60.5		97.4	39.2	7.4
LOS	F	D		F	F	C	C	E		F	D	A
Approach Delay		64.8			70.2			59.2			34.2	
Approach LOS		E			E			E			C	
Queue Length 50th (m)	116.8	100.2		69.1	102.7	17.2	7.3	100.6		11.1	16.5	0.0
Queue Length 95th (m)	#180.9	123.4		#108.8	#141.0	44.5	15.4	#140.0		#32.7	25.5	16.9
Internal Link Dist (m)		420.4			459.3			595.0			1777.8	
Turn Bay Length (m)	90.0			50.0		80.0	50.0			80.0		80.0
Base Capacity (vph)	462	1027		349	768	471	333	946		78	801	500
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.99	0.78		0.81	0.99	0.57	0.13	0.96		0.82	0.20	0.36

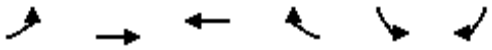
Intersection Summary			
Area Type:	Other		
Cycle Length: 140.4			
Actuated Cycle Length: 140.4			
Natural Cycle: 120			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 62.1		Intersection LOS: E	
Intersection Capacity Utilization 103.0%		ICU Level of Service G	

Analysis Period (min) 15

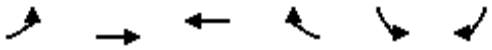
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Hawthorne & Hunt Club



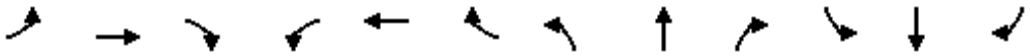
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	30	1148	1572	76	17	16
Future Volume (vph)	30	1148	1572	76	17	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0			0.0	30.0	0.0
Storage Lanes	1			0	0	0
Taper Length (m)	10.0				10.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.993		0.935	
Flt Protected	0.950				0.975	
Satd. Flow (prot)	1701	3402	3378	0	1632	0
Flt Permitted	0.950				0.975	
Satd. Flow (perm)	1701	3402	3378	0	1632	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			7		16	
Link Speed (k/h)		80	80		50	
Link Distance (m)		483.3	877.4		161.8	
Travel Time (s)		21.7	39.5		11.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	1148	1572	76	17	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	30	1148	1648	0	33	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		4.0	4.0		4.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		2.0	2.0		2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	18.6	93.0	93.0		18.6	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	18.6	5.5	5.5		18.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		87.5	87.5			
Detector 2 Size(m)		5.5	5.5			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		4	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	
Minimum Split (s)	11.4	24.3	25.6		32.7	
Total Split (s)	11.4	57.3	45.9		32.7	
Total Split (%)	12.7%	63.7%	51.0%		36.3%	
Maximum Green (s)	5.0	50.9	39.5		26.9	
Yellow Time (s)	4.6	4.6	4.6		3.7	
All-Red Time (s)	1.8	1.8	1.8		2.1	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.4	6.4	6.4		5.8	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	None	C-Min	C-Min		None	
Walk Time (s)			7.0		7.0	
Flash Dont Walk (s)			11.0		19.0	
Pedestrian Calls (#/hr)			0		0	
Act Effct Green (s)	7.1	78.1	69.5		6.7	
Actuated g/C Ratio	0.08	0.87	0.77		0.07	
v/c Ratio	0.22	0.39	0.63		0.24	
Control Delay	42.2	2.8	10.6		29.3	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	42.2	2.8	10.6		29.3	
LOS	D	A	B		C	
Approach Delay		3.8	10.6		29.3	
Approach LOS		A	B		C	
Queue Length 50th (m)	4.6	22.3	85.3		2.6	
Queue Length 95th (m)	11.9	34.6	130.0		10.4	
Internal Link Dist (m)		459.3	853.4		137.8	
Turn Bay Length (m)	30.0				30.0	
Base Capacity (vph)	134	2953	2609		499	
Starvation Cap Reductn	0	0	0		0	
Spillback Cap Reductn	0	0	0		0	
Storage Cap Reductn	0	0	0		0	
Reduced v/c Ratio	0.22	0.39	0.63		0.07	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 8.0	Intersection LOS: A
Intersection Capacity Utilization 62.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Hunt Club & Last Mile Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	60	36	3	638	0	56	0	1	0	0	0
Future Volume (vph)	0	60	36	3	638	0	56	0	1	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
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		0.949						0.998				
Flt Protected								0.953				
Satd. Flow (prot)	0	1699	0	0	1790	0	0	1703	0	0	1790	0
Flt Permitted								0.953				
Satd. Flow (perm)	0	1699	0	0	1790	0	0	1703	0	0	1790	0
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		448.2			179.8			60.0			43.4	
Travel Time (s)		20.2			8.1			4.3			3.1	
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
Adj. Flow (vph)	0	60	36	3	638	0	56	0	1	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	96	0	0	641	0	0	57	0	0	0	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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	60	36	3	638	0	56	0	1	0	0	0
Future Vol, veh/h	0	60	36	3	638	0	56	0	1	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	60	36	3	638	0	56	0	1	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	638	0	0	96	0	0	722	722	78	723	740	638
Stage 1	-	-	-	-	-	-	78	78	-	644	644	-
Stage 2	-	-	-	-	-	-	644	644	-	79	96	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	932	-	-	1479	-	-	338	349	974	338	341	471
Stage 1	-	-	-	-	-	-	923	824	-	456	463	-
Stage 2	-	-	-	-	-	-	456	463	-	922	810	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	932	-	-	1479	-	-	337	348	974	337	340	471
Mov Cap-2 Maneuver	-	-	-	-	-	-	337	348	-	337	340	-
Stage 1	-	-	-	-	-	-	923	824	-	456	462	-
Stage 2	-	-	-	-	-	-	455	462	-	921	810	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	17.7	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	341	932	-	-	1479	-	-	-
HCM Lane V/C Ratio	0.167	-	-	-	0.002	-	-	-
HCM Control Delay (s)	17.7	0	-	-	7.4	0	-	0
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	1	0	77	2	1	26
Future Volume (vph)	1	0	77	2	1	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.997			
Flt Protected	0.950					0.998
Satd. Flow (prot)	1701	0	1785	0	0	1787
Flt Permitted	0.950					0.998
Satd. Flow (perm)	1701	0	1785	0	0	1787
Link Speed (k/h)	50		50			50
Link Distance (m)	61.3		151.8			95.2
Travel Time (s)	4.4		10.9			6.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	0	77	2	1	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	79	0	0	27
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.0		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	2.0		2.0			2.0
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 14.4%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	0	77	2	1	26
Future Vol, veh/h	1	0	77	2	1	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	1	0	77	2	1	26

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	106	78	0	0	79	0
Stage 1	78	-	-	-	-	-
Stage 2	28	-	-	-	-	-
Critical Hdwy	6.45	6.25	-	-	4.15	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	884	974	-	-	1500	-
Stage 1	938	-	-	-	-	-
Stage 2	987	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	883	974	-	-	1500	-
Mov Cap-2 Maneuver	883	-	-	-	-	-
Stage 1	938	-	-	-	-	-
Stage 2	986	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	883	1500	-
HCM Lane V/C Ratio	-	-	0.001	0.001	-
HCM Control Delay (s)	-	-	9.1	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	68	9	13	25	2	4
Future Volume (vph)	68	9	13	25	2	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.984				0.910	
Flt Protected				0.983	0.984	
Satd. Flow (prot)	1762	0	0	1760	1603	0
Flt Permitted				0.983	0.984	
Satd. Flow (perm)	1762	0	0	1760	1603	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	164.7			48.8	46.2	
Travel Time (s)	11.9			3.5	3.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	68	9	13	25	2	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	77	0	0	38	6	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	4.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	2.0			2.0	2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		14	24		24	14
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			

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	68	9	13	25	2	4
Future Vol, veh/h	68	9	13	25	2	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	68	9	13	25	2	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	77	0	124	73
Stage 1	-	-	-	-	73	-
Stage 2	-	-	-	-	51	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1503	-	864	981
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	964	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1503	-	856	981
Mov Cap-2 Maneuver	-	-	-	-	856	-
Stage 1	-	-	-	-	942	-
Stage 2	-	-	-	-	955	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.5	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	935	-	-	1503	-
HCM Lane V/C Ratio	0.006	-	-	0.009	-
HCM Control Delay (s)	8.9	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	72	0	1	38	0	1
Future Volume (vph)	72	0	1	38	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.999		
Satd. Flow (prot)	1790	0	0	1789	1549	0
Flt Permitted				0.999		
Satd. Flow (perm)	1790	0	0	1789	1549	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	48.8			223.9	45.5	
Travel Time (s)	3.5			16.1	3.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	0	1	38	0	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	0	0	39	1	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	4.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	2.0			2.0	2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	14.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	72	0	1	38	0	1
Future Vol, veh/h	72	0	1	38	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	72	0	1	38	0	1

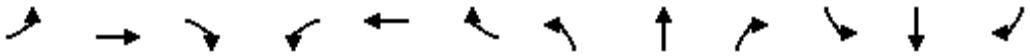
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	72	0	112	72
Stage 1	-	-	-	-	72	-
Stage 2	-	-	-	-	40	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1509	-	878	982
Stage 1	-	-	-	-	943	-
Stage 2	-	-	-	-	975	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1509	-	877	982
Mov Cap-2 Maneuver	-	-	-	-	877	-
Stage 1	-	-	-	-	943	-
Stage 2	-	-	-	-	974	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	982	-	-	1509	-
HCM Lane V/C Ratio	0.001	-	-	0.001	-
HCM Control Delay (s)	8.7	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

1: Hawthorne & Industrial Access & Russell

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	8	24	16	3	167	8	773	17	261	939	19
Future Volume (vph)	39	8	24	16	3	167	8	773	17	261	939	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	20.0		0.0	40.0		100.0	40.0		0.0	60.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00					0.99						
Frt		0.887				0.850		0.997			0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1624	1466	0	1768	1139	1508	1232	3286	0	1639	3270	0
Flt Permitted	0.756			0.736			0.283			0.348		
Satd. Flow (perm)	1291	1466	0	1370	1139	1488	367	3286	0	600	3270	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24				167		5			4	
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		87.3			183.0			1801.8			224.3	
Travel Time (s)		6.3			13.2			92.7			11.5	
Confl. Peds. (#/hr)	1					1						
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 (%)	10%	25%	10%	1%	65%	6%	45%	8%	25%	9%	9%	5%
Adj. Flow (vph)	39	8	24	16	3	167	8	773	17	261	939	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	32	0	16	3	167	8	790	0	261	958	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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	
Trailing Detector (m)	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	
Detector 1 Size(m)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Detector 2 Position(m)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	

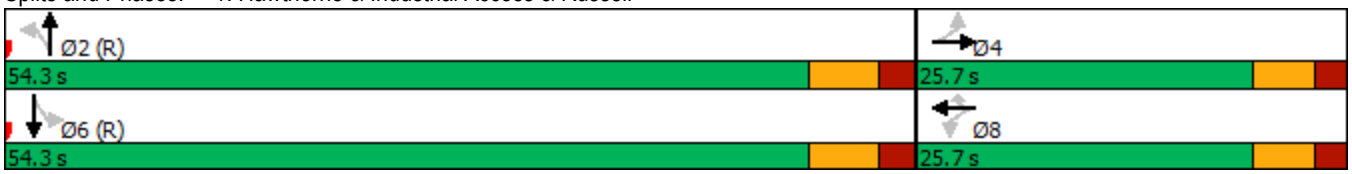


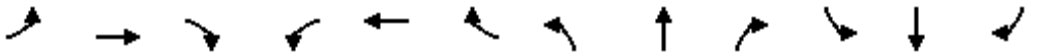
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	25.7	25.7		25.7	25.7	25.7	26.5	26.5		26.5	26.5	
Total Split (s)	25.7	25.7		25.7	25.7	25.7	54.3	54.3		54.3	54.3	
Total Split (%)	32.1%	32.1%		32.1%	32.1%	32.1%	67.9%	67.9%		67.9%	67.9%	
Maximum Green (s)	20.0	20.0		20.0	20.0	20.0	47.8	47.8		47.8	47.8	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	4.2	4.2		4.2	4.2	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.3	2.3		2.3	2.3	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.7	5.7		5.7	5.7	5.7	6.5	6.5		6.5	6.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	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	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	15.0	15.0		15.0	15.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	5.0	5.0		5.0	5.0	
Pedestrian Calls (#/hr)	1	1		1	1	1	1	1		1	1	
Act Effct Green (s)	12.0	12.0		12.0	12.0	12.0	55.8	55.8		55.8	55.8	
Actuated g/C Ratio	0.15	0.15		0.15	0.15	0.15	0.70	0.70		0.70	0.70	
v/c Ratio	0.20	0.13		0.08	0.02	0.46	0.03	0.34		0.62	0.42	
Control Delay	30.8	15.0		27.9	26.3	9.1	5.6	5.8		17.0	6.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	30.8	15.0		27.9	26.3	9.1	5.6	5.8		17.0	6.4	
LOS	C	B		C	C	A	A	A		B	A	
Approach Delay		23.7			11.0			5.8			8.6	
Approach LOS		C			B			A			A	
Queue Length 50th (m)	5.0	1.0		2.0	0.4	0.0	0.3	17.0		14.5	22.4	
Queue Length 95th (m)	11.0	6.7		5.9	2.1	12.7	2.0	37.7		#63.8	48.6	
Internal Link Dist (m)		63.3			159.0			1777.8			200.3	
Turn Bay Length (m)	20.0			40.0		100.0	40.0			60.0		
Base Capacity (vph)	322	384		342	284	497	256	2293		418	2281	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.12	0.08		0.05	0.01	0.34	0.03	0.34		0.62	0.42	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 16 (20%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 8.3		Intersection LOS: A	

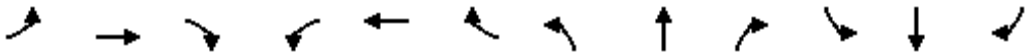
Intersection Capacity Utilization 62.9% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Hawthorne & Industrial Access & Russell





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	278	902	26	502	1035	111	27	209	340	184	535	514
Future Volume (vph)	278	902	26	502	1035	111	27	209	340	184	535	514
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	90.0		0.0	50.0		80.0	50.0		0.0	80.0		80.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	10.0			10.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00				0.99		1.00		
Frt		0.996				0.850		0.907				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1595	3422	0	1654	3468	1141	1717	2806	0	1609	3247	1522
Flt Permitted	0.950			0.950			0.372			0.127		
Satd. Flow (perm)	1595	3422	0	1653	3468	1141	672	2806	0	215	3247	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				166		249				480
Link Speed (k/h)		80			80			70			70	
Link Distance (m)		444.4			485.0			619.0			1801.8	
Travel Time (s)		20.0			21.8			31.8			92.7	
Confl. Peds. (#/hr)			1	1					1	1		
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 (%)	12%	4%	1%	8%	3%	40%	4%	25%	8%	11%	10%	5%
Adj. Flow (vph)	278	902	26	502	1035	111	27	209	340	184	535	514
Shared Lane Traffic (%)												
Lane Group Flow (vph)	278	928	0	502	1035	111	27	549	0	184	535	514
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)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	18.6	93.0		18.6	93.0	18.6	18.6	93.0		18.6	93.0	18.6
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)	18.6	5.5		18.6	5.5	18.6	18.6	5.5		18.6	5.5	18.6
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)		87.5			87.5			87.5			87.5	
Detector 2 Size(m)		5.5			5.5			5.5			5.5	
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	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0	20.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.4	32.4		11.4	32.4	32.4	11.3	32.3		11.3	32.3	32.3
Total Split (s)	37.4	44.4		50.2	57.2	57.2	11.3	33.0		18.8	40.5	40.5
Total Split (%)	25.5%	30.3%		34.3%	39.1%	39.1%	7.7%	22.5%		12.8%	27.7%	27.7%
Maximum Green (s)	31.0	38.0		43.8	50.8	50.8	5.0	26.7		12.5	34.2	34.2
Yellow Time (s)	4.6	4.6		4.6	4.6	4.6	4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.8	1.8		1.8	1.8	1.8	2.1	2.1		2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4		6.4	6.4	6.4	6.3	6.3		6.3	6.3	6.3
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	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	Ped		None	Ped	Ped	None	None		None	None	None
Walk Time (s)		7.0			7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		19.0			19.0	19.0		19.0			19.0	19.0
Pedestrian Calls (#/hr)		1			1	1		1			1	1
Act Effct Green (s)	27.9	38.0		43.8	54.0	54.0	27.7	22.7		41.5	34.9	34.9
Actuated g/C Ratio	0.20	0.27		0.31	0.38	0.38	0.19	0.16		0.29	0.24	0.24
v/c Ratio	0.89	1.02		0.99	0.79	0.21	0.16	0.84		1.00	0.67	0.70
Control Delay	85.4	84.7		86.1	45.9	1.6	38.6	43.3		108.2	54.2	11.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	85.4	84.7		86.1	45.9	1.6	38.6	43.3		108.2	54.2	11.4
LOS	F	F		F	D	A	D	D		F	D	B
Approach Delay		84.9			55.2			43.1			44.4	
Approach LOS		F			E			D			D	
Queue Length 50th (m)	71.6	~140.7		~138.3	135.3	0.0	5.1	41.5		38.4	69.6	7.2
Queue Length 95th (m)	#113.1	#179.2		#204.8	161.3	1.9	11.9	61.6		#82.7	88.6	43.0
Internal Link Dist (m)		420.4			461.0			595.0			1777.8	
Turn Bay Length (m)	90.0			50.0		80.0	50.0			80.0		80.0
Base Capacity (vph)	347	914		508	1313	535	167	728		184	801	737
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.80	1.02		0.99	0.79	0.21	0.16	0.75		1.00	0.67	0.70

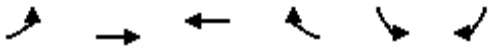
Intersection Summary			
Area Type:	Other		
Cycle Length: 146.4			
Actuated Cycle Length: 142.5			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 58.5		Intersection LOS: E	
Intersection Capacity Utilization 106.3%		ICU Level of Service G	

Analysis Period (min) 15

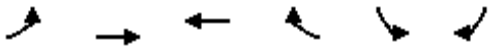
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Hawthorne & Hunt Club



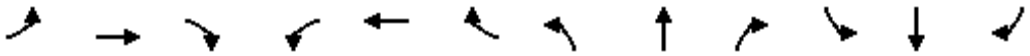
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	15	1438	1604	28	51	58
Future Volume (vph)	15	1438	1604	28	51	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	30.0			0.0	30.0	0.0
Storage Lanes	1			0	0	0
Taper Length (m)	10.0				10.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.997		0.928	
Flt Protected	0.950				0.977	
Satd. Flow (prot)	1701	3402	3392	0	1623	0
Flt Permitted	0.950				0.977	
Satd. Flow (perm)	1701	3402	3392	0	1623	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			2		58	
Link Speed (k/h)		80	80		50	
Link Distance (m)		485.0	886.2		155.3	
Travel Time (s)		21.8	39.9		11.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	1438	1604	28	51	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	1438	1632	0	109	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		4.0	4.0		4.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		2.0	2.0		2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2		1	
Detector Template	Left	Thru	Thru		Left	
Leading Detector (m)	18.6	93.0	93.0		18.6	
Trailing Detector (m)	0.0	0.0	0.0		0.0	
Detector 1 Position(m)	0.0	0.0	0.0		0.0	
Detector 1 Size(m)	18.6	5.5	5.5		18.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	
Detector 2 Position(m)		87.5	87.5			
Detector 2 Size(m)		5.5	5.5			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA		Prot	
Protected Phases	5	2	6		4	
Permitted Phases						



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector Phase	5	2	6		4	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	
Minimum Split (s)	11.4	24.4	24.4		31.8	
Total Split (s)	11.4	58.2	46.8		31.8	
Total Split (%)	12.7%	64.7%	52.0%		35.3%	
Maximum Green (s)	5.0	51.8	40.4		26.0	
Yellow Time (s)	4.6	4.6	4.6		3.7	
All-Red Time (s)	1.8	1.8	1.8		2.1	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	6.4	6.4	6.4		5.8	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Recall Mode	None	C-Min	C-Min		None	
Walk Time (s)			7.0		7.0	
Flash Dont Walk (s)			11.0		19.0	
Pedestrian Calls (#/hr)			0		0	
Act Effct Green (s)	6.4	72.6	69.8		8.7	
Actuated g/C Ratio	0.07	0.81	0.78		0.10	
v/c Ratio	0.12	0.52	0.62		0.52	
Control Delay	40.9	5.0	8.9		28.6	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	40.9	5.0	8.9		28.6	
LOS	D	A	A		C	
Approach Delay		5.4	8.9		28.6	
Approach LOS		A	A		C	
Queue Length 50th (m)	2.3	37.1	46.6		7.8	
Queue Length 95th (m)	7.6	63.4	138.9		20.9	
Internal Link Dist (m)		461.0	862.2		131.3	
Turn Bay Length (m)	30.0				30.0	
Base Capacity (vph)	120	2745	2631		510	
Starvation Cap Reductn	0	0	0		0	
Spillback Cap Reductn	0	0	0		0	
Storage Cap Reductn	0	0	0		0	
Reduced v/c Ratio	0.13	0.52	0.62		0.21	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 8.0	Intersection LOS: A
Intersection Capacity Utilization 64.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: Hunt Club & Last Mile Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	484	62	1	58	0	42	0	3	0	0	0
Future Volume (vph)	0	484	62	1	58	0	42	0	3	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	15.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	10.0			10.0			10.0			10.0		
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						0.991				
Flt Protected					0.999			0.955				
Satd. Flow (prot)	0	1764	0	0	1789	0	0	1695	0	0	1790	0
Flt Permitted					0.999			0.955				
Satd. Flow (perm)	0	1764	0	0	1789	0	0	1695	0	0	1790	0
Link Speed (k/h)		80			80			50			50	
Link Distance (m)		190.2			170.3			78.3			58.1	
Travel Time (s)		8.6			7.7			5.6			4.2	
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
Adj. Flow (vph)	0	484	62	1	58	0	42	0	3	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	546	0	0	59	0	0	45	0	0	0	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			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		2.0			2.0			2.0			2.0	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	484	62	1	58	0	42	0	3	0	0	0
Future Vol, veh/h	0	484	62	1	58	0	42	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	0	484	62	1	58	0	42	0	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	58	0	0	546	0	0	575	575	515	577	606	58
Stage 1	-	-	-	-	-	-	515	515	-	60	60	-
Stage 2	-	-	-	-	-	-	60	60	-	517	546	-
Critical Hdwy	4.15	-	-	4.15	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.245	-	-	2.245	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1527	-	-	1008	-	-	425	424	554	423	407	1000
Stage 1	-	-	-	-	-	-	537	530	-	944	839	-
Stage 2	-	-	-	-	-	-	944	839	-	536	513	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1527	-	-	1008	-	-	425	424	554	420	407	1000
Mov Cap-2 Maneuver	-	-	-	-	-	-	425	424	-	420	407	-
Stage 1	-	-	-	-	-	-	537	530	-	944	838	-
Stage 2	-	-	-	-	-	-	943	838	-	533	513	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	14.3	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	432	1527	-	-	1008	-	-	-
HCM Lane V/C Ratio	0.104	-	-	-	0.001	-	-	-
HCM Control Delay (s)	14.3	0	-	-	8.6	0	-	0
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	3	1	37	1	1	80
Future Volume (vph)	3	1	37	1	1	80
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.966		0.996			
Flt Protected	0.964					0.999
Satd. Flow (prot)	1667	0	1783	0	0	1789
Flt Permitted	0.964					0.999
Satd. Flow (perm)	1667	0	1783	0	0	1789
Link Speed (k/h)	50		50			50
Link Distance (m)	61.3		160.0			97.2
Travel Time (s)	4.4		11.5			7.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	3	1	37	1	1	80
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	0	38	0	0	81
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	4.0		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	2.0		2.0			2.0
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 15.3%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	1	37	1	1	80
Future Vol, veh/h	3	1	37	1	1	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	3	1	37	1	1	80

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	120	38	0	0	38	0
Stage 1	38	-	-	-	-	-
Stage 2	82	-	-	-	-	-
Critical Hdwy	6.45	6.25	-	-	4.15	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	868	1025	-	-	1553	-
Stage 1	977	-	-	-	-	-
Stage 2	934	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	867	1025	-	-	1553	-
Mov Cap-2 Maneuver	867	-	-	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	933	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	902	1553	-
HCM Lane V/C Ratio	-	-	0.004	0.001	-
HCM Control Delay (s)	-	-	9	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	33	5	5	73	8	13
Future Volume (vph)	33	5	5	73	8	13
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.982				0.916	
Flt Protected				0.997	0.981	
Satd. Flow (prot)	1758	0	0	1785	1609	0
Flt Permitted				0.997	0.981	
Satd. Flow (perm)	1758	0	0	1785	1609	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	164.7			43.6	46.2	
Travel Time (s)	11.9			3.1	3.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	33	5	5	73	8	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	0	0	78	21	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	4.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	2.0			2.0	2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		14	24		24	14
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			

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	33	5	5	73	8	13
Future Vol, veh/h	33	5	5	73	8	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	33	5	5	73	8	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	38	0	119	36
Stage 1	-	-	-	-	36	-
Stage 2	-	-	-	-	83	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1553	-	870	1028
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	933	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1553	-	867	1028
Mov Cap-2 Maneuver	-	-	-	-	867	-
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	930	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	960	-	-	1553	-
HCM Lane V/C Ratio	0.022	-	-	0.003	-
HCM Control Delay (s)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	46	0	2	77	0	1
Future Volume (vph)	46	0	2	77	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected				0.999		
Satd. Flow (prot)	1790	0	0	1789	1549	0
Flt Permitted				0.999		
Satd. Flow (perm)	1790	0	0	1789	1549	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	43.6			212.9	34.2	
Travel Time (s)	3.1			15.3	2.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	46	0	2	77	0	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	46	0	0	79	1	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	4.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	2.0			2.0	2.0	
Two way Left Turn Lane						
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 16.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	46	0	2	77	0	1
Future Vol, veh/h	46	0	2	77	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	46	0	2	77	0	1

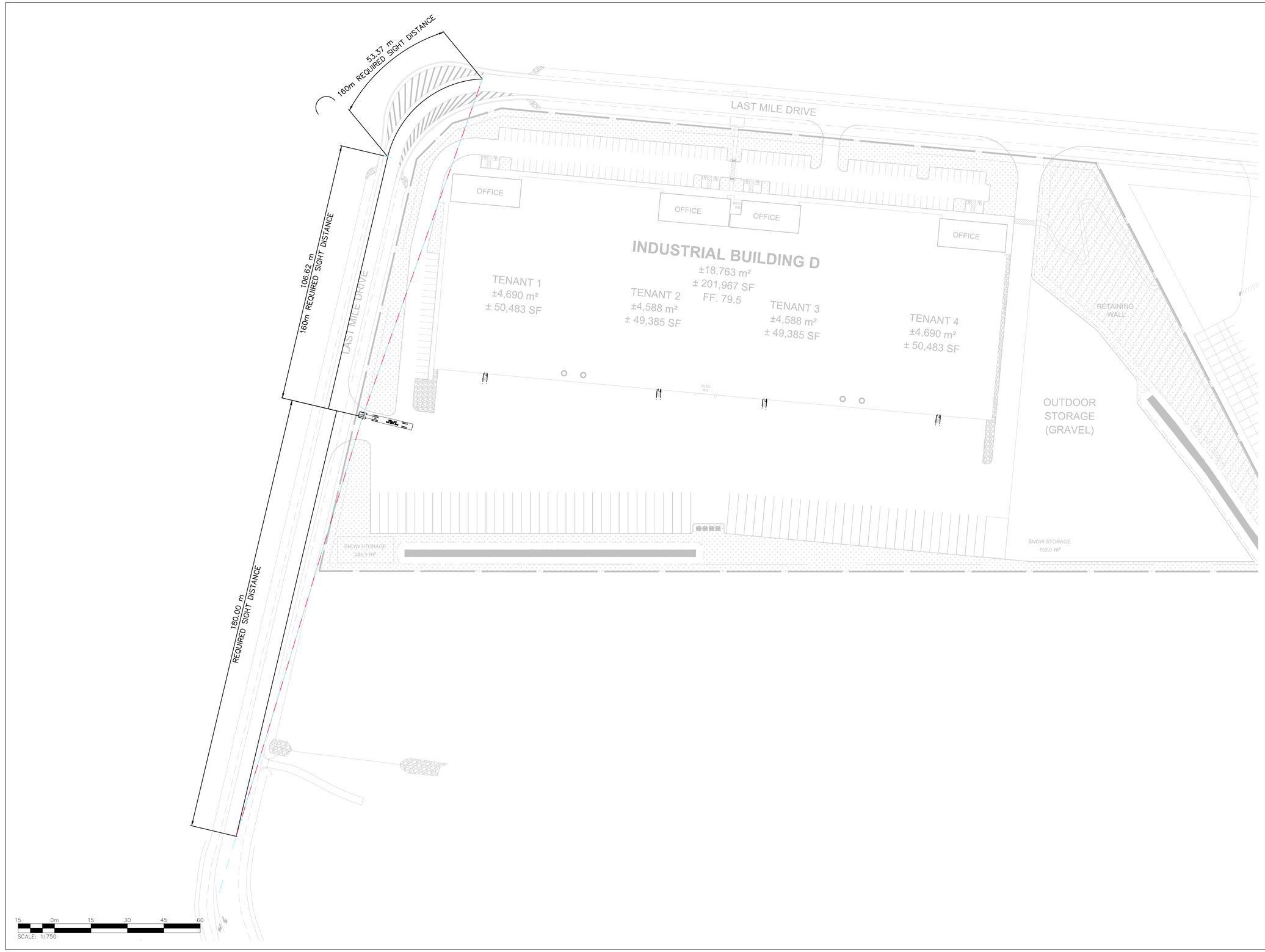
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	46	0	127	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	81	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1543	-	860	1015
Stage 1	-	-	-	-	969	-
Stage 2	-	-	-	-	935	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1543	-	859	1015
Mov Cap-2 Maneuver	-	-	-	-	859	-
Stage 1	-	-	-	-	969	-
Stage 2	-	-	-	-	934	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1015	-	-	1543	-
HCM Lane V/C Ratio	0.001	-	-	0.001	-
HCM Control Delay (s)	8.6	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

APPENDIX G

Sight Distance Figures



SIGHT DISTANCE CALCULATION

FEATURE	DESCRIPTION
INTERSECTION TYPE	FULL MOVEMENT
DESIGN SPEED	60 km/h
BASE TIME GAP (LEFT-TURN/RIGHT-TURN)	7.5 s/6.5 s
GRADE OF ROADWAY	LESS THAN 3%
HORIZONTAL ALIGNMENT OF ROADWAY	STRAIGHT WITH CURVE 160 m NORTH OF SITE ACCESS
REQUIRED SIGHT DISTANCE (LEFT-TURN/RIGHT-TURN)	160 m/180 m

NOTE 1: TIME GAP FOR LEFT-TURNING VEHICLES FROM A STOP ONTO A TWO-LANE ROAD WITH NO MEDIAN AND WITH A GRADE LESS THAN 3% VALUE FROM TABLE 9.9.5. IN THE TAC-GDGCR

NOTE 2: SIGHT DISTANCE VALUE CALCULATED FROM EQUATION 9.9.1 IN THE TAC-GDGCR.

Legend

REQUIRED SIGHT DISTANCE — PASSENGER CAR

AVAILABLE SIGHT DISTANCE — WB-20 TRUCK

Project

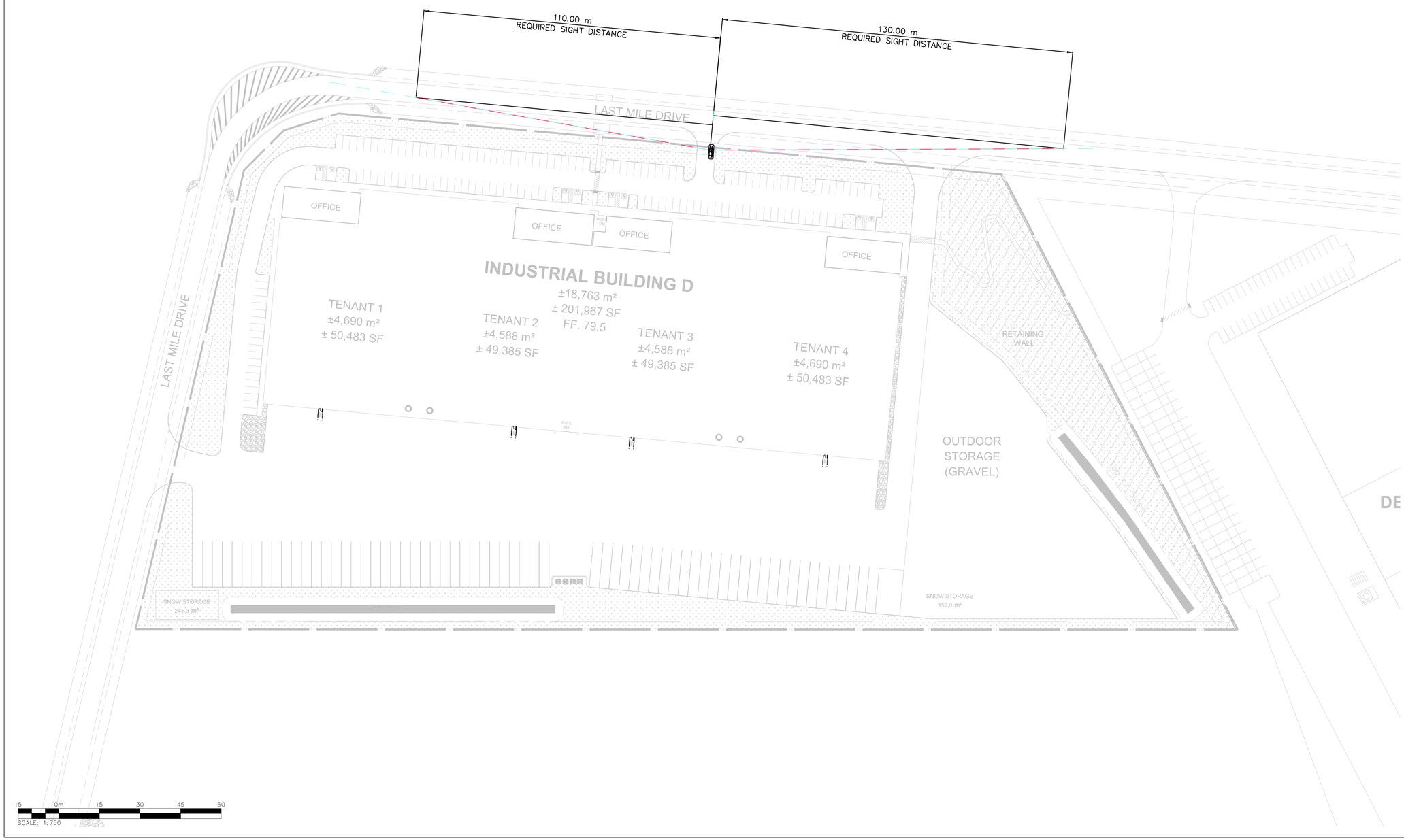
4055 RUSSELL ROAD

Drawing

HORIZONTAL SIGHT DISTANCE ASSESMENT

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 600
TORONTO, ON. M5B 1M4
416477-3392 T
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project	
D.A.		1909-5877	
Check By	Check By	Scale	Drawing
A.H	P.A	1:750	ACCESS 1



SIGHT DISTANCE CALCULATION

FEATURE	DESCRIPTION
INTERSECTION TYPE	FULL MOVEMENT
DESIGN SPEED	60 km/h
BASE TIME GAP (LEFT–TURN/RIGHT–TURN)	7.5 s/6.5 s
GRADE OF ROADWAY	LESS THAN 3%
HORIZONTAL ALIGNMENT OF ROADWAY	STRAIGHT
REQUIRED SIGHT DISTANCE (LEFT–TURN/RIGHT–TURN)	130 m/110 m

NOTE 1: TIME GAP FOR LEFT–TURNING VEHICLES FROM A STOP ONTO A TWO–LANE ROAD WITH NO MEDIAN AND WITH A GRADE LESS THAN 3% VALUE FROM TABLE 9.9.5. IN THE TAC–GDGCR

NOTE 2: SIGHT DISTANCE VALUE CALCULATED FROM EQUATION 9.9.1 IN THE TAC–GDGCR.

Legend

REQUIRED SIGHT DISTANCE — PASSENGER CAR

AVAILABLE SIGHT DISTANCE — WB–20 TRUCK

Project

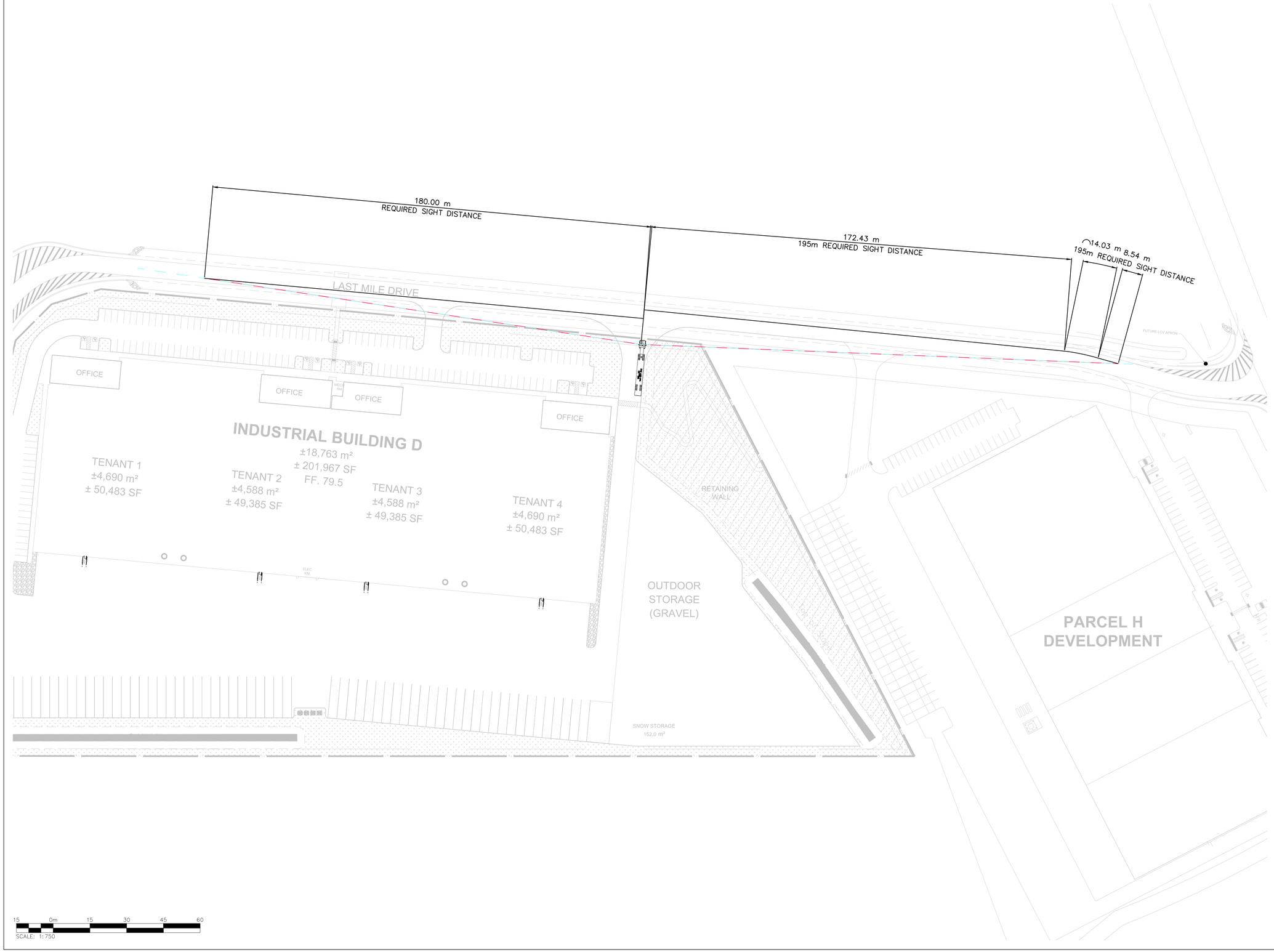
4055 RUSSELL ROAD

Drawing

HORIZONTAL SIGHT DISTANCE ASSESMENT

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 600
TORONTO, ON. M5B 1M4
416 477-3392 T
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project	
D.A.		1909–5877	
Check By	Check By	Scale	Drawing
A.H	P.A	1: 750	ACCESS 2



SIGHT DISTANCE CALCULATION

FEATURE	DESCRIPTION
INTERSECTION TYPE	FULL MOVEMENT
DESIGN SPEED	60 km/h
BASE TIME GAP (LEFT–TURN/RIGHT–TURN)	11.5 s/10.5 s
GRADE OF ROADWAY	LESS THAN 3%
HORIZONTAL ALIGNMENT OF ROADWAY	STRAIGHT
REQUIRED SIGHT DISTANCE (LEFT–TURN/RIGHT–TURN)	195 m/180 m

NOTE 1: TIME GAP FOR LEFT–TURNING VEHICLES FROM A STOP ONTO A TWO–LANE ROAD WITH NO MEDIAN AND WITH A GRADE LESS THAN 3% VALUE FROM TABLE 9.9.5. IN THE TAC–GDGCCR

NOTE 2: SIGHT DISTANCE VALUE CALCULATED FROM EQUATION 9.9.1 IN THE TAC–GDGCR.

Legend

REQUIRED SIGHT DISTANCE

AVAILABLE SIGHT DISTANCE

PASSENGER CAR

WB–20 TRUCK

Project

4055 RUSSELL ROAD

Drawing

HORIZONTAL SIGHT DISTANCE ASSESMENT

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 600
TORONTO, ON, M5B 1M4
416.477.3392 T
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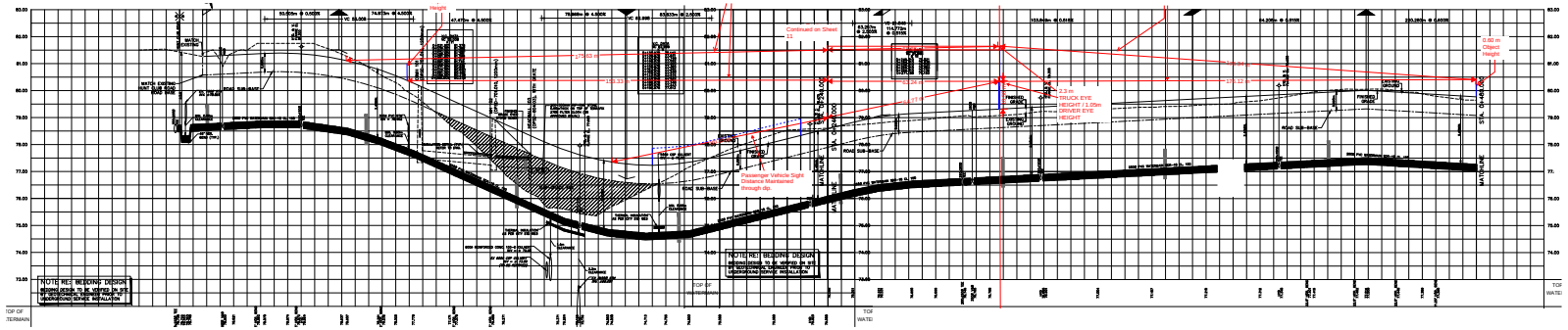
INFO@CFCROZIER.CA

Drawn By	Design By	Project	1909–5877
D.A.			
Check By	Check By	Scale	Drawing
A.H.	P.A.	1:750	ACCESS 3

Last Mile Drive Vertical Sight Distance Assessment Overview - 4120 Russell Road
(Site 2 National Capital Buisness Park, Ottawa. C.F. Crozier & Associates)



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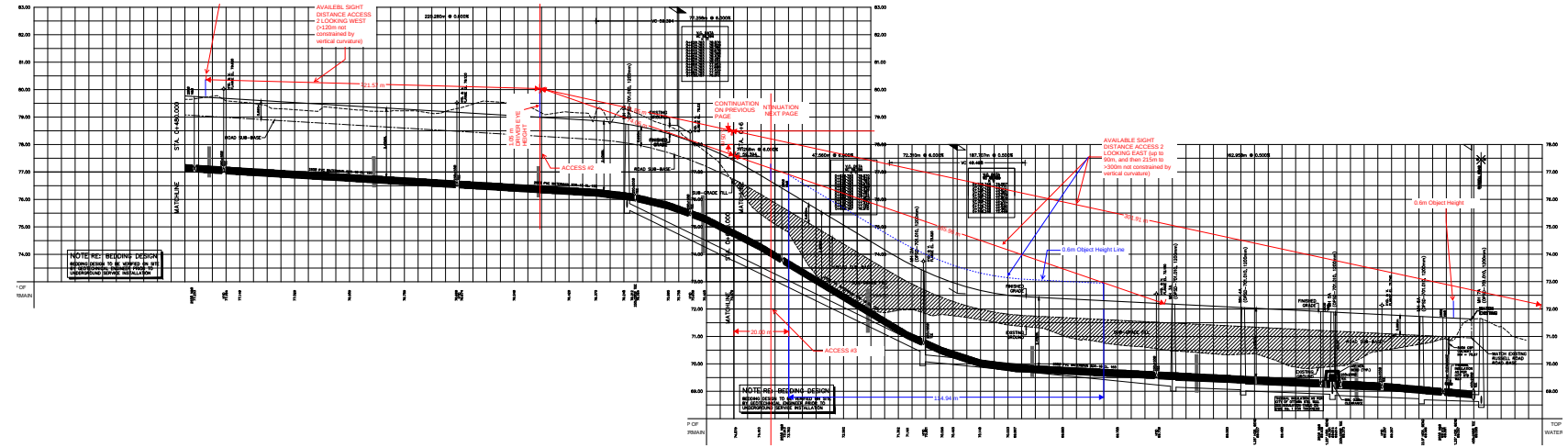

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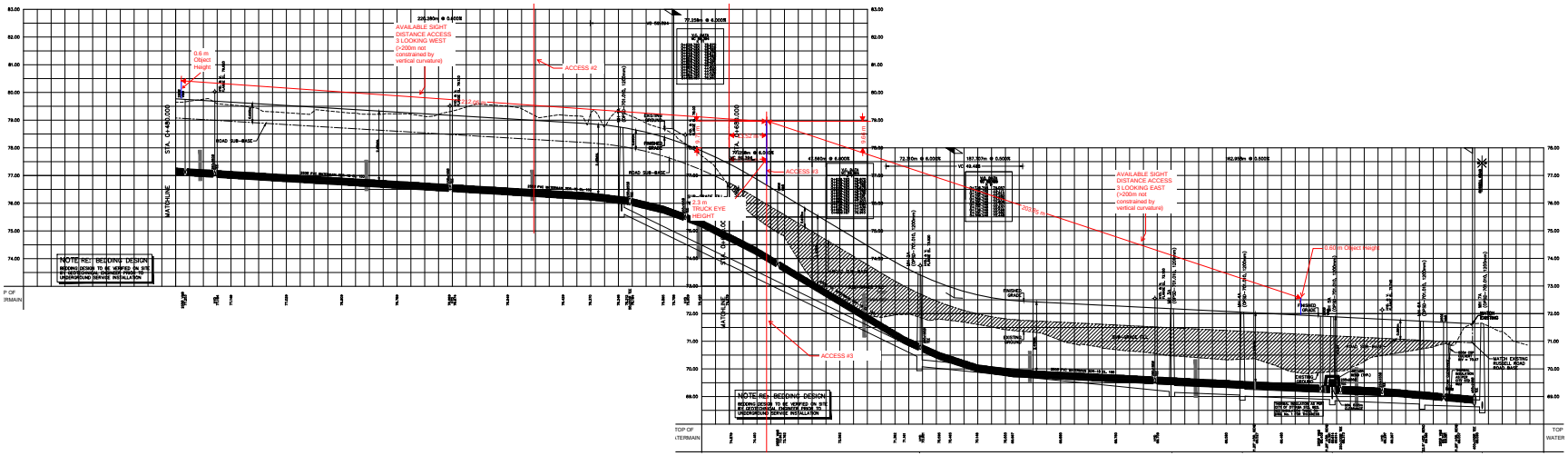

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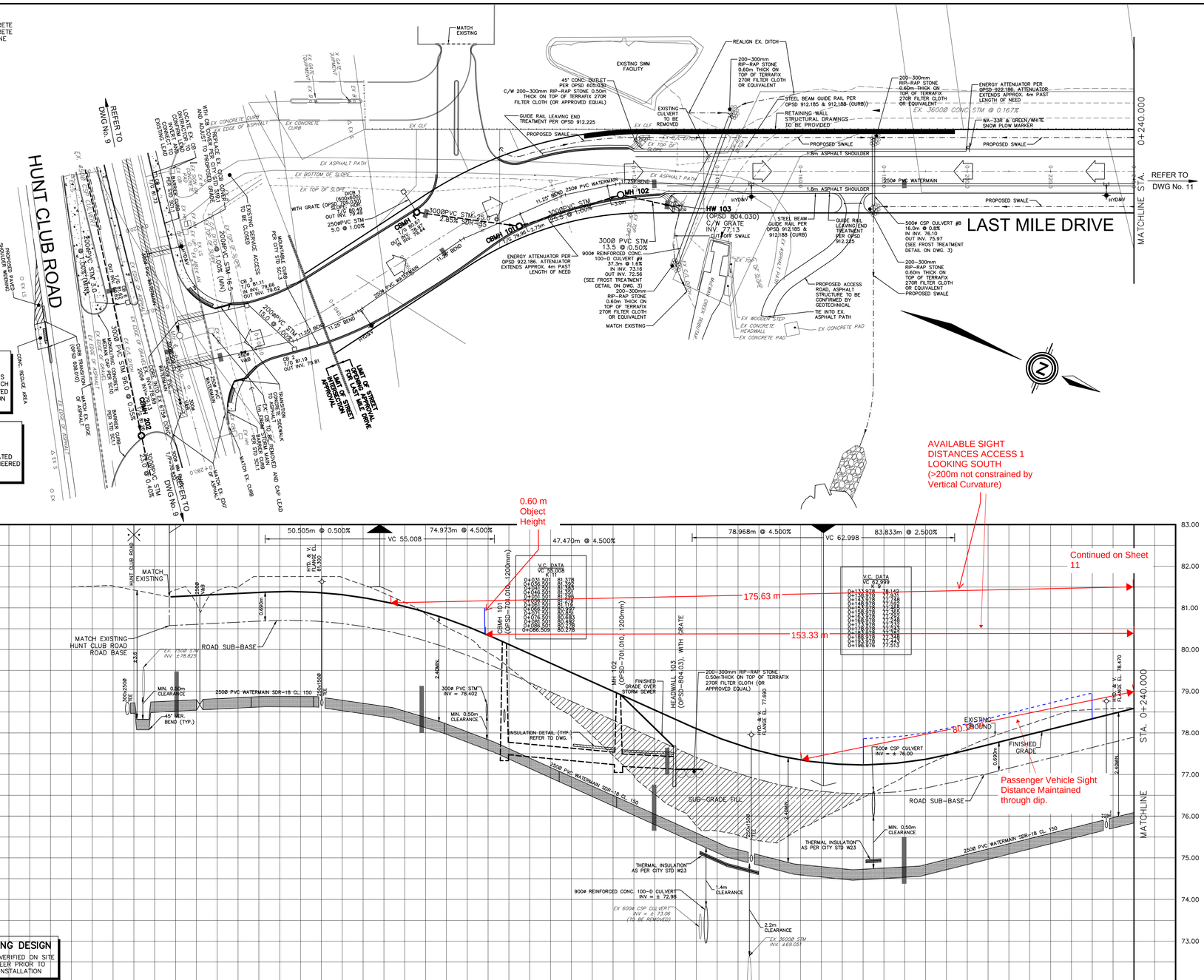


PAVEMENT DESIGN

40mm SUPERPAVE 12.5 ASPHALTIC CONCRETE
50mm SUPERPAVE 19.0 ASPHALTIC CONCRETE
150mm OPSS GRANULAR A CRUSHED STONE
450mm OPSS GRANULAR B TYPE II

NOTE:
ALL EXISTING BUILDINGS, BARNS, POST & WIRE FENCES, TREES, UTILITY WIRES, POLES AND CULVERTS WITHIN LOTS AND BLOCKS TO BE REMOVED, UNLESS OTHERWISE NOTED

ANY DISTURBED AREA DURING CONSTRUCTION TO BE RESTORED TO THE ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITIES HAVING JURISDICTION

WRITTEN PERMISSION REQUIRED FOR WORK ON ADJACENT LANDS

NOTE
FOR WATERMAIN STUBS, 2.4m MIN. COVER TO BE PROVIDED

CONTRACTOR TO VERIFY THE PRECISE LOCATIONS AND INVERT ELEVATIONS OF Ex. UNDERGROUND SERVICES AND Ex. UTILITIES PRIOR TO STARTING CONSTRUCTION

REINSTATEMENT LOCATED WITHIN EXISTING ROADS TO MATCH EXISTING ROAD STRUCTURE UNLESS SPECIFIED OTHERWISE BY GEOTECHNICAL ENGINEER

NOTE:
ALL WATERMAIN CONNECTIONS AND DECOMMISSIONING OF EXISTING WATERMAINS TO BE COMPLETED BY CITY FORCES. TRENCH BACKFILL/REINSTATEMENT TO BE COMPLETED BY THE CONTRACTOR TO THE SATISFACTION OF THE CITY OF OTTAWA.

NOTE:RE: TEST PIT/BOREHOLE EXCAVATIONS
ANY DISTURBED MATERIAL ENCOUNTERED BELOW THE SUBGRADE LEVEL WITHIN A BUILDING FOOTPRINT TO BE SUB-EXCAVATED AND BACKFILLED WITH COMPACTED ENGINEERED FILL AS PER GEOTECHNICAL ENGINEERS RECOMMENDATION.

LEGEND

AVAILABLE SIGHT DISTANCES ACCESS 1 LOOKING SOUTH (>200m not constrained by Vertical Curvature)

0.60 m Object Height

Continued on Sheet 11

175.63 m

153.33 m

Passenger Vehicle Sight Distance Maintained through dip.

NOTE RE: BEDDING DESIGN
BEDDING DESIGN TO BE VERIFIED ON SITE BY GEOTECHNICAL ENGINEER PRIOR TO UNDERGROUND SERVICE INSTALLATION

No.	BY	DATE	DESCRIPTION
5	B.N.C.	02-03-22	ISSUED FOR LAST MILE DRIVE ROAD OPENING APPROVAL
4	B.N.C.	10-20-21	4TH SUBMISSION
3	B.N.C.	09-17-21	3RD SUBMISSION
2	B.N.C.	06-29-21	2ND SUBMISSION
1	A.D.F.	02-19-21	1ST SUBMISSION

TOPOGRAPHIC INFORMATION

ANNIS, O'SULLIVAN, VOLLEBEKK LTD. JOB NO. 17730-19 DATED JUNE 18, 2020

LEGAL INFORMATION

ANNIS, O'SULLIVAN, VOLLEBEKK LTD. LEGAL SURVEY JOB NO. 17730-19 DATED NOVEMBER 25, 2020

BENCH MARK No.0011962U3456 & No.00819678094

ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM AND REFERRED TO CONTROL MONUMENT 0011962U3456 HAVING AN ELEVATION OF 73.746 METERS AND CONTROL MONUMENT 00819678094 HAVING AN ELEVATION OF 69.215 METERS

NATIONAL
CAPITAL
BUSINESS PARK

LAST MILE DRIVE
PHASE 1

DSEL
david schaeffer engineering ltd
120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

S. L. MERRICK
100186523
2022-02-03

JOB# 19-1155

Ottawa
110 Laurier Ave W
Ottawa, Ontario, K1P 1J1
Tel. (613) 580-2400
www.Ottawa.ca

PLAN AND PROFILE OF

LAST MILE DRIVE
(STA 0+000.000 TO STA 0+240.000)

DRAWN BY: CPB
CHECKED BY: BNC
DESIGNED BY: BNC
CHECKED BY: SLM
SCALE: VERT. 1:50 HORZ. 1:500
PROJECT No. 19-1155
SHEET No. 10

CITY PLAN No. 18438

CITY FILE No. D07-15-20-0004

PAVEMENT DESIGN

40mm SUPERPAVE 12.5 ASPHALTIC CONCRETE
50mm SUPERPAVE 19.0 ASPHALTIC CONCRETE
150mm OPSS GRANULAR A CRUSHED STONE
450mm OPSS GRANULAR B TYPE II

NOTE:
ALL EXISTING BUILDINGS, BARNS, POST & WIRE FENCES, TREES, UTILITY WIRES, POLES AND CULVERTS WITHIN LOTS AND BLOCKS TO BE REMOVED, UNLESS OTHERWISE NOTED

ANY DISTURBED AREA DURING CONSTRUCTION TO BE RESTORED TO THE ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITIES HAVING JURISDICTION

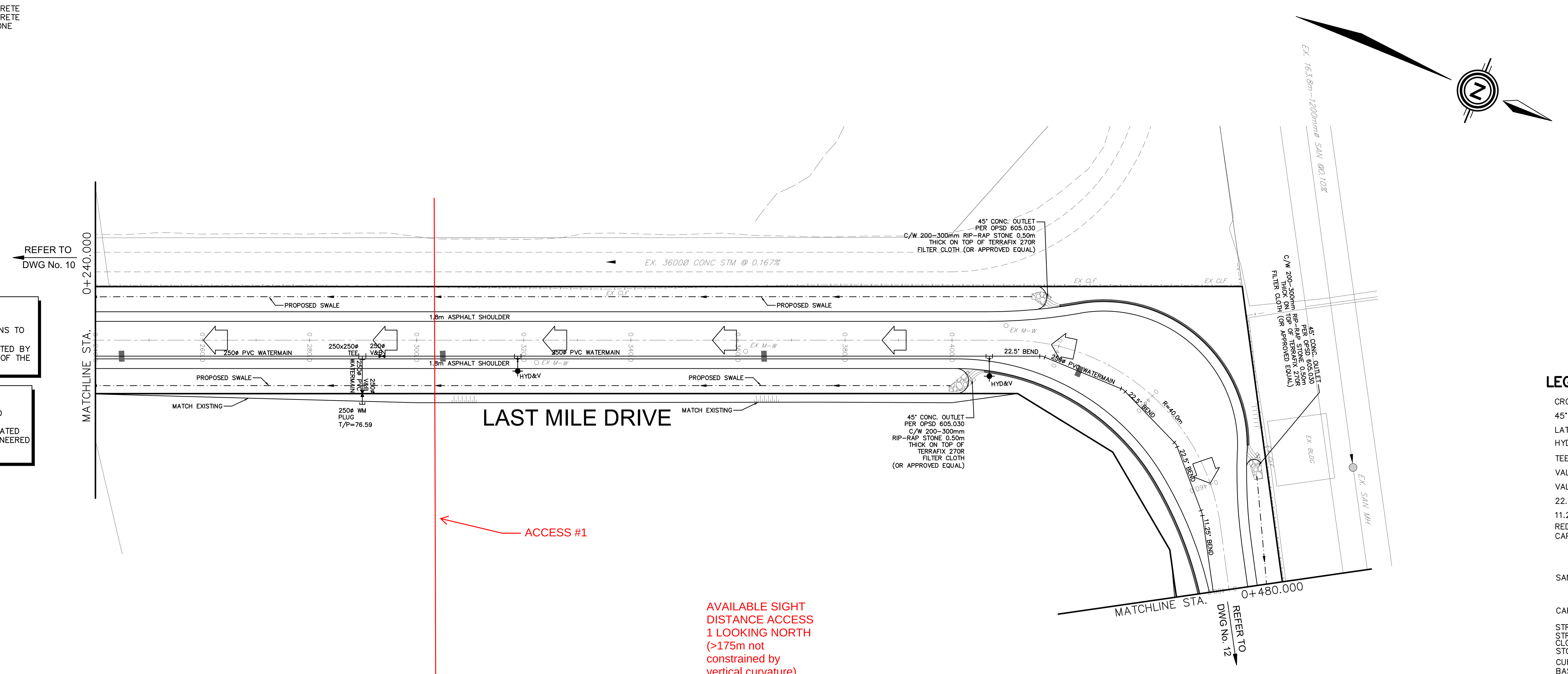
WRITTEN PERMISSION REQUIRED FOR WORK ON ADJACENT LANDS

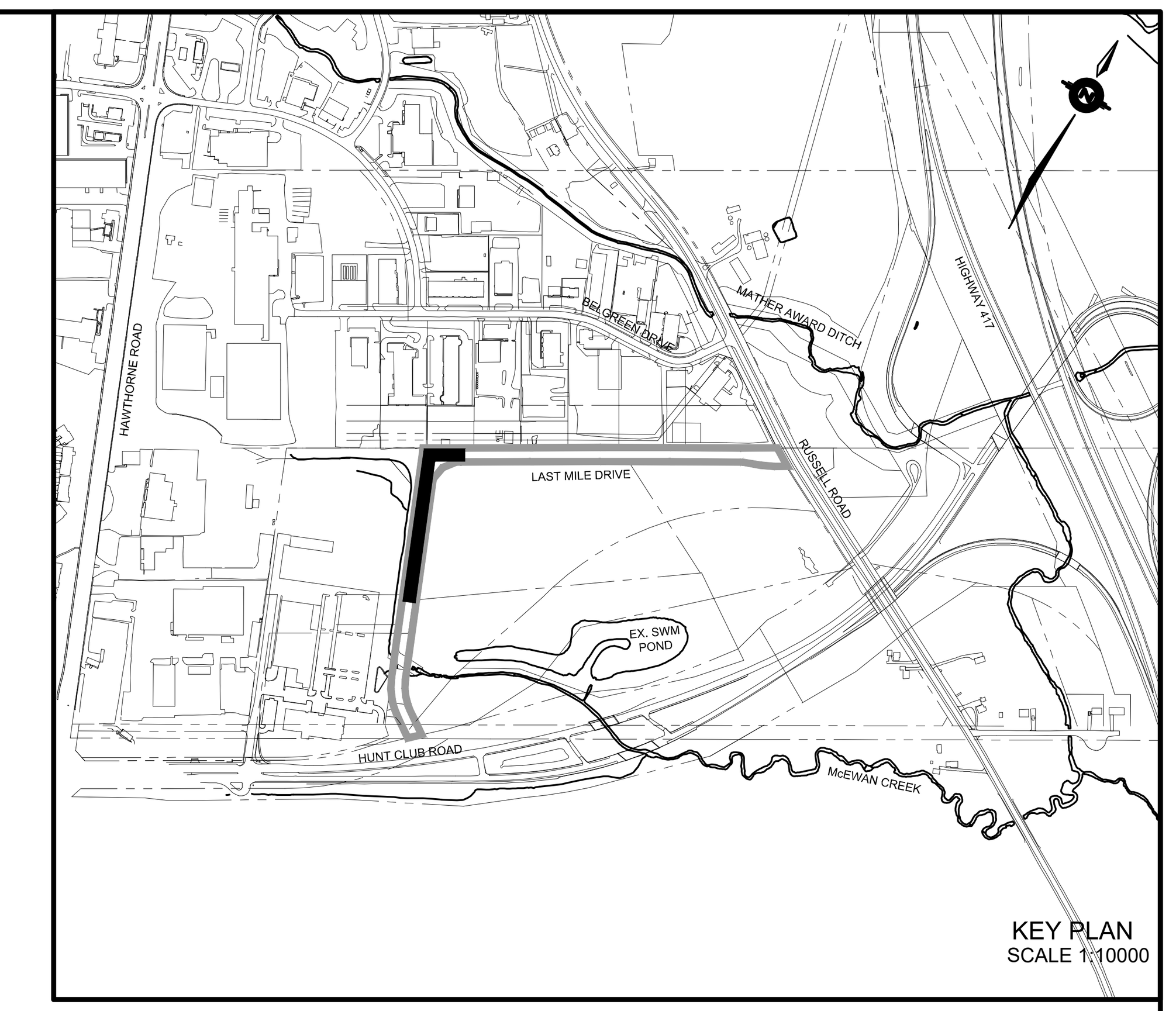
NOTE
FOR WATERMAIN STUBS, 2.4m MIN. COVER TO BE PROVIDED

NOTE:
ALL WATERMAIN CONNECTIONS AND DECOMMISSIONING OF EXISTING WATERMAINS TO BE COMPLETED BY CITY FORCES. TRENCH BACKFILL/REINSTATEMENT TO BE COMPLETED BY THE CONTRACTOR TO THE SATISFACTION OF THE CITY OF OTTAWA.

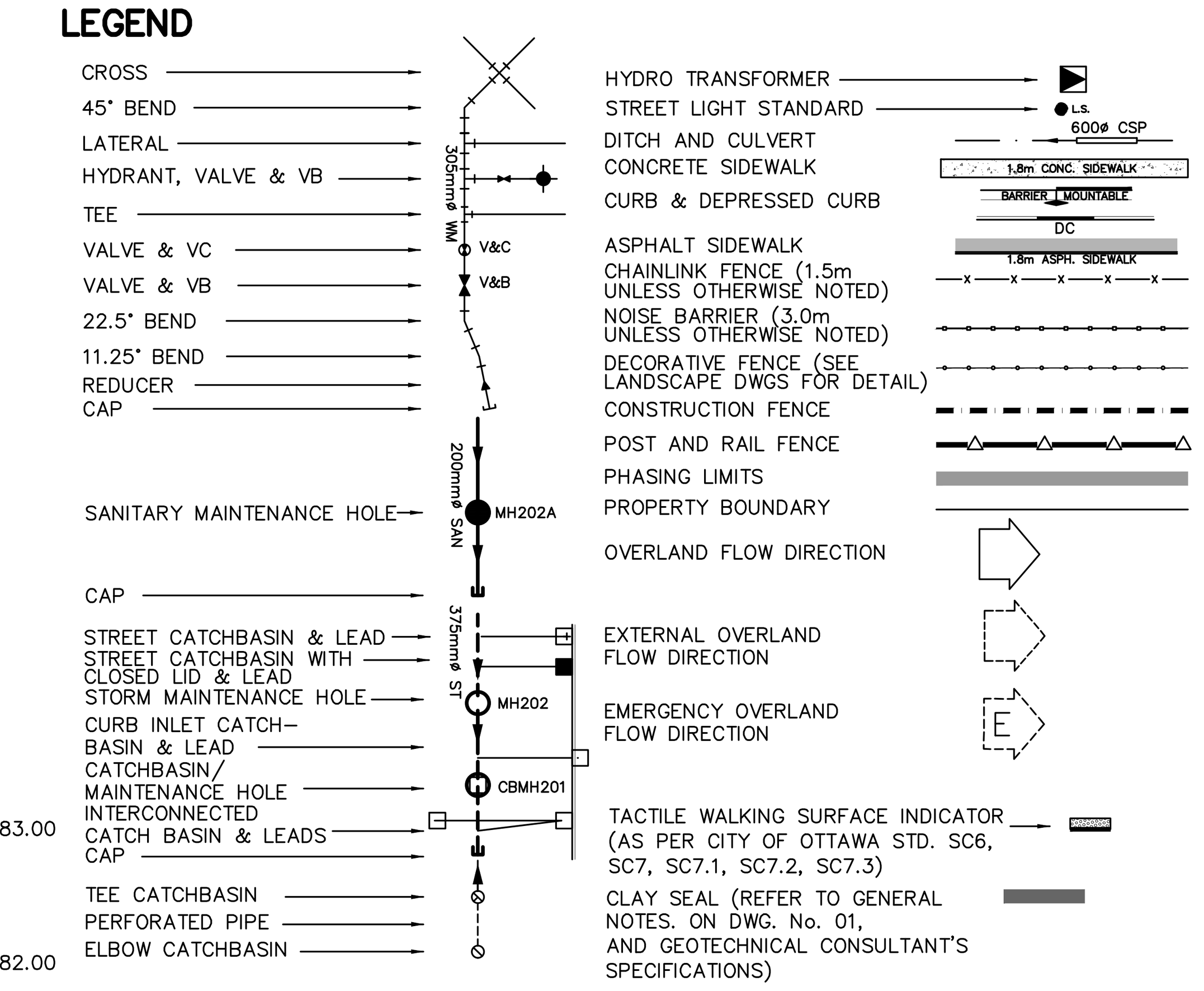
NOTE: RE: TEST PIT/BOREHOLE EXCAVATIONS
ANY DISTURBED MATERIAL ENCOUNTERED BELOW THE SUBGRADE LEVEL WITHIN A BUILDING FOOTPRINT TO BE SUB-EXCAVATED AND BACKFILLED WITH COMPACTED ENGINEERED FILL AS PER GEOTECHNICAL ENGINEERS RECOMMENDATION.

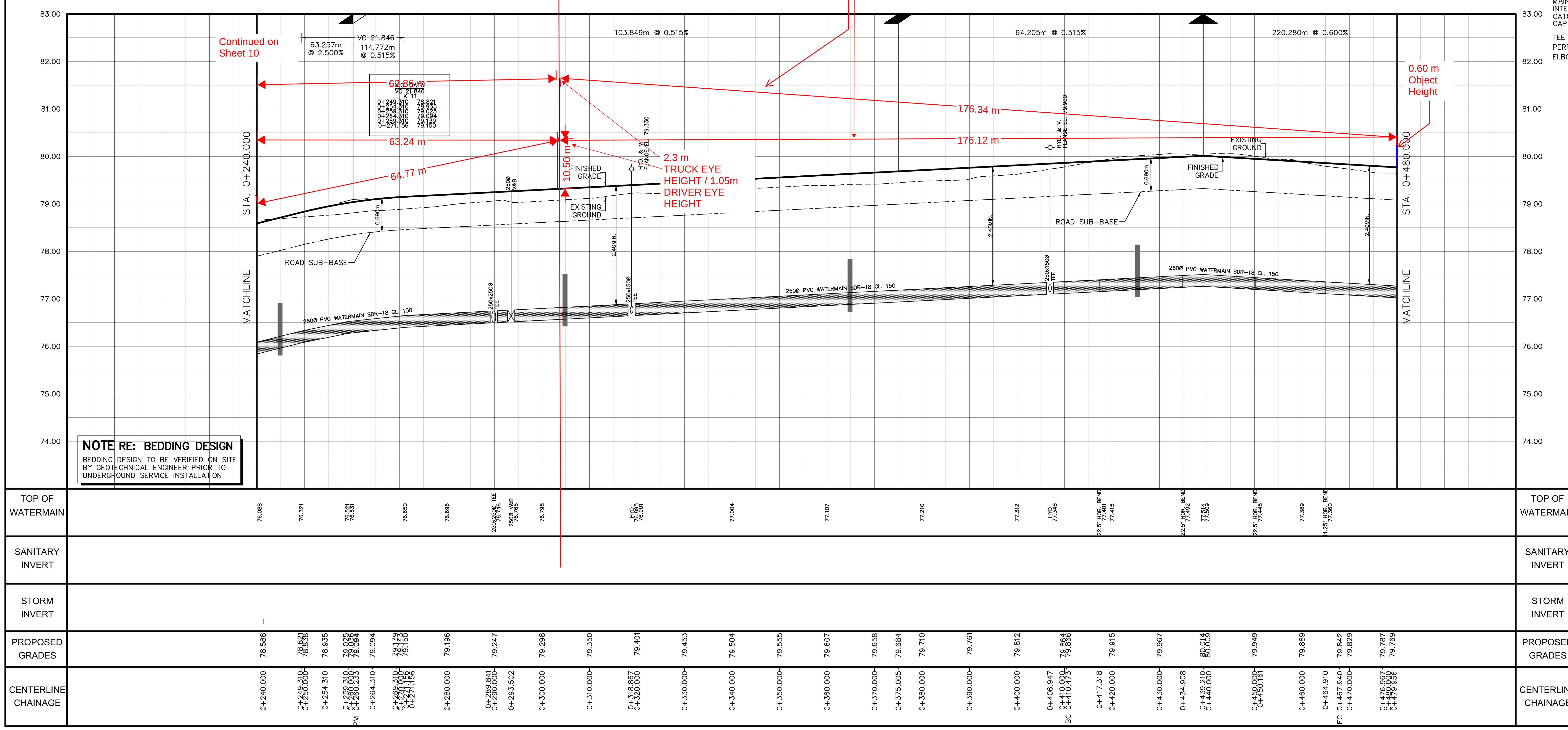
CONTRACTOR TO VERIFY THE PRECISE LOCATIONS AND INVERT ELEVATIONS OF Ex. UNDERGROUND SERVICES AND Ex. UTILITIES PRIOR TO STARTING CONSTRUCTION





LEGEND





NOTE RE: BEDDING DESIGN
BEDDING DESIGN TO BE VERIFIED ON SITE BY GEOTECHNICAL ENGINEER PRIOR TO UNDERGROUND SERVICE INSTALLATION

No.	BY	DATE	DESCRIPTION
5	B.N.C.	02-03-22	ISSUED FOR LAST MILE DRIVE ROAD OPENING APPROVAL
4	B.N.C.	10-20-21	4TH SUBMISSION
3	B.N.C.	09-17-21	3RD SUBMISSION
2	B.N.C.	06-29-21	2ND SUBMISSION
1	A.D.F.	02-19-21	1ST SUBMISSION

TOPOGRAPHIC INFORMATION
ANNIS, O'SULLIVAN, VOLLEBEKK LTD. JOB NO. 17730-19 DATED JUNE 18, 2020

LEGAL INFORMATION
ANNIS, O'SULLIVAN, VOLLEBEKK LTD. LEGAL SURVEY JOB NO. 17730-19 DATED NOVEMBER 25, 2020

BENCH MARK No.0011962U3456 & No.00819678094
ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM AND REFERRED TO CONTROL MONUMENT 0011962U3456 HAVING AN ELEVATION OF 73.746 METERS AND CONTROL MONUMENT 00819678094 HAVING AN ELEVATION OF 69.215 METERS

NATIONAL CAPITAL BUSINESS PARK

LAST MILE DRIVE
PHASE 1

david schaeffer engineering ltd
120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

LICENSED PROFESSIONAL ENGINEER S. L. MERRICK 100186523 2022-02-03 PROVINCE OF ONTARIO

JOB# 19-1155

Ottawa
110 Laurier Ave W
Ottawa, Ontario, K1P 1J1
Tel. (613) 580-2400
www.Ottawa.ca

PLAN AND PROFILE OF

LAST MILE DRIVE
(STA. 0+240.000 TO STA. 0+480.000)

DRAWN BY: CPB	CHECKED BY: BNC	PROJECT No. 19-1155	
DESIGNED BY: BNC	CHECKED BY: SLM		
SCALE: VERT. 1:50 / HORZ. 1:500		SHEET No. 11	

CITY PLAN No. 18438

CITY FILE No. D07-15-20-0004

PAVEMENT DESIGN

40mm SUPERPAVE 12.5 ASPHALTIC CONCRETE
50mm SUPERPAVE 19.0 ASPHALTIC CONCRETE
150mm OPSS GRANULAR A CRUSHED STONE
450mm OPSS GRANULAR B TYPE II

NOTE:
ALL EXISTING BUILDINGS, BARNS, POST & WIRE FENCES, TREES, UTILITY WIRES, POLES AND CULVERTS WITHIN LOTS AND BLOCKS TO BE REMOVED, UNLESS OTHERWISE NOTED

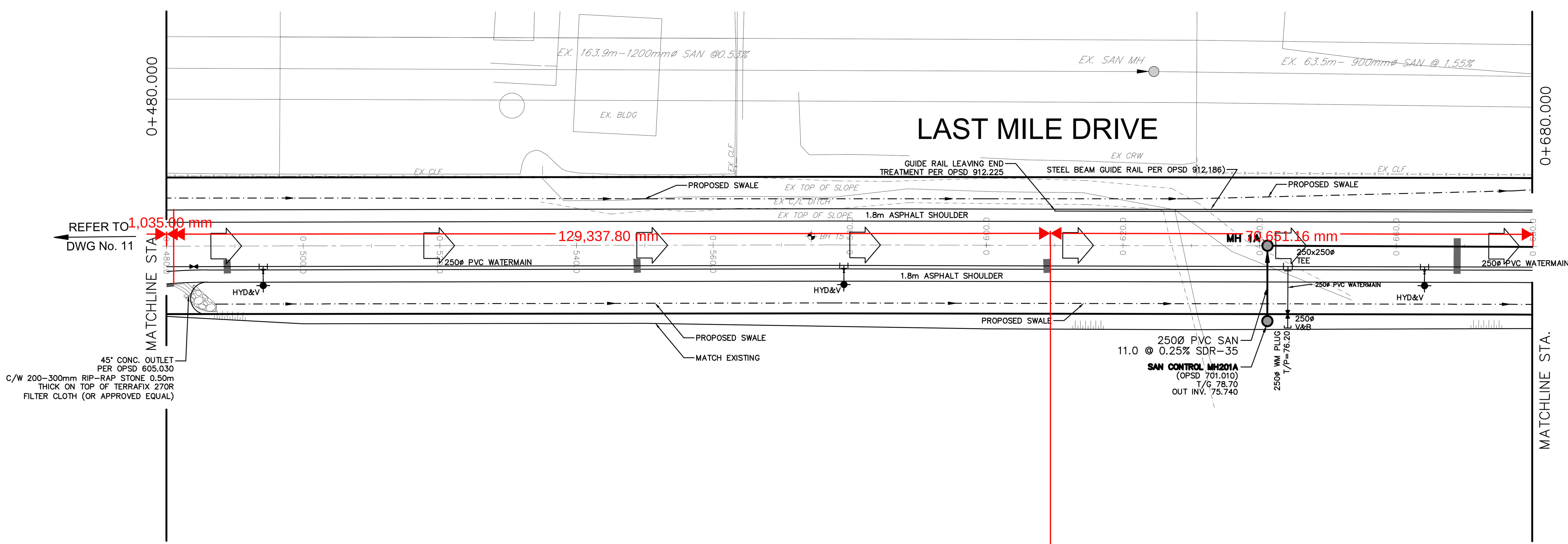
ANY DISTURBED AREA DURING CONSTRUCTION TO BE RESTORED TO THE ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITIES HAVING JURISDICTION

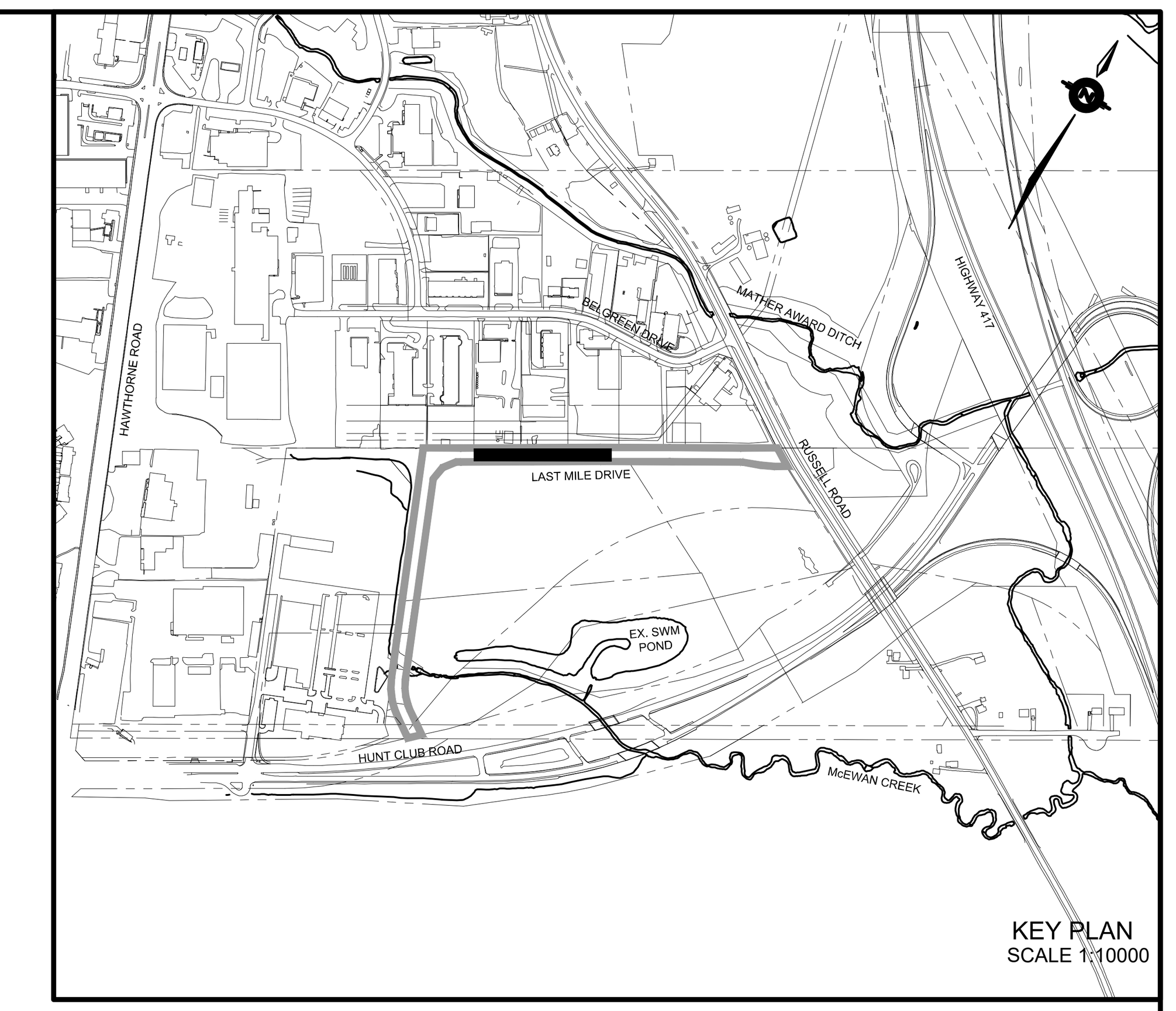
WRITTEN PERMISSION REQUIRED FOR WORK ON ADJACENT LANDS

NOTE
FOR WATERMAIN STUBS, 2.4m MIN. COVER TO BE PROVIDED

NOTE:
ALL WATERMAIN CONNECTIONS AND DECOMMISSIONING OF EXISTING WATERMAINS TO BE COMPLETED BY CITY FORCES. TRENCH BACKFILL/REINSTATEMENT TO BE COMPLETED BY THE CONTRACTOR TO THE SATISFACTION OF THE CITY OF OTTAWA.

CONTRACTOR TO VERIFY THE PRECISE LOCATIONS AND INVERT ELEVATIONS OF Ex. UNDERGROUND SERVICES AND Ex. UTILITIES PRIOR TO STARTING CONSTRUCTION





LEGEND

CROSS
45° BEND
LATERAL
HYDRANT, VALVE & VB
TEE
VALVE & VC
VALVE & VB
22.5° BEND
11.25° BEND
REDUCER
CAP
SANITARY MAINTENANCE HOLE
CAP
STREET CATCHBASIN & LEAD
STREET CATCHBASIN WITH CLOSED LID & LEAD
STORM MAINTENANCE HOLE
CURB INLET CATCHBASIN & LEAD
CATCHBASIN/MAINTENANCE HOLE
INTERCONNECTED CATCH BASIN & LEADS
CAP
TEE CATCHBASIN
PERFORATED PIPE
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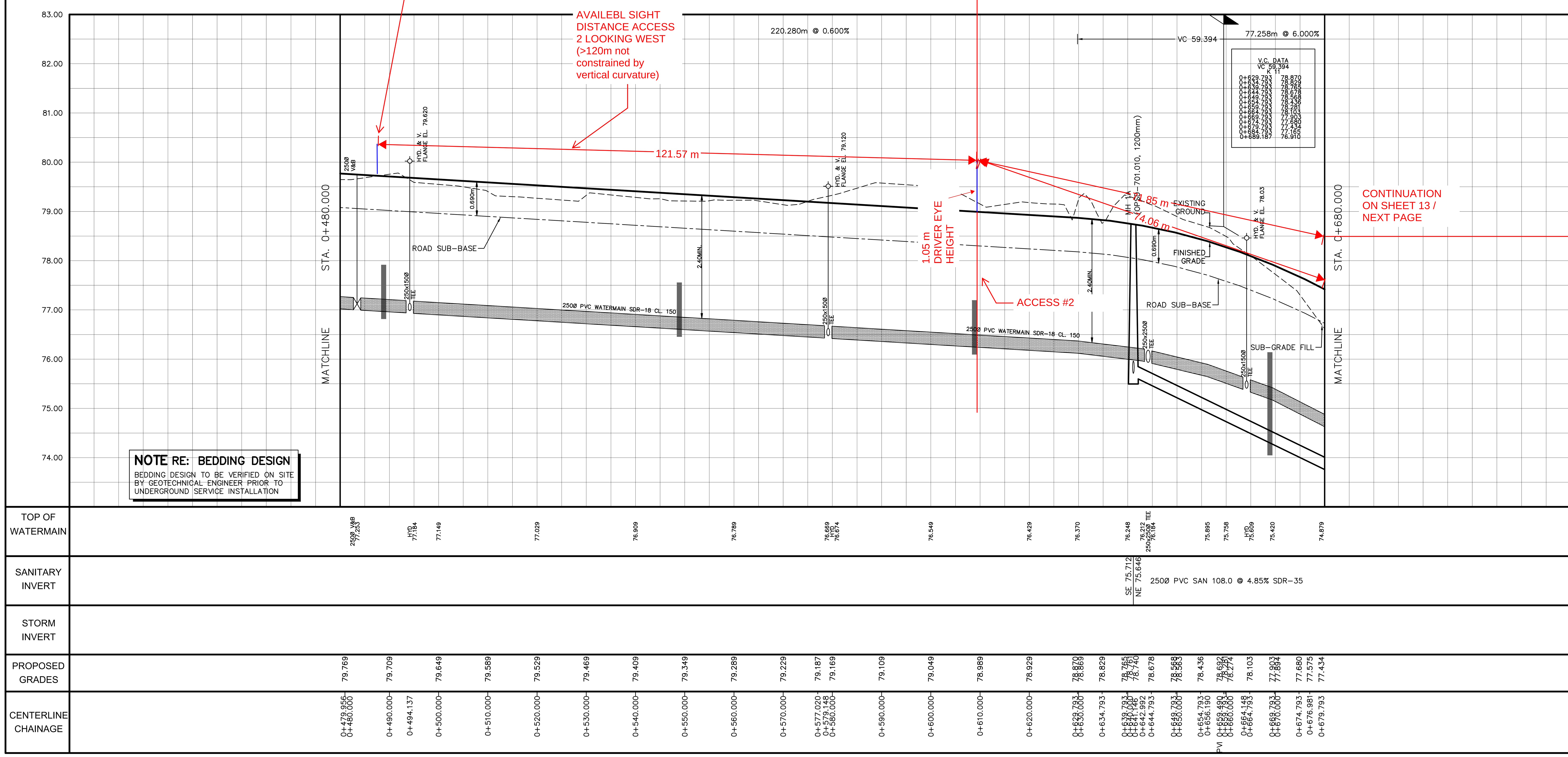
CONCRETE CURB
ASPHALT SIDEWALK
CHAINLINK FENCE (1.5m UNLESS OTHERWISE NOTED)
NOISE BARRIER (3.0m UNLESS OTHERWISE NOTED)
DECORATIVE FENCE (SEE LANDSCAPE DWGS FOR DETAIL)
CONSTRUCTION FENCE
POST AND RAIL FENCE
PHASING LIMITS
PROPERTY BOUNDARY
OVERLAND FLOW DIRECTION
EXTERNAL OVERLAND FLOW DIRECTION
EMERGENCY OVERLAND FLOW DIRECTION
TACTILE WALKING SURFACE INDICATOR (AS PER CITY OF OTTAWA STD. SC6, SC7, SC7.1, SC7.2, SC7.3)
CLAY SEAL (REFER TO GENERAL NOTES ON DWG. No. 01, AND GEOTECHNICAL CONSULTANT'S SPECIFICATIONS)



NOTE RE: BEDDING DESIGN
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NATIONAL CAPITAL BUSINESS PARK

LAST MILE DRIVE PHASE 1

DSEL
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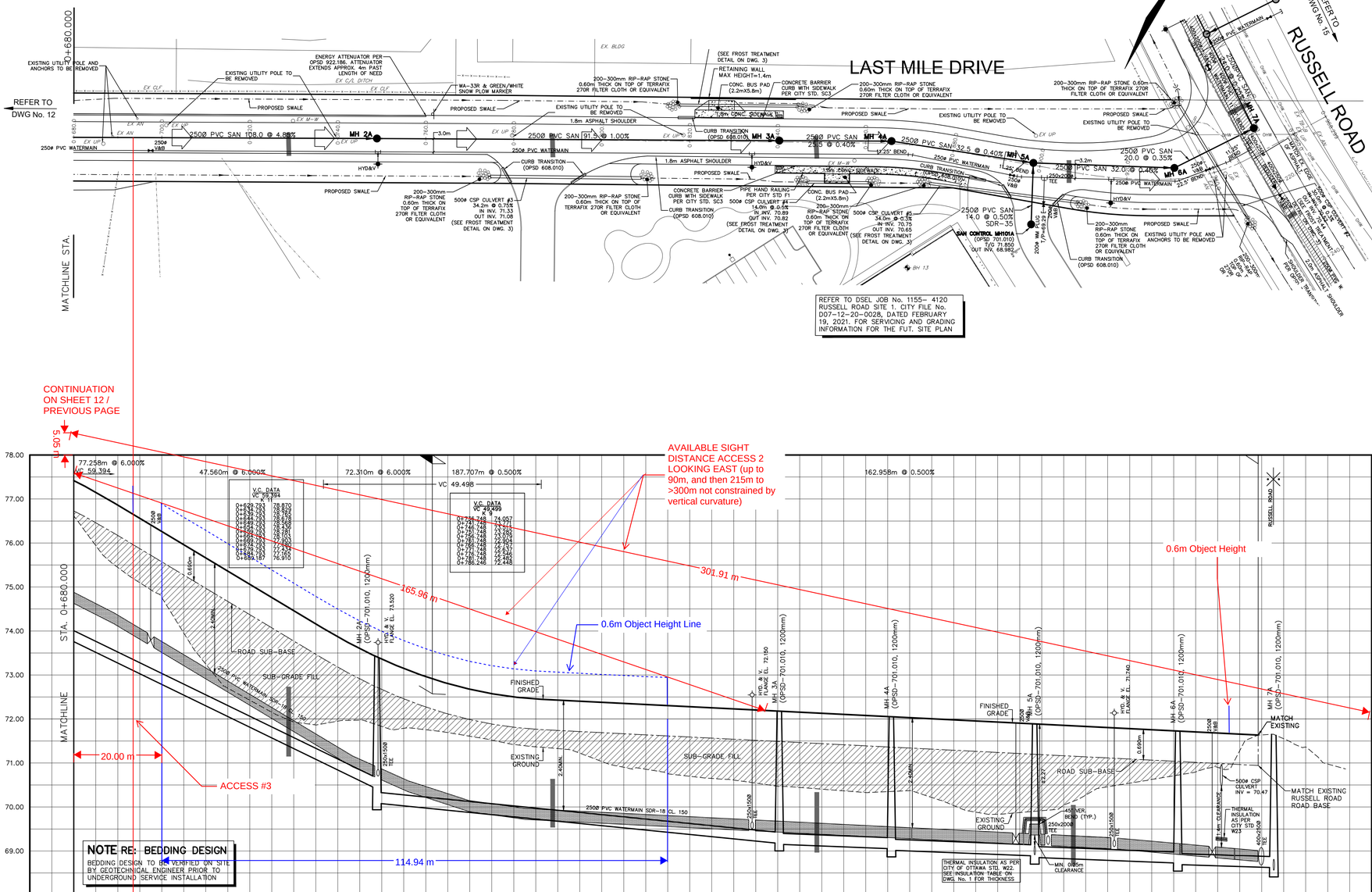
PLAN AND PROFILE OF

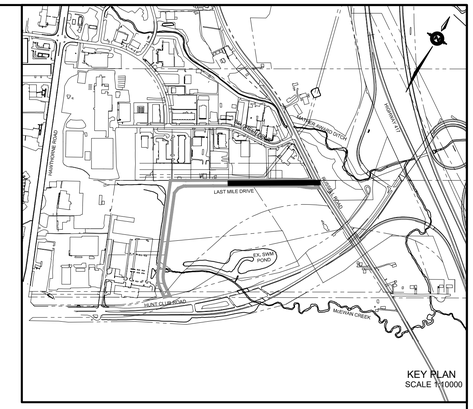
LAST MILE DRIVE

(STA 0+480.000 TO STA 0+680.000)

DRAWN BY: CPB | CHECKED BY: BNC
DESIGNED BY: BNC | CHECKED BY: SLM
SCALE: VERT. 1:50 HORZ. 1:500
PROJECT No. 19-1155
SHEET No. 12

CITY PLAN No. 18438
CITY FILE No. D07-15-20-0004





PAVEMENT DESIGN

40mm SUPERPAVE 12.5 ASPHALTIC CONCRETE
50mm SUPERPAVE 19.0 ASPHALTIC CONCRETE
150mm OPSS GRANULAR A CRUSHED STONE
450mm OPSS GRANULAR B TYPE II

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REFER TO DSEL JOB No. 1155- 4120 RUSSELL ROAD SITE 1. CITY FILE No. D07-12-20-0028, DATED FEBRUARY 19, 2021. FOR SERVICING AND GRADING INFORMATION FOR THE FUT. SITE PLAN

NOTE RE: BEDDING DESIGN
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NATIONAL
CAPITAL
BUSINESS PARK

LAST MILE DRIVE
PHASE 1

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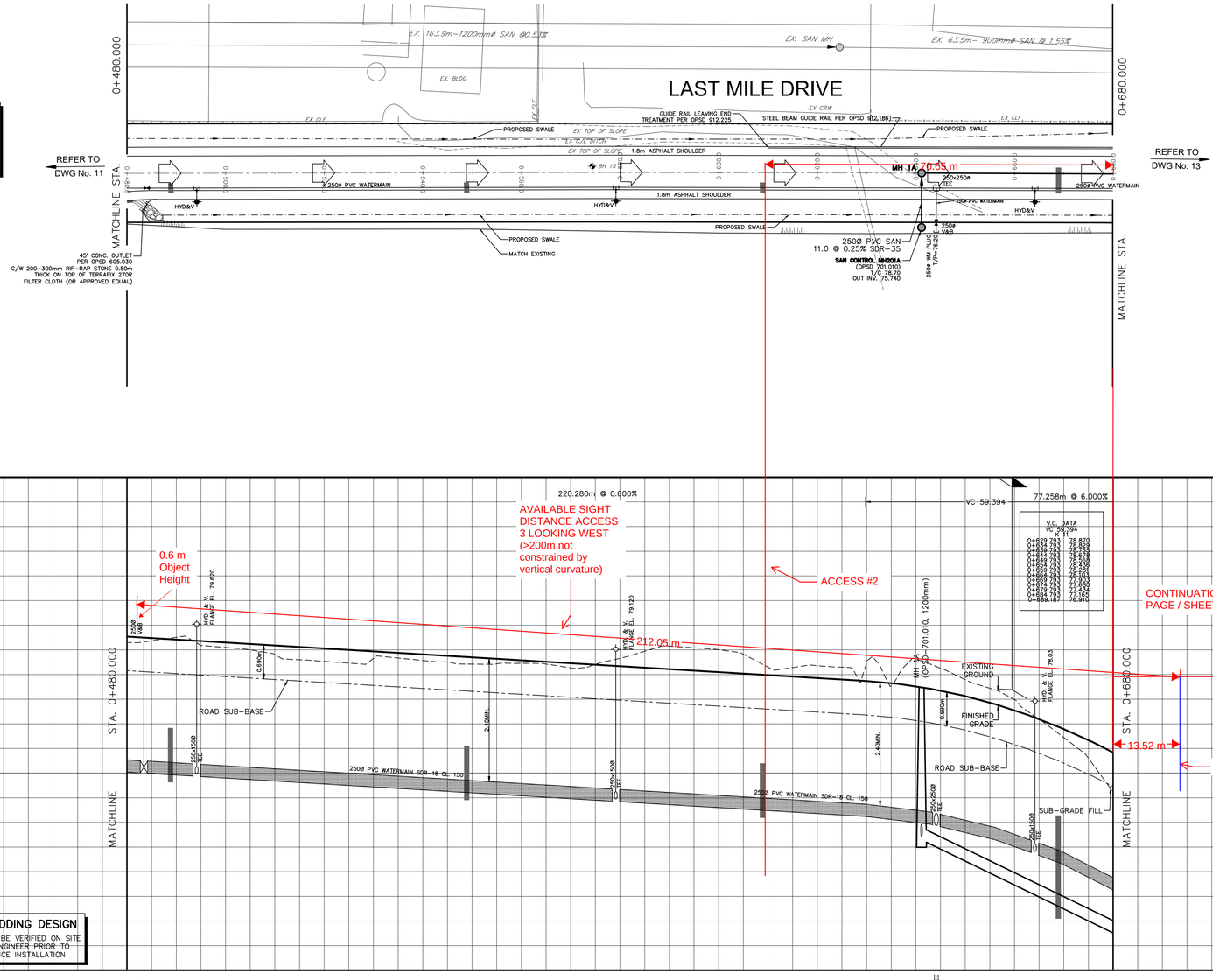
PLAN AND PROFILE OF

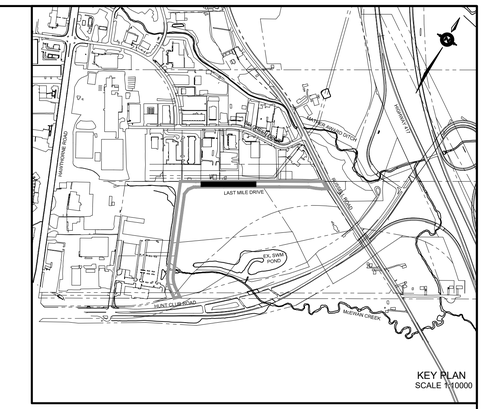
LAST MILE DRIVE
(STA. 0+680.000 TO STA. 0+968.299)

DRAWN BY:	CPB	CHECKED BY:	BNC	PROJECT No. 19–1155
DESIGNED BY:	BNC	CHECKED BY:	SLM	
SCALE:	VERT. 1:50	0 0.5 1.0 1.5 2.0		SHEET No. 13
	HORZ. 1:500	0 5 10 15 20		

CITY PLAN No. 18438

CITY FILE No. D07-15-20-0004





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LEGEND

- CROSS
- 45° BEND
- LATERAL
- HYDRANT, VALVE & VB
- TEE
- VALVE & VC
- VALVE & VB
- 22.5° BEND
- 11.25° BEND
- REDUCER
- CAP
- SANITARY MAINTENANCE HOLE
- CAP
- STREET CATCHBASIN & LEAD
- STREET CATCHBASIN WITH CLOSED LID & LEAD
- STORM MAINTENANCE HOLE
- CURB INLET CATCH-BASIN & LEAD
- CATCHBASIN/ MAINTENANCE HOLE
- INTERCONNECTED CATCH BASIN & LEADS
- CAP
- TEE CATCHBASIN
- PERFORATED PIPE
- ELBOW CATCHBASIN

305mmø WM
V&C
V&B
200mmø SAN
MH202A
375mmø ST
MH202
CBMH201

- HYDRO TRANSFORMER
- STREET LIGHT STANDARD (L.S.)
- DITCH AND CULVERT (600ø CSP)
- CONCRETE SIDEWALK (1.8m CONC. SIDEWALK)
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- PHASING LIMITS
- PROPERTY BOUNDARY
- OVERLAND FLOW DIRECTION
- EXTERNAL OVERLAND FLOW DIRECTION
- EMERGENCY OVERLAND FLOW DIRECTION (E)
- TACTILE WALKING SURFACE INDICATOR (AS PER CITY OF OTTAWA STD. SC6, SC7, SC7.1, SC7.2, SC7.3)
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© DSEL

PLAN AND PROFILE OF

LAST MILE DRIVE

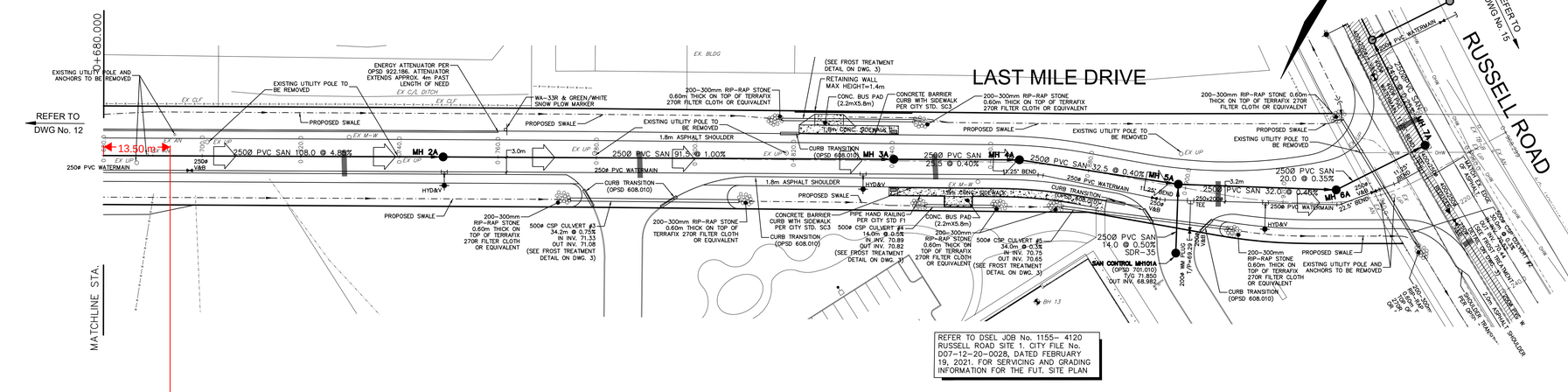
(STA 0+480.000 TO STA 0+680.000)

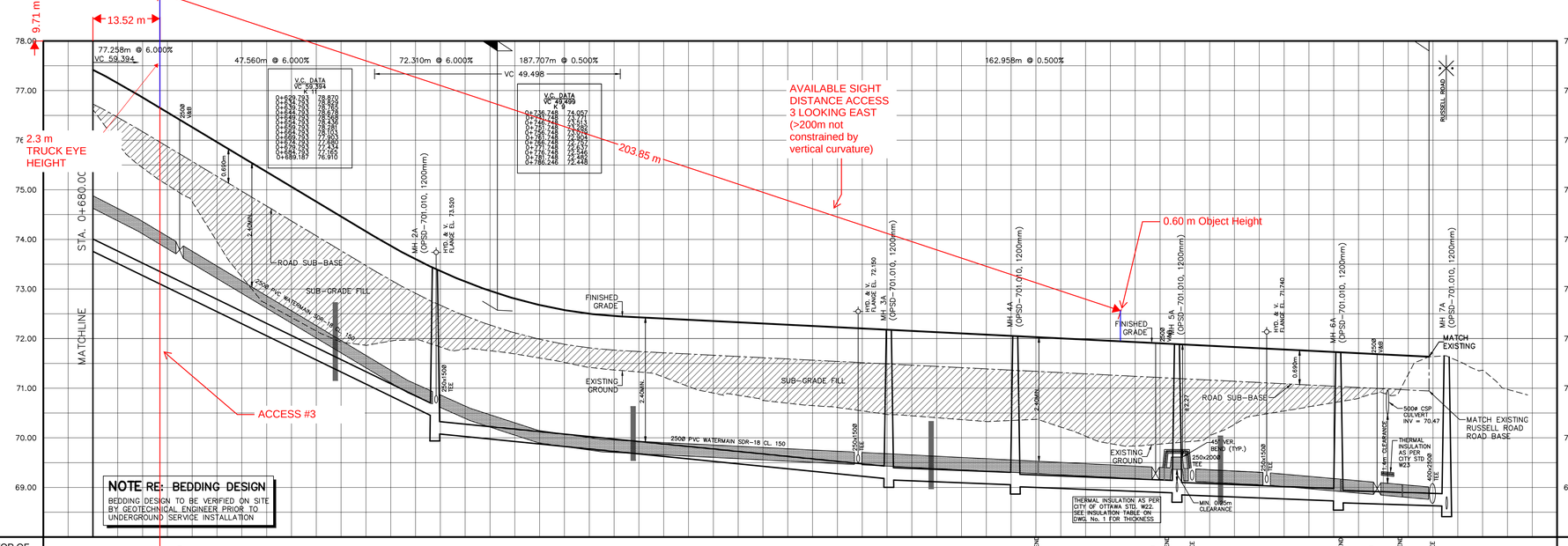
DRAWN BY:	CPB	CHECKED BY:	BNC
DESIGNED BY:	BNC	CHECKED BY:	SLM

SCALE: VERT. 1:50 (0 0.5 1.0 1.5 2.0) HORZ. 1:500 (0 5 10 15 20)

PROJECT No. 19–1155
SHEET No. 12

CITY PLAN No. 18438
CITY FILE No. D07-15-20-0004





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V.C. DATA
VC 59.394
K 11

0+629.793	78.870
0+634.793	78.829
0+639.793	78.765
0+644.793	78.678
0+649.793	78.568
0+654.793	78.436
0+659.793	78.281
0+664.793	78.103
0+669.793	77.903
0+674.793	77.680
0+679.793	77.434
0+684.793	77.165
0+689.187	76.910

V.C. DATA
VC 49.499
K 9

0+736.748	74.057
0+741.748	73.771
0+746.748	73.513
0+751.748	73.282
0+756.748	73.079
0+761.748	72.904
0+766.748	72.757
0+771.748	72.637
0+776.748	72.546
0+781.748	72.482
0+786.246	72.448

KEY PLAN
SCALE 1:10000

LEGEND

- CROSS
- 45° BEND
- LATERAL
- HYDRANT, VALVE & VB
- TEE
- VALVE & VC
- VALVE & VB
- 22.5° BEND
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305mmØ WM, V&C, V&B, 200mmØ SAN, MH202A, 375mmØ ST, MH202, CBMH201

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PLAN AND PROFILE OF

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DRAWN BY: CPB	CHECKED BY: BNC	PROJECT No.	19-1155
DESIGNED BY: BNC	CHECKED BY: SLM		
SCALE: VERT. 1:50 (0 0.5 1.0 1.5 2.0) HORZ. 1:500 (0 5 10 15 20)		SHEET No.	13

CITY PLAN No. 18438

CITY FILE No. D07-15-20-0004