



Engineers, Planners & Landscape Architects

Engineering

- Land / Site Development
- Municipal Infrastructure
- Environmental / Water Resources
- Traffic / Transportation
- Structural
- Recreational

Planning

- Land / Site Development
- Planning Application Management
- Municipal Planning Documents & Studies
- Expert Witness (OMB)
- Wireless Industry

Landscape

Architecture

- Urban Design & Streetscapes
- Open Space, Parks & Recreation Planning
- Community & Residential Developments
- Commercial & Institutional Sites
- Environmental Restoration



National Capital Business Park - Building 'C'

Traffic Impact Assessment

Engineering excellence. Planning precision. Inspired landscapes.

National Capital Business Park
Building 'C' 4120 Russell Road
Transportation Impact Assessment

Prepared By:

NOVATECH

Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

August 2020

Rev: December 2020

Novatech File: 119124

Ref: R-2020-098

December 8, 2020

Ministry of Transportation - Eastern Region
Corridor Management Planner
1355 John Counter Blvd.
Kingston, Ontario K7L 5A3

Attention: Mr. Stephen Kapusta

City of Ottawa
Planning and Growth Management Department
110 Laurier Ave. W., 4th Floor,
Ottawa, Ontario K1P 1J1

Attention: Mr. Wally Dubyk

Dear Sirs:

**Reference: National Capital Business Park, Building 'C'
Revised Transportation Impact Assessment
Novatech File No. 119124**

We are pleased to submit the following revised Transportation Impact Assessment in support of a Site Plan Application for Site 1 of the development of the National Capital Business Park (4055 and 4120 Russell Road). The structure and format of this report is in accordance with the City of Ottawa Transportation Impact Assessment Guidelines (June 2017) and the MTO General Guidelines for the Preparation of Traffic Impact Studies (December 2009). This revised TIA has been prepared to address City comments dated September 18, 2020 as well as changes to the site plan since the August 2020 submission.

If you have any questions or comments regarding this report, please feel free to contact me.

Yours truly,

NOVATECH



Patrick Hatton, P.Eng.
Project Manager | Transportation/Traffic



TIA Plan Reports

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

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

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

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed¹ or registered² professional in good standing, whose field of expertise [check ☒ appropriate field(s)] is either transportation engineering ☒ or transportation planning ☐.

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

City Of Ottawa
Infrastructure Services and Community
Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
Tel. : 613-580-2424
Fax: 613-560-6006

Ville d'Ottawa
Services d'infrastructure et Viabilité des
collectivités
Urbanisme et Gestion de la croissance
110, avenue Laurier Ouest
Ottawa (Ontario) K1P 1J1
Tél. : 613-580-2424
Télécopieur: 613-560-6006

Dated at Ottawa this 8th day of December, 2020.
(City)

Name: Patrick Hatton, P.Eng.
(Please Print)

Professional Title: Project Manager, Transportation / Traffic



Signature of Individual certifier that s/he meets the above four criteria

| Office Contact Information (Please Print) | |
|---|---------------------------------------|
| Address: | 240 Michael Cowpland Drive, Suite 200 |
| City / Postal Code: | Ottawa, ON, K2M 1P6 |
| Telephone / Extension: | 613-254-9643 x 322 |
| E-Mail Address: | p.hatton@novatech-eng.com |

TABLE OF CONTENTS

| | | |
|------------|---|-----------|
| 1.0 | SITE LOCATION..... | 1 |
| 2.0 | PROPOSED DEVELOPMENT | 1 |
| 3.0 | SCREENING | 2 |
| 4.0 | SCOPING..... | 2 |
| 4.1 | EXISTING CONDITIONS | 2 |
| 4.1.1 | Roadways..... | 2 |
| 4.1.2 | Pedestrian and Cycling Facilities | 2 |
| 4.1.3 | Transit | 3 |
| 4.1.4 | Intersection..... | 4 |
| 4.1.5 | Existing Study Area Traffic Volumes | 4 |
| 4.1.6 | Collision Data | 5 |
| 4.1.7 | Driveways..... | 6 |
| 4.1.8 | Area Traffic Management | 6 |
| 4.2 | PLANNED CONDITIONS | 6 |
| 4.3 | STUDY AREA AND TIME PERIODS | 8 |
| 4.4 | EXEMPTIONS REVIEW..... | 8 |
| 5.0 | FORECASTING | 9 |
| 5.1 | DEVELOPMENT-GENERATED TRAFFIC | 9 |
| 5.1.1 | Trip Generation..... | 9 |
| 5.1.2 | Trip Distribution / Assignment | 10 |
| 5.2 | BACKGROUND TRAFFIC | 12 |
| 5.2.1 | General Background Traffic Growth Rate | 12 |
| 5.2.2 | Other Area Development | 12 |
| 5.2.3 | Diverted Belgreen Drive Trips | 14 |
| 5.2.4 | Future Background and Total Traffic Volume Projections | 15 |
| 6.0 | ANALYSIS | 18 |
| 6.1 | DEVELOPMENT DESIGN | 18 |
| 6.2 | PARKING | 19 |
| 6.3 | BOUNDARY STREETS | 19 |
| 6.4 | ACCESS INTERSECTIONS | 20 |
| 6.5 | TRANSPORTATION DEMAND MANAGEMENT | 22 |
| 6.6 | TRANSIT | 23 |
| 6.7 | INTERSECTION ANALYSIS..... | 23 |
| 6.7.1 | Existing Traffic Operations..... | 23 |
| 6.7.2 | 2023 Intersection Operations – Future Background Traffic | 24 |
| 6.7.3 | 2023 Intersection Operations – Total Traffic with Site Generated Trips..... | 24 |
| 6.7.4 | 2028 Intersection Operations – Future Background Traffic | 25 |
| 6.7.5 | 2028 Intersection Operations – Total Traffic with Site Generated Trips..... | 25 |
| 6.7.6 | 2033 Intersection Operations – Future Background Traffic | 26 |
| 6.7.7 | 2033 Intersection Operations – Total Traffic with Site Generated Trips..... | 26 |
| 6.7.8 | Right Turn Channelized Highway Ramps – Traffic Analysis and Results | 26 |
| 7.0 | CONCLUSIONS AND RECOMMENDATIONS | 28 |

Figures

| | |
|---|----|
| Figure 1: Site Location | 1 |
| Figure 2: OC Transpo Bus Stop Locations | 3 |
| Figure 3: Existing Traffic Volumes..... | 5 |
| Figure 4: Innes-Walkley-Hunt Club Connection..... | 7 |
| Figure 5: Comparison of PM Peak Travel Times for Hwy 417 Trips to North | 11 |
| Figure 6: Site 1 Generated Traffic Volumes | 12 |
| Figure 7: Other Development Traffic Volumes..... | 14 |
| Figure 8: Diversion Routes for Belgreen trips to Last Mile | 14 |
| Figure 9: 2023 Future Background Traffic Volumes | 15 |
| Figure 10: 2028 Future Background Traffic Volumes | 16 |
| Figure 11: 2033 Future Background Traffic Volumes | 16 |
| Figure 12: 2023 Total Traffic Volumes with Site Generated Trips..... | 17 |
| Figure 13: 2028 Total Traffic Volumes with Site Generated Trips..... | 17 |
| Figure 14: 2033 Total Traffic Volumes with Site Generated Trips..... | 18 |
| Figure 15: Sight Distance Diagram..... | 22 |

Tables

| | |
|---|----|
| Table 1: Reported Collisions | 5 |
| Table 2: TIA Exemptions..... | 8 |
| Table 3: Person Trip Generation | 9 |
| Table 4: Person Trips by Modal Share | 9 |
| Table 5: Trip Assignment Assumptions | 10 |
| Table 6: Vehicular, Bicycle, Barrier Free Parking and Loading Requirements..... | 19 |
| Table 7: Segment MMLOS Summary..... | 20 |
| Table 8: Existing Traffic - Intersection Operations | 23 |
| Table 9: 2023 Background Traffic - Intersection Operations..... | 24 |
| Table 10: 2023 Total Traffic - Intersection Operations..... | 24 |
| Table 11: 2028 Background Traffic - Intersection Operations..... | 25 |
| Table 12: 2028 Total Traffic - Intersection Operations..... | 25 |
| Table 13: 2033 Background Traffic - Intersection Operations..... | 26 |
| Table 14: 2033 Total Traffic - Intersection Operations..... | 26 |
| Table 15: 2033 Background Traffic – SimTraffic Delay Results..... | 27 |
| Table 16: 2033 Total Traffic – SimTraffic Delay Results..... | 27 |
| Table 17: 2033 Background Traffic – SimTraffic Merging Queue Results..... | 27 |
| Table 18: 2033 Total Traffic – SimTraffic Merging Queue Results..... | 27 |

Appendices

| |
|---|
| Appendix A: Concept Plan |
| Appendix B: TIA Screening Form |
| Appendix C: OC Transpo System Information |
| Appendix D: Traffic Count Data and Long-Range Snapshots |
| Appendix E: Collision Records |
| Appendix F: Excerpts from Relevant Traffic Studies |
| Appendix G: Multimodal Level of Service (MMLOS) |
| Appendix H: Signal and Left Turn Warrant |
| Appendix I: Transportation Demand Management (TDM) Checklists |
| Appendix J: Functional Design of Last Mile Drive |
| Appendix K: Traffic Analysis Reports |

EXECUTIVE SUMMARY

This revised 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 at 4120 Russell Road.

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. The site is designated as ‘Urban Employment Area’ on Schedule ‘B’ of the City of Ottawa’s Official Plan and zoned IH (Heavy Industrial). A TIA was prepared (Novatech, May 2020) for Master Site Plan for the full development.

This TIA includes Site Plan for Site 1 only (planned completion by 2023) which is to be one warehouse with 13,538m² (145,717ft²).

Site 1 includes a total of about 128 parking spaces, 24 bicycle parking spaces, as well as 54 loading bays and 26 trailer drop spaces. As part of the development, Last Mile Drive will be constructed as a public street, running between Hunt Club Road and Russell Road with two 3.5m lanes and a 20m right-of-way that includes paved shoulders. Site 1 will have two full movement accesses to Last Mile Drive and one full movement access to Russell Road.

The study area intersections are:

- Hunt Club Road/Highway 417 EB Off-Ramp
- Russell Road at the proposed Site 1 driveway
- The proposed Last Mile Drive connections to Russell Road and Hunt Club Road
- The Site 1 connections to Last Mile Drive

The weekday AM and PM peak hours are considered to represent the “worst case” combination of site-generated traffic and peak traffic conditions of the adjacent roadways. Intersection capacity analysis has been completed for the weekday AM and PM peak hours. Analysis of potential transportation impacts has been completed for the 2023 Site 1 opening year, the 2028 horizon year, and the 2033 ten-year horizon year. Weekday AM and PM traffic counts were collected at the existing study area intersection as well as at the Hawthorne Road/Hunt Club Road and Russell Road/Belgreen Drive intersections to estimate the traffic volumes along Hunt Club Road and Russell Road passing the site. Counts were collected by the City of Ottawa or coordinated by Novatech.

A 1% background growth rate was applied to traffic along Russell Road, Hunt Club Road, and the Hwy 417 off-ramp. Other study area developments and diversion of trips from Belgreen Drive to Last Mile Drive have been accounted for separately. Background traffic volumes for the 2023 Site 1 opening year, as well as the 2028 and 2033 horizon years were determined by applying the annual traffic growth rate to the peak hour traffic volumes and by adding the traffic from the new developments in the area. Site generated traffic was estimated using *Trip Generation Manual, 10th Edition* (Institute of Transportation Engineers, Washington 2017). Site traffic was distributed and added to the projected background traffic to determine future total traffic volumes.

The main conclusions and recommendations of this TIA are:

Development Design and Parking

- Pedestrian facilities will be provided between the main buildings and the parking lots. A new pedestrian walkway will be constructed, providing connectivity to Russell Road.
- All required TDM-supportive design and infrastructure measures in the TDM checklist are met.
- The proposed vehicular parking spaces meet the requirements of the ZBL.
- The proposed bicycle parking spaces exceed the minimum requirements of the ZBL.
- The number of barrier-free spaces meet the AODA requirements.
- As per the City of Ottawa’s Zoning By-law, a minimum of three loading spaces are required, 54 loading bays are provided in addition to 26 trailer parking spaces.
- Stops #3514 and #3622 are located along Belgreen Drive, which is about 290m walking distance from the site’s northern exterior door. There are planned bus stops with concrete landing pads on both sides of Last Mile Drive near the site.

Boundary Street Multi-Modal Level of Service (MMLOS)

The results of the segment MMLOS analysis for Russell Road and Hunt Club Road can be summarized as follows:

- Both Russell Road and Hunt Club Road operate with a Pedestrian Level of Service (PLOS) F, missing the target PLOS C;
- Russell Road (F) and Hunt Club Road (E) miss the target Bicycle Level of Service (BLOS) of E and C, respectively;
- Russell Road (C) misses and Hunt Club Road (A) exceeds the target Truck Level of Service (TkLOS) of B; and,
- If the City urbanizes Russell Road in the future, sidewalk and onstreet bicycle lanes should be considered. The existing gravel shoulders are approximately 2.5m. The City may wish to consider paving an additional 0.5m on either side of the road.

Segment MMLOS has also been completed for the proposed cross section along Last Mile Drive and indicates:

- Last Mile Drive will operate with PLOS ‘F’. A paved shoulder is proposed along Last Mile Drive and is considered appropriate for the rural context.
- Since Last Mile Drive is a local street and not a designated bicycle route there is no target BLOS however, based on its cross section and anticipated travel speed, it would operate with BLOS D.
- The TkLOS of Last Mile Drive (C) surpasses the target (E).

Transit

- Site 1 is anticipated to generate an additional 4 transit trips (4 in, 0 out) during the weekday AM peak hour and 4 transit trips (0 in, 4 out) during the weekday PM peak hour.

Access Design

- Last Mile Drive will be constructed between Russell Road and Hunt Club Road as a public street with a rural cross section and a 20m right-of-way that includes paved shoulders. Connections to Last Mile Drive will be full movement and full movement to Russell Road.
- The Russell Road driveway will be 7.7m wide, measured at the property line. The driveway meets the requirements of the City’s Private Approach By-law.
- Adequate turning sight distance for heavy vehicles is available along Russell Road at both Last Mile Drive and the site driveway.

- The Last Mile Drive connection to Hunt Club Road should be signalized while the remaining connections are expected to operate well with STOP control.
- An eastbound left turn lane is warranted along Hunt Club Road at Last Mile Drive.
- Due to the low turning volume (about 2.0%), a left turn lane is not warranted on Russell Road at Last Mile Drive.
- The signalized Last Mile Drive connection to Hunt Club is proposed approximately 250m east of the Hydro Ottawa (signalized) Access. The location and ultimate conceptual design of this intersection have been agreed by the City of Ottawa and Hydro Ottawa in a tri-party agreement with NCC in 2016.
- The Last Mile Drive connection to Hunt Club is 60m east of Hydro Ottawa's right-in, right-out (RIRO) driveway. Per the 2711 Hunt Club TIS, Hydro's RIRO access will be closed with construction of the Last Mile Drive access and a new connection provided between the Hydro Ottawa site and Last Mile Drive. The new Hydro Ottawa access has been designed to accommodate the WB-20 design vehicle and a 15m left turn lane has been provided along Last Mile Drive for traffic turning at the Hydro Ottawa connection.

Recommended Modifications

Modifications that have been identified for the City's/MTO's consideration without added site development are:

Existing/Background Traffic:

- Modify the right turn ramp for Highway 417 eastbound off-ramp onto Hunt Club Road with an increased radius or a second lane to accommodate projected traffic without and with site generated trips.

Background Traffic:

While the need for the Last Mile Drive connection to Hunt Club Road is not triggered by Site 1 traffic alone (due to the relatively low generated trips), there is a recognized benefit to site connectivity of constructing Last Mile Drive at the outset. As discussed with City staff, an RMA will be filed under separate cover with the right-of-way conveyed through a road opening. Functional design plans have been attached to this TIA.

- Install an eastbound left turn lane and traffic signals at the Hunt Club Road / Last Mile Drive intersection and construct Last Mile Drive as a public local street with a 20m rural cross section that includes paved shoulders connecting Hunt Club Road and Russell Road.

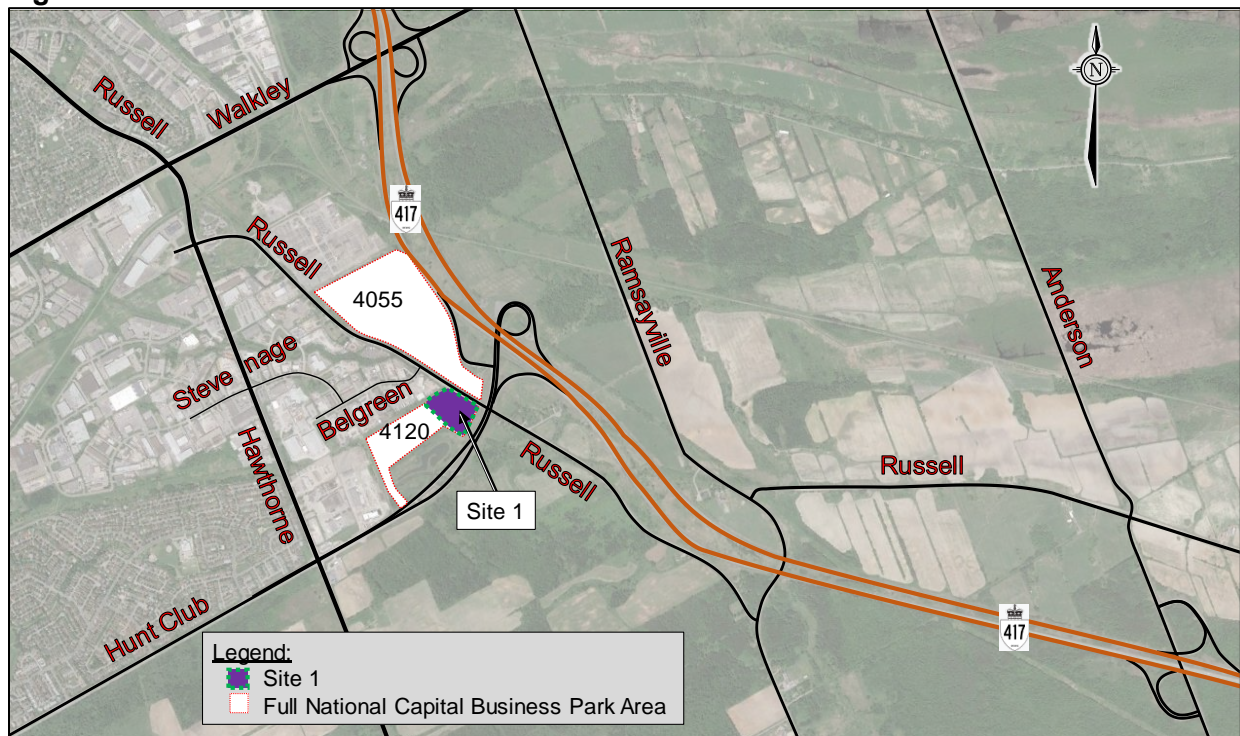
No modifications have been identified to accommodate Site 1 traffic.

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 13,538m² (145,717ft²). 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

Appendix J. The site will have full access to Last Mile Drive and one full movement access to Russell Road.

3.0 SCREENING

The City of Ottawa's 2017 TIA Guidelines identifies three triggers for completing a TIA report, including trip generation, location, and safety. The criteria for each trigger are outlined in the City's TIA Screening Form (See **Appendix B**).

The trigger results are as follows:

- **Trip Generation Trigger** – Site 1 is not anticipated to generate over 60 person trips/peak hour; further assessment **is not required** based on this trigger.
- **Location Triggers** – The site proposes driveways to Last Mile Drive (new public street) and Russell Road; further assessment **is not required** based on this trigger.
- **Safety Triggers** – The development proposes new connections onto Russell Road, which has a posted speed limit of 80 km/h; further assessment **is required** based on this trigger.

4.0 SCOPING

4.1 Existing Conditions

4.1.1 Roadways

Russell Road is a two-lane undivided rural arterial and is classified as a truck route, allowing full loads. It runs northwest-southeast through the area and has a posted speed limit of 80km/h. The City of Ottawa Official Plan identifies 30m ROW protection and widening may be required as part of this development application.

Hunt Club Road is a four-lane divided arterial roadway and is classified as a truck route, allowing full loads. It runs east-west and has a posted speed limit of 80km/h. The City of Ottawa Official Plan identifies 42.5m - 50m ROW protection from Hawthorne Road to Highway 417.

4.1.2 Pedestrian and Cycling Facilities

Hunt Club Road is identified as a spine cycling route in the City's Cycling Network. There are currently no designated bike facilities on Hunt Club Road.

Concrete sidewalks are provided along the north side of Hunt Club Road east of Hawthorne to the west limit of 4120 Russell Road.

4.1.3 Transit

Transit service (via route #47) is provided along Russell Road in front of the civic #4055 site and along Belgreen Drive with bus stops #3622 and #3514 along Belgreen Drive.

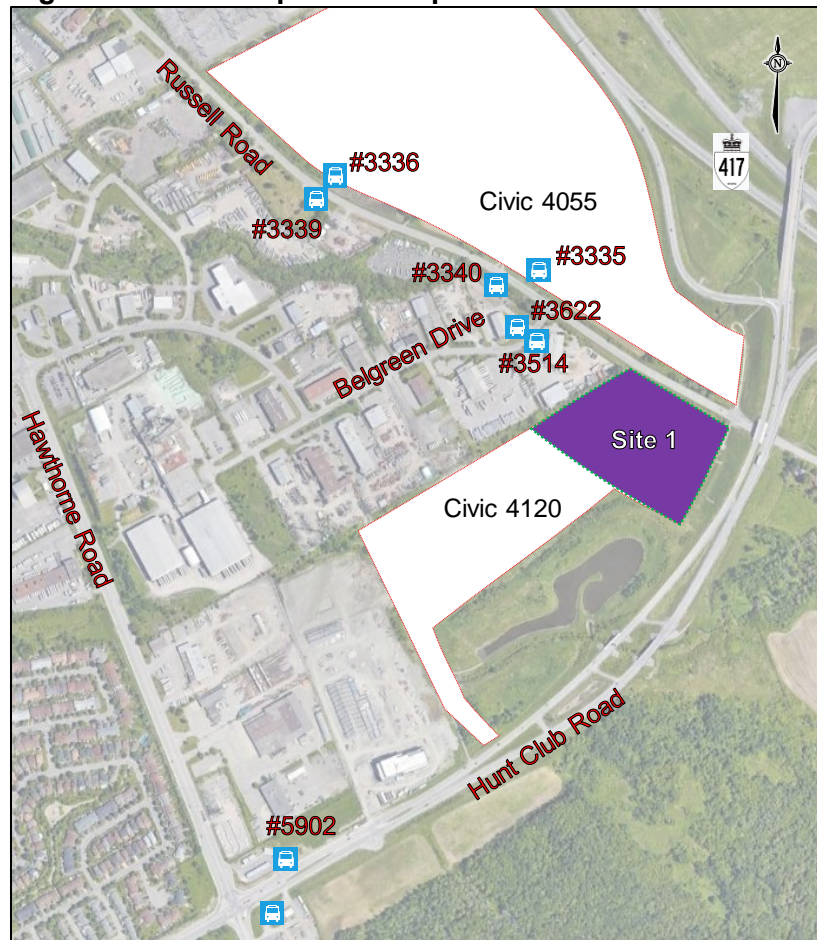
Additional transit service is provided (via route #98) with bus stops at the Hunt Club / Hawthorne intersection. These bus stop locations are shown in **Figure 2**.

OC Transpo Route #47 travels from the Hydro station just north of civic #4055, past the civic #4055 site along Russell Road and to the St Laurent Station. It provides weekday peak period service (from St Laurent toward the site in the morning and from the site toward St Laurent in the afternoon).

OC Transpo Route #98 travels from the Hunt Club / Hawthorne intersection to Hurdman station. It provides all day service 7 days per week.

OC Transpo Route information is included in **Appendix C**.

Figure 2: OC Transpo Bus Stop Locations

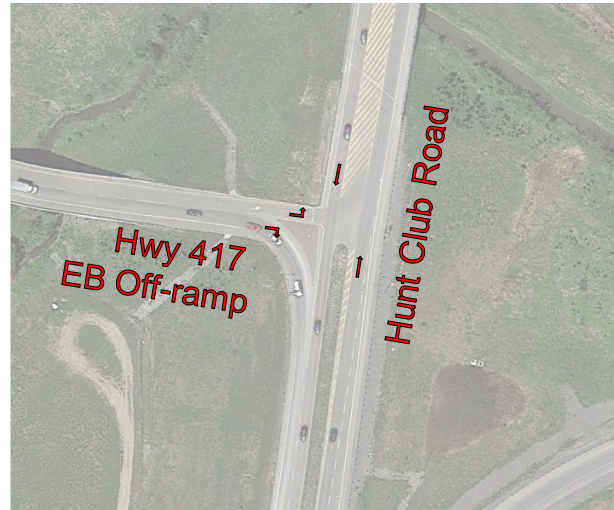


4.1.4 Intersection

The following is considered the existing study area intersection with layout and lane configurations described below.

1. Hunt Club Road at Highway 417 EB Off-ramp

- STOP controlled intersection (STOP on ramp)
- Northbound/Southbound (Hunt Club Road): one through lane.
- Eastbound (Highway 417): one left turn lane and one channelized right turn lane.



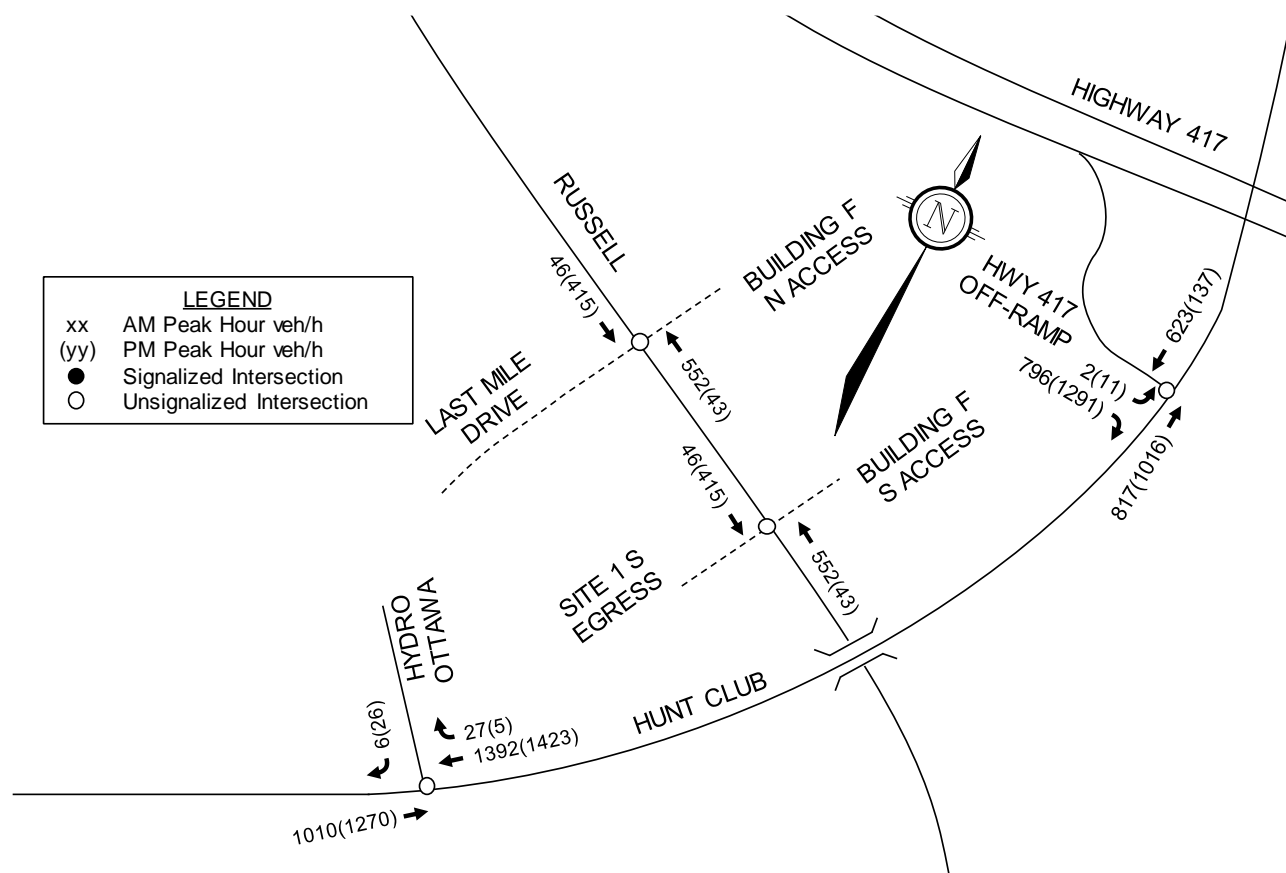
4.1.5 Existing Study Area Traffic Volumes

Weekday traffic counts were collected to determine the existing volumes at the study intersection. Additional traffic counts were collected at the intersections of Hunt Club at Hawthorne Road and Russell Road at Belgreen Drive to estimate the traffic volumes passing the site along Hunt Club Road and Russell Road, respectively. Additional counts at the Hawthorne Road at Stevenage Road intersection were used to review potential diversion from Belgreen/Stevenage to Last Mile Drive (See **Section 5.2.3**). Trips assigned to the Hydro Ottawa driveway in the 2016 Hydro Ottawa TIS (See **Appendix F**) were assigned to the driveway for this study. The counts were completed by the City of Ottawa or coordinated by Novatech on the following dates:

- | | | |
|--|-------------------|------------|
| • Hunt Club Road/Highway 417 EB Off-Ramp | December 12, 2019 | (Novatech) |
| • Russell Road/Belgreen Drive | November 14, 2019 | (Novatech) |
| • Hawthorne Road/Hunt Club Road | July 24, 2018 | (City) |
| • Hawthorne Road/Stevenage Road | December 7, 2016 | (City) |

Weekday AM and PM peak hour traffic volumes are shown in **Figure 3**. Peak hour summary sheets of the above traffic counts are included in **Appendix D**.

Figure 3: Existing Traffic Volumes



4.1.6 Collision Data

Historical collision data from the last five years were obtained from the City’s Public Works and Service Department for the intersection of Hunt Club Road at Hwy 417 Off-ramp. Copies of the collision summary reports are included in **Appendix E**.

The collision data have been evaluated to determine if there are identifiable collision patterns. **Table 1** summarizes the number of collisions at each study intersection from January 1, 2014 to December 31, 2018. During the period, there were zero fatal collisions reported at the intersection.

Table 1: Reported Collisions

| Intersection | Number of Collisions | | | | | | |
|-------------------------------|-------------------------|-------------|----------|-------|--------------|------------|-------|
| | SMV ¹ /Other | Approaching | Rear-End | Angle | Turning Mvmt | Side-swipe | Total |
| Hunt Club at Hwy 417 Off-ramp | 1 | 0 | 6 | 1 | 0 | 0 | 8 |

1. SMV: Single Motor Vehicle

4.1.7 Driveways

In accordance with the City's 2017 TIA guidelines, a review of adjacent driveways along the boundary roads are provided as follows:

Russell Road, West Side:

- One residential driveway for 4236 Russell
- One residential driveway for 4230 Russell

Russell Road, East Side:

- No nearby driveways

Hunt Club Road:

- One signalized driveway for Hydro Ottawa 250m west of Last Mile Drive.
- One right-in, right-out driveway about 60m west of Last Mile Drive; to be closed with a new connection to Last Mile Drive.
- Service access to SWM pond; to be closed with a new connection to Last Mile Drive.

4.1.8 Area Traffic Management

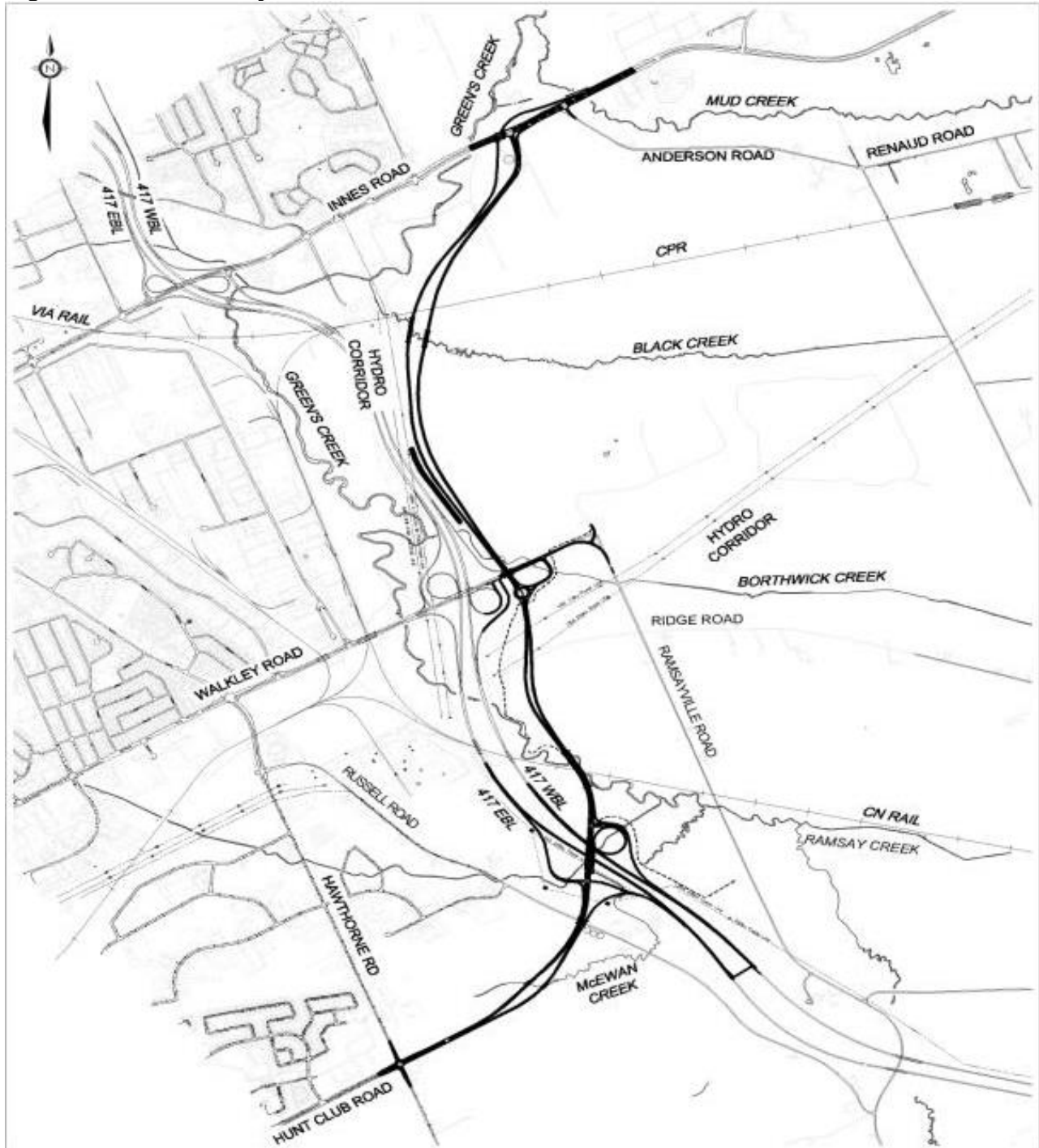
There are no Area Traffic Management (ATM) studies within the study area that have been completed or are currently in progress.

4.2 Planned Conditions

The Innes-Walkley-Hunt Club Connection (See **Figure 4**) is identified in the City of Ottawa's 2031 network concept. This is a new four lane road (initial phase two-lanes) between Hunt Club and Innes Road west of Blackburn Hamlet. The road would bypass congestion on a section of Innes Road and provides direct connection between Orléans and Hunt Club.

Information on other area developments is included in **Section 5.2.2**.

Figure 4: Innes-Walkley-Hunt Club Connection



Source: Innes-Walkley-Hunt Club Connection Environmental Assessment – Study Recommendations, City of Ottawa Transportation Committee

4.3 Study Area and Time Periods

A boundary street review will be conducted for Russell Road and Hunt Club Road. The study area intersections are the Hunt Club Road at Highway 417 off-ramp, the Last Mile Drive connections to Hunt Club Road and Russell Road, and the Site 1 driveway connections to Russell Road and Last Mile Drive.

The selected time periods for the analysis are the weekday AM and PM peak hours, as they represent the 'highest volume' of site generated traffic and adjacent street traffic. This TIA will perform analysis for the weekday AM and PM peak periods with Site 1 development in 2023, as well as the 2028 and 2033 horizon years.

4.4 Exemptions Review

This module reviews possible exemptions from the final Transportation Impact Assessment, as outlined in the City's TIA guidelines. The applicable exemptions for this site are shown in **Table 2**.

Table 2: TIA Exemptions

| Module | Element | Exemption Criteria | Exemption Status |
|--|----------------------------------|--|-------------------------|
| Design Review Component | | | |
| 4.1 Development Design | 4.1.2 Circulation and Access | • Only required for site plans | Not Exempt |
| | 4.1.3 New Street Networks | • Only required for plans of subdivision | Not Exempt ¹ |
| 4.2 Parking | 4.2.1 Parking Supply | • Only required for site plans | Not Exempt |
| | 4.2.2 Spillover Parking | • Only required for site plans where parking supply is 15% below unconstrained demand | Exempt |
| Network Impact Component | | | |
| 4.5 Transportation Demand Management | <i>All elements</i> | • Not required for non-residential site plans expected to have fewer than 60 employees and/or students on location at any given time | Not Exempt |
| 4.6 Neighbourhood Traffic Management | 4.6.1 Adjacent Neighbourhoods | • Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds | Exempt |
| 4.8 Network Concept | <i>All elements</i> | • Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by the established zoning | Exempt |

Note: 1: While not a Plan of Subdivision, a review of the proposed cross section and right-of-way for Last Mile Drive is provided.

5.0 Forecasting

5.1 Development-Generated Traffic

5.1.1 Trip Generation

The proposed development is planned to be one warehouse with 13,538m² (145,717ft²). 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 <i>Trip Generation 10th Edition</i> (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

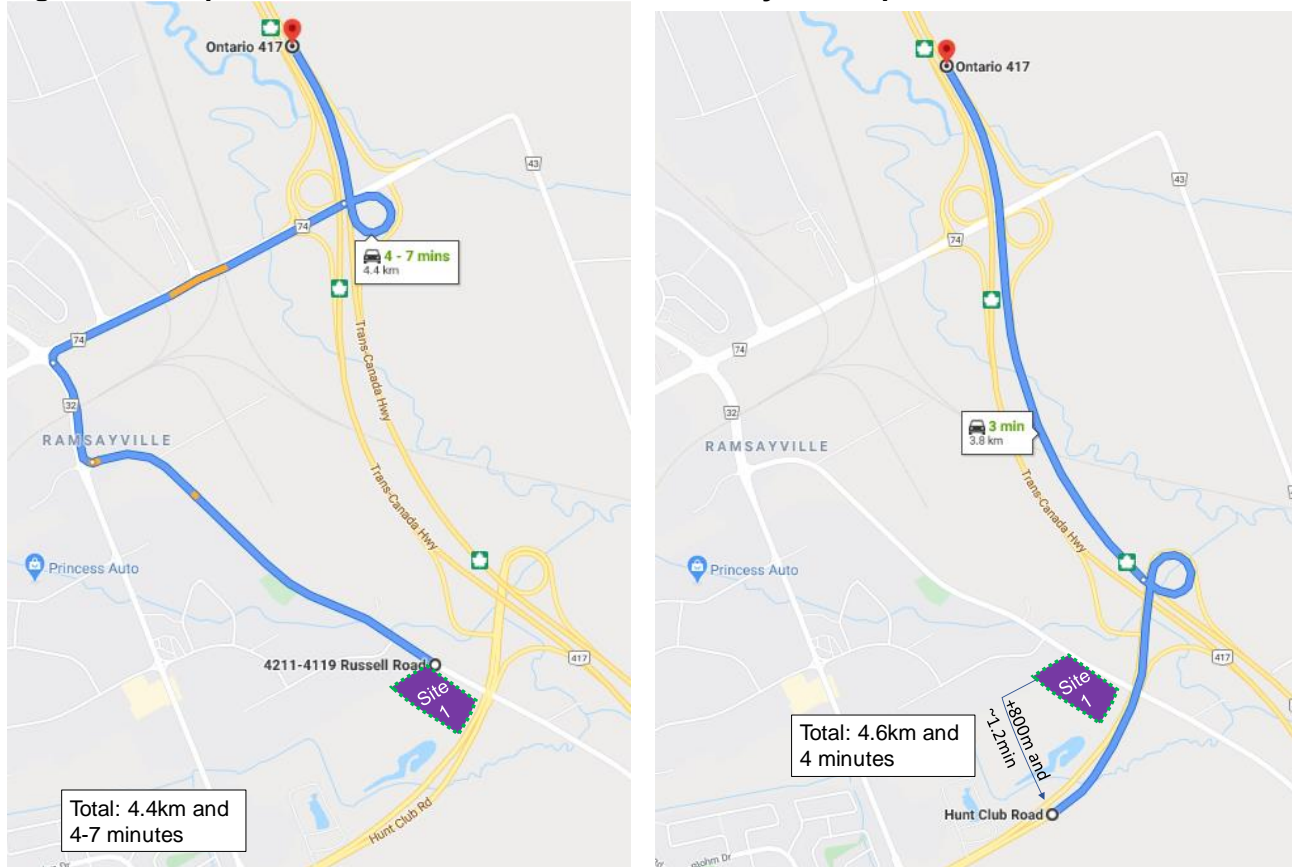
| | Site 1 |
|-----------------------------------|---|
| Hwy 417^{1,2} | 80% of trips will use the Hunt Club interchange and the Last Mile Drive connection to Hunt Club |
| Hunt Club W | 100% of trips will use the Last Mile Drive connection to Hunt Club |
| To / from north on Russell | 60% of trips will 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.

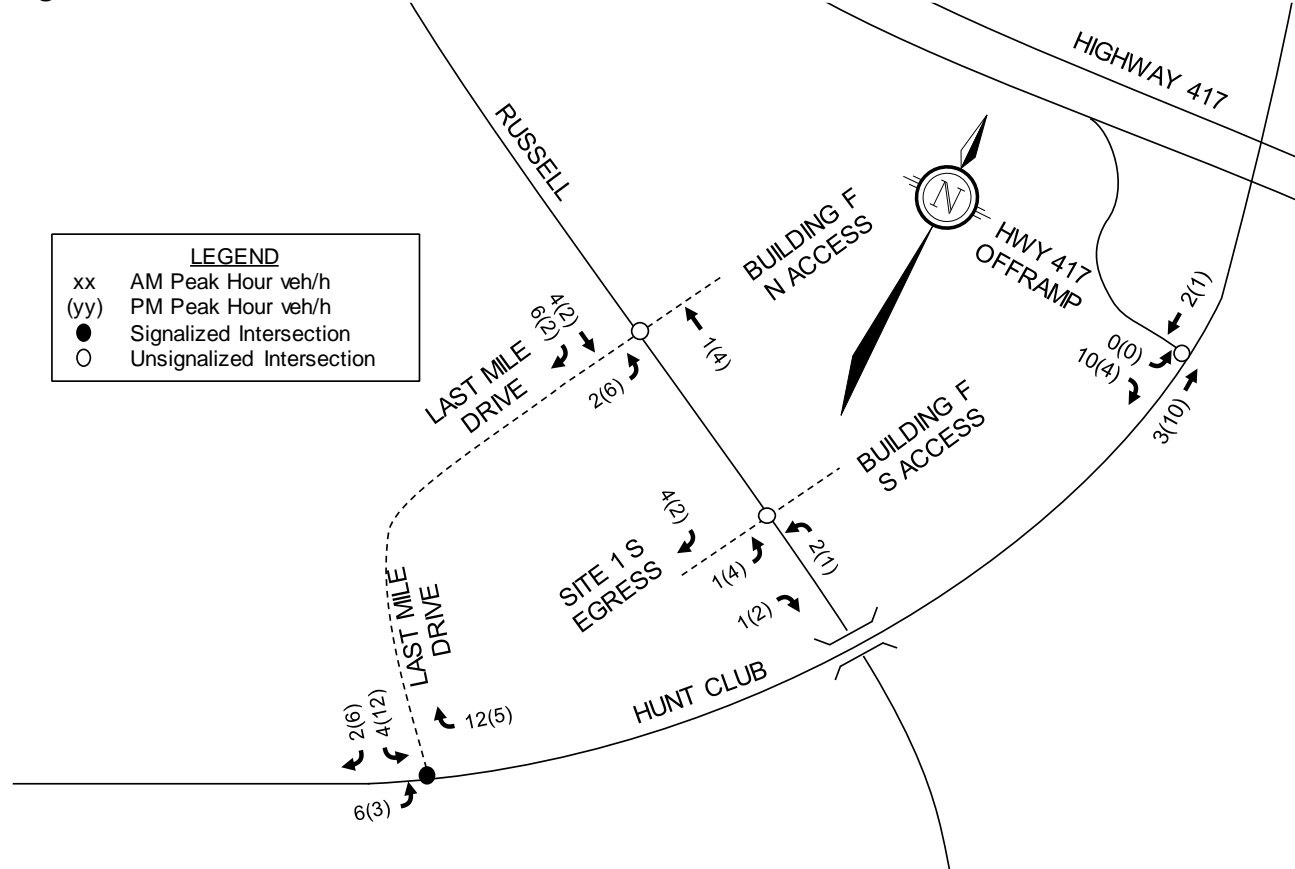
Figure 5: Comparison of PM Peak Travel Times for Hwy 417 Trips to North



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 (929m²) and warehouse (2,323m²). 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 13,000m² of industrial use added to the approximately 10,000m². 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:

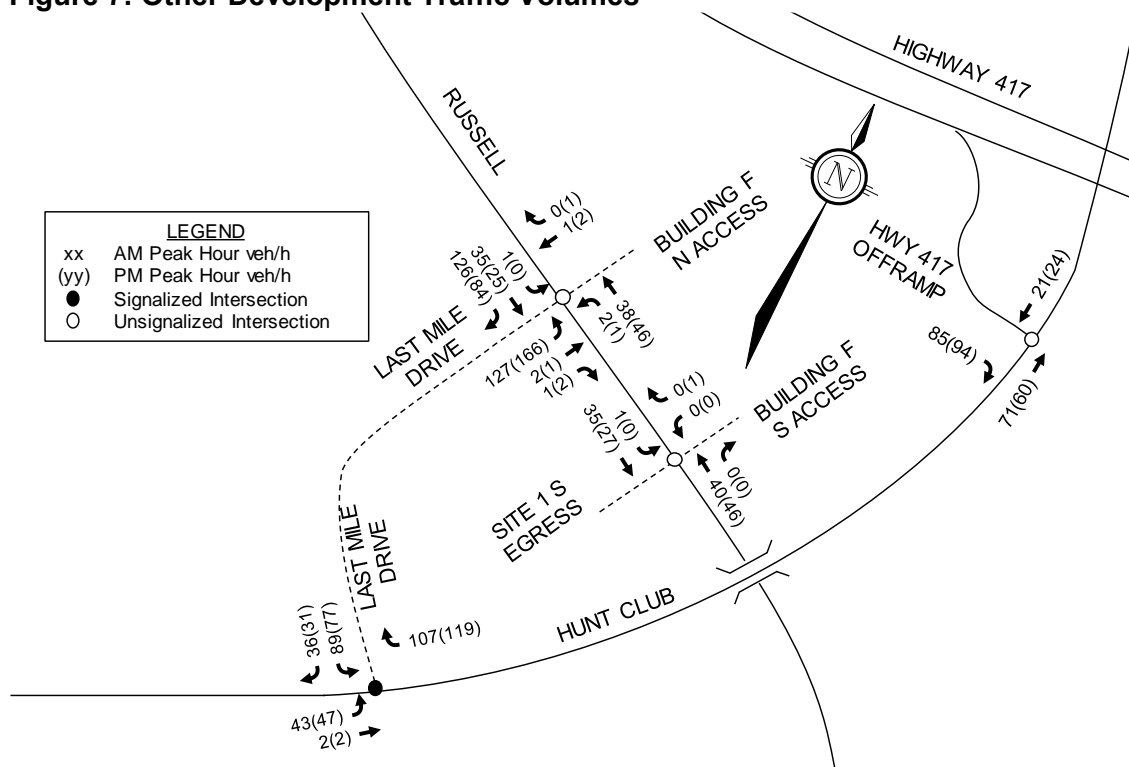
- Under a low scenario (light industrial development) the NCC lands would generate an estimated 258 AM peak hour and 272 PM peak hour vehicle trips; and,
- Under a high scenario (office development) the NCC lands would generate an estimated 480 AM peak hour and 415 PM peak hour vehicle trips.

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

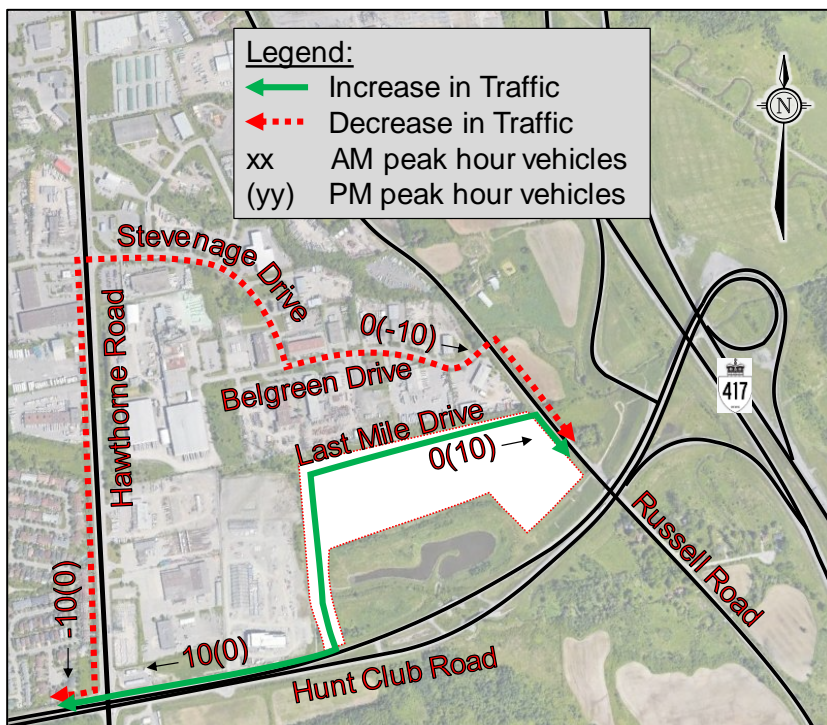


5.2.3 Diverted Belgreen Drive Trips

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



5.2.4 Future Background and Total Traffic Volume Projections

Future Background Traffic Volumes have been projected for the 2023 opening year and the 2028, and 2033 horizon years (See **Figures 9, 10, and 11**, respectively) and include the annual background growth, background development trips, and diverted Belgreen Drive trips. Total Traffic Volumes have been projected for the Study Area intersections for the weekday AM and PM peak hours in 2023, 2028, and 2033 (**Figures 12, 13, and 14**, respectively) and include future background traffic and site generated trips.

Figure 9: 2023 Future Background Traffic Volumes

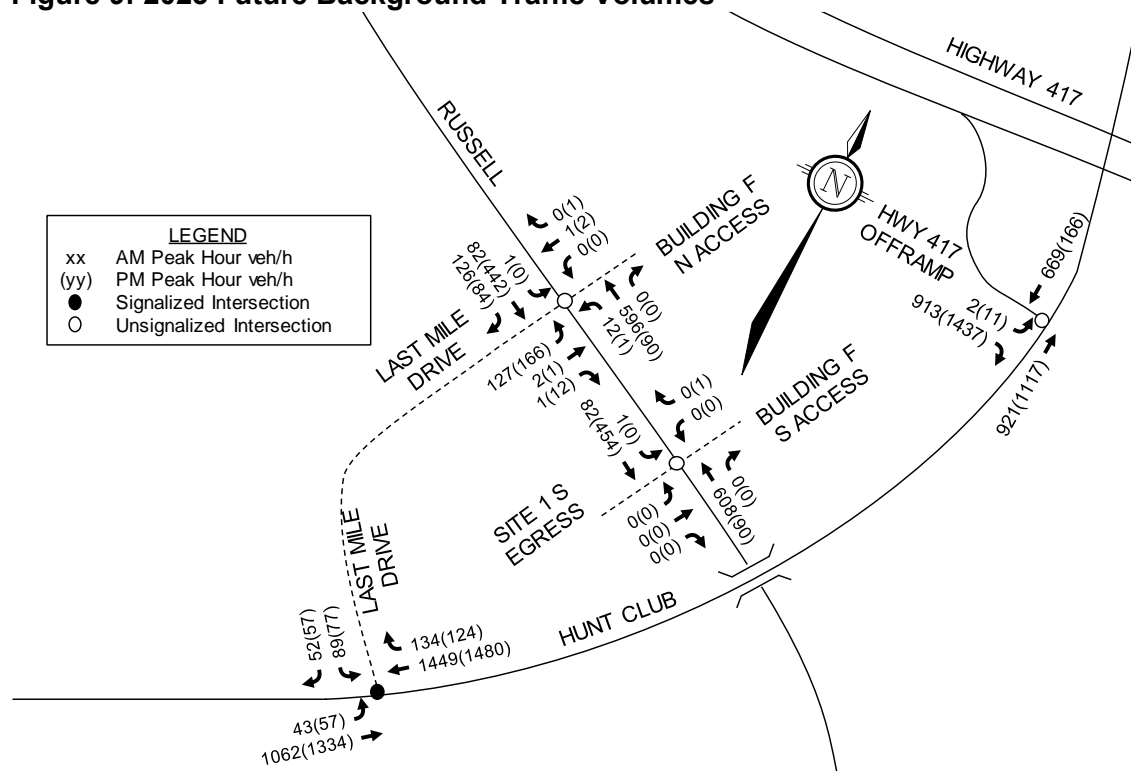


Figure 10: 2028 Future Background Traffic Volumes

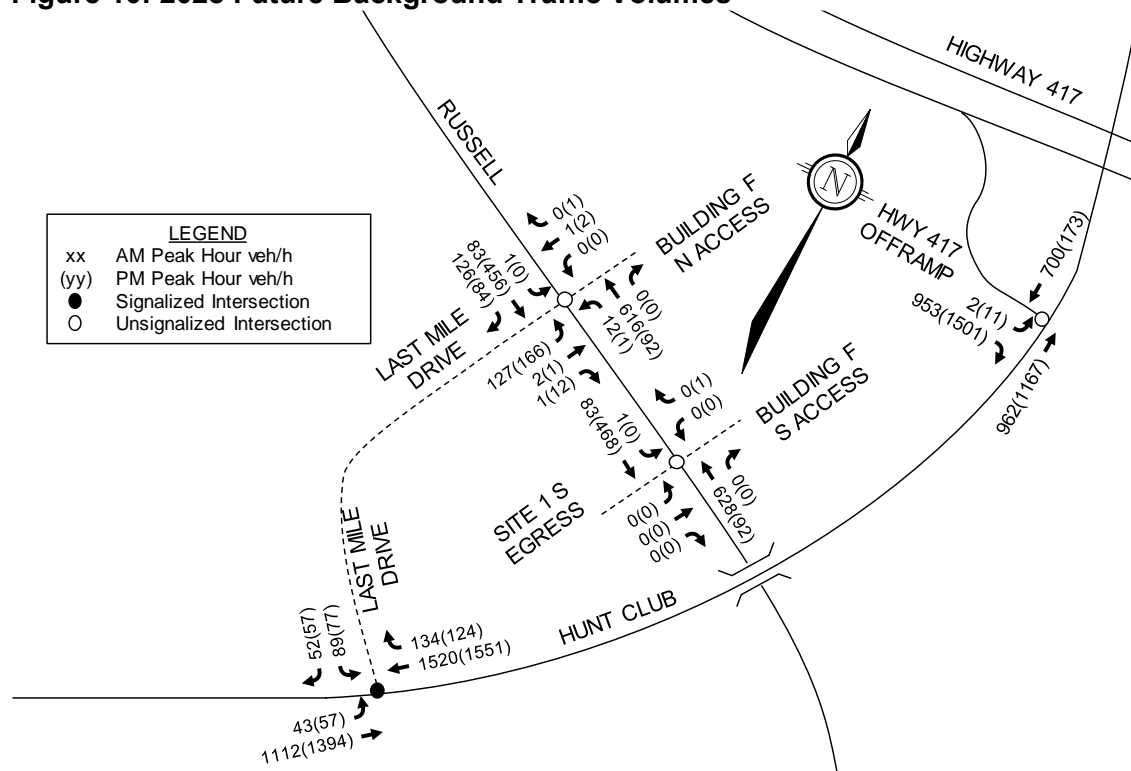


Figure 11: 2033 Future Background Traffic Volumes

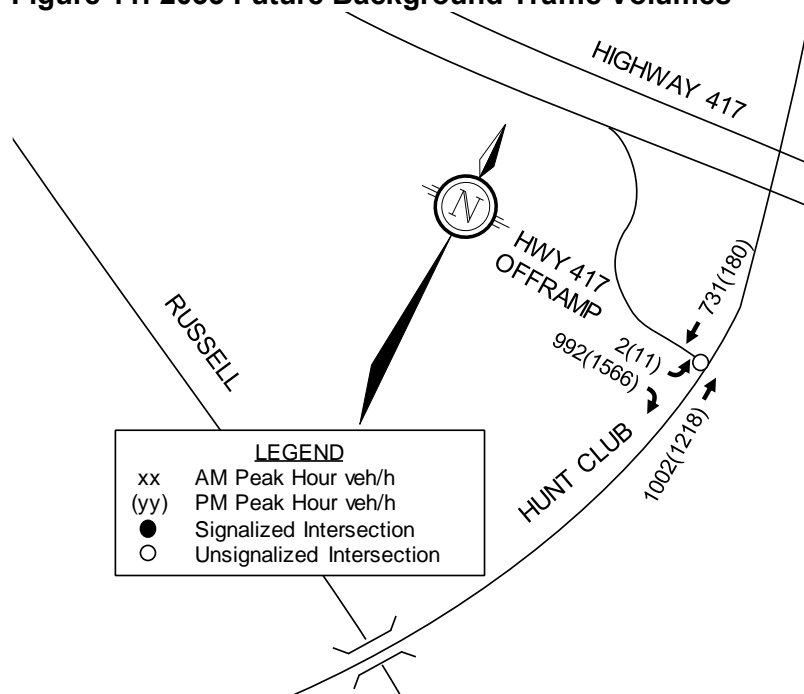


Figure 12: 2023 Total Traffic Volumes with Site Generated Trips

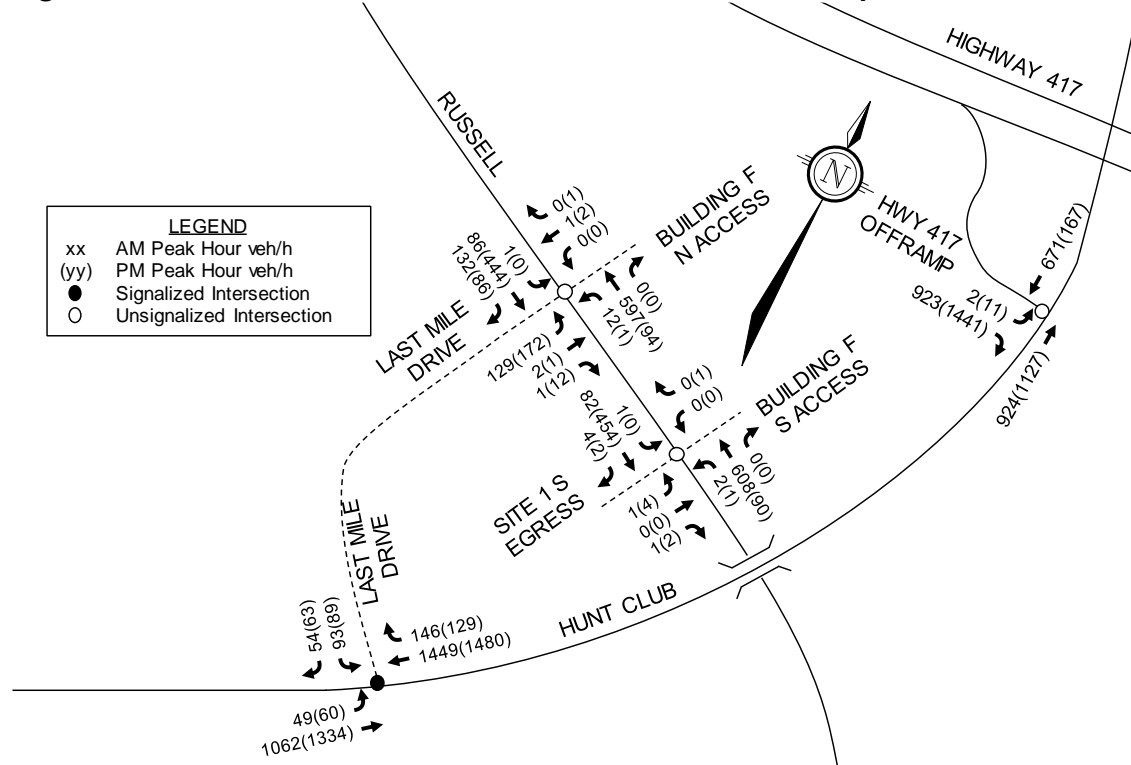


Figure 13: 2028 Total Traffic Volumes with Site Generated Trips

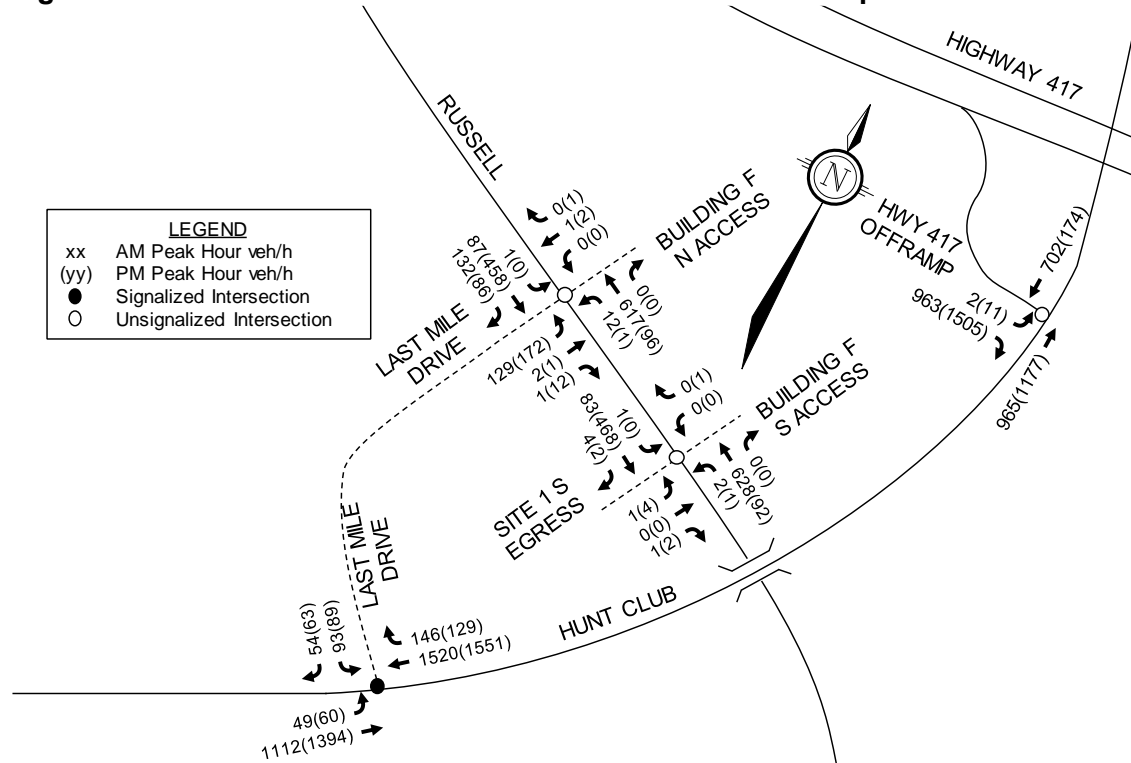
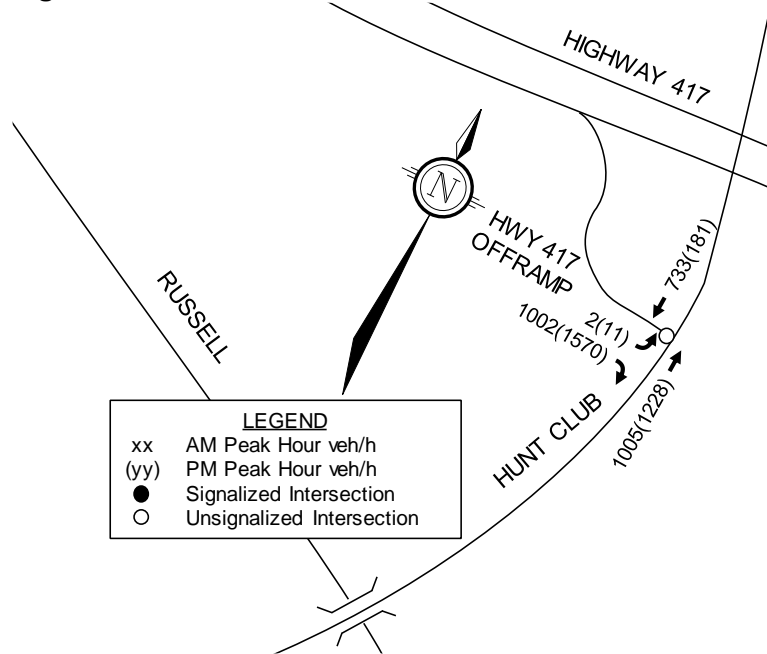


Figure 14: 2033 Total Traffic Volumes with Site Generated Trips



6.0 Analysis

6.1 Development Design

The design overview of Site 1 is summarized below.

- Pedestrian facilities are shown (See **Appendix A**) between the building and the parking lots and a new pedestrian walkway will be constructed to connect to Russell Road.
- OC Transpo's service design guideline for peak period service is to provide service within a five minute (400m) walk of the home, school and work location of 95% of urban residents. The existing bus stops near the subject sites are described in **Section 4.1.3**.
 - The walking distance between exterior access doors for Building C and OC Transpo stops #3514 and #3622 is about 290m. These stops are along Belgreen Drive and do not require pedestrians to cross Russell Road.
- There are proposed bus stops with landing pads along Last Mile Drive in both directions near the site.
- The Fire Route for the site (See **Appendix A**) is through the main parking area via Last Mile Drive, circulates the building and out via the truck access to Last Mile Drive.
- Garbage collection will be refined once the tenant is known.
- There will be a pedestrian walkway to future development at Site 2 (to the south).
- Last Mile Drive will be constructed as a public road between Russell Road and Hunt Club Road. Site 1 will access Last Mile Drive via two full movement connections and Russell Road via one full movement access. Last Mile Drive will be a local, two-lane rural roadway with 3.5m travel lanes and a 20m right-of-way that includes 1.8m paved shoulders.
- A review of the Transportation Demand Management (TDM) – *Supportive Development Design and Infrastructure Checklist* has been conducted. A copy of the TDM checklist is

included in **Appendix I**. All required TDM-supportive design and infrastructure measures in the TDM checklist are met.

- Figures showing heavy vehicle turning paths are shown in **Appendix A**.

6.2 Parking

The subject site is within Area C on Schedule 1 and 1A of the City of Ottawa's ZBL. Minimum vehicular and bicycle parking as well as loading rates for the proposed uses are identified in the ZBL and are summarized in **Table 6**. The proposed vehicular parking spaces, bicycle parking, and loading meet or exceed the minimum requirements of the ZBL while the number of barrier-free parking spaces exceed the AODA requirements. In addition to the 54 loading bays, there are also proposed to be 26 trailer parking spaces.

Table 6: Vehicular, Bicycle, Barrier Free Parking and Loading Requirements

| Land Use | Rate | GFA/Units | Requirement | Provided |
|-------------------------------|---------------------------------|--------------------------|-------------|----------|
| <i>Vehicle Parking</i> | | | | |
| Office | 2.4 / 100 m ² of GFA | 1,077.67 m ² | 26 | 27 |
| Warehouse | 0.8 / 100 m ² of GFA | 12,459.93 m ² | 100 | 101 |
| <i>Bicycle Parking</i> | | | | |
| Office | 1 / 250m ² of GFA | 1,077.67 m ² | 4 | 5 |
| Warehouse | 1 / 2,000m ² of GFA | 12,459.93 m ² | 6 | 19 |
| <i>Barrier Free Parking</i> | | | | |
| Site | | 128 public spaces | 5 | 8 |
| <i>Vehicle Loading Spaces</i> | | | | |
| Office | 1 / 1,999m ² of GFA | 1,077.67 m ² | 1 | 1 |
| Warehouse | 2 / 14,999m ² of GFA | 12,459.93 m ² | 2 | 53 |

6.3 Boundary Streets

Schedule 'B' of the City of Ottawa's Official Plan indicates the site is in an Urban Employment Area. Targets for pedestrian level of service (PLOS), bicycle level of service (BLOS), and truck level of service (TkLOS) for Russell Road and Hunt Club Road reflect those outlined for an arterial road located within an employment area in Exhibit 22 of the MMLOS guidelines. MMLOS for Last Mile Drive has also been evaluated with PLOS, BLOS, and TkLOS targets for a local street. Since none of the streets currently have transit service fronting the site, the transit level of service (TLOS) has not been evaluated. The Segment PLOS, BLOS, and TkLOS and associated targets for Russell Road, Hunt Club Road, and Last Mile Drive are summarized in **Table 7**. Details on the Segment MMLOS are included in **Appendix G**.

Table 7: Segment MMLOS Summary

| Intersection | PLOS | BLOS | TkLOS |
|-----------------|----------|------------------|----------|
| Russell Road | F | F | C |
| Target | C | E | B |
| Hunt Club Road | F | E | A |
| Target | C | C | B |
| Last Mile Drive | F | D | C |
| Target | C | No Target | E |

The PLOS along both Russell Road and Hunt Club Road fronting the site is currently failing. Both streets have 80km/h posted speed limits fronting the site and more than 3,000 vehicles per day AADT. Even if sidewalk were installed, the highest attainable PLOS score for each roadway is D due to the roadway speed and volume. Hunt Club Road fronting the site currently only leads to the Highway 417 ramps and has no pedestrian destinations. If Russell Road in this area is urbanized in the future and a reduced operating speed of 60km/h (posted 50km/h) is achieved, the City could include 2m sidewalk with 2m boulevard to achieve the PLOS target.

Last Mile Drive will operate with PLOS 'F'. A paved shoulder is proposed along Last Mile Drive and is considered appropriate for the rural context.

The BLOS along both Russell Road and Hunt Club Road fronting the site is currently failing. Without physically separated bikeways, the highest attainable BLOS score on both roadways is E due to the high operating speed. Hunt Club Road fronting the site currently only leads to the Highway 417 ramps and has no cycling destinations. The addition of on-street bicycle lanes along Russell Road would achieve the City's BLOS target for that street. This is identified for the City's consideration pending funding.

The TkLOS along Russell Road fronting the site misses the target B. To achieve the target TkLOS of B, 3.7m wide lanes are required. The existing gravel shoulders are approximately 2.5m. The City may wish to consider paving an additional 0.5m on either side of the road.

The TkLOS of Last Mile Drive (C) surpasses the target (E).

6.4 Access Intersections

Site 1 will be served by two connections to Last Mile Drive, one accessing the main parking lot about 36m southwest of Russell Road and one truck access about 155 southwest of Russell Road. The site will also have one connection to Russell Road at the south of the site about 145m south of Last Mile Drive. The Russell connection will be full movement. The 2028 trips to Last Mile Drive from Russell Road are projected to be 145 and 89 during the AM and PM peak hours, respectively (See **Figure 13**). The AM arrival rate is equivalent to about 2.5 vehicles every minute. The left turning volume to Site 1 from Last Mile Drive is expected to be 6 and 2 vehicles during the AM and PM peak hours, respectively (See **Figure 6**). With 132 and 185 eastbound through vehicles during the AM and PM peak hours, respectively (See **Figure 13**) there are expected to be ample gaps for left turning traffic. With approximately 36m between Russell Road and the easterly site driveway along Last Mile Drive, there is sufficient storage for 5-6 vehicles. Westbound vehicles queuing for the left turn are not expected to spill back onto Russell Road.

Signals are not expected to be warranted (See **Appendix H**), however, signals are required at the connection to Hunt Club Road based on high approach intersection delay (See **Table 10**). The Last Mile Drive connection to Hunt Club Road is proposed approximately 250m east of the Hydro Ottawa (signalized) access road. The location and ultimate conceptual design of this intersection have been agreed by the City of Ottawa and Hydro Ottawa in a tri-party agreement with NCC in 2016. RMA plans have been prepared (included in **Appendix J**) for the construction of Last Mile Drive as well as its connections to Hunt Club Road (signalized) and Russell Road (STOP controlled). The Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (Chapter 9, page 102) identifies appropriate storage lengths for auxiliary lanes at signalized intersections. TAC indicates that the minimum auxiliary lane lengths for the Last Mile Drive at Hunt Club Road intersection are:

- 22m for the SBR lane (Last Mile Drive turning to Hunt Club Road) with a 120m cycle length. This is to accommodate the 63 SBR vehicles (2028 PM peak hour). 25m is provided for the lane in the RMA.
- 21m for the EBL lane (Hunt Club Road turning to Last Mile Drive) with a 120m cycle length. This is to accommodate the 60 EBL vehicles (2028 PM peak hour). 40m is provided for the lane in the RMA.

The Last Mile Drive connection to Hunt Club Road is 60m east of Hydro Ottawa's right-in, right-out (RIRO) driveway. Per the TIS prepared for Hydro Ottawa's development, Hydro's RIRO access will be closed with construction of Last Mile Drive and a new connection provided between the Hydro Ottawa site and Last Mile Drive. The new Hydro Ottawa access has been designed to accommodate the WB-20 design vehicle (See **Appendix J**) and a 15m left turn lane has been provided along Last Mile Drive for traffic turning at the Hydro Ottawa connection. The following summarizes the stopping sight distance (SSD) review completed for the driveway:

- There is unimpeded SSD for northbound traffic from the Hunt Club Road intersection (about 90m to the south). This is sufficient SSD for a 60km/h design speed on a 4.5% downhill grade.
- Available SSD for southbound traffic (toward Hunt Club Road) is over 100m, exceeding the 80m SSD required for a 60 km/h design speed on a 4.5% uphill grade.

Sight Distance Figures have been included in **Appendix A**.

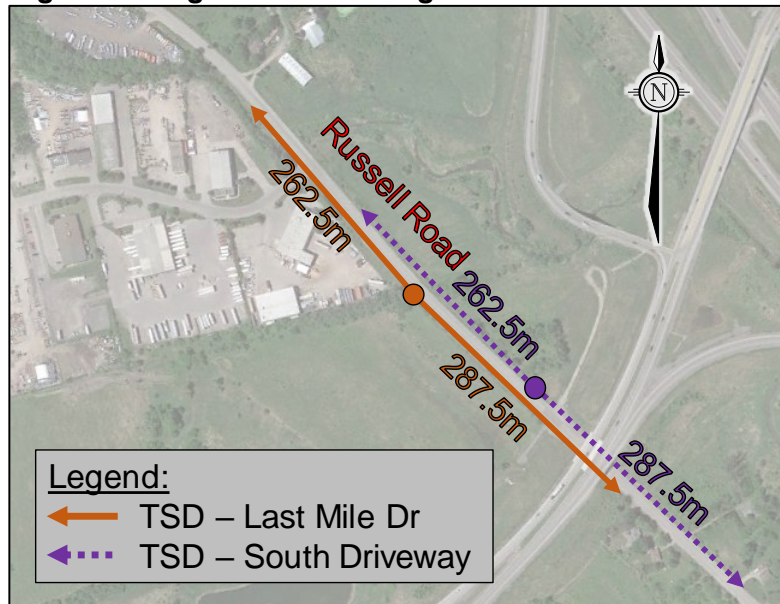
While the need for the Last Mile Drive connection to Hunt Club Road is not triggered by Site 1 traffic alone (due to the relatively low generated trips), there is a recognized benefit to connectivity of constructing Last Mile Drive at the outset and the RMA application is being filed concurrently with the site plan application for Site 1. Functional design of required road modifications is included in **Appendix J**.

The access configurations with respect to design guidelines and requirements of the City's Private Approach By-law for Site 1 are summarized below.

- Section 25 (a) of the City's Private Approach By-Law identifies that a maximum of 2 two-way approaches can be provided along Russell Road based on the 205m of frontage. The site proposes 1 two-way connection to Russell Road and a new two-way public street (Last Mile Drive). The number of proposed accesses meets the by-law.
- Section 25 (m) of the *Private Approach By-Law* identifies spacing between driveways and streets for properties abutting arterial and major collector roads. For sites with 100-199 parking spaces, this spacing is 30m.
 - The site's connection to Last Mile Drive is 36m from Russell Road, meeting this requirement.
 - The south driveway is about 145m from Last Mile Drive, meeting this requirement.

- The driveway to Russell Road is 7.7m wide, measured at the right-of-way line. This is less than the 9m maximum width for a driveway under the City’s Private Approach by-law.
- The eastern driveway to Last Mile Drive is 9m wide, measured at the right-of-way line. This meets the 9m maximum width for a driveway under the City’s Private Approach by-law.
- The truck access to Last Mile Drive is 12.6m wide, measured at the right-of-way line. This is more than the 9m maximum, but the width is required to accommodate the heavy trucks (See **Appendix A**).
- The Transportation Association of Canada (TAC) outlines minimum clear throat lengths for driveways based on the land use, development size, and type of roadway. For Site 1, the clear throat requirement for a two-way driveway to an arterial is 30m. Approximately 35m of clear throat is provided at the south driveway, meeting the requirement.

Figure 15: Sight Distance Diagram



- The Stopping Sight Distance (SSD) along a 90 km/h design speed roadway is 155.5m. Available SSD is greater than 200m at the Last Mile Drive and south access connections to Russell Road.
 - The Turning Sight Distance (TSD) requirements on a two-lane roadway with a 90km/h design speed for a left turning and right turning heavy vehicle from STOP are 287.5m and 262.5m, respectively. Available TSD is greater than 300m at the Last Mile Drive and south access connections to Russell Road. Required TSD at the two connections to Russell Road is shown in **Figure 15**.
 - The following summarizes the stopping sight distance (SSD) review completed for the truck access onto Last Mile Drive:
 - Available SSD for eastbound traffic (toward Russell Road) is over 100m, exceeding the 92m SSD required for a 60 km/h design speed on a 6% downhill grade.
 - Available SSD for westbound traffic (from Russell Road) is over 100m, exceeding the 83m SSD required for a 60 km/h design speed on a 0% grade.
- Sight distance figures for this driveway have been included in **Appendix A**.

Each of the Site 1 connections meet the requirements of the City’s Zoning By-law and Private Approach By-law.

Traffic analysis of the driveway intersections is included in **Section 6.7**.

6.5 Transportation Demand Management

The TDM measures checklist was prepared for Site 1 (See **Appendix I**). TDM measures will include:

- Display local area maps with walking/cycling access routes and key destinations at major entrances; and,

- Display relevant transit schedules and route maps at entrances.

6.6 Transit

Based on the modal share presented in **Table 4**, Site 1 is anticipated to generate an additional 4 transit trips (4 in and 0 out) during the weekday AM peak hour and 4 transit trips (0 in and 4 out) during the weekday PM peak hour.

6.7 Intersection Analysis

Left turn lane warrants have been prepared for the site accesses and indicate:

- An eastbound left turn lane is warranted (See **Appendix H**) on Hunt Club Road at the Last Mile Drive connection with projected background traffic; and,
- Due to the low turning volumes (about 2.0% which is less than the 5% for the lowest nomograph), a left turn lane is not warranted on Russell Road at Last Mile Drive. This left turn volume includes 10 diverted trips from Belgreen Drive to Last Mile Drive during the AM peak hour.

Auto LOS (*Synchro 10*) analysis for the existing as well as the 2023, 2028, and 2033 peak periods without and with the addition of site generated trips are summarized in the following sections. Intersection parameters in the analysis are consistent with the City's TIA guidelines (saturation flow rate: 1800 vphpl, existing conditions PHF: 0.9, future conditions PHF: 1.0).

Since there are receiving lanes to accommodate the right turning traffic from the Highway 417 off-ramps along Hunt Club Road, the right turn channel for this ramp generally operates in free flow with delay and capacity constraints due to downstream merging with mainline through traffic. This receiving lane is continuous and does not require a merge except at downstream intersections over 1km away. For the below analysis, the volume-to-capacity ratios of the left turn movement is reported at this intersection. Analysis of this offramp and its right turn channels has been prepared using SimTraffic and is included in **Section 6.7.8** with results included in **Appendix K**.

6.7.1 Existing Traffic Operations

Intersection capacity analysis has been completed with existing traffic volumes (See **Figure 3**) at the Highway 417 Off-ramp onto Hunt Club Road. Analysis is summarized in **Table 8** for the weekday AM and PM peak hours with detailed *Synchro 10* reports included in **Appendix K**.

Table 8: Existing Traffic - Intersection Operations

| Intersection | AM Peak | | | PM Peak | | |
|--|-------------------|-----|------|-------------------|-----|------|
| | Max. v/c or delay | LOS | Mvmt | Max. v/c or delay | LOS | Mvmt |
| Hunt Club at Hwy 417 Off-ramp ¹ | 37 sec | E | EBL | 29 sec | D | EBL |

1. Unsignalized intersection

The eastbound left turning volume at the Hunt Club at Hwy 417 Off-ramp operates with LOS E during the AM peak hour. The volume of this movement is low (2 AM peak hour vehicles) and there is ample capacity for this movement (v/c = 0.02).

6.7.2 2023 Intersection Operations – Future Background Traffic

Intersection capacity analysis has been completed for the projected 2023 AM and PM peak hours with background traffic volumes (See **Figure 8**) are summarized in **Table 9** for the weekday AM and PM peak hours. Detailed *Synchro 10* reports are included in **Appendix K**.

Table 9: 2023 Background Traffic - Intersection Operations

| Intersection | AM Peak | | | PM Peak | | |
|--|-------------------|----------|------------|-------------------|----------|-----------|
| | Max. v/c or delay | LOS | Mvmt | Max. v/c or delay | LOS | Mvmt |
| Hunt Club at Hwy 417 Off-ramp ¹ | 37 sec | E | EBL | 29 sec | D | EBL |
| Hunt Club at Last Mile | 0.65 | B | WBT | 0.63 | B | WBT |
| Hunt Club at Last Mile (Unsignalized) ¹ | 870 sec | F | SB | Error | F | SB |
| Russell at Last Mile ¹ | 24 sec | C | NB | 19 sec | C | NB |
| Russell at Site 1 South Access ¹ | 0 sec | A | - | 9 sec | A | SB |

1. Unsignalized intersection

With signalization and construction of turn lanes at the Hunt Club Road at Last Mile Drive intersection, all study intersections are expected to operate well with 2023 background traffic.

6.7.3 2023 Intersection Operations – Total Traffic with Site Generated Trips

Intersection capacity analysis has been completed for the projected 2023 AM and PM peak hours with the addition of site generated trips (See **Figure 11**). The results of the analysis are summarized in **Table 10** for the weekday AM and PM peak hours. Detailed *Synchro 10* reports are included in **Appendix K**.

Table 10: 2023 Total Traffic - Intersection Operations

| Intersection | AM Peak | | | PM Peak | | |
|--|-------------------|----------|------------|-------------------|----------|-----------|
| | Max. v/c or delay | LOS | Mvmt | Max. v/c or delay | LOS | Mvmt |
| Hunt Club at Hwy 417 Off-ramp ¹ | 37 sec | E | EBL | 30 sec | D | EBL |
| Hunt Club at Last Mile | 0.64 | B | WBT | 0.64 | B | WBT |
| Hunt Club at Last Mile (Unsignalized) ¹ | 985 sec | F | SB | Error | F | SB |
| Russell at Last Mile ¹ | 25 sec | C | NB | 20 sec | C | NB |
| Russell at Site 1 South Access ¹ | 12 sec | B | NB | 13 sec | B | NB |

1. Unsignalized intersection

With signalization and construction of turn lanes at the Hunt Club Road at Last Mile Drive intersection, all study intersections are expected to continue to operate well with the addition of site generated trips. At the Hunt Club Road / Last Mile Drive intersection, the 95th %ile queue of the EBL and SBR movements are 13m and 14m (both PM peak hour), respectively. These queues are less than the 40m EBL storage and the 25m SBR storage lengths provided in the RMA (See functional designs in **Appendix J**). The storage lengths of these lanes are expected to be sufficient for typical conditions.

6.7.4 2028 Intersection Operations – Future Background Traffic

Intersection capacity analysis has been completed for the projected 2028 AM and PM peak hours with background traffic volumes for the weekday AM and PM peak hours (See **Figure 9**) and are summarized in **Table 11**. Detailed *Synchro 10* reports are included in **Appendix K**.

Table 11: 2028 Background Traffic - Intersection Operations

| Intersection | AM Peak | | | PM Peak | | |
|---|-------------------|-----|------|-------------------|-----|------|
| | Max. v/c or delay | LOS | Mvmt | Max. v/c or delay | LOS | Mvmt |
| Hunt Club at Hwy 417 Off-ramp ¹ | 40 sec | E | EBL | 32 sec | D | EBL |
| Hunt Club at Last Mile | 0.66 | B | WBT | 0.65 | B | WBT |
| Russell at Last Mile ¹ | 25 sec | D | NB | 20 sec | C | NB |
| Russell at Site 1 South Access ¹ | 0 sec | A | - | 9 sec | A | SB |

1. Unsignalized intersection

Based on the previous tables and compared to the 2023 background traffic conditions, marginal increases in v/c ratios and delay are anticipated as a result of background growth within the study area.

6.7.5 2028 Intersection Operations – Total Traffic with Site Generated Trips

Intersection capacity analysis has been completed for the 2028 AM and PM peak hours with the addition of site generated trips (See **Figure 12**). The results of the analysis are summarized in **Table 12** for the weekday AM and PM peak hours. Detailed *Synchro 10* reports are included in **Appendix K**.

Table 12: 2028 Total Traffic - Intersection Operations

| Intersection | AM Peak | | | PM Peak | | |
|---|-------------------|-----|------|-------------------|-----|------|
| | Max. v/c or delay | LOS | Mvmt | Max. v/c or delay | LOS | Mvmt |
| Hunt Club at Hwy 417 Off-ramp ¹ | 41 sec | E | EBL | 32 sec | D | EBL |
| Hunt Club at Last Mile | 0.66 | B | WBT | 0.66 | B | WBT |
| Russell at Last Mile ¹ | 26 sec | D | NB | 21 sec | C | NB |
| Russell at Site 1 South Access ¹ | 12 sec | C | NB | 13 sec | B | NB |

1. Unsignalized intersection

Based on the previous tables and compared to the 2028 background traffic conditions, marginal increases in v/c ratios and queue lengths within the study area are anticipated, as a result of increased traffic generated by the proposed development. At the Hunt Club Road / Last Mile Drive intersection, the 95th %ile queue of the EBL and SBR movements are 19m and 15m (both PM peak hour), respectively. These queues are less than the 40m EBL storage and the 25m SBR storage provided in the RMA (See functional designs in **Appendix J**). The storage lengths of these lanes are expected to be sufficient for typical conditions.

6.7.6 2033 Intersection Operations – Future Background Traffic

Intersection capacity analysis has been completed for the projected 2033 AM and PM peak hours with background traffic volumes (See **Figure 10**) for the MTO intersection per the MTO General Guidelines for the Preparation of Traffic Impact Studies (December 2009) and is summarized in **Table 13** for the weekday AM and PM peak hours. Detailed *Synchro 10* reports are included in **Appendix K**.

Table 13: 2033 Background Traffic - Intersection Operations

| Intersection | AM Peak | | | PM Peak | | |
|--|-------------------|-----|------|-------------------|-----|------|
| | Max. v/c or delay | LOS | Mvmt | Max. v/c or delay | LOS | Mvmt |
| Hunt Club at Hwy 417 Off-ramp ¹ | 44 sec | E | EBL | 34 sec | D | EBL |

1. Unsignalized intersection

Based on the previous tables and compared to the 2028 background traffic conditions, marginal increases in v/c ratios and queue lengths are anticipated as a result of background growth within the study area.

6.7.7 2033 Intersection Operations – Total Traffic with Site Generated Trips

Intersection capacity analysis has been completed for the 2033 AM and PM peak hours with the addition of site generated trips at the MTO intersection per the MTO guidelines (See **Figure 14**). The results of the analysis are summarized in **Table 14** for the weekday AM and PM peak hours. Detailed *Synchro 10* reports are included in **Appendix K**.

Table 14: 2033 Total Traffic - Intersection Operations

| Intersection | AM Peak | | | PM Peak | | |
|--|-------------------|-----|------|-------------------|-----|------|
| | Max. v/c or delay | LOS | Mvmt | Max. v/c or delay | LOS | Mvmt |
| Hunt Club at Hwy 417 Off-ramp ¹ | 45 sec | E | EBL | 35 sec | D | EBL |

1. Unsignalized intersection

Based on the previous tables and compared to the 2033 background traffic conditions, no noticeable change is expected with the addition of Site 1 trips at the Highway 417 off-ramp onto Hunt Club Road.

6.7.8 Right Turn Channelized Highway Ramps – Traffic Analysis and Results

SimTraffic is a microscopic model used to simulate a wide variety of traffic controls. Each vehicle in the traffic system is individually tracked through the model and comprehensive operational measures of effectiveness are collected on every vehicle during each 0.1-second of the simulation. Unlike *Synchro*, SimTraffic measures the full impact of queuing and blocking.

Eleven 1-hour SimTraffic simulation runs have been prepared for each of the AM and PM peak hours with 2033 Future Background and Total Traffic to analyze the operations of the Highway 417 off-ramp to Hunt Club Road. This analysis considers the free flow channel and impacts of downstream merging. The delay results of this SimTraffic analysis for the 2033 future background and total traffic

scenarios are included in **Table 15** and **Table 16**, respectively. The merging queues along Hunt Club Road downstream of these channels for the 2033 future background and total traffic scenarios are summarized in **Table 17** and **Table 18**, respectively. Detailed SimTraffic reports are included in **Appendix K**.

Table 15: 2033 Background Traffic – SimTraffic Delay Results

| Intersection | AM Peak | | | PM Peak | | |
|-----------------------------------|-------------------|-----|------|-------------------|-----|------|
| | Max. v/c or delay | LOS | Mvmt | Max. v/c or delay | LOS | Mvmt |
| Hunt Club at Highway 417 Off-ramp | 5 secs | A | EBR | 46 sec | E | EBR |

Table 16: 2033 Total Traffic – SimTraffic Delay Results

| Intersection | AM Peak | | | PM Peak | | |
|-----------------------------------|-------------------|-----|------|-------------------|-----|------|
| | Max. v/c or delay | LOS | Mvmt | Max. v/c or delay | LOS | Mvmt |
| Hunt Club at Highway 417 Off-ramp | 5 secs | A | EBR | 48 sec | E | EBR |

Table 17: 2033 Background Traffic – SimTraffic Merging Queue Results

| Intersection | AM Peak | | | PM Peak | | |
|-----------------------------------|-------------------|------------------|-------------------|-------------------|------------------|-------------------|
| | Average Queue (m) | 95th % Queue (m) | Maximum Queue (m) | Average Queue (m) | 95th % Queue (m) | Maximum Queue (m) |
| Hunt Club at Highway 417 Off-ramp | - | - | - | - | - | - |

Table 18: 2033 Total Traffic – SimTraffic Merging Queue Results

| Intersection | AM Peak | | | PM Peak | | |
|-----------------------------------|-------------------|------------------|-------------------|-------------------|------------------|-------------------|
| | Average Queue (m) | 95th % Queue (m) | Maximum Queue (m) | Average Queue (m) | 95th % Queue (m) | Maximum Queue (m) |
| Hunt Club at Highway 417 Off-ramp | - | - | - | - | - | - |

The SimTraffic analysis indicates:

- During the 2033 AM peak hour without and with added site generated trips, the right turn from the Highway 417 SB off-ramp onto Hunt Club Road will operate well. With a continuous lane along Hunt Club, merging is only required for lane selection at downstream intersections, about 1km away.
- During the 2033 PM peak hour, with projected right turning volume exceeding 1500 vehicles coming from the highway turning right to Hunt Club, the turn is approaching (or may exceed) its lane capacity without and with site generated trips.
- Consideration should be given to creating a wider radius channel to accommodate higher speeds around this turn or a second right turning lane may be required for this movement. This is identified for MTO's consideration.

7.0 Conclusions and Recommendations

Development Design and Parking

- Pedestrian facilities will be provided between the main buildings and the parking lots. A new pedestrian walkway will be constructed, providing connectivity to Russell Road.
- All required TDM-supportive design and infrastructure measures in the TDM checklist are met.
- The proposed vehicular parking spaces meet the requirements of the ZBL.
- The proposed bicycle parking spaces exceed the minimum requirements of the ZBL.
- The number of barrier-free spaces meet the AODA requirements.
- As per the City of Ottawa’s Zoning By-law, a minimum of three loading spaces are required, 54 loading bays are provided in addition to 26 trailer parking spaces.
- Stops #3514 and #3622 are located along Belgreen Drive, which is about 290m walking distance from the site’s northern exterior door. There are planned bus stops with concrete landing pads on both sides of Last Mile Drive near the site.

Boundary Street Multi-Modal Level of Service (MMLOS)

The results of the segment MMLOS analysis for Russell Road and Hunt Club Road can be summarized as follows:

- Both Russell Road and Hunt Club Road operate with a Pedestrian Level of Service (PLOS) F, missing the target PLOS C;
- Russell Road (F) and Hunt Club Road (E) miss the target Bicycle Level of Service (BLOS) of E and C, respectively;
- Russell Road (C) misses and Hunt Club Road (A) exceeds the target Truck Level of Service (TkLOS) of B; and,
- If the City urbanizes Russell Road in the future, sidewalk and onstreet bicycle lanes should be considered. The existing gravel shoulders are approximately 2.5m. The City may wish to consider paving an additional 0.5m on either side of the road.

Segment MMLOS has also been completed for the proposed cross section along Last Mile Drive and indicates:

- Last Mile Drive will operate with PLOS ‘F’. A paved shoulder is proposed along Last Mile Drive and is considered appropriate for the rural context.
- Since Last Mile Drive is a local street and not a designated bicycle route there is no target BLOS however, based on its cross section and anticipated travel speed, it would operate with BLOS D.
- The TkLOS of Last Mile Drive (C) surpasses the target (E).

Transit

- Site 1 is anticipated to generate an additional 4 transit trips (4 in, 0 out) during the weekday AM peak hour and 4 transit trips (0 in, 4 out) during the weekday PM peak hour.

Access Design

- Last Mile Drive will be constructed between Russell Road and Hunt Club Road as a public street with a rural cross section and a 20m right-of-way that includes paved shoulders. Connections to Last Mile Drive and Russell Road will each be full movement.
- The Russell Road driveway will be 7.7m wide, measured at the property line. The driveway meets the requirements of the City’s Private Approach By-law.

- Adequate turning sight distance for heavy vehicles is available along Russell Road at both Last Mile Drive and the site driveway.
- The Last Mile Drive connection to Hunt Club Road should be signalized while the remaining connections are expected to operate well with STOP control.
- An eastbound left turn lane is warranted along Hunt Club Road at Last Mile Drive.
- Due to the low turning volume (about 2.0%), a left turn lane is not warranted on Russell Road at Last Mile Drive.
- The signalized Last Mile Drive connection to Hunt Club is proposed approximately 250m east of the Hydro Ottawa (signalized) Access. The location and ultimate conceptual design of this intersection have been agreed by the City of Ottawa and Hydro Ottawa in a tri-party agreement with NCC in 2016.
- The Last Mile Drive connection to Hunt Club is 60m east of Hydro Ottawa's right-in, right-out (RIRO) driveway. Per the 2711 Hunt Club TIS, Hydro's RIRO access will be closed with construction of the Last Mile Drive access and a new connection provided between the Hydro Ottawa site and Last Mile Drive. The new Hydro Ottawa access has been designed to accommodate the WB-20 design vehicle and a 15m left turn lane has been provided along Last Mile Drive for traffic turning at the Hydro Ottawa connection.

Recommended Modifications

Modifications that have been identified for the City's/MTO's consideration without added site development are:

Existing/Background Traffic:

- Modify the right turn ramp for Highway 417 eastbound off-ramp onto Hunt Club Road with an increased radius or a second lane to accommodate projected traffic without and with site generated trips.

Background Traffic:

While the need for the Last Mile Drive connection to Hunt Club Road is not triggered by Site 1 traffic alone (due to the relatively low generated trips), there is a recognized benefit to site connectivity of constructing Last Mile Drive at the outset. As discussed with City staff, an RMA will be filed under separate cover with the right-of-way conveyed through a road opening. Functional design plans have been attached to this TIA.

- Install an eastbound left turn lane and traffic signals at the Hunt Club Road / Last Mile Drive intersection and construct Last Mile Drive as a public local street with a 20m rural cross section that includes paved shoulders connecting Hunt Club Road and Russell Road.

No modifications have been identified to accommodate Site 1 traffic.

NOVATECH

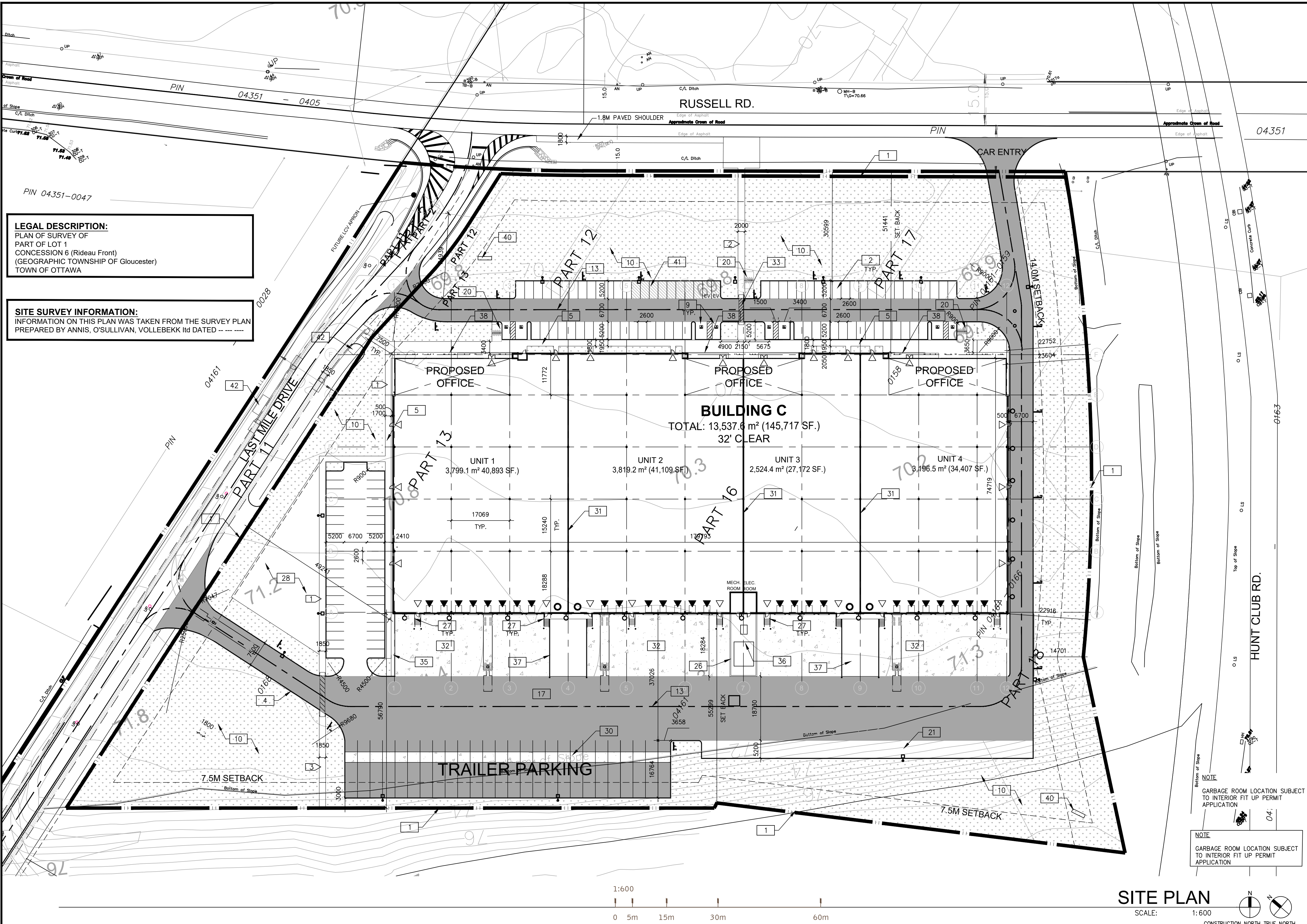
Prepared by:



Patrick Hatton, P.Eng.
Project Manager | Transportation/Traffic

APPENDIX A

Concept Plan



SITE PLAN NOTES

- | | | |
|---|--|---|
| 1 PROPERTY LINE | 12 12.0x3.5m TRUCK LOADING DOCK, TYPICAL | 25 TACTILE INDICATOR |
| 2 2600x5200mm PARKING STALL, PAINTED PARKING STRIPING PER CITY OF OTTAWA ZONING BY-LAW NO. 2008-250 | 13 FIRE ACCESS ROUTE W/ 12.0M TURNING RADIUS (---) | 26 CONCRETE PENINSULA - REFER TO CIVIL DRAWINGS |
| 3 PRINCIPLE ENTRY - TENANT FIT-UP SUBJECT TO INTERIOR ALTERATION PERMIT | 14 PROPOSED LOCATION OF ELECTRICAL RM | 27 EXTERIOR STEEL STAIRS |
| 4 150mm WIDE CURB TYPICAL | 15 ROOF ACCESS STAIR | 28 EMPLOYMENT AMENITY SPACE - REFER TO LANDSCAPE DRAWINGS |
| 5 1500mm MIN. WIDE SIDEWALK TYPICAL U.N.O | 16 PROPOSED LOCATION OF MECHANICAL RM | 29 BOLLARDS AT THE END OF STAIRS WITH PAINTED STRIPES BELOW |
| 6 FIRE DEPARTMENT/SIAMESE CONNECTION | 17 HATCHED AREA DENOTES HEAVY DUTY ASPHALT. TYPICAL FOR ALL AREAS REQUIRED FIRE TRUCK ACCESS | 30 CONCRETE DOLLY PAD |
| 7 ENTRY PLAZA - SEE LANDSCAPE DRAWINGS | 18 ROAD CURB AND SIDEWALK TO BE CONTINUOUS THROUGH THE DRIVEWAY. DRIVEWAY GRADE TO BE COMPATIBLE WITH EXISTING SIDEWALK AND A CURB DEPRESSION WILL BE PROVIDED AT EACH ENTRANCE. | 31 FUTURE TENANT DEMISING WALL. SUBJECT TO TENANT FIT UP |
| 8 GALVANIZED BICYCLE RACKS REFER TO LANDSCAPING DRAWINGS | 19 PERIMETER FENCE - REFER TO LANDSCAPING DRAWINGS | 32 CONCRETE APRON |
| 9 TYPICAL ACCESSIBLE PARKING STALLS, PAINTED PARKING STRIPING PER BY-LAW OTTAWA ZONING BY-LAW NO. 2008-250. EACH PAIR OF SHARED STALLS TO HAVE TYPE A: 3.4m X 5.2m AND TYPE B: 2.4m X 5.2m WITH 1.5m WIDE PAINTED BARRIER FREE AISLE AND SIGNAGE REFER TO ONTARIO INTEGRATED ACCESSIBILITY STANDARDS. | 20 BICYCLE RACK - SEE LANDSCAPE DRAWINGS | 33 PAINTED LINES PEDESTRIAN CROSSING |
| 10 LANDSCAPE AREA - SEE LANDSCAPE DRAWINGS | 21 SNOW STORAGE AREA | 34 STEEL BOLLARD |
| 11 GUARDRAIL SET INTO RETAINING WALL WHERE GRADE CHANGE GREATER THAN 600mm. - SEE CIVIL DRAWINGS | 22 PROPOSED FIRE HYDRANT | 35 RETAINING WALL |
| | 23 PROPOSED LIGHT POLE. REFER TO ELECTRICAL DRAWINGS | 36 HV PADMOUNT TRANSFORMER |
| | 24 PROPOSED RETAINING WALL - SEE CIVIL DWG. | 37 CONCRETE RAMP |
| | | 38 CANOPY PROJECTION |
| | | 39 ALUMINUM FINS |
| | | 40 PYLON SIGNAGE |
| | | 41 FUTURE EV PARKING STALLS (10) |
| | | 42 FUTURE BUS PAD |

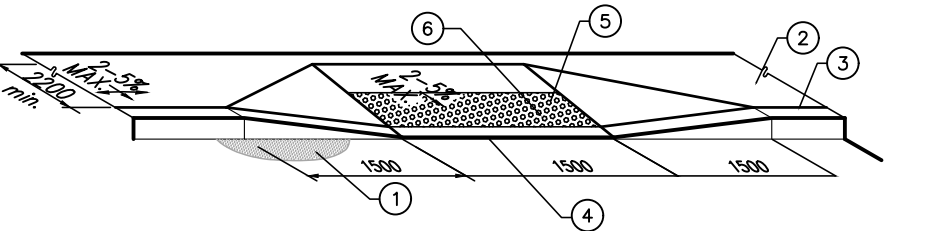
SITE LEGEND

- | | |
|---|---|
| NEW HEAVY DUTY PAVEMENT (HATCHED) | FIRE ROUTE SIGN |
| NEW LANDSCAPED AREA (HATCHED) | D.C. 1500mm WIDE DEPRESSED CURB FOR ACCESSIBLE PARKING AND PEDESTRIAN ACCESS - REFER TO DETAIL 4/A1.2 |
| PAINTED DIAGONAL LINES WHERE INDICATED | MH DENOTES MANHOLE |
| FUTURE EV PARKING STALLS | PROPOSED CATCHBASIN |
| PROPERTY LINE | TACTILE INDICATORS AT DEPRESSED CURB |
| GAS METER LOCATION. | BICYCLE RACK |
| FIRE DEPT CONNECTION (VERIFY LOCATION WITH CIVIL DRAWINGS) | FENCE |
| PROPOSED FIRE HYDRANT (VERIFY LOCATION WITH CIVIL DRAWINGS) | MAN DOOR |
| LIGHT POLE | DOCK HIGH TRUCK DOOR |
| WALL MOUNTED LIGHT | GRADE LEVEL TRUCK DOOR |
| NEW STOP SIGN | |
| CONCRETE SIDEWALK | |
| ASPHALT PATHWAY | |
| STONE DUST PATHWAY | |

| TOR20-0031-00 NATIONAL CAPITAL - OVERALL SITE | | |
|--|------------|----------|
| SITE STATISTICS | | |
| | | |
| ZONING | IH/AG | |
| GROSS SITE AREA | 472,380 SF | |
| Zone Permitted Use (OTTAWA ZONING BY-LAW NO. 2008-250) | | |
| Proposed Use | Industrial | |
| Regulations (Part 11: Industrial Zones) | | |
| | Proposed | Required |
| 1. Front Yard Building Setback (m) | 7.5 m | 7.5 m |
| 2. Interior Side Yard Building Set back (m) | 22.91 m | 7.5 m |
| 3. Rear Yard Building Setback (m) | 55.29m | 7.5 m |
| 4. Landscape Front Yard Setback (m) | 30.59 m | 3 m |
| 5. Landscape Side Yard Setback (m) (Abuts an E Zone) | 14.70 m | 3 m |
| 6. Landscape Rear Yard Setback (m) (Abuts an E Zone) | 3.0 m | 3 m |
| 7. Corner Side Yard Setback | 7.5 m | 7.5 m |
| 8. Floor Space Index | 0.3 | 2 |
| 9. Building Height | 11.25 m | 22 m |

| BUILDING FLOOR AREA | | |
|---------------------|-------------|--|
| Industrial BLDG C | | |
| Industrial Area | 12,459.93m² | |
| Office Area | 1,077.67m² | |
| TOTAL BUILDING GFA | 13,537.60m² | |

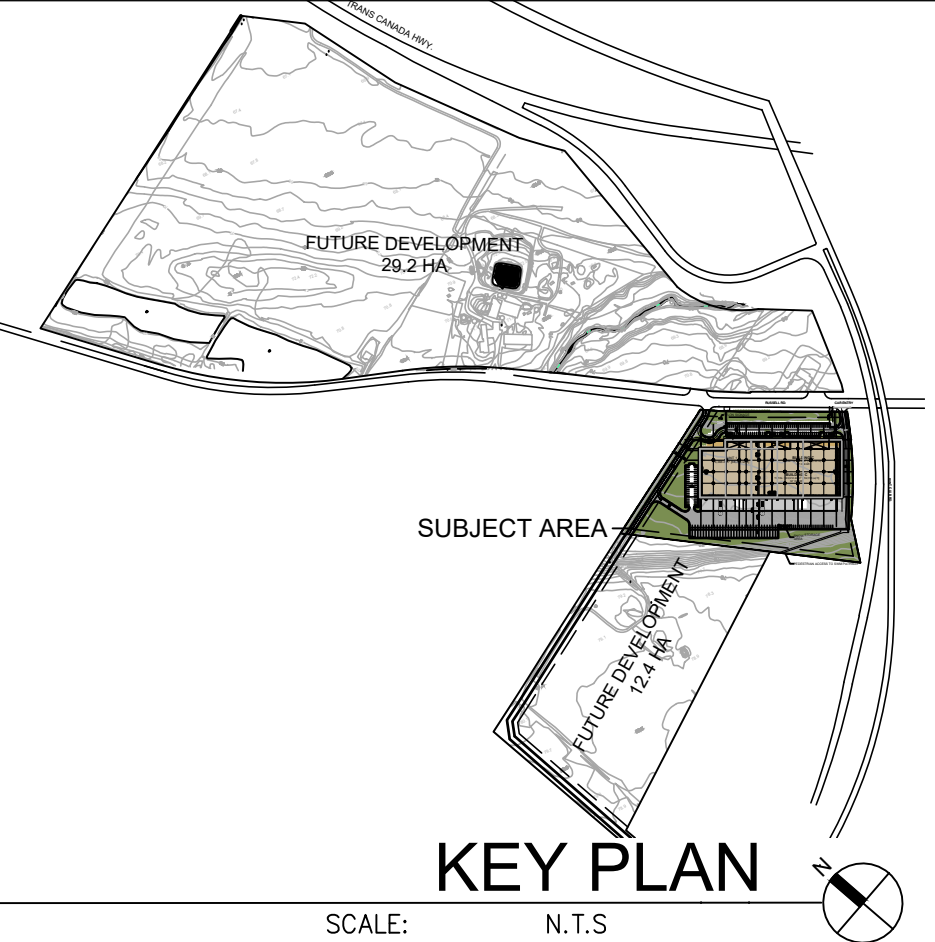
| PARKING REQUIREMENT | | |
|---|---------------|----------|
| | REQUIRED | PROPOSED |
| Industrial GFA @ 0.8 Spaces Per 100m² | 100 | 101 |
| Office GFA @ 2.4 Spaces Per 100m² | 26 | 27 |
| Total No. of Parking Spaces | 126 | 128 |
| Barrier Free Parking Spaces | 7 | 8 |
| Parking Stall Dimensions | 2.6 m X 5.2 m | |
| Barrier Free Parking Stall Type A | 3.4m X 5.2m | |
| Barrier Free Parking Stall Type B | 2.4m X 5.2m | |
| Bicycle Parking Space Dimensions | 1.8m X 0.6m | |
| No. Of Bicycle Parking (Warehouses: 1 per 2000m², Office 1 per 250m²) | 12 | 24 |
| Loading Space Dimensions | 3.5m X 9.0m | |
| No. Of Loading Spaces | 2 | 54 |
| Trailer Parking | 26 | |
| DOCK STATISTICS | Proposed | |
| DOCK-HIGH DOORS | 26 | |
| OVER-HEAD DOORS | 4 | |



- PAVEMENT
- ACCESSIBLE ROUTE OF PEDESTRIAN TRAVEL 2200mm MIN. (UNLESS OTHERWISE NOTED ON PLANS)
- TOP FACE OF CURB.
- DEPRESSED CURB
- TRUNCATED DOMES WITH A HEIGHT OF 4.5-5.5mm, BASE DIAMETER OF 21-25mm REGULAR SPACING PATTERN AT 55-65mm ON CENTRE
- A MINIMUM 600mm WIDE SECTION DETECTABLE WARNING SURFACE SHALL BE PROVIDED WHEN FLAT TRAVEL SURFACE ADJACENT A VEHICULAR WAY (10mm CURB FACE)

ACCESSIBLE CURB RAMP

SCALE: N.T.S



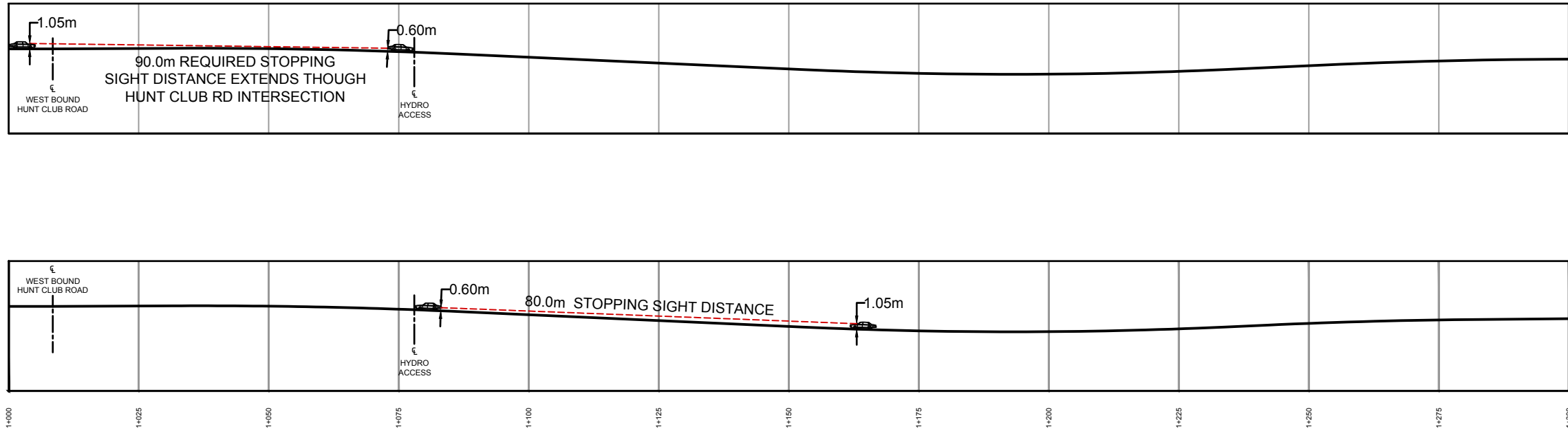
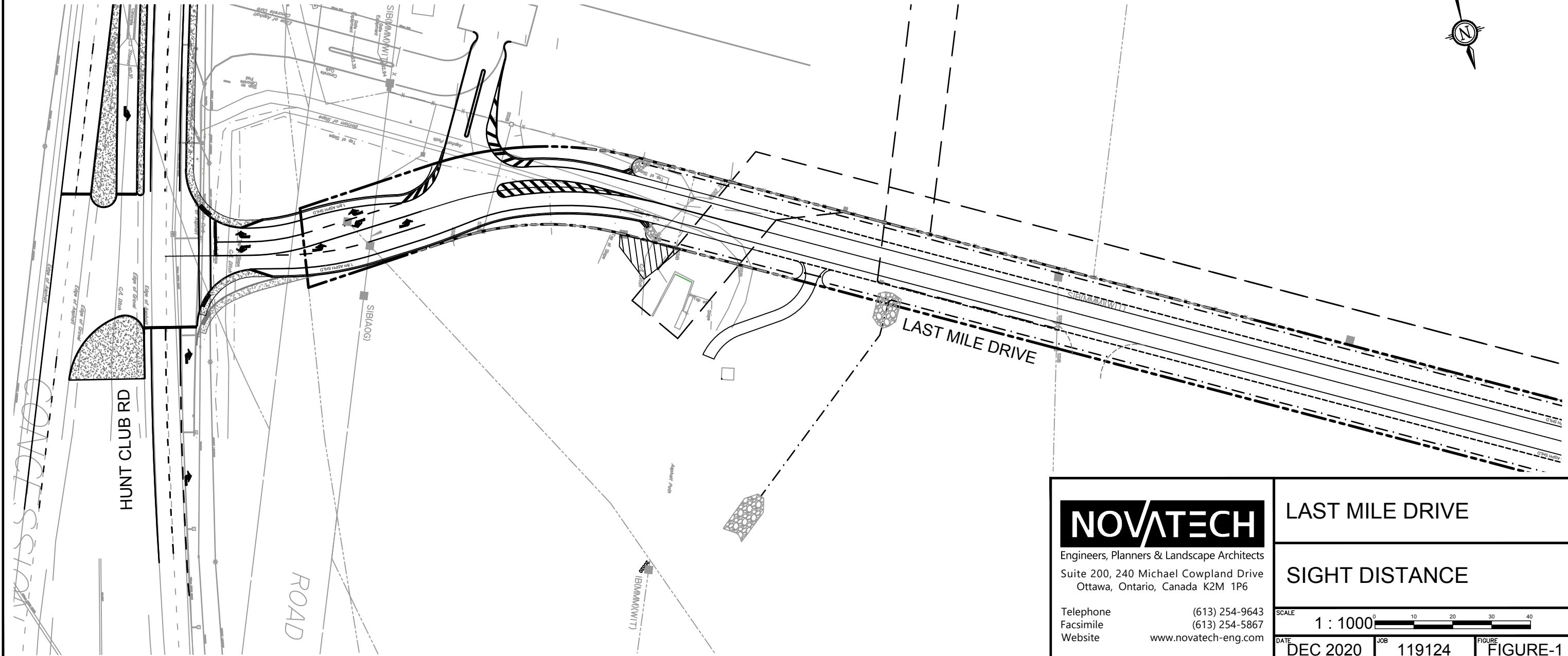
NATIONAL CAPITAL BUILDING C 4120 RUSSELL RD OTTAWA, ONTARIO

OVERALL SITE PLAN

| | |
|-----------|---------------|
| PA / PM: | AS/LN |
| DRAWN BY: | JT |
| JOB NO.: | TOR20-0019-00 |

SHEET
A1.0

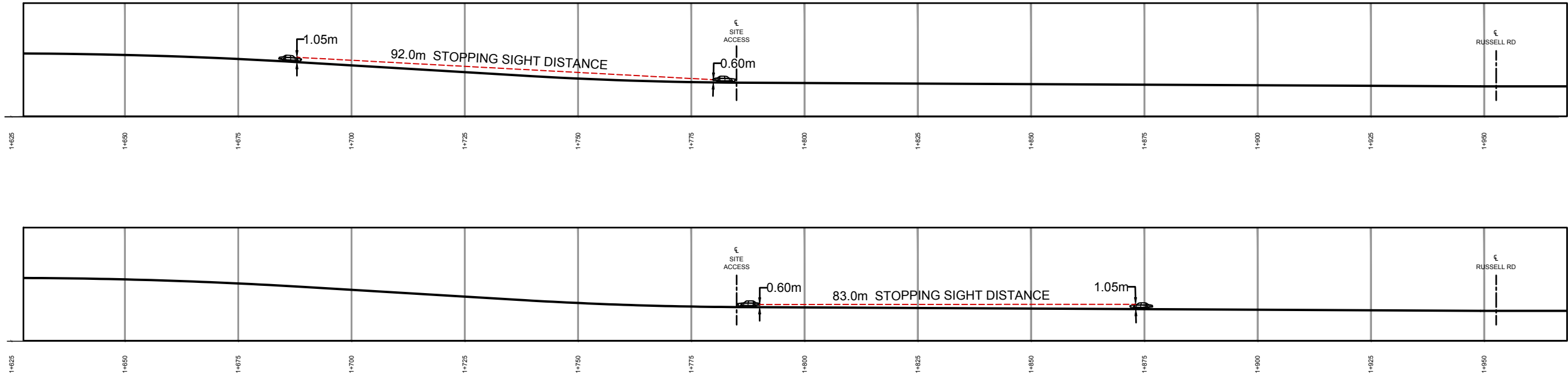
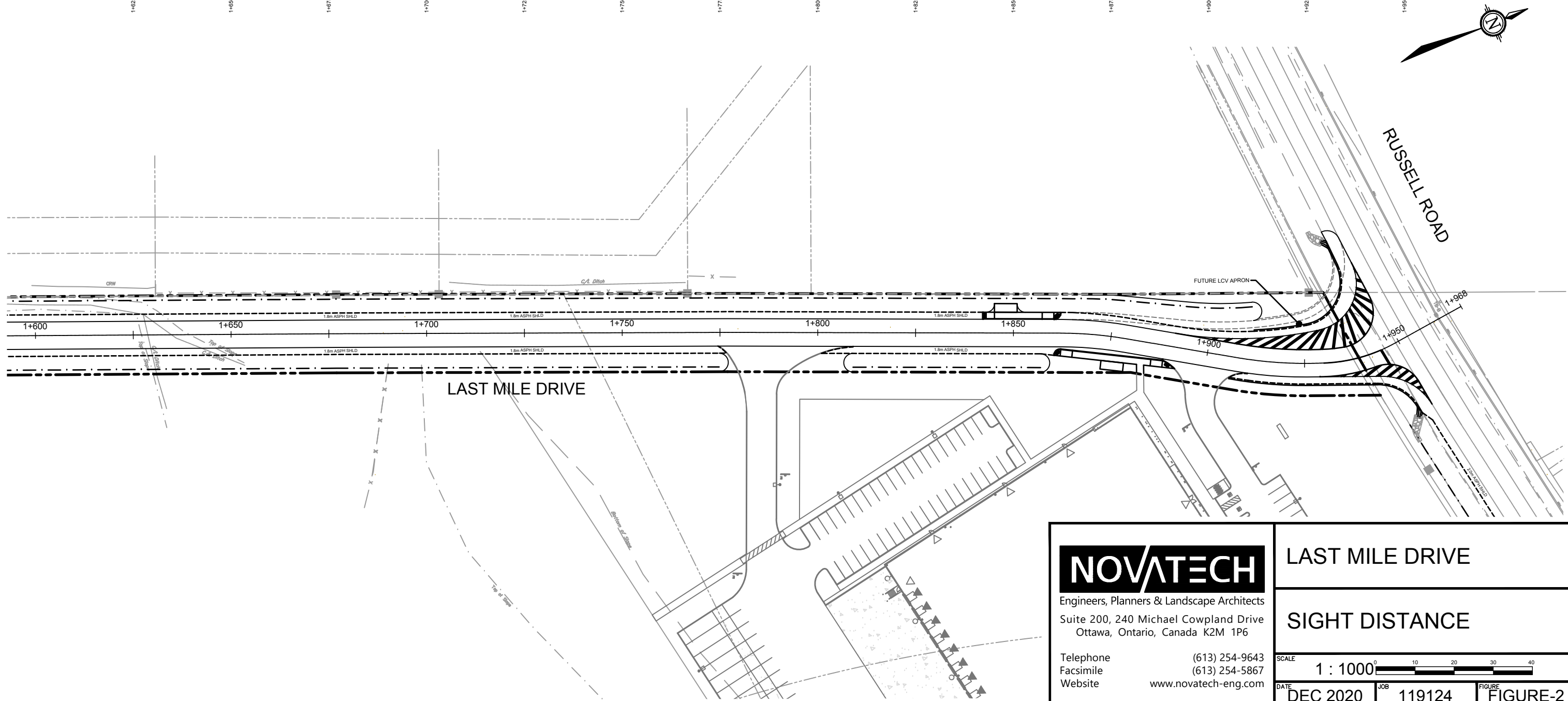
C:\temp\AcPublish_6172\119124-SD.dwg, Figure1, Dec 04, 2020 - 4:59pm, rhillier



| | | | |
|---|------------|-----------------|--|
| NOVATECH Engineers, Planners & Landscape Architects Suite 200, 240 Michael Cowpland Drive Ottawa, Ontario, Canada K2M 1P6 Telephone (613) 254-9643 Facsimile (613) 254-5867 Website www.novatech-eng.com | | LAST MILE DRIVE | |
| | | SIGHT DISTANCE | |
| SCALE 1 : 1000 | | | |
| DATE DEC 2020 | JOB 119124 | FIGURE-1 | |

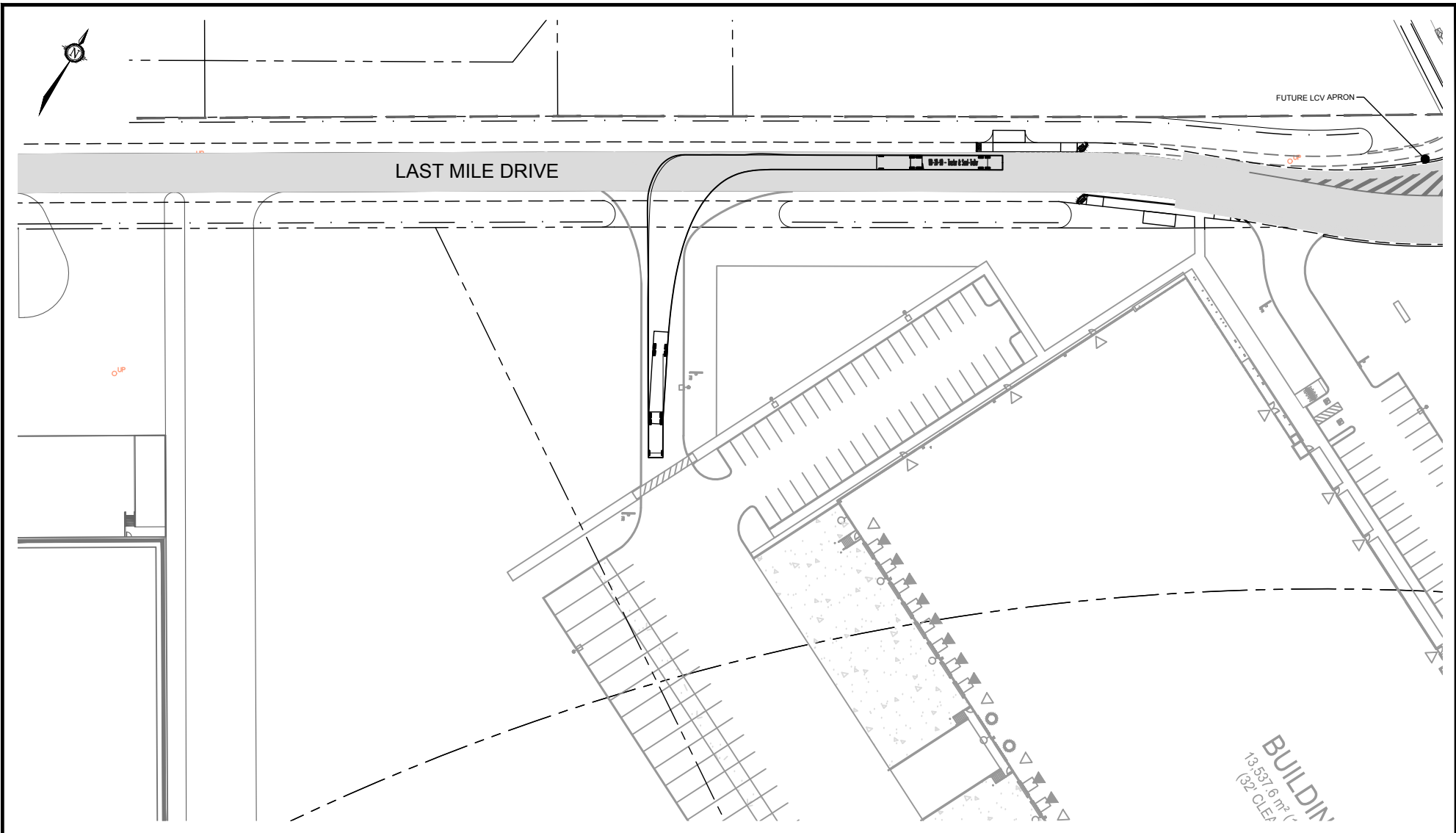
CUT11V17 DWG 270mm X 122mm

C:\temp\AcPublish_6172\119124-SD.dwg, Figure2, Dec 04, 2020 - 4:59pm, rhillier



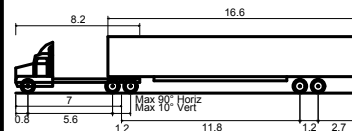
| | | | |
|---|------------|------------------------|--|
| NOVATECH Engineers, Planners & Landscape Architects Suite 200, 240 Michael Cowpland Drive Ottawa, Ontario, Canada K2M 1P6 Telephone (613) 254-9643 Facsimile (613) 254-5867 Website www.novatech-eng.com | | LAST MILE DRIVE | |
| | | SIGHT DISTANCE | |
| SCALE 1 : 1000 | | | |
| DATE DEC 2020 | JOB 119124 | FIGURE-2 | |

CUT11V17 DWG 270mmx122mm



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



WB-20-90 - Tractor & Semi-Trailer

| | |
|-----------------------------|---------|
| Overall Length | 22.700m |
| Overall Width | 2.600m |
| Overall Body Height | 3.730m |
| Min Body Ground Clearance | 0.435m |
| Track Width | 2.600m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 10.700m |

LAST MILE DRIVE

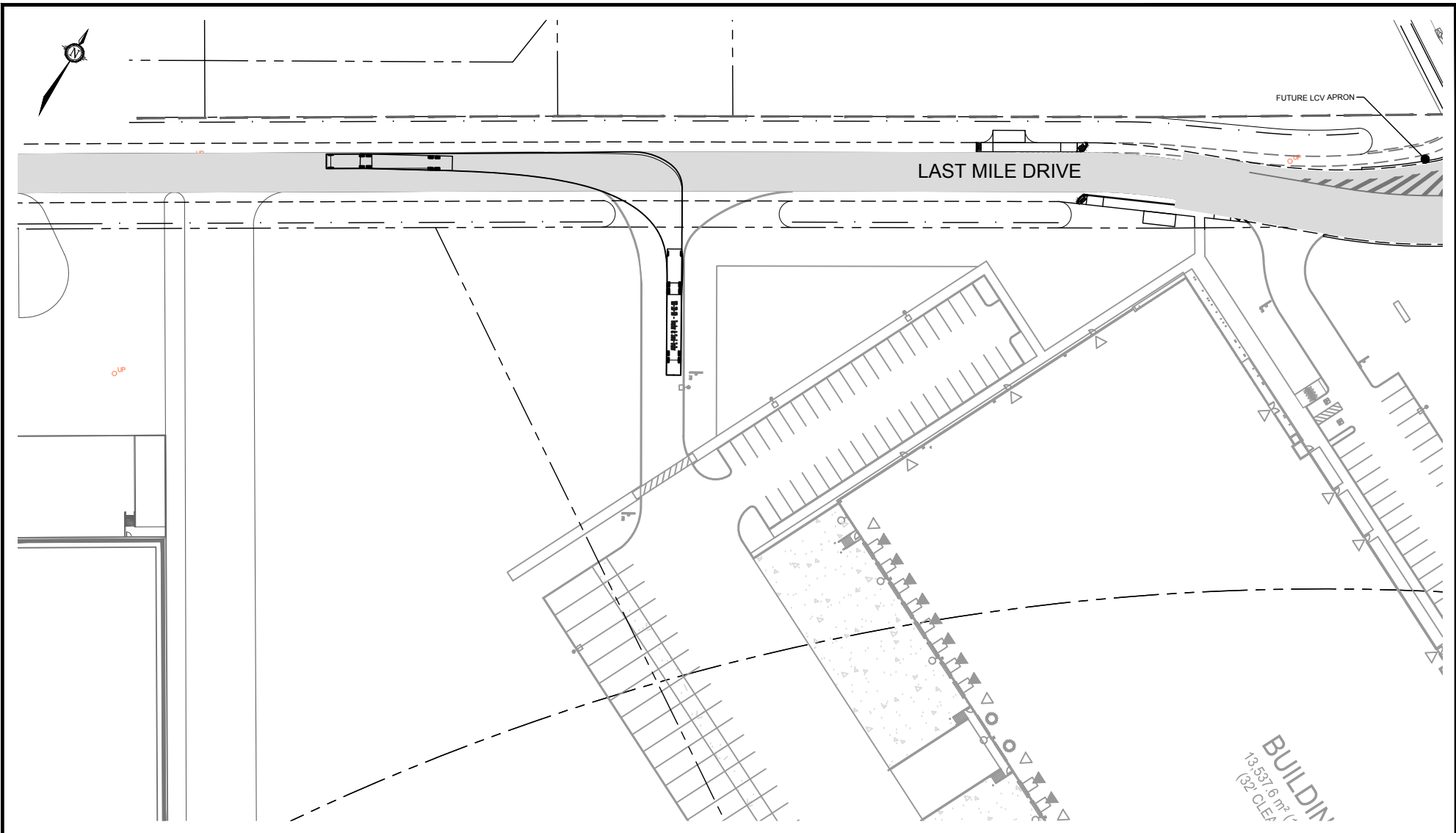
SITE ACCESS TURNING
MOVEMENT - WB20

SCALE 1 : 1000

DATE DEC 2020

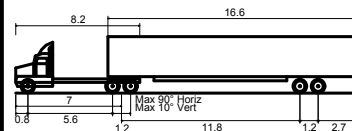
JOB 119124

FIGURE TM-1



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



WB-20-90 - Tractor & Semi-Trailer

| | |
|-----------------------------|---------|
| Overall Length | 22.700m |
| Overall Width | 2.600m |
| Overall Body Height | 3.730m |
| Min Body Ground Clearance | 0.435m |
| Track Width | 2.600m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 10.700m |

LAST MILE DRIVE

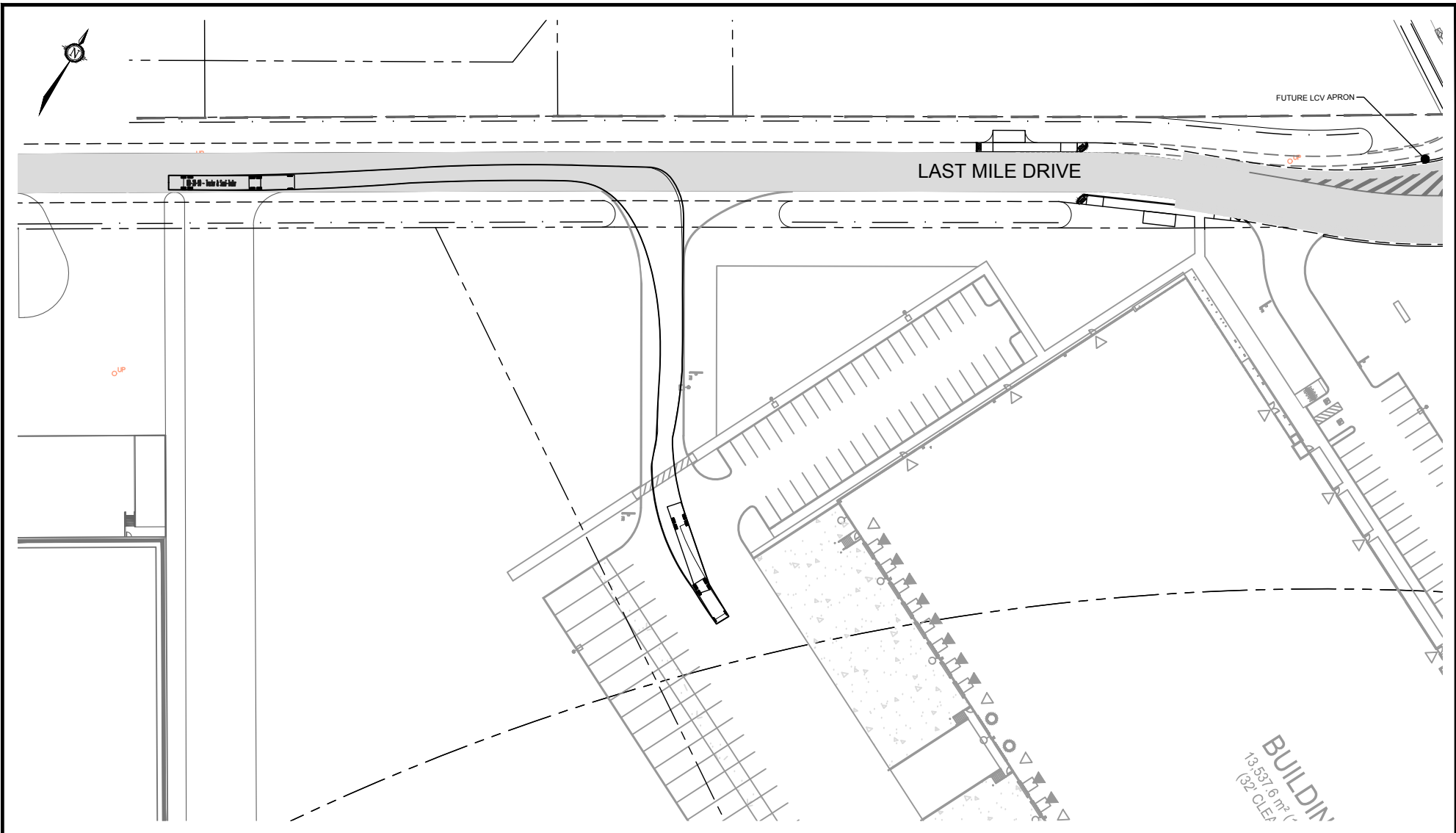
SITE ACCESS TURNING
MOVEMENT - WB20

SCALE 1 : 1000

DATE DEC 2020

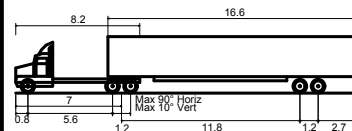
JOB 119124

FIGURE TM-2



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



WB-20-90 - Tractor & Semi-Trailer

| | |
|-----------------------------|---------|
| Overall Length | 22.700m |
| Overall Width | 2.600m |
| Overall Body Height | 3.730m |
| Min Body Ground Clearance | 0.435m |
| Track Width | 2.600m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 10.700m |

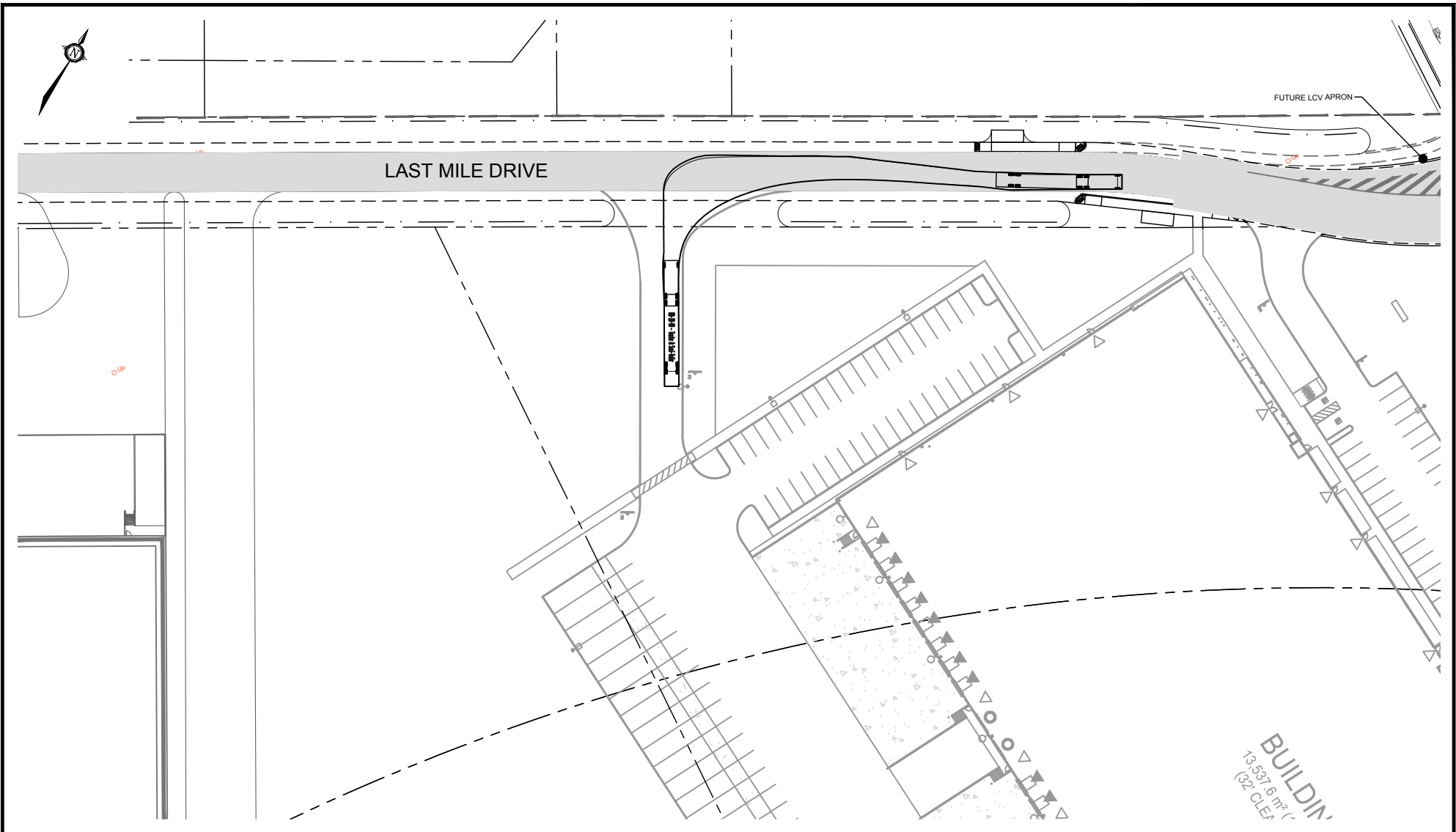
LAST MILE DRIVE

SITE ACCESS TURNING
MOVEMENT - WB20

SCALE 1 : 1000

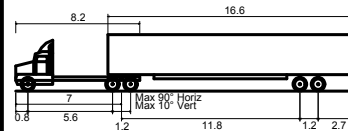
DATE DEC 2020 JOB 119124 FIGURE TM-3

C:\temp\AcPublish_1188\119124-WB20-TM.dwg, TM4, Dec 03, 2020 - 11:18am, rhillier



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



WB-20-90 - Tractor & Semi-Trailer
Overall Length 22.700m
Overall Width 2.600m
Overall Body Height 3.730m
Min Body Ground Clearance 0.435m
Track Width 2.600m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 10.700m

LAST MILE DRIVE

SITE ACCESS TURNING
MOVEMENT - WB20

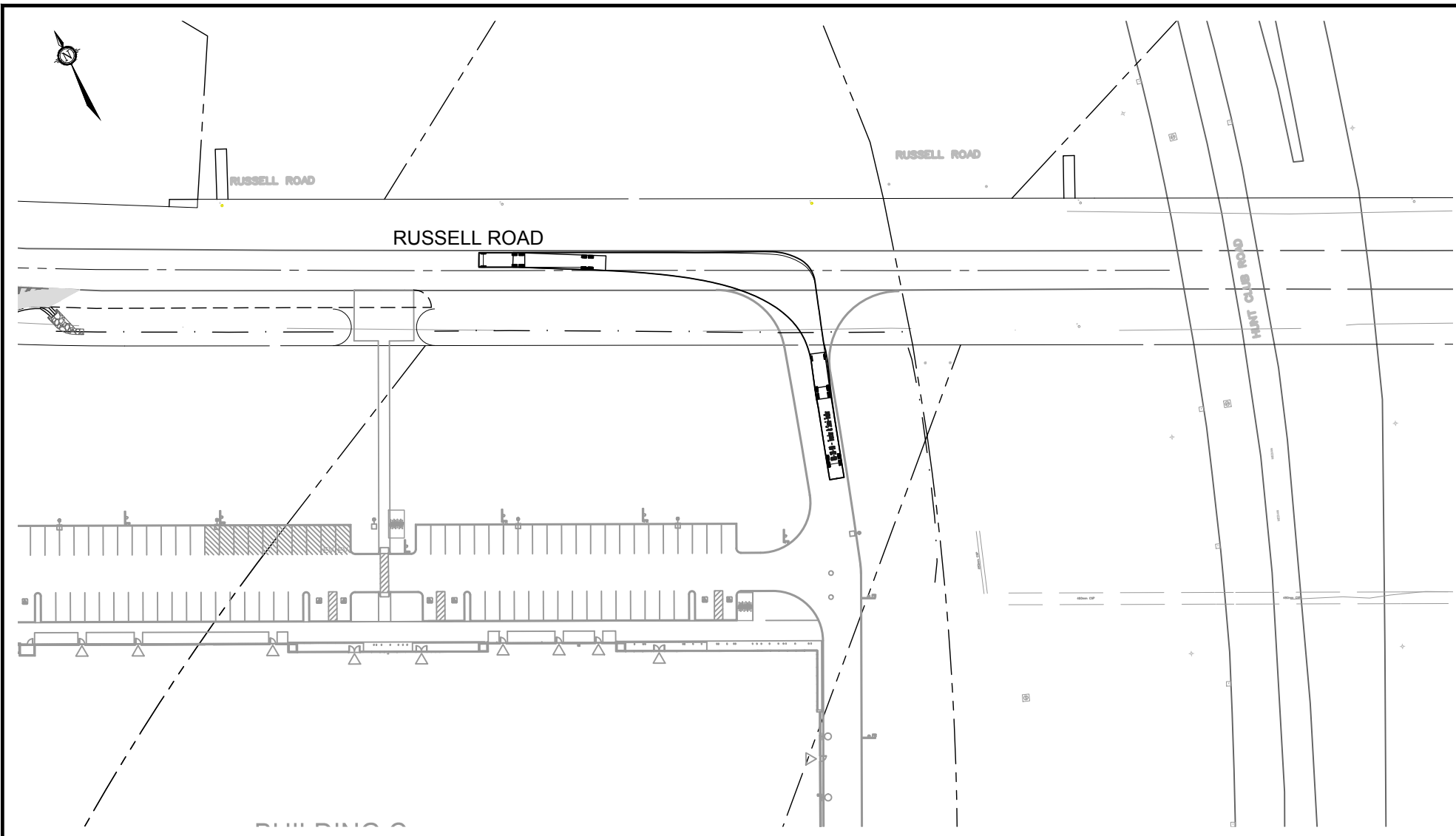
SCALE 1 : 1000

DATE DEC 2020

JOB 119124

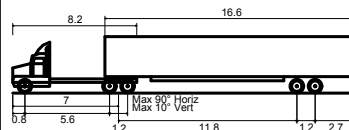
FIGURE TM-4

C:\temp\AcPublish_1188\119124-WB20-TM.dwg, TM5, Dec 03, 2020 - 11:18am, rhillier



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



WB-20-90 - Tractor & Semi-Trailer

Overall Length 22.700m
Overall Width 2.600m
Overall Body Height 3.730m
Min Body Ground Clearance 0.435m
Track Width 2.600m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 10.700m

RUSSELL ROAD

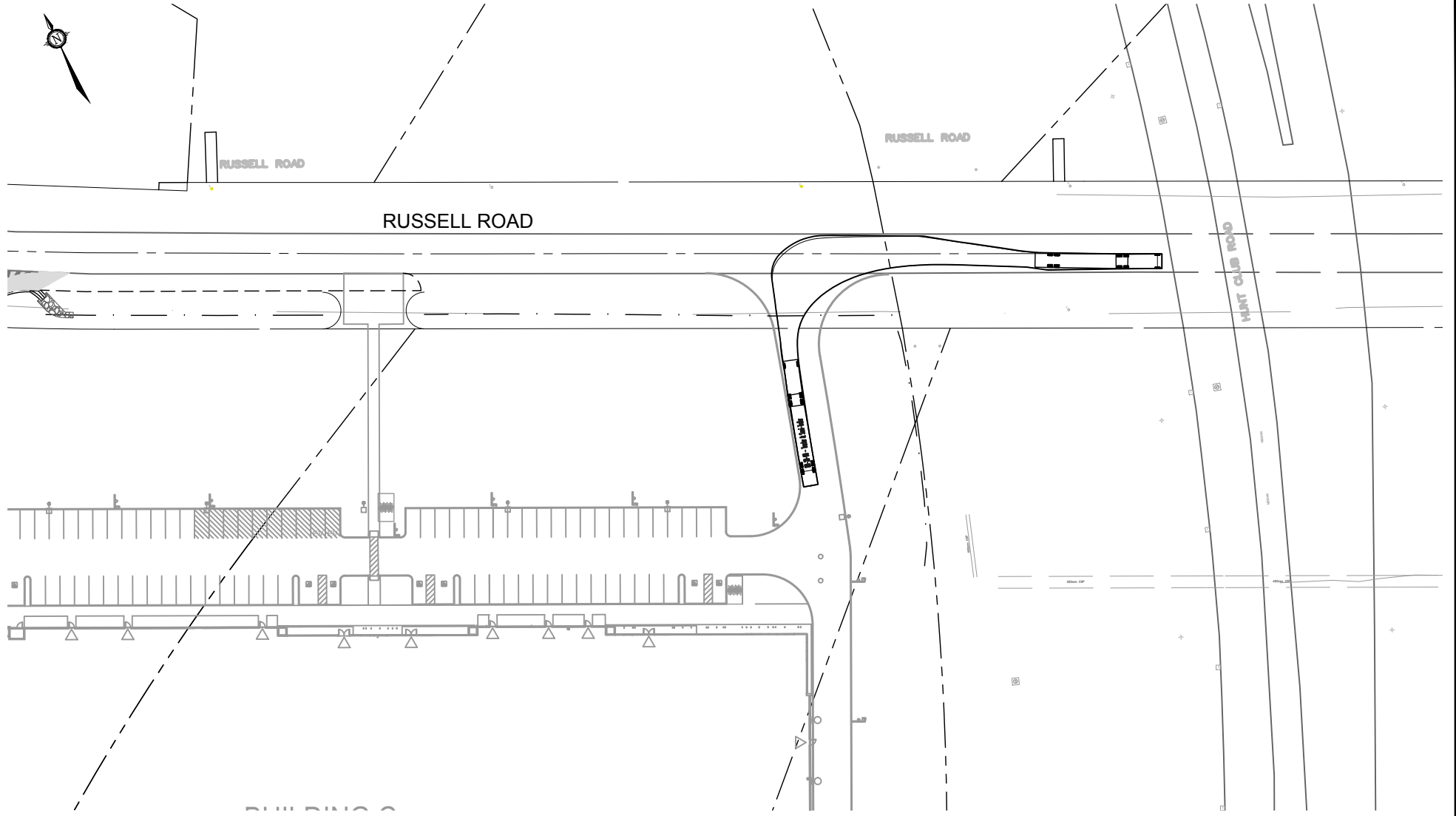
SITE ACCESS TURNING
MOVEMENT - WB20

SCALE 1 : 1000

DATE DEC 2020

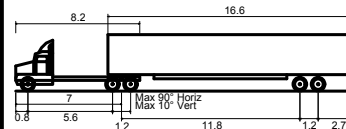
JOB 119124

FIGURE TM-5



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



WB-20-90 - Tractor & Semi-Trailer

RUSSELL ROAD

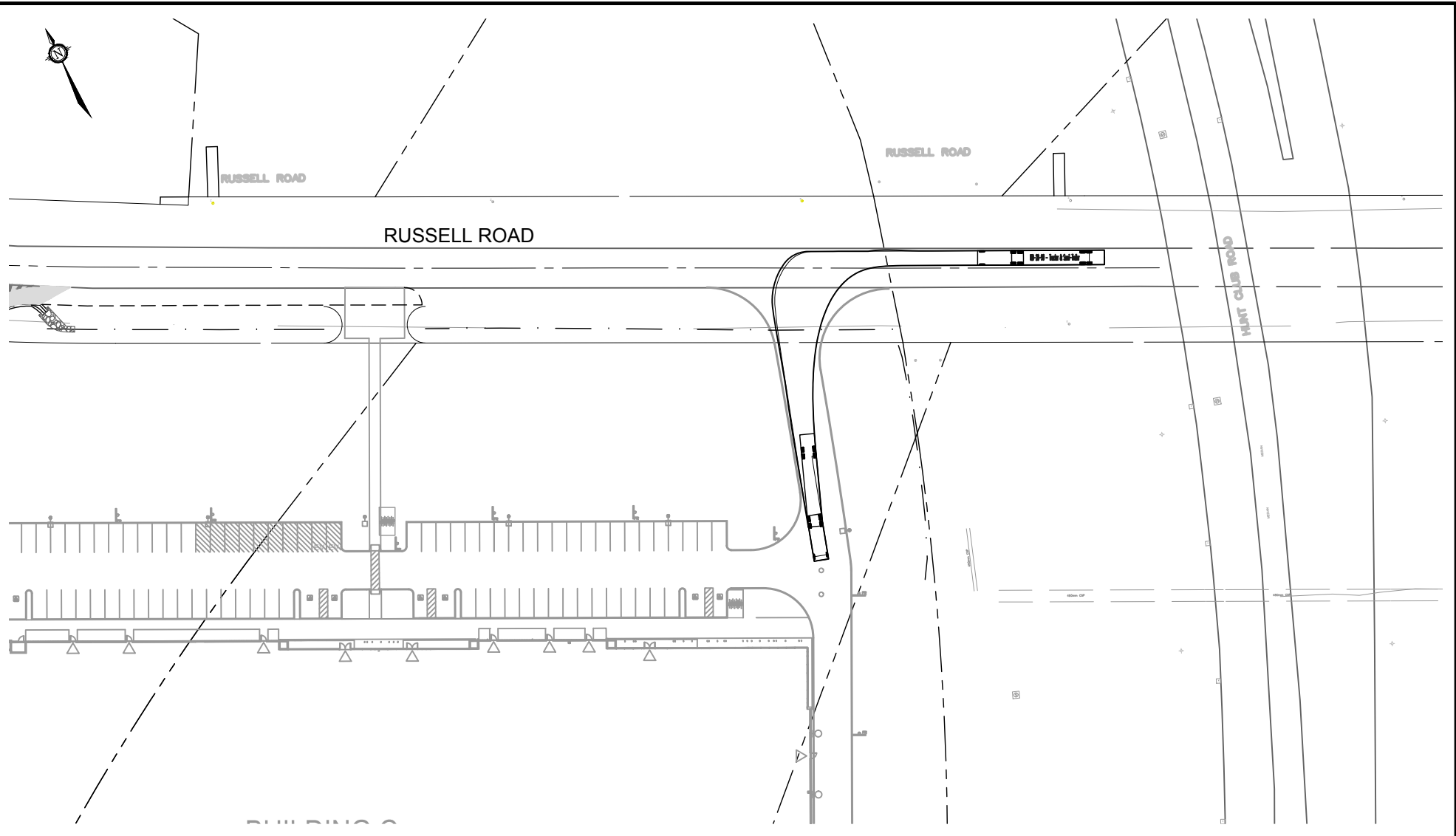
SITE ACCESS TURNING
MOVEMENT - WB20

SCALE 1 : 1000

DATE DEC 2020

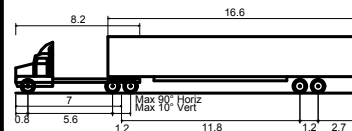
JOB 119124

FIGURE TM-6



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



WB-20-90 - Tractor & Semi-Trailer

| | |
|-----------------------------|---------|
| Overall Length | 22.700m |
| Overall Width | 2.600m |
| Overall Body Height | 3.730m |
| Min Body Ground Clearance | 0.435m |
| Track Width | 2.600m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 10.700m |

RUSSELL ROAD

SITE ACCESS TURNING
MOVEMENT - WB20

SCALE 1 : 1000

DATE DEC 2020 JOB 119124 FIGURE TM-7

APPENDIX B

TIA Screening Form



City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

| | |
|------------------------------------|---|
| Municipal Address | 4120 Russell Road |
| Description of Location | Along Russell Road north of Hunt Club Overpass |
| Land Use Classification | Industrial |
| Development Size (units) | |
| Development Size (m ²) | ~13,538m ² of warehouse |
| Number of Accesses and Locations | New public road (Last Mile Drive) connecting Russell Road and Hunt Club Road. Two site connections to Last Mile Drive and one connection to Russell Road north of Hunt Club Overpass. |
| Phase of Development | |
| Buildout Year | 2023 |

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

2. Trip Generation Trigger

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

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

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

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

3. Location Triggers

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

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

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

4. Safety Triggers

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

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

5. Summary

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

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

APPENDIX C

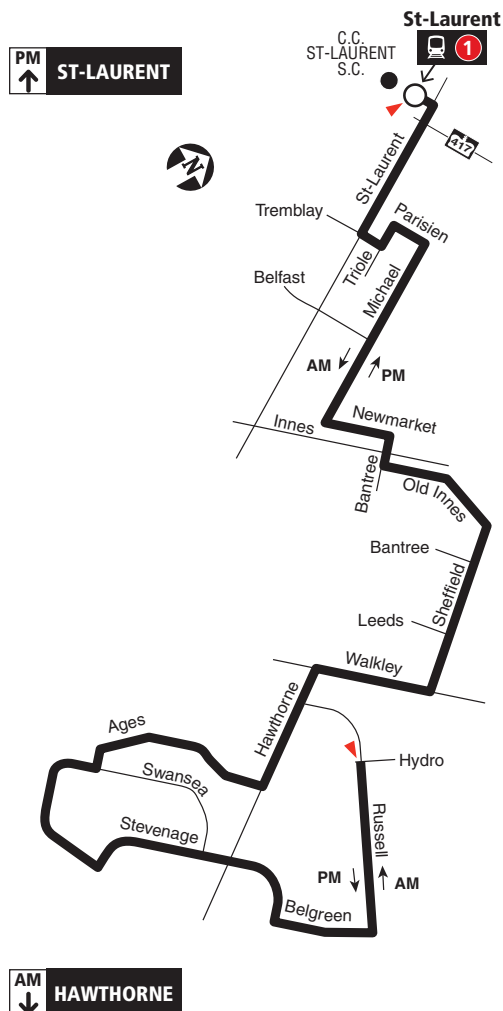
OC Transpo System Information

47

Local

**HAWTHORNE
ST-LAURENT**

Monday to Friday / Lundi au vendredi
Peak periods only
Périodes de pointe seulement



2019.06

Schedule / Horaire613-560-1000

Text / Texto560560

plus your four digit bus stop number / plus votre numéro d'arrêt à quatre chiffres

Customer Service

Service à la clientèle **613-741-4390**

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité **613-741-2478**

Effective June 25, 2017

En vigueur 25 juin 2017



INFO 613-741-4390
octranspo.com



98

HAWTHORNE
HURDMAN

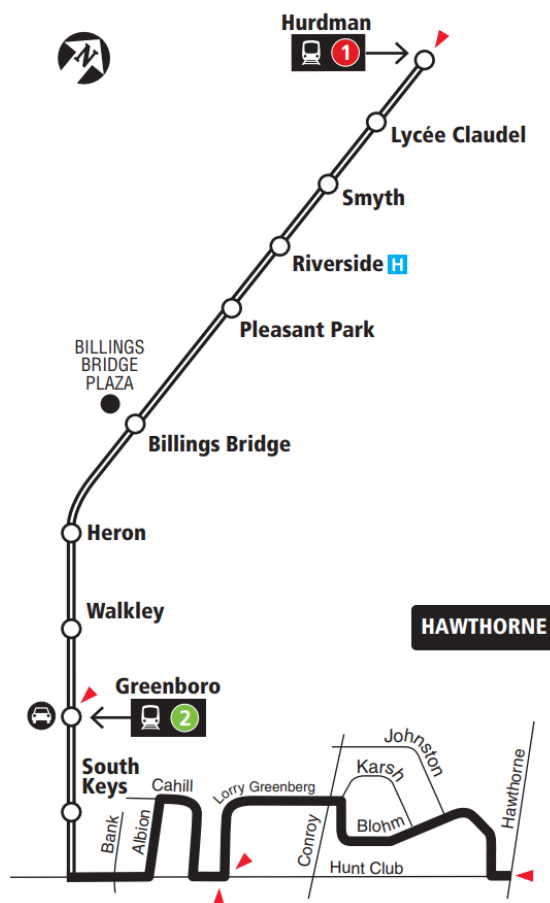
Rapid^e

7 days a week / 7 jours par semaine

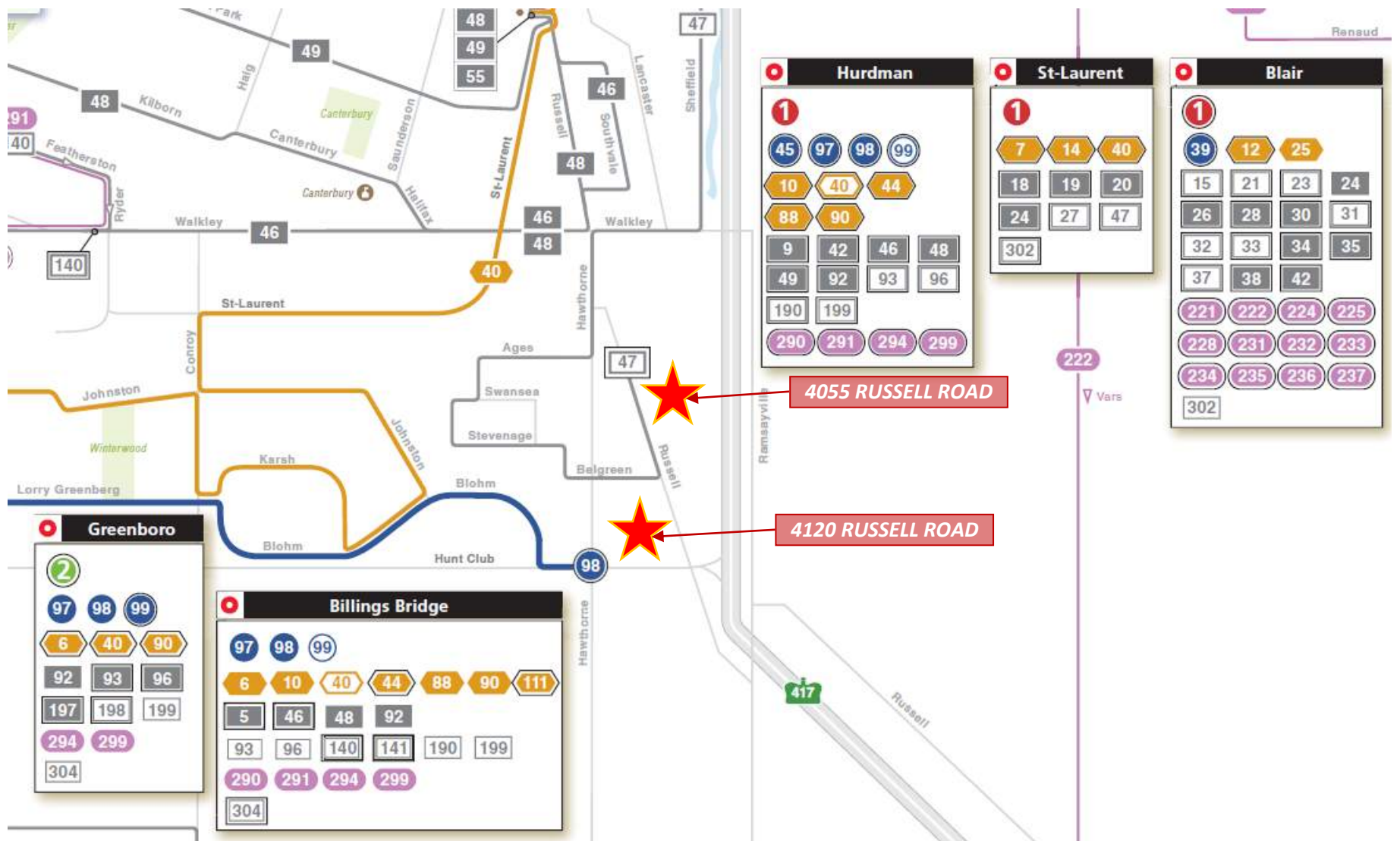
All day service

Service toute la journée

HURDMAN



-  Transitway & Station
-  Park & Ride | Parc-o-bus
-  Timepoint | Heures de passage



APPENDIX D

Traffic Count Data and Long-Range Snapshots



Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

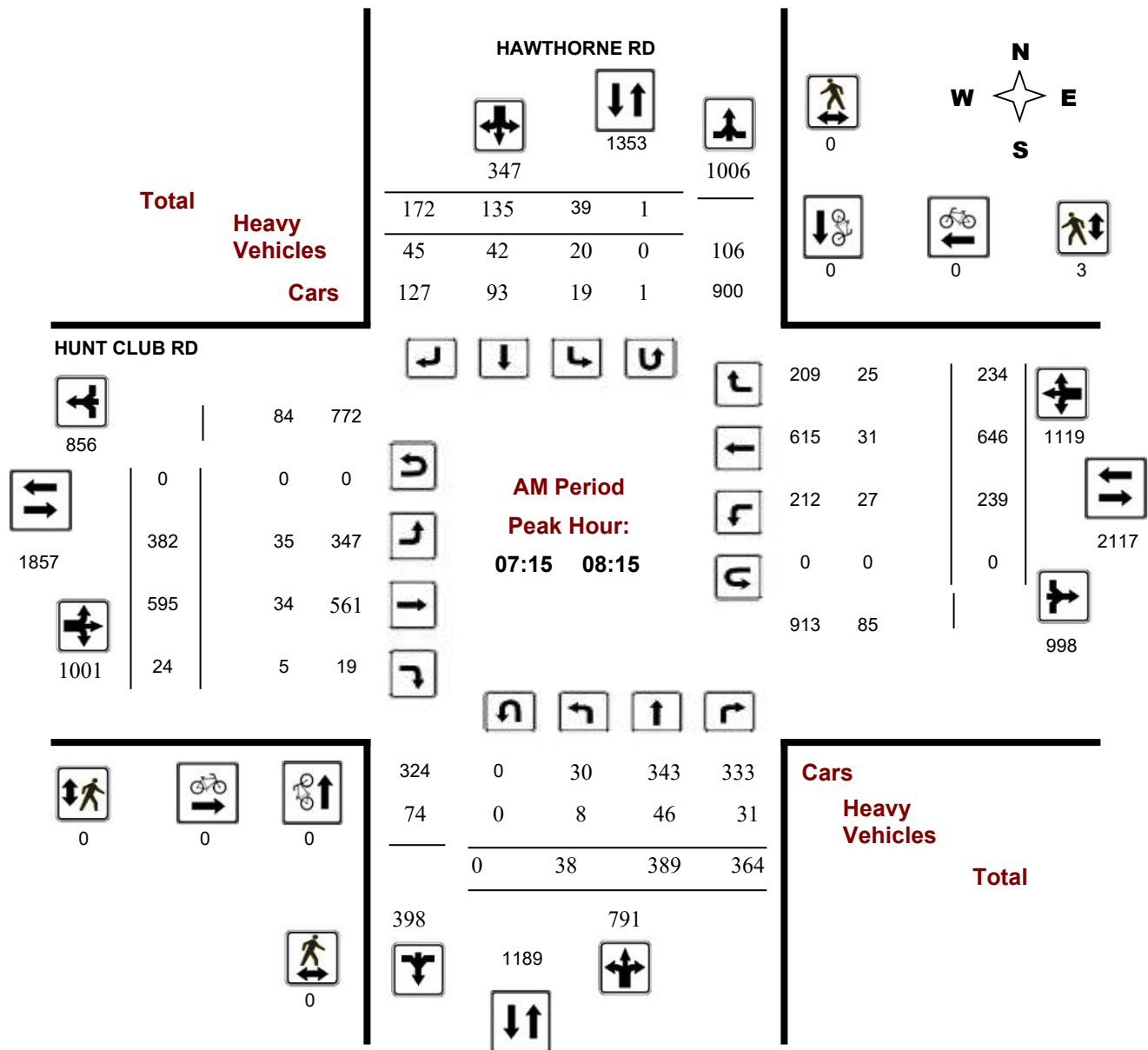
HAWTHORNE RD @ HUNT CLUB RD

Survey Date: Tuesday, July 24, 2018

Start Time: 07:00

WO No: 37991

Device: Miovision



Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

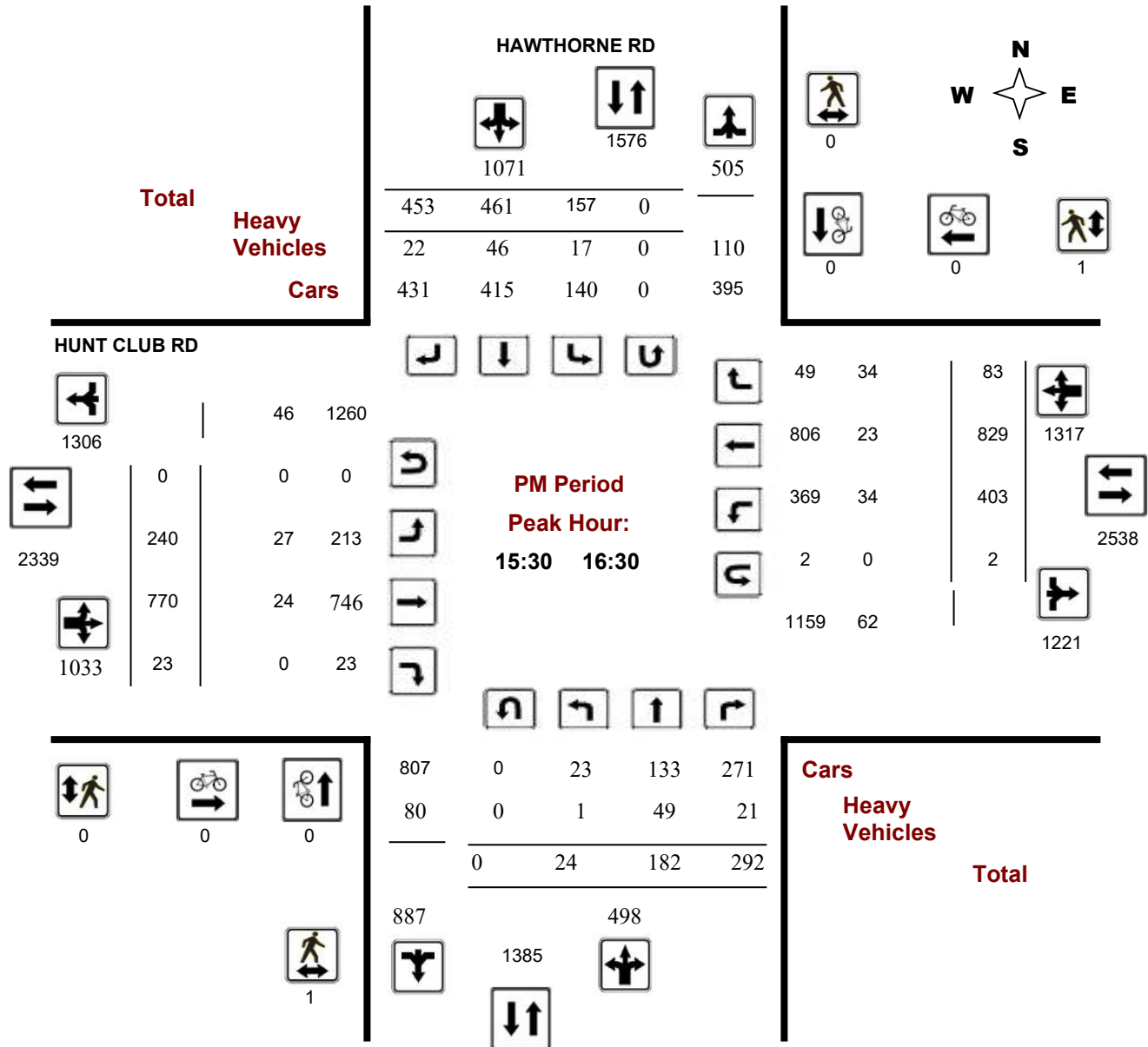
HAWTHORNE RD @ HUNT CLUB RD

Survey Date: Tuesday, July 24, 2018

Start Time: 07:00

WO No: 37991

Device: Miovision





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

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

Belgreen Drive & Russell Road

Ramsayville, ON

All Vehicles

(Except Bicycles & Electric Scooters)

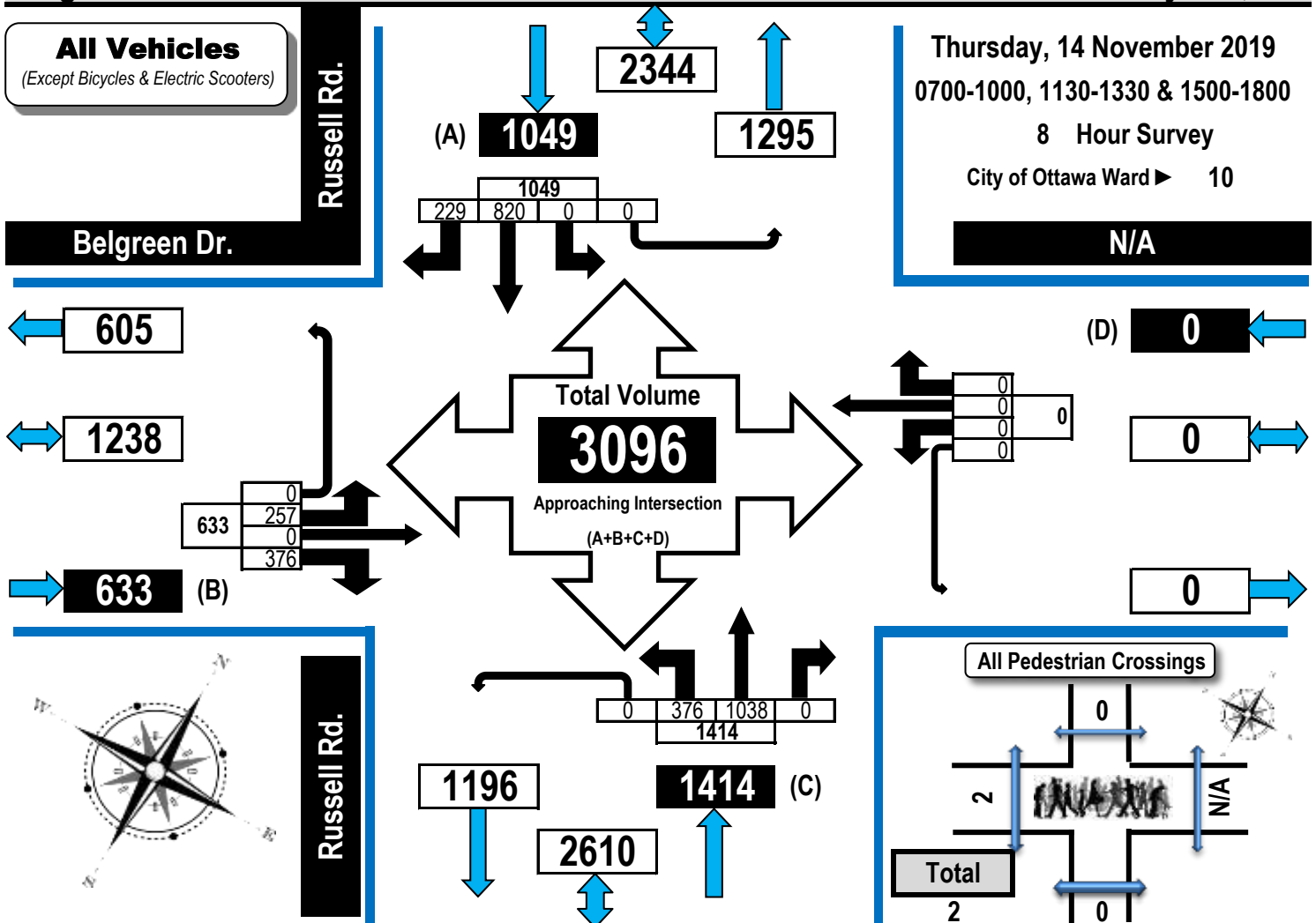
Thursday, 14 November 2019

0700-1000, 1130-1330 & 1500-1800

8 Hour Survey

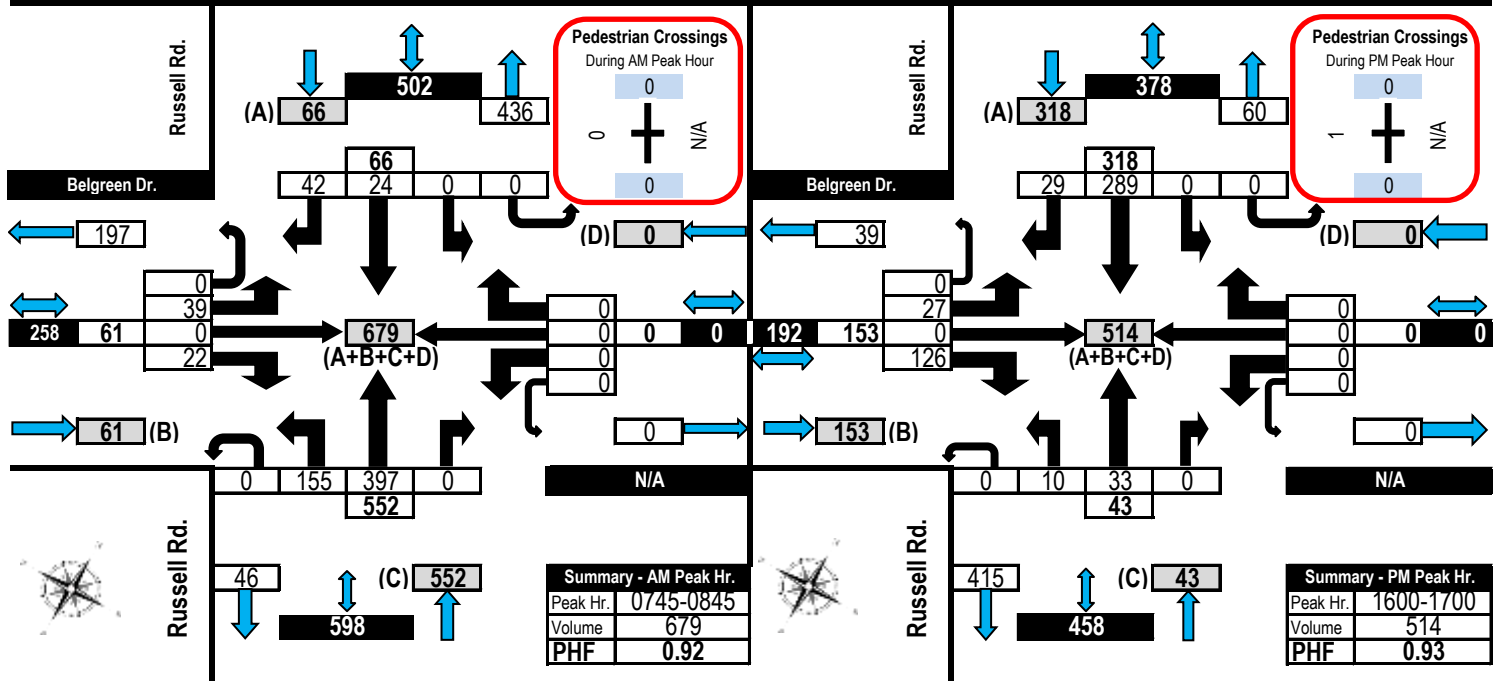
City of Ottawa Ward 10

N/A



AM Peak Hour Flow Diagram

PM Peak Hour Flow Diagram





Turning Movement Count Summary Report AADT and Expansion Factors

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

Belgreen Drive & Russell Road

Ramsayville, ON

Survey Date: Thursday, 14 November 2019

Start Time: 0700

AADT Factor: 0.9

Weather AM: Light snow -9°C

Survey Duration: 8 Hrs.

Survey Hours: 0700-1000, 1130-1330 & 1500-1800

Weather PM: Overcast 0°C

Surveyor(s): Carmody

| Belgreen Dr. | | | | | | N/A | | | | | | Russell Rd. | | | | | | Russell Rd. | | | | | |
|--------------|-----|----|-----|----|---------|-----------|----|----|----|---------|--------------|-------------|------|----|----|---------|----|-------------|-----|----|---------|--------------|-------------|
| Eastbound | | | | | | Westbound | | | | | | Northbound | | | | | | Southbound | | | | | |
| Time Period | LT | ST | RT | UT | E/B Tot | LT | ST | RT | UT | W/B Tot | Street Total | LT | ST | RT | UT | N/B Tot | LT | ST | RT | UT | S/B Tot | Street Total | Grand Total |
| 0700-0800 | 23 | 0 | 7 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 30 | 109 | 415 | 0 | 0 | 524 | 0 | 19 | 30 | 0 | 49 | 573 | 603 |
| 0800-0900 | 45 | 0 | 24 | 0 | 69 | 0 | 0 | 0 | 0 | 0 | 69 | 153 | 340 | 0 | 0 | 493 | 0 | 26 | 38 | 0 | 64 | 557 | 626 |
| 0900-1000 | 67 | 0 | 41 | 0 | 108 | 0 | 0 | 0 | 0 | 0 | 108 | 48 | 130 | 0 | 0 | 178 | 0 | 37 | 26 | 0 | 63 | 241 | 349 |
| 1130-1230 | 21 | 0 | 21 | 0 | 42 | 0 | 0 | 0 | 0 | 0 | 42 | 23 | 30 | 0 | 0 | 53 | 0 | 33 | 27 | 0 | 60 | 113 | 155 |
| 1230-1330 | 28 | 0 | 15 | 0 | 43 | 0 | 0 | 0 | 0 | 0 | 43 | 12 | 32 | 0 | 0 | 44 | 0 | 36 | 25 | 0 | 61 | 105 | 148 |
| 1500-1600 | 19 | 0 | 78 | 0 | 97 | 0 | 0 | 0 | 0 | 0 | 97 | 11 | 29 | 0 | 0 | 40 | 0 | 192 | 30 | 0 | 222 | 262 | 359 |
| 1600-1700 | 27 | 0 | 126 | 0 | 153 | 0 | 0 | 0 | 0 | 0 | 153 | 10 | 33 | 0 | 0 | 43 | 0 | 289 | 29 | 0 | 318 | 361 | 514 |
| 1700-1800 | 27 | 0 | 64 | 0 | 91 | 0 | 0 | 0 | 0 | 0 | 91 | 10 | 29 | 0 | 0 | 39 | 0 | 188 | 24 | 0 | 212 | 251 | 342 |
| Totals | 257 | 0 | 376 | 0 | 633 | 0 | 0 | 0 | 0 | 0 | 633 | 376 | 1038 | 0 | 0 | 1414 | 0 | 820 | 229 | 0 | 1049 | 2463 | 3096 |

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor

Applicable to the Day and Month of the Turning Movement Count

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

| Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 ➔ 12 expansion factor of 1.39 | | | | | | | | | | | | | | | | | | | | | | | |
|---|-----|---|-----|---|------|---|---|---|---|---|------|-----|------|---|---|------|---|------|-----|---|------|------|------|
| Equ. 12 Hr | 357 | 0 | 523 | 0 | 880 | 0 | 0 | 0 | 0 | 0 | 880 | 523 | 1443 | 0 | 0 | 1965 | 0 | 1140 | 318 | 0 | 1458 | 3424 | 4303 |
| Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.9 | | | | | | | | | | | | | | | | | | | | | | | |
| AADT 12-hr | 322 | 0 | 470 | 0 | 792 | 0 | 0 | 0 | 0 | 0 | 792 | 470 | 1299 | 0 | 0 | 1769 | 0 | 1026 | 286 | 0 | 1312 | 3081 | 3873 |
| 24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 ➔ 24 expansion factor of 1.31 | | | | | | | | | | | | | | | | | | | | | | | |
| AADT 24 Hr | 421 | 0 | 616 | 0 | 1037 | 0 | 0 | 0 | 0 | 0 | 1037 | 616 | 1701 | 0 | 0 | 2317 | 0 | 1344 | 375 | 0 | 1719 | 4036 | 5074 |

AADT and expansion factors provided by the City of Ottawa

| AM Peak Hour Factor ➡ 0.92 | | | | | | | | | | | | Highest Hourly Vehicle Volume Between 0700h & 1000h | | | | | | | | | | | |
|-----------------------------|----|----|-----|----|-----|----|----|----|----|-----|-------|---|-----|----|----|-----|----|-----|----|----|-----|-------|-------|
| AM Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
| 0745-0845 | 39 | 0 | 22 | 0 | 61 | 0 | 0 | 0 | 0 | 0 | 61 | 155 | 397 | 0 | 0 | 552 | 0 | 24 | 42 | 0 | 66 | 618 | 679 |
| OFF Peak Hour Factor ➡ 0.84 | | | | | | | | | | | | Highest Hourly Vehicle Volume Between 1130h & 1330h | | | | | | | | | | | |
| OFF Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
| 1145-1245 | 26 | 0 | 25 | 0 | 51 | 0 | 0 | 0 | 0 | 0 | 51 | 21 | 30 | 0 | 0 | 51 | 0 | 33 | 29 | 0 | 62 | 113 | 164 |
| PM Peak Hour Factor ➡ 0.93 | | | | | | | | | | | | Highest Hourly Vehicle Volume Between 1500h & 1800h | | | | | | | | | | | |
| PM Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
| 1600-1700 | 27 | 0 | 126 | 0 | 153 | 0 | 0 | 0 | 0 | 0 | 153 | 10 | 33 | 0 | 0 | 43 | 0 | 289 | 29 | 0 | 318 | 361 | 514 |

Comments:

Some northbound drivers pass northbound left-turning vehicles waiting to turn onto Belgreen Drive by using the east shoulder. A few southbound drivers pass southbound right-turning vehicles - in some cases heavy vehicles - and cannot see if there are any eastbound right-turning vehicles from Belgreen Drive occurring at the same time. There were no bicycles. The heavy vehicle total includes 36 buses - primarily school buses with some OC Transpo buses.

Notes:

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



Transportation Services - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

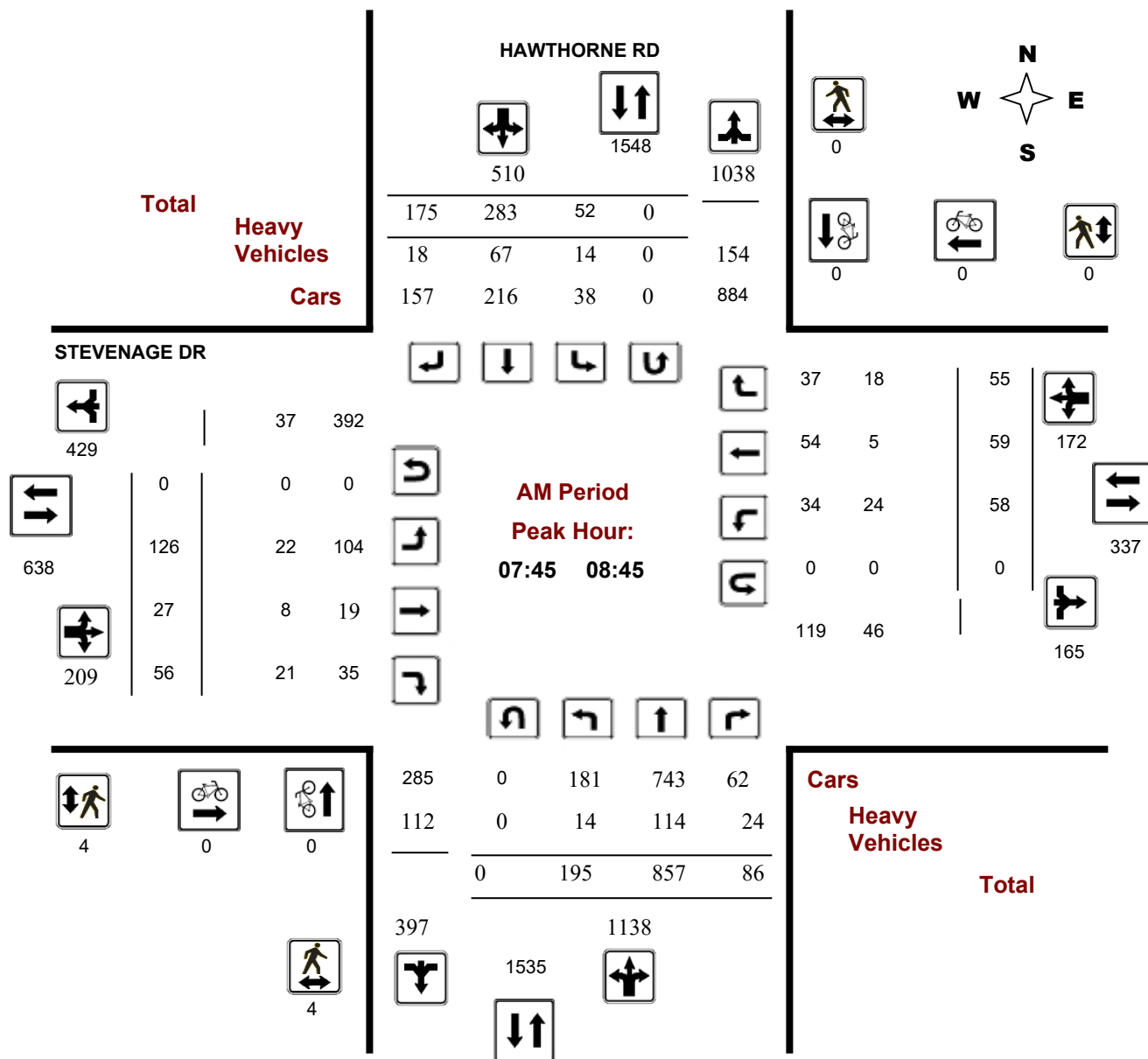
HAWTHORNE RD @ STEVENAGE DR

Survey Date: Wednesday, December 07, 2016

Start Time: 07:00

WO No: 36598

Device: Miovision

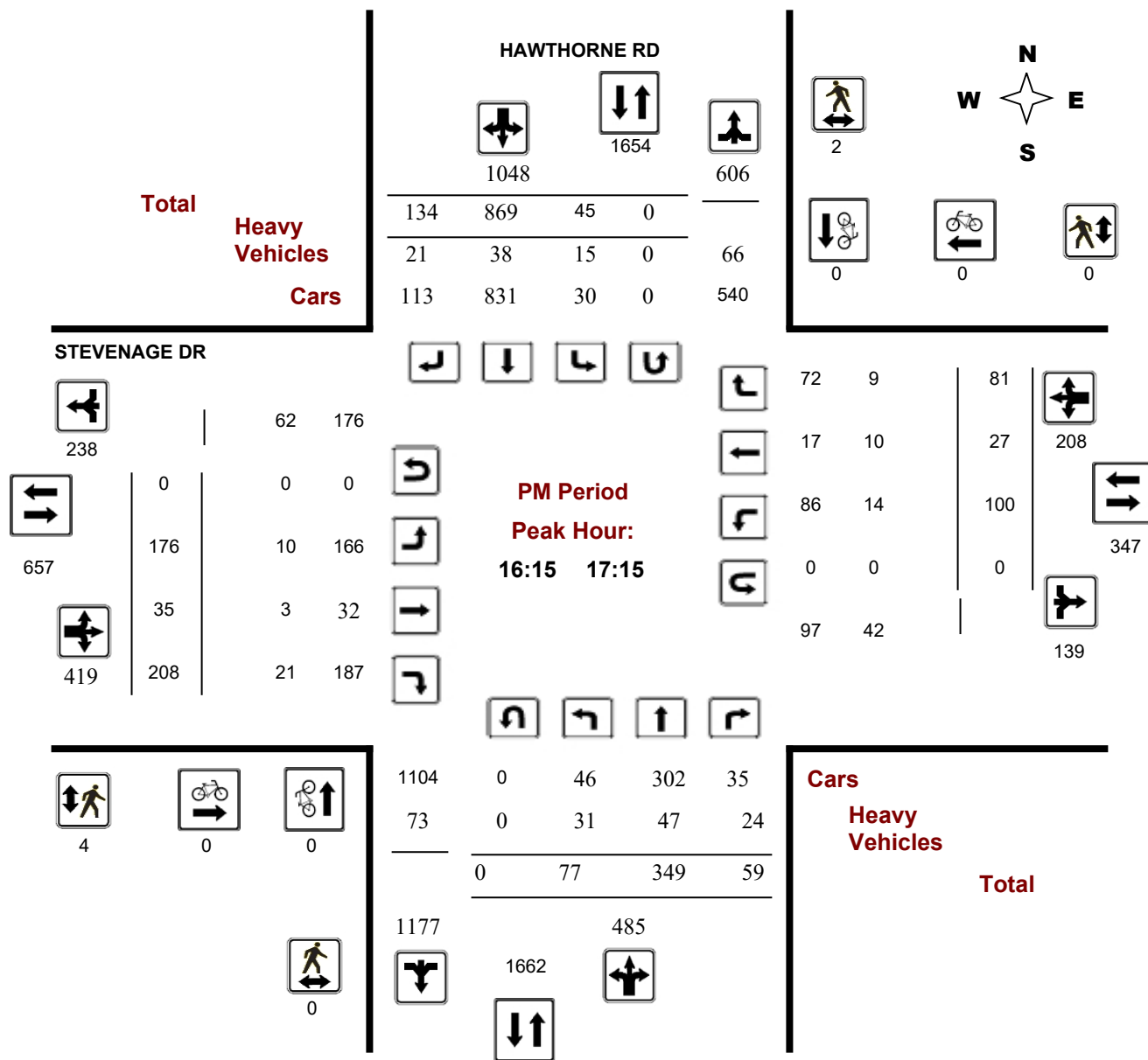


Survey Date: Wednesday, December 07, 2016

Start Time: 07:00

WO No: 36598

Device: Miovision



TRANS Regional Model

2011 Version V 1.12 - last updated January 18, 2018


AM Peak Hour Total Traffic Volume

Walkley Rd.

Scenario 11112

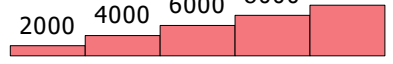
Modifications from base version:
none

User Initials: JF
Preparation Date: August 8, 2018





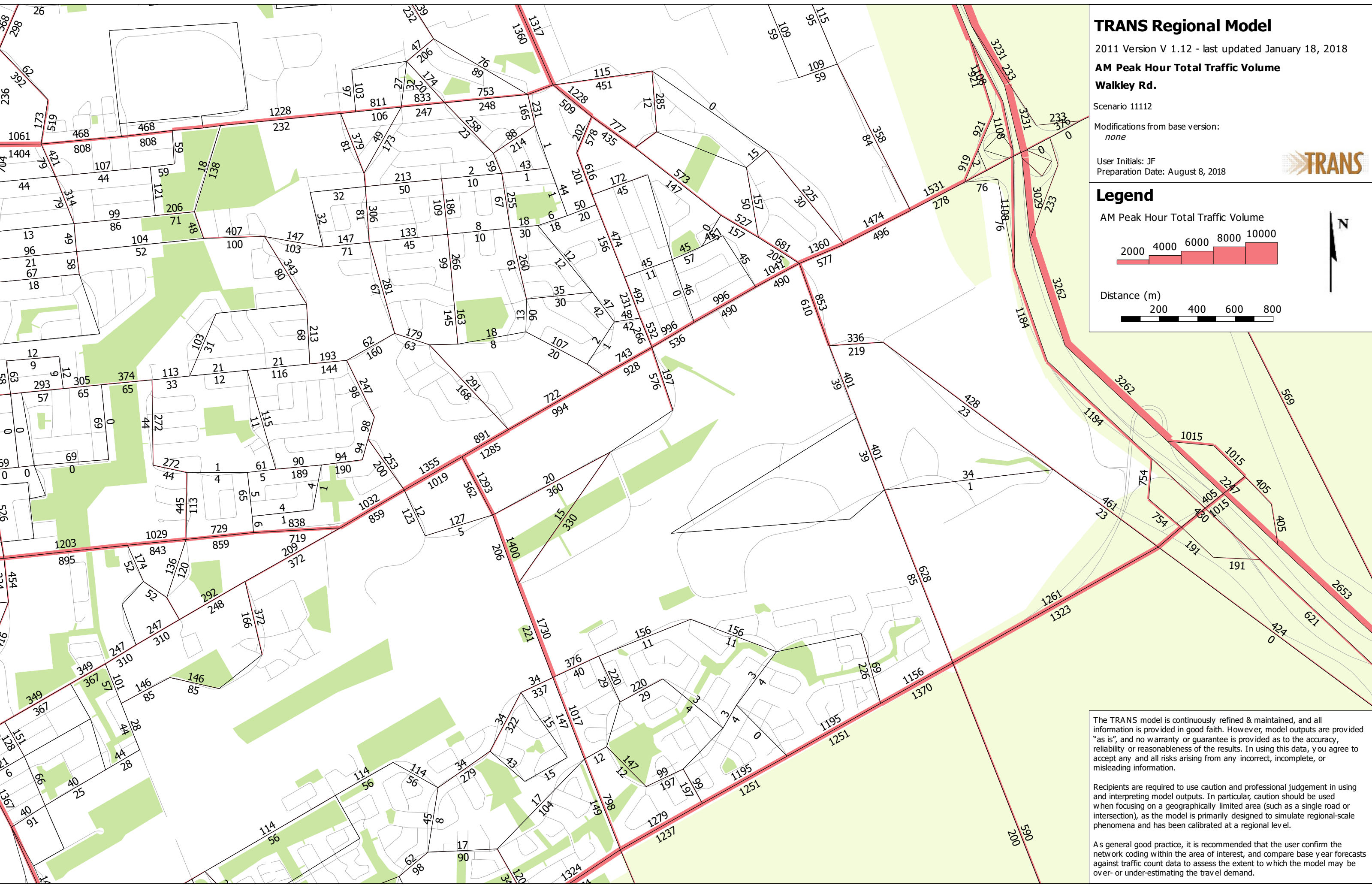
Legend

AM Peak Hour Total Traffic Volume



Distance (m)





The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided “as is”, and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

TRANS Regional Model

2031 Version V 1.12 - last updated January 18, 2018

AM Peak Hour Total Traffic Volume
Walkley Rd.

Scenario 12334

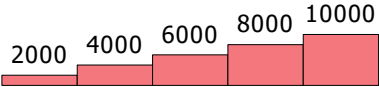
Modifications from base version:
none

User Initials: JF
Preparation Date: August 8, 2018



Legend

AM Peak Hour Total Traffic Volume



The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided “as is”, and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

APPENDIX E

Collision Records

| | | | | | | | | |
|------------------------|------|----------|------------------|-----|------|-------------|---------------------------|---------------------|
| 2017-Apr-15, Sat,16:18 | Rain | Rear end | Non-fatal injury | Wet | East | Going ahead | Municipal transit bus | Other motor vehicle |
| | | | | | East | Stopped | Automobile, station wagon | Other motor vehicle |

Location: HUNT CLUB RD @ HWY417 HUNT CLUB IC109 RAMP52

Traffic Control: Stop sign

Total Collisions: 8

| Date/Day/Time | Environment | Impact Type | Classification | Surface Cond'n | Veh. Dir | Vehicle Manoeuver | Vehicle type | First Event | No. Ped |
|------------------------|-------------|-------------|------------------|----------------|----------|---------------------|---------------------------|---------------------|---------|
| 2016-Jun-24, Fri,18:08 | Clear | Angle | P.D. only | Dry | South | Turning right | Automobile, station wagon | Other motor vehicle | |
| | | | | | West | Going ahead | Automobile, station wagon | Other motor vehicle | |
| 2016-Dec-14, Wed,17:30 | Clear | Rear end | Non-fatal injury | Dry | West | Slowing or stopping | Pick-up truck | Other motor vehicle | |
| | | | | | West | Turning right | Automobile, station wagon | Other motor vehicle | |
| 2015-Dec-11, Fri,02:00 | Clear | SMV other | P.D. only | Dry | East | Turning right | Passenger van | Curb | |
| 2015-Jan-26, Mon,16:00 | Clear | Rear end | P.D. only | Dry | East | Slowing or stopping | Automobile, station wagon | Other motor vehicle | |
| | | | | | East | Stopped | Pick-up truck | Other motor vehicle | |
| 2015-Apr-28, Tue,15:45 | Clear | Rear end | Non-fatal injury | Dry | East | Going ahead | Pick-up truck | Other motor vehicle | |
| | | | | | East | Stopped | Automobile, station wagon | Other motor vehicle | |
| | | | | | East | Stopped | Automobile, station wagon | Other motor vehicle | |
| 2015-Jan-26, Mon,16:30 | Clear | Rear end | P.D. only | Dry | East | Going ahead | Automobile, station wagon | Other motor vehicle | |

| | | | | | | | | |
|------------------------|-------|----------|-----------|-------|-------|-------------|------------------------------|------------------------|
| | | | | | East | Stopped | Automobile, station wagon | Other motor vehicle |
| 2015-Jan-31, Sat,16:00 | Clear | Rear end | P.D. only | Slush | East | Going ahead | Automobile, station wagon | Other motor vehicle |
| | | | | | East | Stopped | Automobile, station wagon | Other motor vehicle |
| 2018-Sep-08, Sat,12:31 | Clear | Rear end | P.D. only | Dry | North | Going ahead | Automobile, station wagon | Other motor vehicle |
| | | | | | North | Stopped | Automobile, station wagon | Other motor vehicle |

Location: RAMSAYVILLE RD @ RUSSELL RD N

Traffic Control: Stop sign

Total Collisions: 8

| Date/Day/Time | Environment | Impact Type | Classification | Surface Cond'n | Veh. Dir | Vehicle Manoeuver | Vehicle type | First Event | No. Ped |
|------------------------|-------------|------------------|------------------|-------------------------|----------|---------------------|------------------------------|------------------------|---------|
| 2014-Aug-12, Tue,19:23 | Rain | SMV other | Non-fatal injury | Wet | West | Going ahead | Automobile, station wagon | Ran off road | |
| 2014-Sep-21, Sun,14:43 | Rain | SMV other | P.D. only | Wet | West | Going ahead | Automobile, station wagon | Ran off road | |
| 2015-Aug-09, Sun,13:59 | Clear | SMV other | Non-fatal injury | Loose sand or gravel | West | Slowing or stopping | Motorcycle | Skidding/sliding | |
| 2016-Nov-20, Sun,08:58 | Rain | Turning movement | P.D. only | Wet | North | Going ahead | Automobile, station wagon | Other motor vehicle | |
| | | | | | South | Turning left | Passenger van | Other motor vehicle | |
| 2017-Mar-10, Fri,01:23 | Clear | SMV other | Non-fatal injury | Dry | West | Slowing or stopping | Pick-up truck | Ran off road | |
| 2018-Jan-16, Tue,13:40 | Clear | SMV other | P.D. only | Wet | West | Going ahead | Pick-up truck | Skidding/sliding | |

APPENDIX F

Excerpts from Relevant Traffic Studies

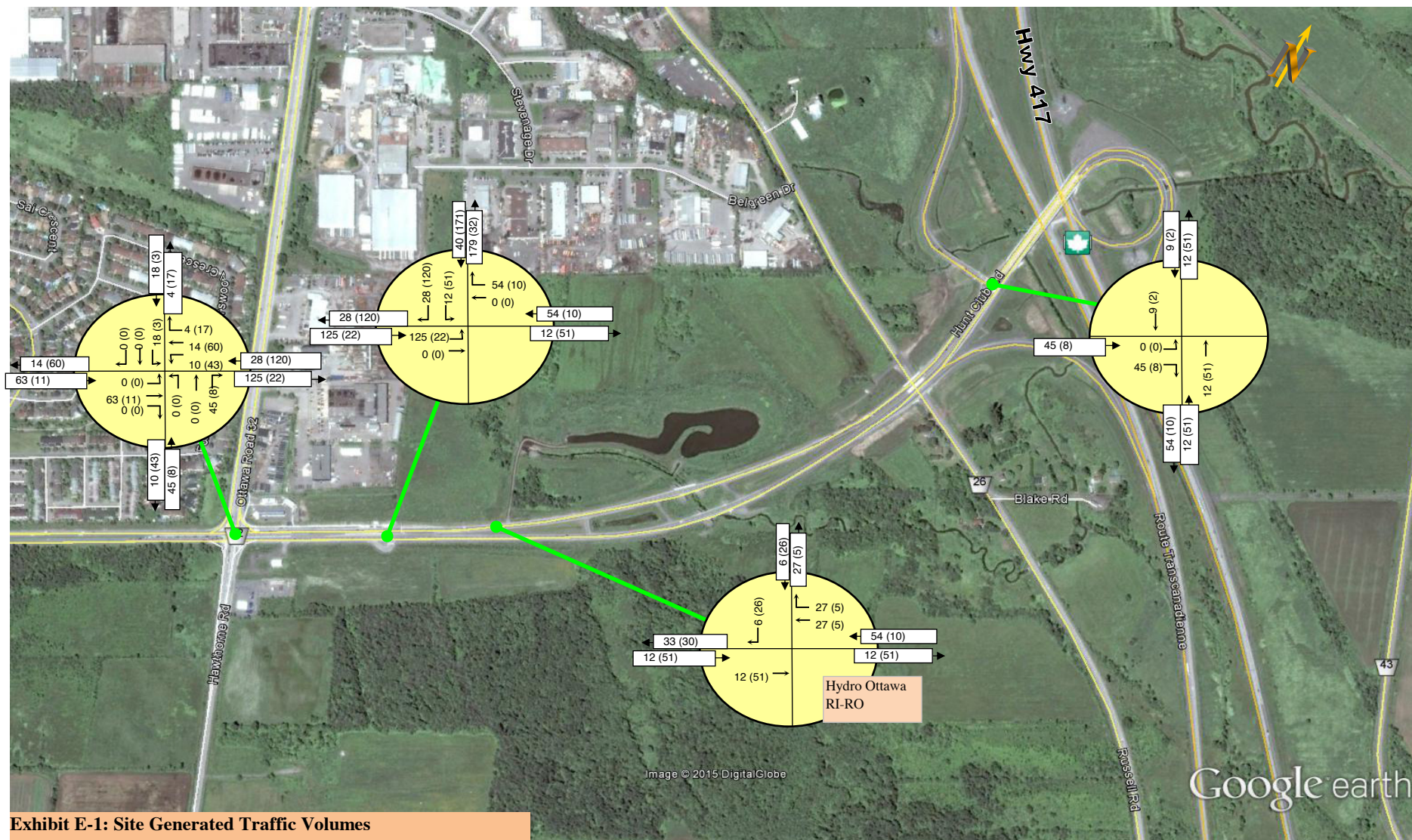


Exhibit E-1: Site Generated Traffic Volumes

Morning Peak Hour (Afternoon Peak Hour)

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 8,325m² (89,610ft²);
- Site 2- two warehouses with 17,400m² (187,300ft²); and,
- Site 3- three warehouses with 75,685m² (814,700ft²).

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 <i>Trip Generation 10th Edition</i> (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**.

The map illustrates the proposed development site and its access points. Key features include:

- Highway 417:** Running diagonally from the top right to the bottom right. It includes an off-ramp for Highway 417 NB and an off-ramp for Highway 417 SB.
- Local Streets:**
 - RUSSELL:** A major street running horizontally across the top and bottom of the map.
 - WALKLEY:** A street running horizontally across the top left.
 - STEVENAGE:** A street running horizontally across the middle left.
 - HUNT CLUB:** A street running horizontally across the bottom left.
 - HAWTHORNE:** A street running vertically along the bottom left.
 - RAMSAYVILLE:** A street running vertically along the bottom right.
 - ANDERSON:** A street running vertically along the far right.
- Development Sites:**
 - SITE 1:** Located in the center, with access points labeled SITE 1 NORTH ACCESS, SITE 1 SOUTH ACCESS, SITE 2N ACCESS, SITE 2S ACCESS, and BUILDING F N ACCESS.
 - SITE 2:** Located in the center, with access points labeled SITE 2N ACCESS, SITE 2S ACCESS, and BUILDING F S ACCESS.
 - SITE 3:** Located in the center, with access points labeled SITE 3 NORTH ACCESS and SITE 3 SOUTH ACCESS.
- Traffic Volumes:** Indicated by numbers in parentheses next to arrows, representing AM and PM peak hour volumes. For example, at the intersection of Russell and Walkley, the volumes are 73(91) for Russell and 63(71) for Walkley.
- Legend:**
 - xx (yy): AM Peak Hour veh/h (yy) PM Peak Hour veh/h
 - : Signalized Intersection
 - : Unsignalized Intersection
- North Arrow:** Located in the top right corner, pointing towards the top right.

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.

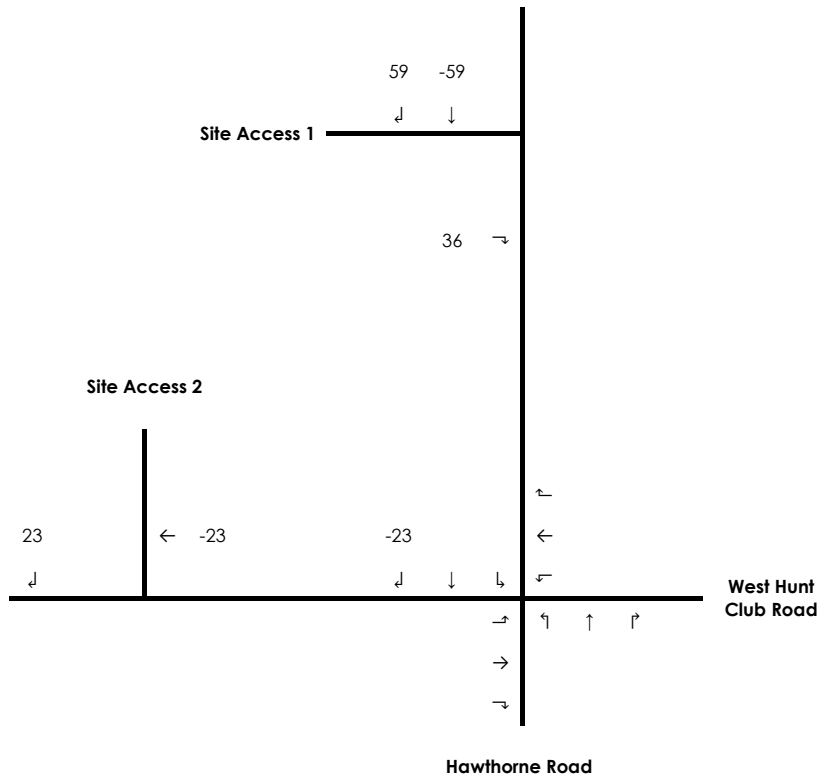
Figure 9 illustrates the net new site trips the proposed commercial development is anticipated to generate.

3.3.3 Traffic Distribution and Assignment

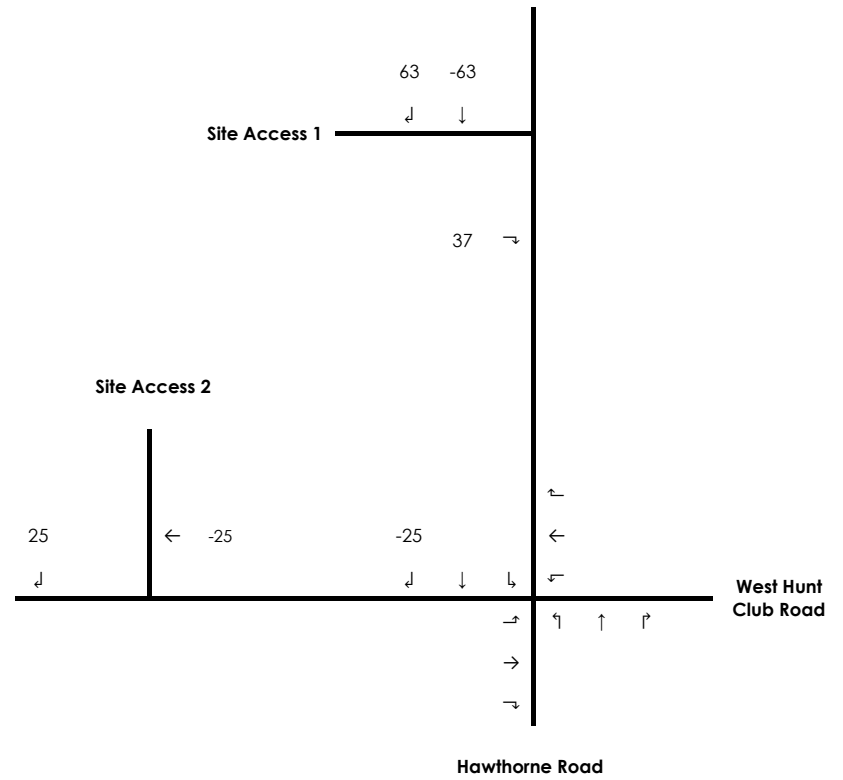
The distribution of traffic to / from the study area was determined through examination of the current traffic patterns at the Hunt Club Road at Hawthorne Road intersection.

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

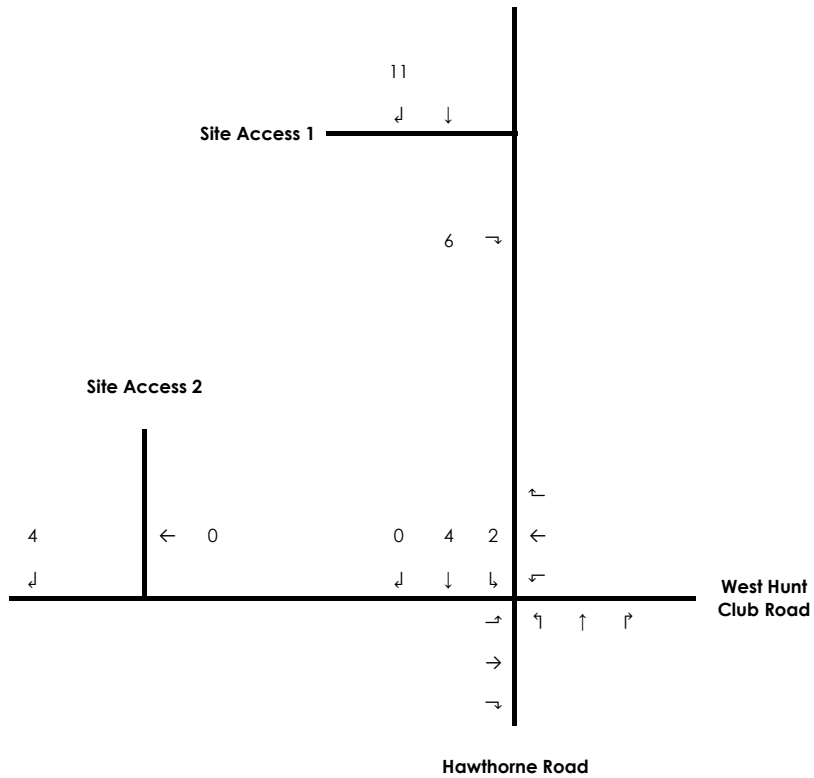
AM Peak Hour



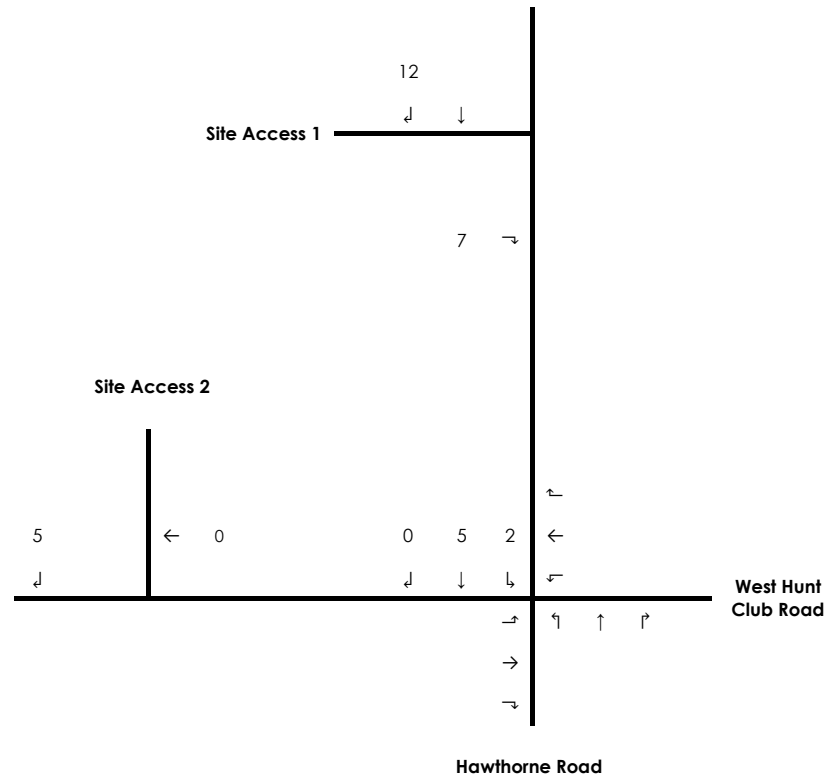
PM Peak Hour



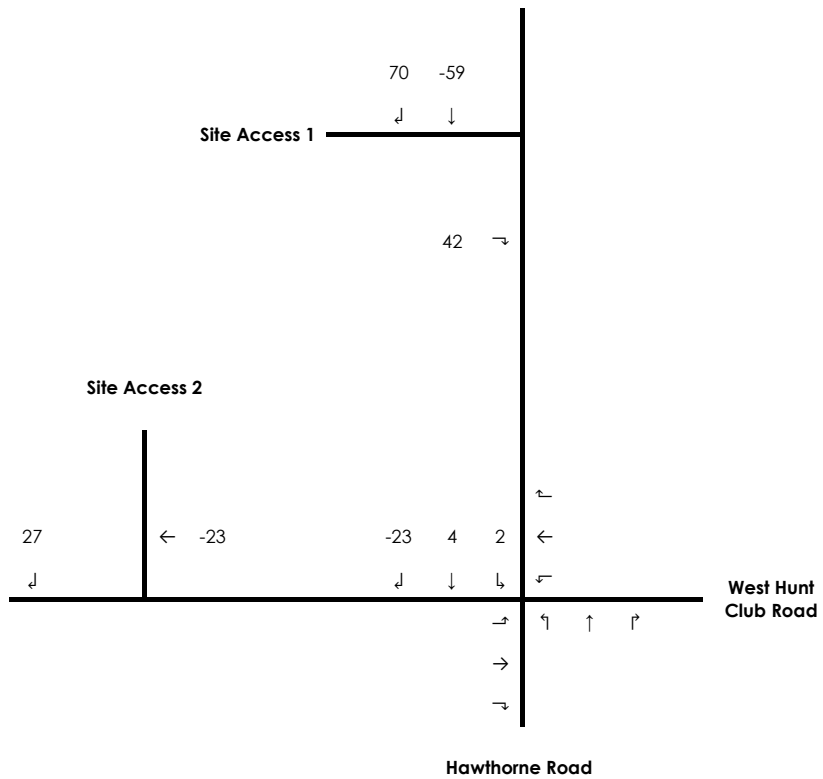
AM Peak Hour



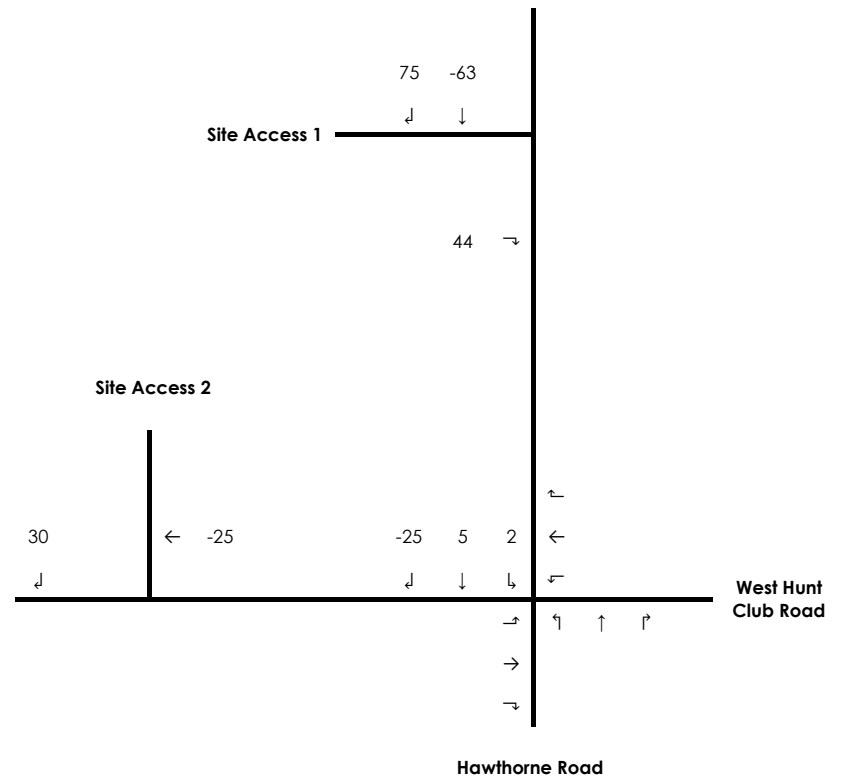
PM Peak Hour



AM Peak Hour



PM Peak Hour



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 Guidelines.

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 m² tile warehouse and 929 m² 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. |

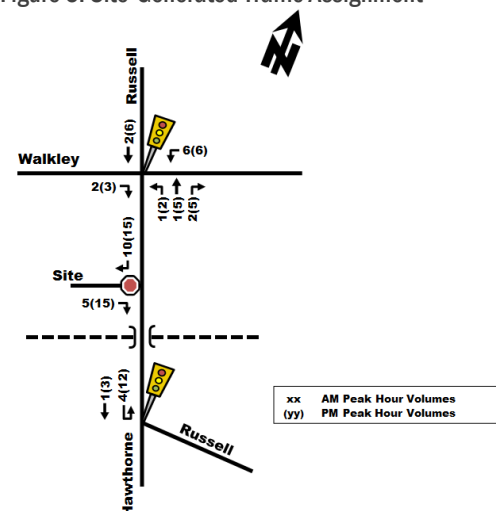
5.3 Trip Distribution and Assignment

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 Russell I/Walkley and Russell/Hawthorne intersections would distribute similar to the distribution of existing volumes at this intersection as depicted in Figure 5.

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.

Figure 5: Site-Generated Traffic Assignment



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 ft ² | 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

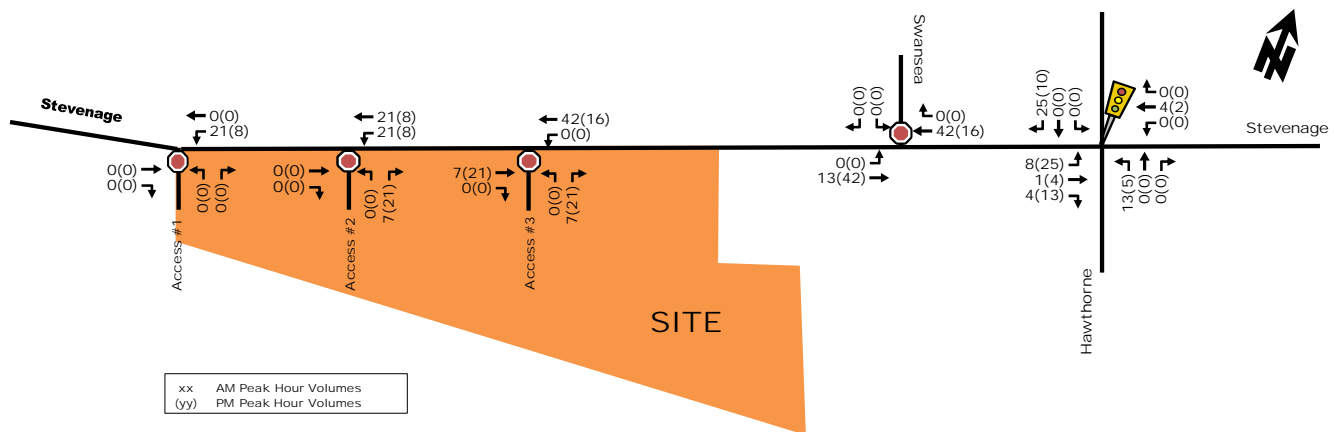
Considering the existing traffic distribution at Hawthorne/Stevenage intersection, the site trip distribution is outlined next:

- 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.

5.0 FORECASTING

5.1 Development-Generated Travel Demand

5.1.1 Trip Generation

Currently, the subject site is occupied by approximately 40,389 ft² of retail space, 76,652 ft² of office space, and 302,002 ft² of warehouse space. The proposed reconfiguration of the site will contain approximately 30,962 ft² retail space, 187,087 ft² of office space, and 182,685 ft² of warehouse space. Trips generated by these land uses have been estimated using the *ITE Trip Generation Manual, 10th Edition*. Retail trips have been estimated based on the Free-Standing Discount Store land use (land use 815), office trips have been estimated based on the General Office Building land use (land use 710), and warehouse trips have been estimated based on the Warehousing land use (land use 150). It is noted that only a portion of the existing parking is required for the remaining warehouse use. As future development for this part of the subject site is unknown at this time, it is proposed that the existing parking be retained and remain vacant. The vacant parking in excess of the warehouse parking will not serve the existing or proposed land uses and is not expected to generate trips.

The estimated number of trips generated by the existing development and proposed redevelopment are shown in **Table 3**.

Table 3: Person Trip Generation

| Land Use | ITE Code | GFA | AM Peak (PPH ⁽¹⁾) | | | PM Peak (PPH) | | |
|-------------------------------|----------|-------------|-------------------------------|-----|-----|---------------|-----|-----|
| | | | IN | OUT | TOT | IN | OUT | TOT |
| Existing Development | | | | | | | | |
| Free-Standing Discount Store | 815 | 40,389 ft² | 41 | 19 | 60 | 125 | 125 | 250 |
| General Office Building | 710 | 76,652 ft² | 109 | 18 | 127 | 18 | 95 | 113 |
| Warehousing | 150 | 302,002 ft² | 61 | 18 | 79 | 22 | 60 | 82 |
| Total | | | 211 | 55 | 266 | 165 | 280 | 445 |
| Proposed Redevelopment | | | | | | | | |
| Free-Standing Discount Store | 815 | 30,962 ft² | 32 | 14 | 46 | 95 | 95 | 190 |
| General Office Building | 710 | 187,087 ft² | 223 | 36 | 259 | 42 | 222 | 264 |
| Warehousing | 150 | 182,685 ft² | 46 | 14 | 60 | 17 | 47 | 64 |
| Total | | | 301 | 64 | 365 | 154 | 364 | 518 |
| Difference | | | 90 | 9 | 99 | -11 | 84 | 73 |

1. PPH: Persons Per Hour – ITE Trip to Person Trip Factor of 1.28 has been applied, consistent with the 2017 TIA Guidelines

From the previous table, the proposed redevelopment is projected to generate an additional 99 person trips during the AM peak hour and 73 person trips during the PM peak hour.

The modal shares for the existing development and proposed redevelopment are anticipated to be consistent with the modal shares outlined in the *2011 TRANS O-D Survey Report*, specific to the Alta Vista region. The modal share values applied to the existing and proposed office space are based on all trips to/within the Alta Vista district in the AM peak hour and all trips from/within the Alta Vista district in the PM peak hour, with an increase to the auto driver share based on location of the subject site. The modal share values applied to the retail and warehousing spaces are based on all

observed trips to/within the Alta Vista district. A full breakdown of the projected net increase in person trips by modal share are shown in **Table 4**.

Table 4: Person Trips by Modal Share

| Travel Mode | Modal Share | AM Peak | | | PM Peak | | |
|--------------------------|-------------|---------|-----|-----|---------|-----|-----|
| | | IN | OUT | TOT | IN | OUT | TOT |
| Existing Development | | | | | | | |
| Retail Person Trips | | 41 | 19 | 60 | 125 | 125 | 250 |
| Auto Driver | 60% | 25 | 11 | 36 | 75 | 75 | 150 |
| Auto Passenger | 15% | 6 | 3 | 9 | 19 | 19 | 38 |
| Transit | 20% | 8 | 4 | 12 | 25 | 25 | 50 |
| Non-Auto | 5% | 2 | 1 | 3 | 6 | 6 | 12 |
| Office Person Trips | | 109 | 18 | 127 | 18 | 95 | 113 |
| Auto Driver | 65% | 71 | 11 | 82 | 11 | 62 | 73 |
| Auto Passenger | 15% | 16 | 3 | 19 | 3 | 14 | 17 |
| Transit | 15% | 16 | 3 | 19 | 3 | 14 | 17 |
| Non-Auto | 5% | 6 | 1 | 7 | 1 | 5 | 6 |
| Warehouse Person Trips | | 61 | 18 | 79 | 22 | 60 | 82 |
| Auto Driver | 60% | 36 | 11 | 47 | 14 | 36 | 50 |
| Auto Passenger | 15% | 9 | 3 | 12 | 3 | 9 | 12 |
| Transit | 20% | 13 | 3 | 16 | 4 | 12 | 16 |
| Non-Auto | 5% | 3 | 1 | 4 | 1 | 3 | 4 |
| Auto Driver (Total) | | 132 | 33 | 165 | 100 | 173 | 273 |
| Auto Passenger (Total) | | 31 | 9 | 40 | 25 | 42 | 67 |
| Transit (Total) | | 37 | 10 | 47 | 32 | 51 | 83 |
| Non-Auto (Total) | | 11 | 3 | 14 | 8 | 14 | 22 |
| Proposed Redevelopment | | | | | | | |
| Retail Person Trips | | 32 | 14 | 46 | 95 | 95 | 190 |
| Auto Driver | 60% | 19 | 8 | 27 | 56 | 56 | 112 |
| Auto Passenger | 15% | 5 | 2 | 7 | 15 | 15 | 30 |
| Transit | 20% | 6 | 3 | 9 | 20 | 20 | 40 |
| Non-Auto | 5% | 2 | 1 | 3 | 4 | 4 | 8 |
| Office Person Trips | | 223 | 36 | 259 | 42 | 222 | 264 |
| Auto Driver | 65% | 145 | 24 | 169 | 28 | 145 | 173 |
| Auto Passenger | 15% | 33 | 5 | 38 | 6 | 33 | 39 |
| Transit | 15% | 33 | 5 | 38 | 6 | 33 | 39 |
| Non-Auto | 5% | 12 | 2 | 14 | 2 | 11 | 13 |
| Warehouse Person Trips | | 46 | 14 | 60 | 17 | 47 | 64 |
| Auto Driver | 60% | 28 | 8 | 36 | 10 | 28 | 38 |
| Auto Passenger | 15% | 7 | 2 | 9 | 3 | 7 | 10 |
| Transit | 20% | 9 | 3 | 12 | 3 | 10 | 13 |
| Non-Auto | 5% | 2 | 1 | 3 | 1 | 2 | 3 |
| Auto Driver (Total) | | 192 | 40 | 232 | 94 | 229 | 323 |
| Auto Passenger (Total) | | 45 | 9 | 54 | 24 | 55 | 79 |
| Transit (Total) | | 48 | 11 | 59 | 29 | 63 | 92 |
| Non-Auto (Total) | | 16 | 4 | 20 | 7 | 17 | 24 |
| Auto Driver (Difference) | | 60 | 7 | 67 | -6 | 56 | 50 |
| Auto Pass. (Difference) | | 14 | 0 | 14 | -1 | 13 | 12 |
| Transit (Difference) | | 11 | 1 | 12 | -3 | 12 | 9 |
| Non-Auto (Difference) | | 5 | 1 | 6 | -1 | 3 | 2 |

From the previous table, the proposed redevelopment is anticipated to generate an additional 67 vehicle trips during the AM peak hour and 50 vehicle trips during the PM peak hour.

A percentage of the trips generated by the proposed redevelopment are anticipated to be internally captured (for example, office workers making a trip to the retail store). It is likely that the number of trips of this nature will only make up a small proportion of the overall site-generated trip volume, and as such, no deduction has been made to account for internally-captured trips. All trips generated by the subject site are assumed to have an origin or destination beyond the subject site. This simplifying assumption also allows for a more conservative analysis.

The retail land use is expected to generate two types of external peak hour trips: primary and pass-by trips. Primary trips are made for the specific purpose of visiting the site, while pass-by trips are made as intermediate stops on the way to another destination. Peak hour pass-by trips have been estimated based on a pass-by rate of 17%, which is the average rate identified in the *ITE Trip Generation Handbook, 3rd Edition* for the Free-Standing Discount Store land use. The pass-by trips generated by the retail store are part of the observed background traffic, and do not constitute new trips on the adjacent road network.

The primary and pass-by trip generation for the existing and proposed retail stores is summarized in **Table 5**.

Table 5: Primary and Pass-By Trips

| Trip Type | AM Peak | | | PM Peak | | |
|--------------------------------------|-----------|----------|-----------|-----------|-----------|------------|
| | IN | OUT | TOT | IN | OUT | TOT |
| <i>Existing Retail Vehicle Trips</i> | 25 | 11 | 36 | 75 | 75 | 150 |
| Pass-by (17%) | 3 | 3 | 6 | 13 | 13 | 26 |
| Primary (83%) | 22 | 8 | 30 | 62 | 62 | 124 |
| <i>Proposed Retail Vehicle Trips</i> | 19 | 8 | 27 | 56 | 56 | 112 |
| Pass-by (17%) | 2 | 2 | 4 | 10 | 10 | 20 |
| Primary (83%) | 17 | 6 | 23 | 46 | 46 | 92 |

5.1.2 Trip Distribution

The assumed distribution of trips generated by the subject site has been derived from existing traffic patterns within the study area. Each land use is anticipated to draw its respective trips from different areas. Considerations for each trip distribution is described below.

The distribution of trips generated by the retail land use anticipates a higher draw of customers in the areas proximally north and west of the subject site, and is based on the off-peak traffic counts within the study area.

The distribution of trips generated by the office and warehouse land uses is anticipated to follow the traffic patterns associated with the typical commute (arriving at work during the AM peak hour and departing from work during the PM peak hour).

The trip distribution for each land use is described as follows:

Retail Distribution

- 20% to/from the north via St. Laurent Boulevard
- 10% to/from the north via Russell Road
- 10% to/from the south via St. Laurent Boulevard
- 15% to/from the south via Russell Road
- 15% to/from the east via Walkley Road
- 30% to/from the west via Walkley Road

Office/Warehouse Distribution

- 10% to/from the north via St. Laurent Boulevard
- 10% to/from the north via Russell Road
- 15% to/from the south via Russell Road
- 45% to/from the east via Walkley Road
- 20% to/from the west via Walkley Road

5.1.3 Trip Assignment

The trip assignment in existing conditions and future conditions is assumed to be different, as a new signalized access is proposed at Melfort Street, and the existing access on Walkley Road will become a RIRO access by modifying the existing median.

In existing conditions, the easternmost access on Walkley Road restricts inbound left turns during the PM peak hour, requiring all inbound traffic from the east to enter via the access on Banton Street.

Trips generated by the existing development will be assigned to the accesses as follows:

Full-Movement Access at Banton Street

- 75% of trips arriving and departing to the north and south via St. Laurent Boulevard and the west via Walkley Road;
- 25% of AM peak trips arriving and departing to the north and south via Russell Road and the east via Walkley Road;
- 100% of PM peak trips arriving and 25% of PM peak trips departing to the north and south via Russell Road and the east via Walkley Road.

Full-Movement Access at Walkley Road (PM inbound left turns restricted)

- 25% of trips arriving and departing to the north and south via St. Laurent Boulevard and the west via Walkley Road;
- 75% of AM peak trips arriving and departing to the north and south via Russell Road and the east via Walkley Road;
- 75% of PM peak trips departing to the north and south via Russell Road and the east via Walkley Road.

In future conditions, the easternmost access on Walkley Road will become right-in/right-out only, and will exclusively access parking designated for retail customers. Employees will be directed to not park in this area, meaning no office or warehouse trips have been assigned to this access. The proposed signalized access at Walkley Road/Melfort Street will act as the main entrance and exit to the site, and the existing access on Banton Street will remain in place. Both of these driveways provide access to office and warehouse parking, as well as warehouse loading at the rear of the site. Therefore, office and warehouse trips have been assigned to both accesses.

Trips generated by the proposed redevelopment will be assigned to the accesses as follows:

Full-Movement Access at Banton Street

- 30% of office trips arriving and departing to the north and south via St. Laurent Boulevard and the west via Walkley Road;
- 100% of warehouse trips arriving and departing to the north and south via St. Laurent Boulevard and the west via Walkley Road.

Full-Movement Access at Walkley Road/Melfort Street

- 50% of retail trips arriving and 100% of retail trips departing to the north and south via St. Laurent Boulevard and the west via Walkley Road;
- 100% of retail trips arriving and 50% of retail trips departing to the north and south via Russell Road and the east via Walkley Road;
- 70% of office trips arriving and departing to the north and south via St. Laurent Boulevard and the west via Walkley Road;
- 100% of office trips arriving and departing to the north and south via Russell Road and the east via Walkley Road;
- 100% of warehouse trips arriving and departing to the north and south via Russell Road and the east via Walkley Road.

RIRO Access at Walkley Road

- 50% of retail trips arriving from the north and south via St. Laurent Boulevard and the west via Walkley Road;
- 50% of retail trips departing to the north and south via Russell Road and the east via Walkley Road.

Pass-by trips generated by the existing development have been distributed evenly to the accesses at Banton Street and Walkley Road. Pass-by trips generated by the proposed redevelopment have been assigned to the proposed signalized access at Walkley Road/Melfort Street.

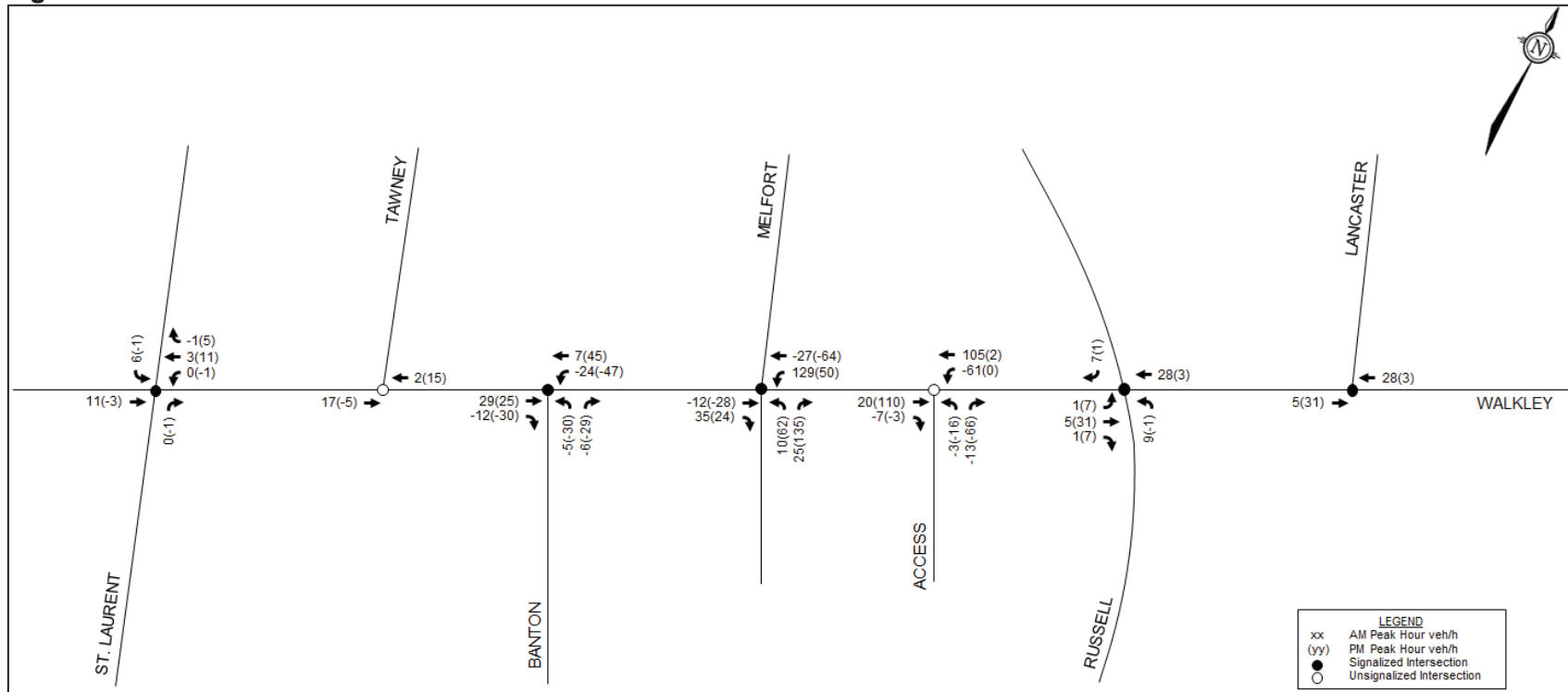
It is anticipated that most vehicular traffic generated by the neighbourhoods north of Walkley Road currently avoid accessing Walkley Road from Melfort Street, given the high traffic volumes on Walkley Road. The analysis conservatively assumes more left-turning vehicular traffic will enter and exit Melfort Street in future background and total traffic conditions, upon implementation of the proposed four-way traffic signal.

5.2 Background Traffic

5.2.1 General Background 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 suggest a growth rate of -0.5% to 1.5% per annum on arterial roadways within the study area. For the 'Inner Suburbs' area of Ottawa, Exhibit 2.10 of the 2013 TMP projects a population growth rate of approximately 0.3% per annum and an employment growth rate of approximately 1.1% per annum. To reflect the study area's development as an employment area, a 1% background growth rate has been applied to Walkley Road, St. Laurent Boulevard, and Russell Road. A 0% growth rate has been applied to all other roadways within the study area.

Figure 9: Net Site-Generated Traffic



APPENDIX G

Multi-Modal Level Of Service (MMLOS)

Segment Level of Service**Pedestrian Level of Service (PLOS)**

| Direction | Sidewalk Width | Boulevard Width | Motor Vehicle Traffic Volume (AADT) | Presence of On-Street Parking | Operating Speed | Segment PLOS |
|------------------------|----------------|-----------------|-------------------------------------|-------------------------------|-----------------|--------------|
| Russell Road | | | | | | |
| East | None | N/A | > 3,000 vpd | No | >60 km/h | F |
| West | None | N/A | > 3,000 vpd | No | >60 km/h | F |
| Hunt Club Road | | | | | | |
| North | None | N/A | > 3,000 vpd | No | >60 km/h | F |
| South | None | N/A | > 3,000 vpd | No | >60 km/h | F |
| Last Mile Drive | | | | | | |
| North/West | None | N/A | > 3,000 vpd | No | 50 km/h | F |
| South/East | None | N/A | > 3,000 vpd | No | 50 km/h | F |

Bicycle Level of Service (BLOS)

| Bike Route | Type of Bikeway | Travel Lanes | Centreline Markings | Operating Speed | Segment BLOS |
|---|-----------------|--------------|---------------------|-----------------|--------------|
| Russell Road | | | | | |
| None | Mixed Traffic | 2 | Yes | >60 km/h | F |
| Hunt Club Road WB¹ | | | | | |
| Spine | Mixed Traffic | 4 | Median | >70 km/h | F |
| Last Mile Drive | | | | | |
| None | Mixed Traffic | 2 | Yes | 50 km/h | D |
| Note: 1. Eastbound Bicyclists are restricted on Hunt Club in front of the site. | | | | | |

Truck Level of Service (TkLOS)

| Curb Lane Width | Travel Lanes | Segment TkLOS |
|------------------------|--------------------------|---------------|
| Russell Road | | |
| 3.5m | 2 travel lanes | C |
| Hunt Club Road | | |
| 3.5m | More than 2 travel lanes | A |
| Last Mile Drive | | |
| 3.5m | 2 travel lanes | C |

APPENDIX H

Signal and Left Turn Warrant

TRAFFIC SIGNAL JUSTIFICATION USING PROJECTED VOLUMES

LOCATION: Hunt Club Road at Last Mile Drive

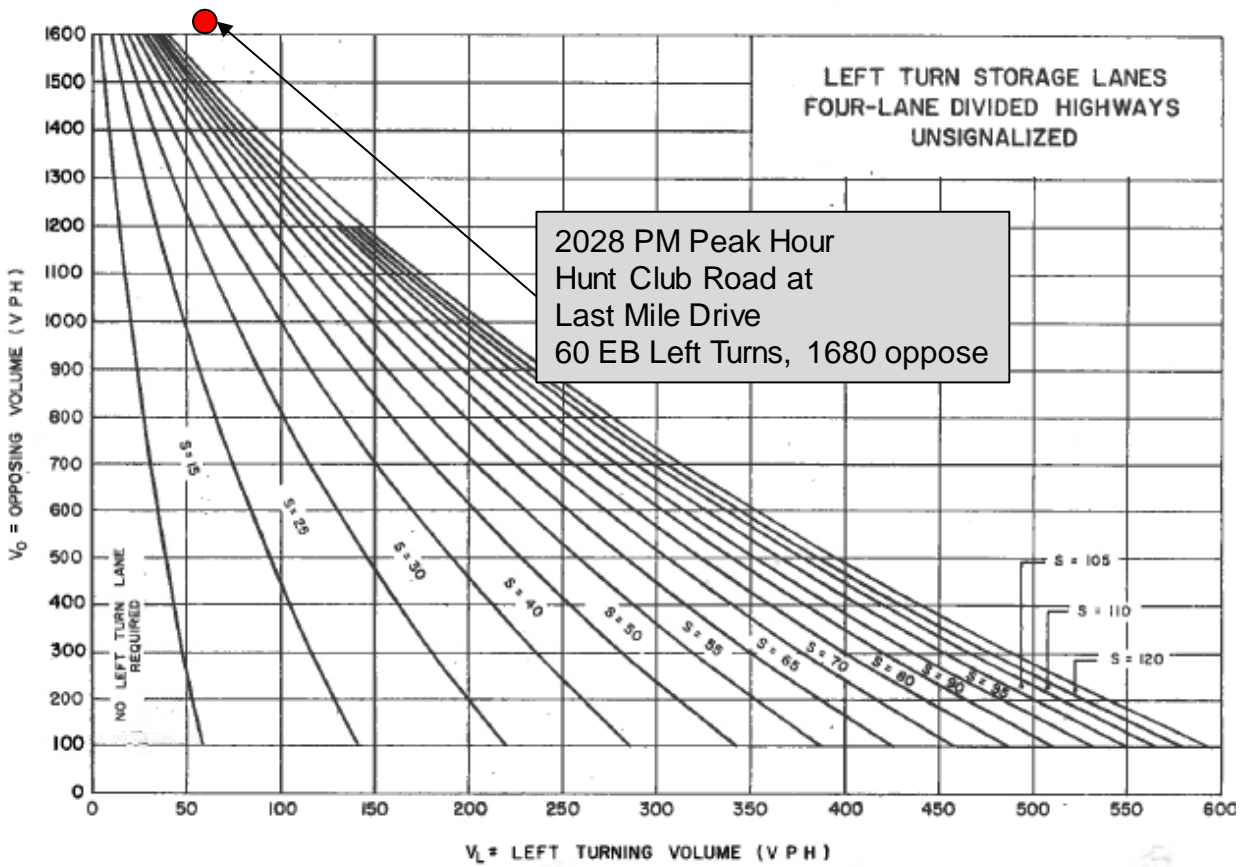
ANALYSIS SCENARIO: 2028 Total Traffic

JUSTIFICATION 7 – Projected Volumes

| Justification | Description | Minimum Requirement 1 Lane Highways | | Minimum Requirement 2 or more lanes | | Compliance | | Entire % ⁽²⁾ |
|----------------------------------|--|--|---------------------------------|--|---------------------------------|--------------------------|------|-------------------------|
| | | | | | | Sectional | | |
| | | Free Flow | Restr. Flow | Free Flow | Restr. Flow | Numerical ⁽³⁾ | % | |
| 1 MINIMUM VEHICULAR VOLUME | A. Vehicle Volume, all approaches (average hour) | 480 | 720 | 600 | 900 | 1566 | 261% | 42% |
| | B. Vehicle volume along minor street (average hour) | 120 (180 T- Intersection) | 170 (255 T- intersection) | 120 (180 T- Intersection) | 170 (255 T- intersection) | 75 | 42% | |
| 2 DELAY TO CROSS TRAFFIC | A. Vehicle Volume, major street (average hour) | 480 | 720 | 600 | 900 | 1491 | 249% | 92% |
| | B. ⁽¹⁾ Combined vehicle and pedestrian volume crossing artery from minor streets (average hour) | 50 | 75 | 50 | 75 | 46 | 92% | |

NOTES

- 1) For definition of crossing volume, refer to the Ontario Traffic Manual Book 12, Section 4.5 (March 2012).
- 2) The lowest sectional percentage governs the entire Justification. For new intersections, the justification must be met to 150% to warrant signalization.
- 3) Average hourly volumes estimated from peak hour volumes, $AHV = PM / 2$ or $AHV = (AM+PM)/4$.



APPENDIX I

Transportation Demand Management (TDM) Checklists

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: <i>Non-residential developments</i> | | 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 | |
| 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 (<i>see Official Plan policy 4.3.3</i>) | N/A |
| 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 (<i>see Official Plan policy 4.3.12</i>) | No public sidewalks |

| TDM-supportive design & infrastructure measures: <i>Non-residential developments</i> | | 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 (<i>see Official Plan policy 4.3.10</i>) | ✓ |
| 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 (<i>see Official Plan policy 4.3.10</i>) | ✓ |
| 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 (<i>see Official Plan policy 4.3.11</i>) | N/A |
| 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) | |

| TDM-supportive design & infrastructure measures: <i>Non-residential developments</i> | | 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 (<i>see Official Plan policy 4.3.6</i>) | ✓ |
| 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 (<i>see Zoning By-law Section 111</i>) | ✓ |
| 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 (<i>see Zoning By-law Section 111</i>) | ✓ |
| 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 | ✓ |
| 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 (<i>see Zoning By-law Section 111</i>) | N/A |
| 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) | |

| TDM-supportive design & infrastructure measures: <i>Non-residential developments</i> | | 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 (<i>see Zoning By-law Section 94</i>) | |
| 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 | |

| TDM-supportive design & infrastructure measures: <i>Non-residential developments</i> | | 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 | ✓ |
| 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 (<i>see Zoning By-law Section 104</i>) | |
| 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 (<i>see Zoning By-law Section 111</i>) | |
| 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 | |

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: <i>Non-residential developments</i> | | 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 | |
| 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 | ✓ |
| 2.2 Bicycle skills training | | |
| <i>Commuter travel</i> | | |
| BETTER | ★ 2.2.1 Offer on-site cycling courses for commuters, or subsidize off-site courses | |
| 2.3 Valet bike parking | | |
| <i>Visitor travel</i> | | |
| BETTER | 2.3.1 Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games) | |

| TDM measures: <i>Non-residential developments</i> | | Check if proposed & add descriptions |
|---|---|--------------------------------------|
| 3. TRANSIT | | |
| 3.1 Transit information | | |
| BASIC | 3.1.1 Display relevant transit schedules and route maps at entrances | ✓ |
| BASIC | 3.1.2 Provide online links to OC Transpo and STO information | |
| BETTER | 3.1.3 Provide real-time arrival information display at entrances | |
| 3.2 Transit fare incentives | | |
| <i>Commuter travel</i> | | |
| 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 | |
| <i>Visitor travel</i> | | |
| 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 | | |
| <i>Commuter travel</i> | | |
| BETTER | 3.3.1 Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends) | |
| <i>Visitor travel</i> | | |
| BETTER | 3.3.2 Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games) | |
| 3.4 Private transit service | | |
| <i>Commuter travel</i> | | |
| 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) | |
| <i>Visitor travel</i> | | |
| 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) | |

| TDM measures: <i>Non-residential developments</i> | | Check if proposed & add descriptions |
|---|---|--------------------------------------|
| 4. RIDESHARING | | |
| 4.1 Ridematching service | | |
| <i>Commuter travel</i> | | |
| BASIC | ★ 4.1.1 Provide a dedicated ridematching portal at OttawaRideMatch.com | |
| 4.2 Carpool parking price incentives | | |
| <i>Commuter travel</i> | | |
| BETTER | 4.2.1 Provide discounts on parking costs for registered carpools | |
| 4.3 Vanpool service | | |
| <i>Commuter travel</i> | | |
| 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 | |
| <i>Commuter travel</i> | | |
| BETTER | 5.1.2 Provide employees with bikeshare memberships for local business travel | |
| 5.2 Carshare vehicles & memberships | | |
| <i>Commuter travel</i> | | |
| 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 | | |
| <i>Commuter travel</i> | | |
| 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 | |
| <i>Visitor travel</i> | | |
| BETTER | 6.1.3 Charge for short-term parking (hourly) | |

| TDM measures: <i>Non-residential developments</i> | | Check if proposed & add descriptions |
|---|-------|---|
| 7. TDM MARKETING & COMMUNICATIONS | | |
| 7.1 Multimodal travel information | | |
| <i>Commuter travel</i> | | |
| BASIC ★ | 7.1.1 | Provide a multimodal travel option information package to new/relocating employees and students |
| <i>Visitor travel</i> | | |
| 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 | | |
| <i>Commuter travel</i> | | |
| BETTER ★ | 7.2.1 | Offer personalized trip planning to new/relocating employees |
| 7.3 Promotions | | |
| <i>Commuter travel</i> | | |
| 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 | | |
| <i>Commuter travel</i> | | |
| BETTER ★ | 8.1.1 | Provide emergency ride home service to non-driving commuters |
| 8.2 Alternative work arrangements | | |
| <i>Commuter travel</i> | | |
| BASIC ★ | 8.2.1 | Encourage flexible work hours |
| BETTER | 8.2.2 | Encourage compressed workweeks |
| BETTER ★ | 8.2.3 | Encourage telework |
| 8.3 Local business travel options | | |
| <i>Commuter travel</i> | | |
| 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 | | |
| <i>Commuter travel</i> | | |
| BETTER | 8.4.1 | Offer employees a taxable, mode-neutral commuting allowance |
| 8.5 On-site amenities | | |
| <i>Commuter travel</i> | | |
| BETTER | 8.5.1 | Provide on-site amenities/services to minimize mid-day or mid-commute errands |

APPENDIX J

Functional Design of Last Mile Drive

SEE DRAWING 119124-FD1
MATCHLINE 1+200

PROPOSED 1.8m
PAVED SHOULDER

LAST MILE DRIVE

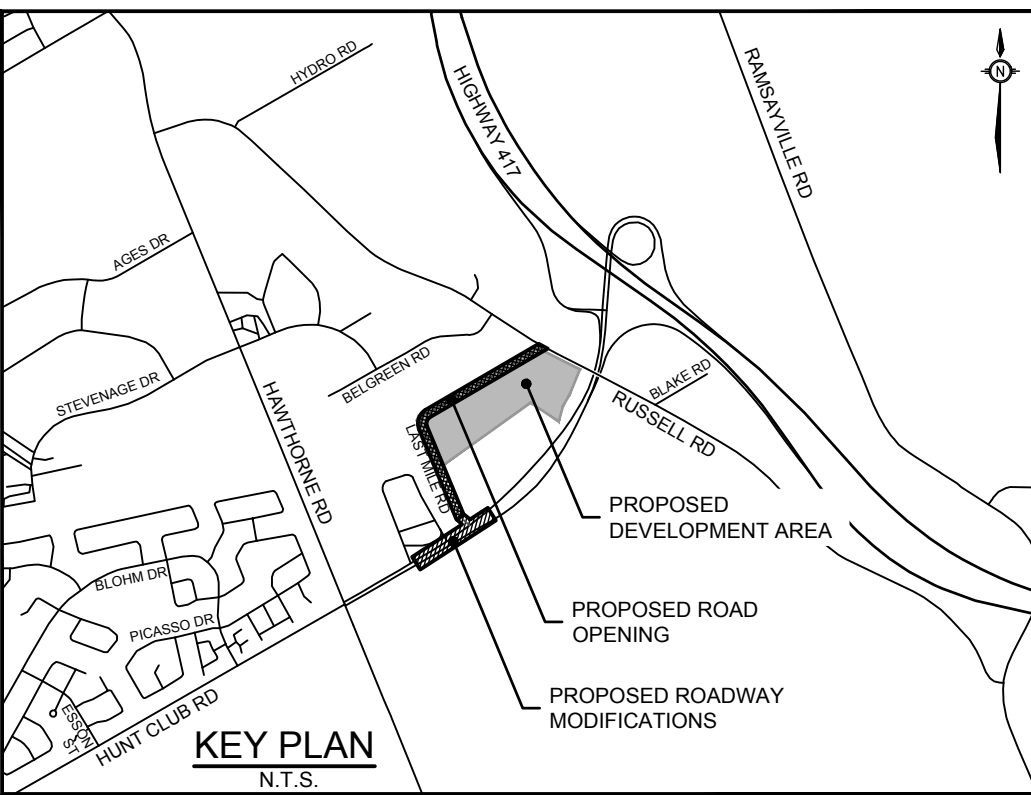
PAINTED GORE AREA TO ALLOW
FUTURE LCV TRUCK MOVEMENTS

PROPOSED ROADWAY

PAINTED GORE AREA TO ALLOW
FUTURE LCV TRUCK MOVEMENTS

PROPOSED
PAVED SHOULDER

MATCHLINE 1+500
SEE BELOW



LEGEND

- PROPOSED ASPHALT
- DC
- PROPOSED DEPRESSED CURB
- PROPOSED EDGE OF PAVED SOULDER
- PROPOSED TACTILE WALKING SURFACE INDICATOR (TWISI)
- EXISTING BELL MANHOLE
- EXISTING UTILITY POLE
- EXISTING SANITARY MANHOLE
- EXISTING STORM MANHOLE
- EXISTING CATCHBASIN
- EXISTING STREETLIGHT
- PROPOSED CATCHBASIN
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED VALVE BOX
- PROPOSED DRAINAGE HEADWALL

SEE ABOVE
MATCHLINE 1+500

Wa-1L
SHARP TURN AHEAD

PROPOSED 1.8m
PAVED SHOULDER

LAST MILE DRIVE

PROPOSED ASPHALT ROADWAY

UTILITY POLES TO BE
RELOCATED

UTILITY POLE TO BE
RELOCATED

UTILITY POLE TO BE
RELOCATED

UTILITY POLE TO BE
RELOCATED

MATCHLINE 1+825
SEE DRAWING 119124-FD3

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS,
WATERMAINS, SEWERS AND OTHER
UNDERGROUND AND OVERGROUND UTILITIES AND
STRUCTURES IS NOT NECESSARILY SHOWN ON
THE CONTRACT DRAWINGS, AND WHERE SHOWN,
THE ACCURACY OF THE POSITION OF SUCH
UTILITIES AND STRUCTURES IS NOT GUARANTEED.
BEFORE STARTING WORK, DETERMINE THE EXACT
LOCATION OF ALL SUCH UTILITIES AND
STRUCTURES AND ASSUME ALL LIABILITY FOR
DAMAGE TO THEM.

| | | | | |
|-----|------------------------|-----------|------|--|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| 1. | ISSUED FOR CITY REVIEW | DEC 08/20 | JILL | |
| No. | REVISION | DATE | BY | |

SCALE

1:500

1:500
0 5 10 15 20

| | |
|----------|------|
| DESIGN | RCH |
| CHECKED | PH |
| DRAWN | RCH |
| CHECKED | PH |
| APPROVED | JILL |

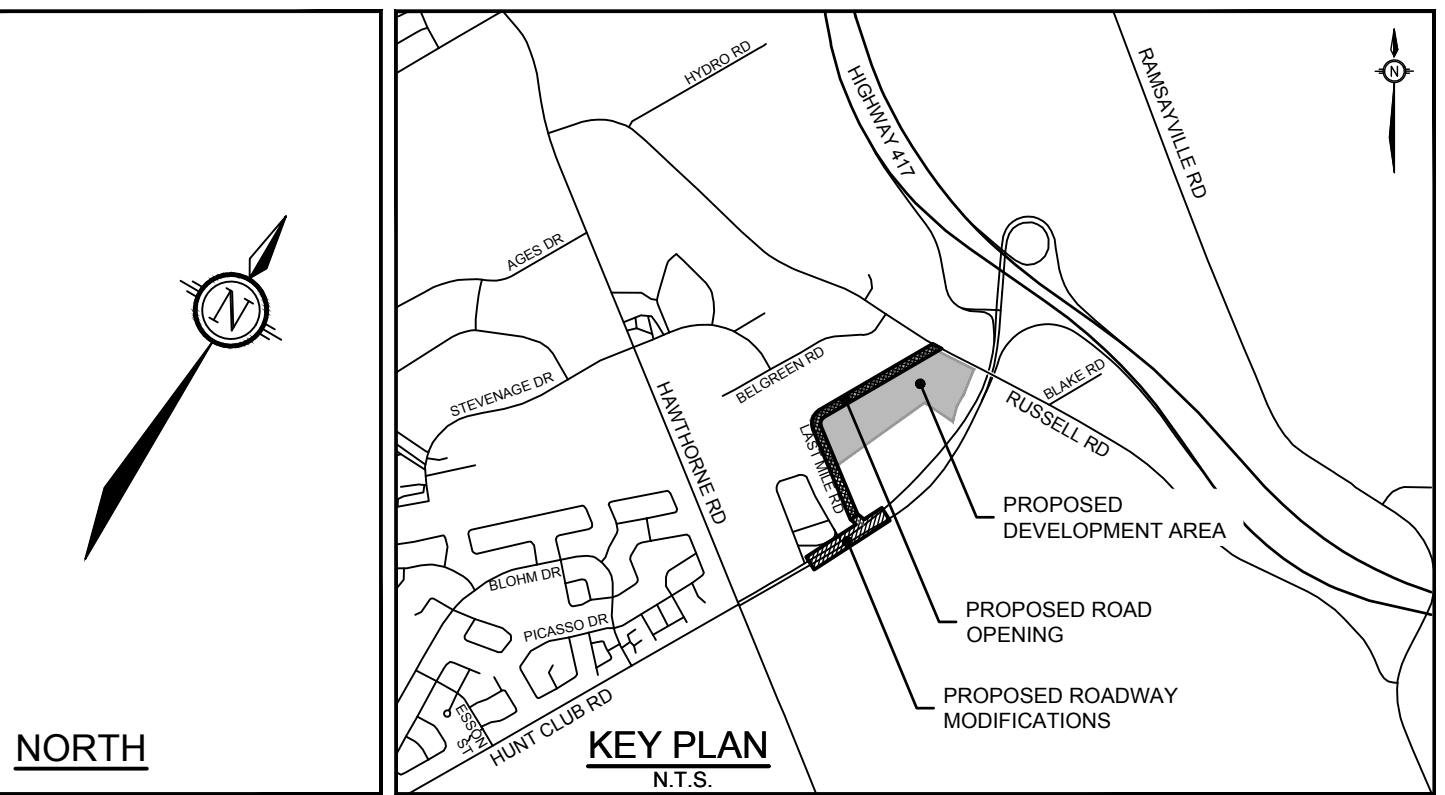
FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY of OTTAWA
NATIONAL CAPITAL BUSINESS PARK

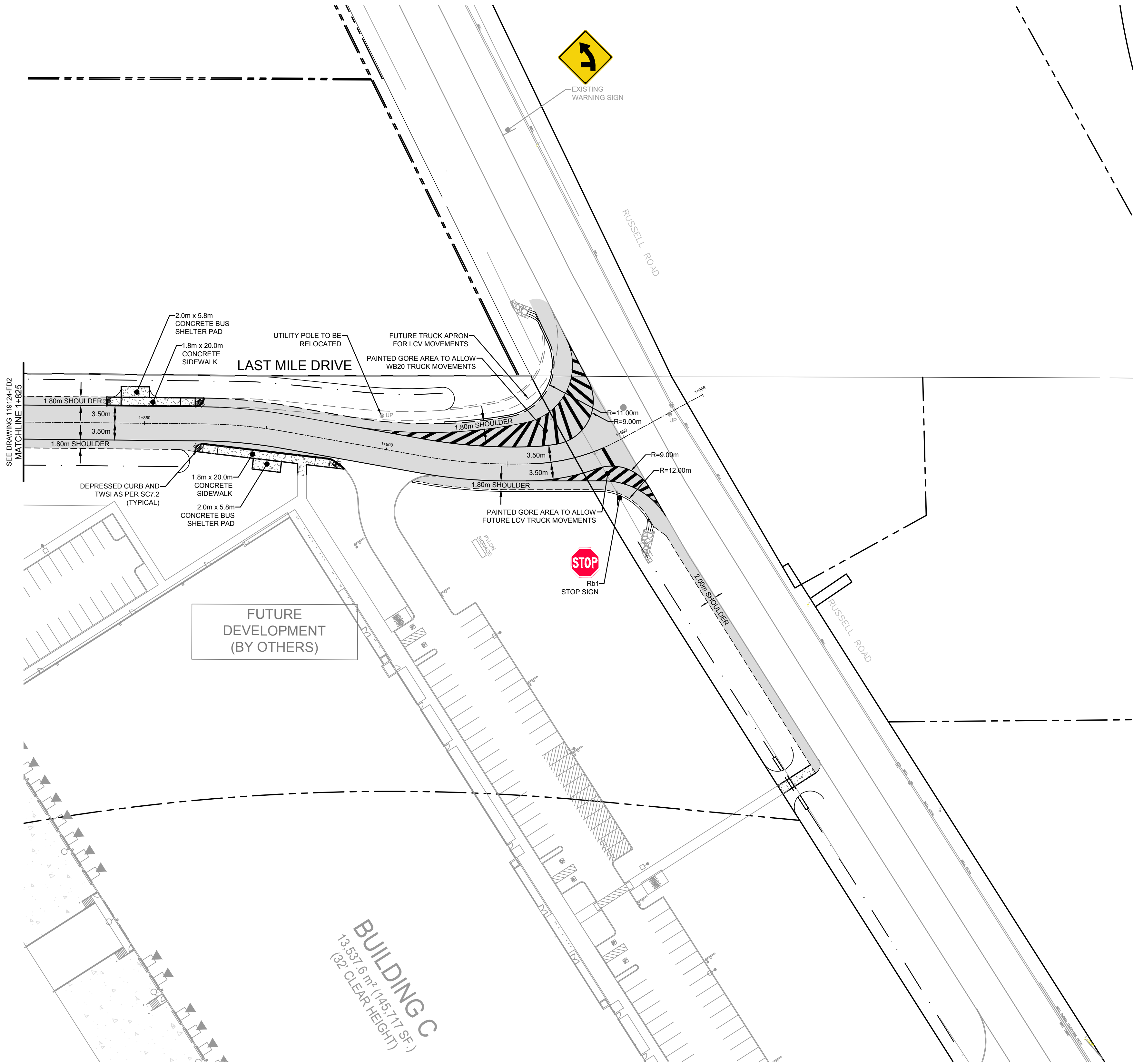
DRAWING NAME
LAST MILE DRIVE
FUNCTIONAL DESIGN

| | |
|-------------|------------|
| PROJECT No. | 119124-00 |
| REV | REV # 1 |
| DRAWING No. | 119124-FD2 |



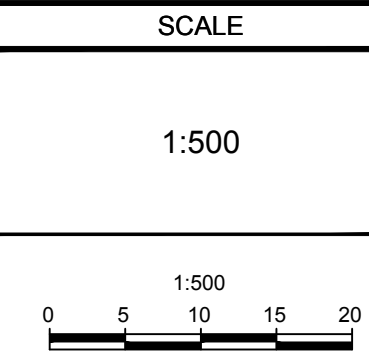
LEGEND

- PROPOSED ASPHALT
- PROPOSED DEPRESSED CURB
- PROPOSED EDGE OF PAVED SHOULDER
- PROPOSED TACTILE WALKING SURFACE INDICATOR (TWISI)
- EXISTING BELL MANHOLE
- EXISTING UTILITY POLE
- EXISTING SANITARY MANHOLE
- EXISTING STORM MANHOLE
- EXISTING CATCHBASIN
- EXISTING STREETLIGHT
- PROPOSED CATCHBASIN
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- PROPOSED VALVE BOX
- PROPOSED DRAINAGE HEADWALL



NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS,
WATERMAINS, SEWERS AND OTHER
UNDERGROUND AND OVERGROUND UTILITIES AND
STRUCTURES IS NOT NECESSARILY SHOWN ON
THE CONTRACT DRAWINGS, AND WHERE SHOWN,
THE ACCURACY OF THE POSITION OF SUCH
UTILITIES AND STRUCTURES IS NOT GUARANTEED.
BEFORE STARTING WORK, DETERMINE THE EXACT
LOCATION OF ALL SUCH UTILITIES AND
STRUCTURES AND ASSUME ALL LIABILITY FOR
DAMAGE TO THEM.

| | | | |
|-----|------------------------|-----------|-----|
| No. | REVISION | DATE | BY |
| 1. | ISSUED FOR CITY REVIEW | DEC 08/20 | JLL |



| | |
|----------|-----|
| DESIGN | RCH |
| CHECKED | PH |
| DRAWN | RCH |
| CHECKED | PH |
| APPROVED | JLL |

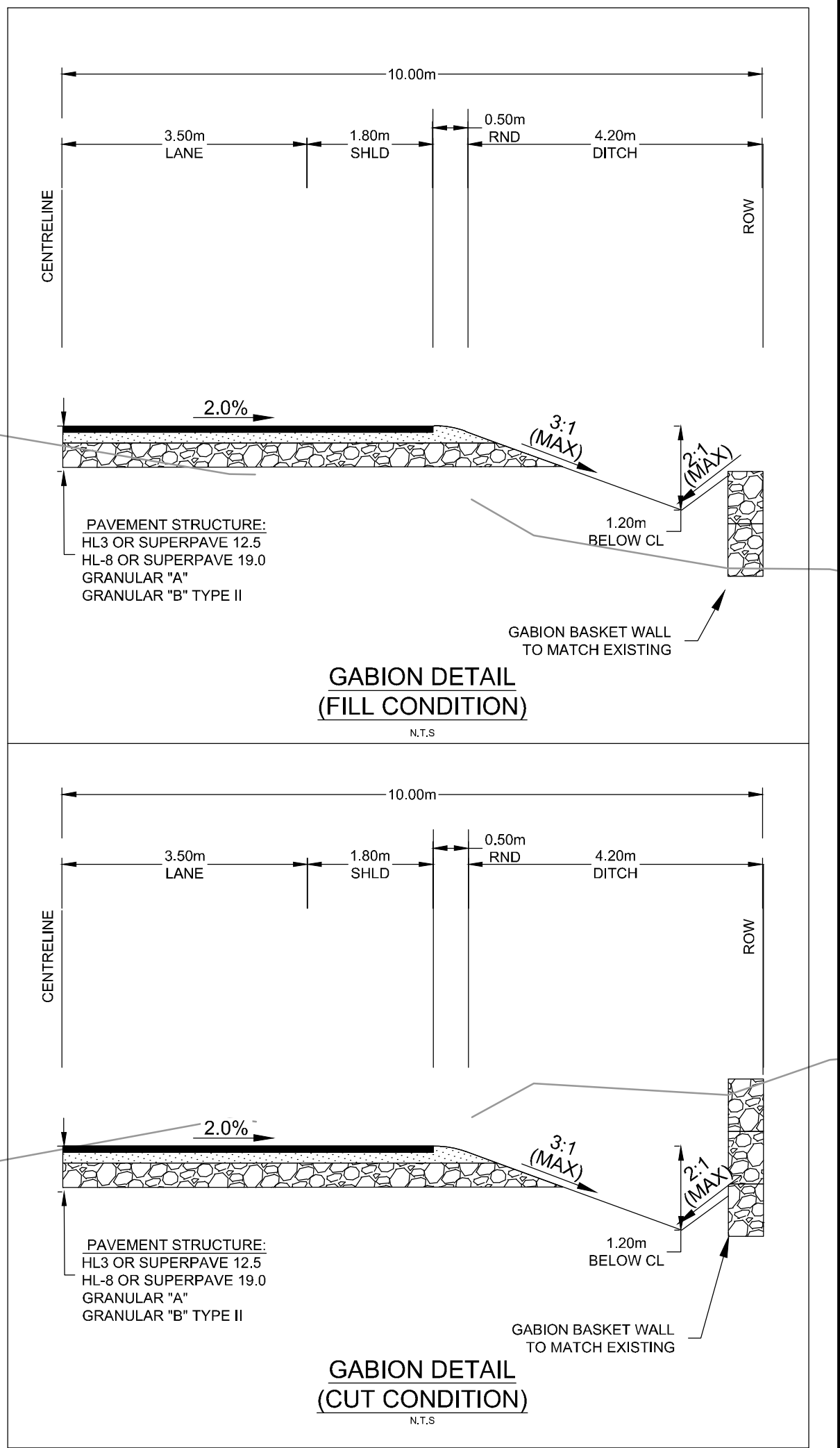
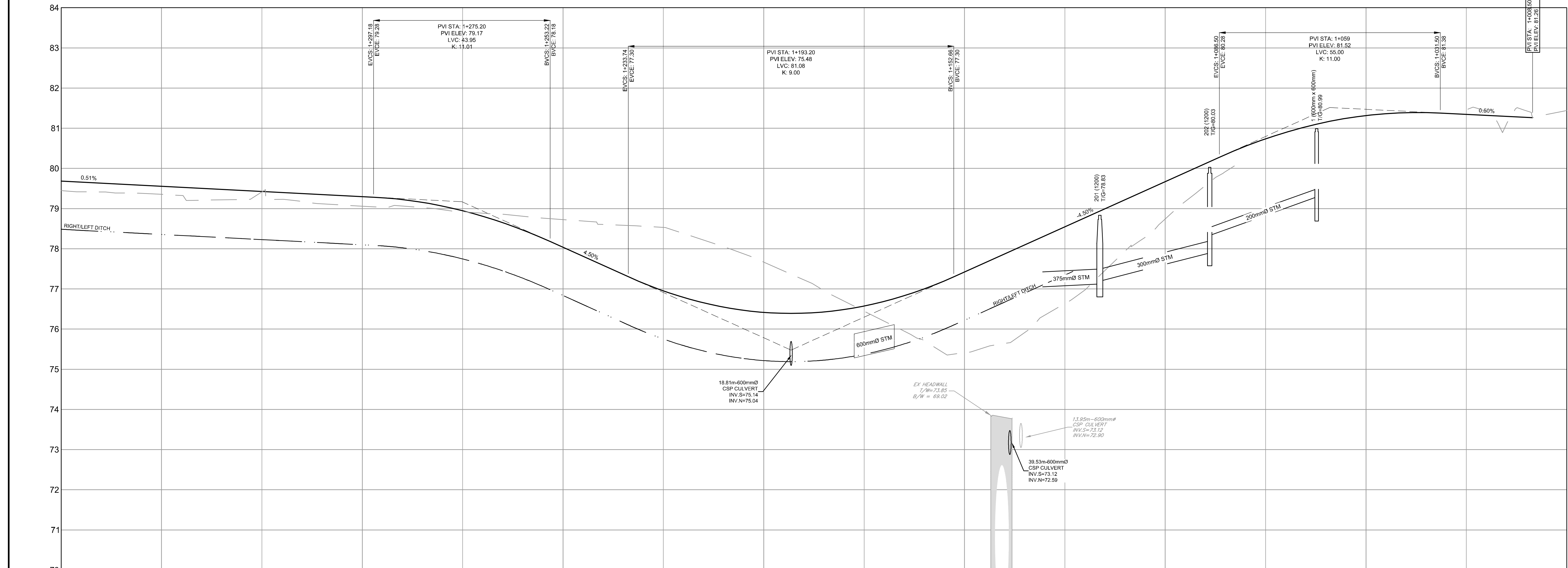
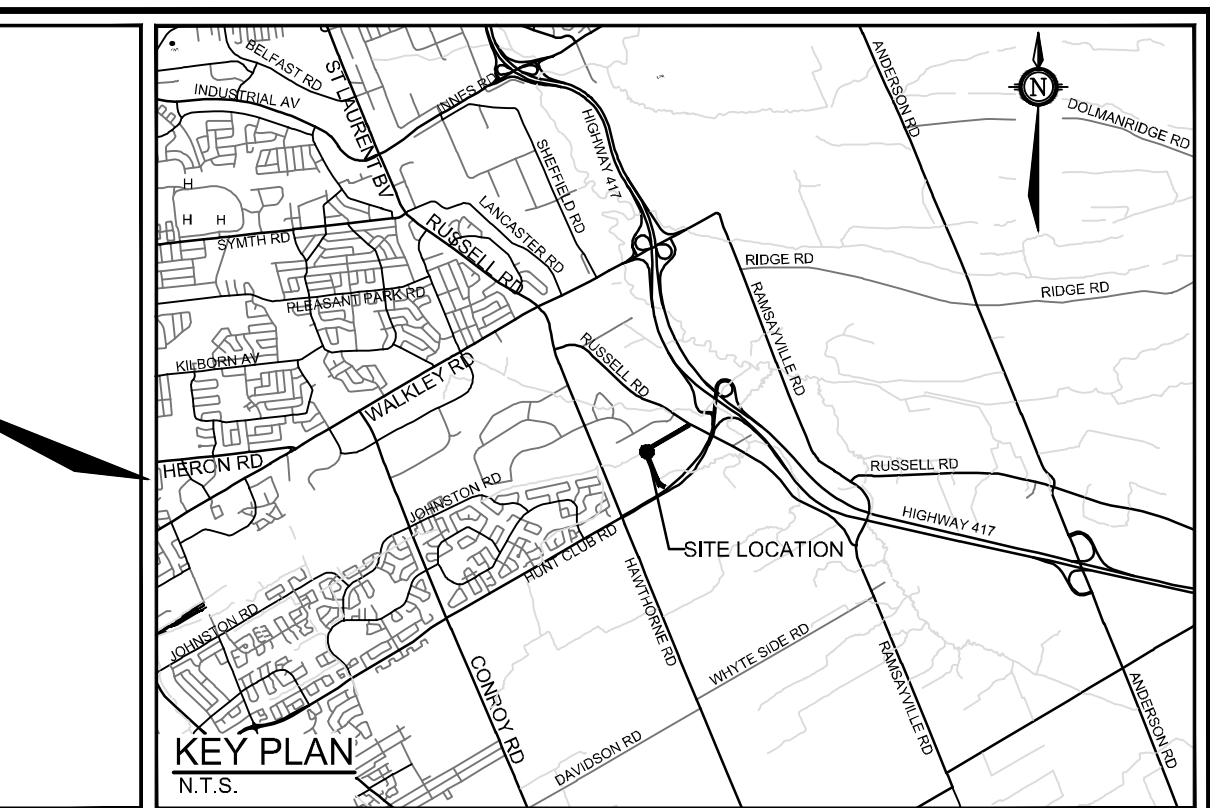
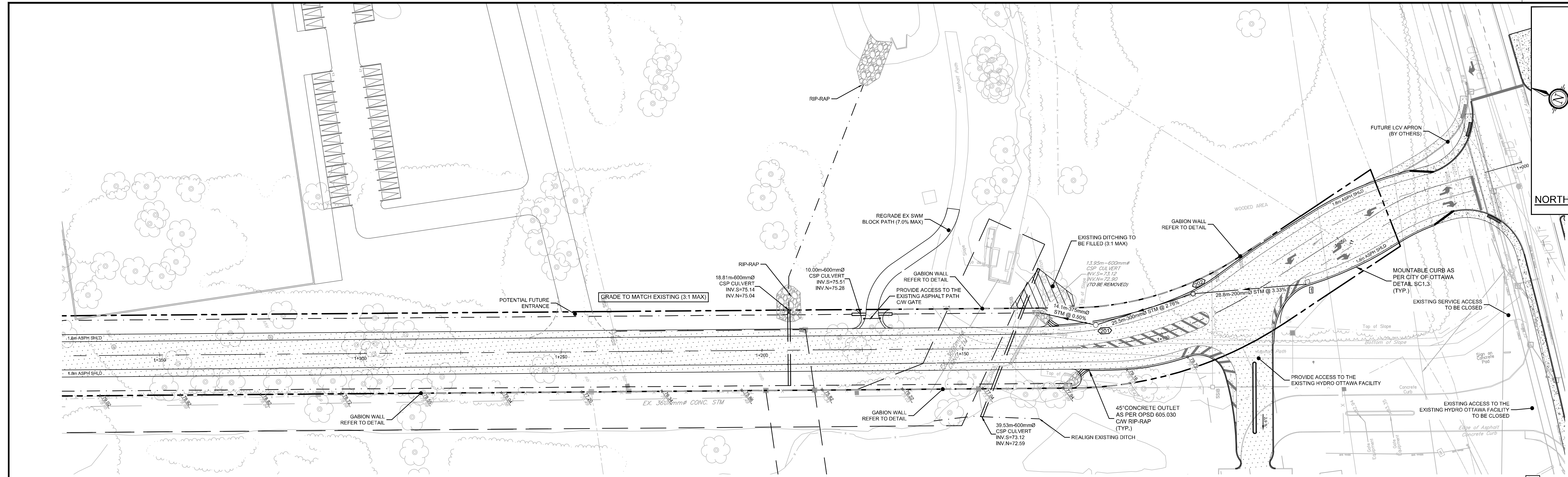
FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY of OTTAWA
NATIONAL CAPITAL BUSINESS PARK

DRAWING NAME
LAST MILE DRIVE
FUNCTIONAL DESIGN

| | |
|-------------|------------|
| PROJECT No. | 119124-00 |
| REV | REV # 1 |
| DRAWING No. | 119124-FD3 |



| PROPOSED ELEVATION | 79.64 | 79.35 | 79.42 | 79.09 | 79.52 | 79.73 | 79.63 | 77.67 | 79.45 | 75.47 | 76.67 | 79.74 | 81.17 | 81.32 | 81.38 | 81.35 | 81.26 |
|------------------------|-------|-------|-------|-------|-------|-------|-------|--------------------------------|--------------------------------|--------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|-------|-------|-------|-------|
| TOP OF WM ELEVATION | | | | | | | | | | | | | | | | | |
| STORM SEWER INVERTS | | | | | | | | 18.81m - 600mm CSP STM @ 0.53% | 10.00m - 600mm CSP STM @ 2.30% | 39.53m - 600mm CSP STM @ 1.34% | 14.11m - 375mm PVC DR 35 STM @ 0.50% | 25.46m - 300mm PVC DR 35 STM @ 2.76% | 78.81m - 200mm PVC DR 35 STM @ 3.33% | | | | |
| SANITARY SEWER INVERTS | | | | | | | | | | | | | | | | | |
| EXISTING ELEVATION | 79.46 | 79.35 | 79.42 | 79.09 | 79.52 | 79.73 | 79.63 | 77.67 | 79.45 | 75.47 | 76.67 | 79.74 | 81.17 | 81.32 | 81.38 | 81.35 | 81.26 |
| CHAINAGE | 1+375 | 1+350 | 1+325 | 1+300 | 1+275 | 1+250 | 1+225 | 1+200 | 1+175 | 1+150 | 1+125 | 1+100 | 1+075 | 1+050 | 1+025 | | 1+000 |

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NOT FOR CONSTRUCTION

| | |
|----------|-----|
| DESIGN | ARM |
| CHECKED | JLS |
| DRAWN | ARM |
| CHECKED | JLS |
| APPROVED | JLS |

SCALE

HORIZONTAL

VERTICAL

FOR REVIEW ONLY

LOCATION
CITY OF OTTAWA
LAST MILE DRIVE

DRAWING NAME
PLAN AND PROFILE
1+000.00 - 1+375.00

NOVATECH

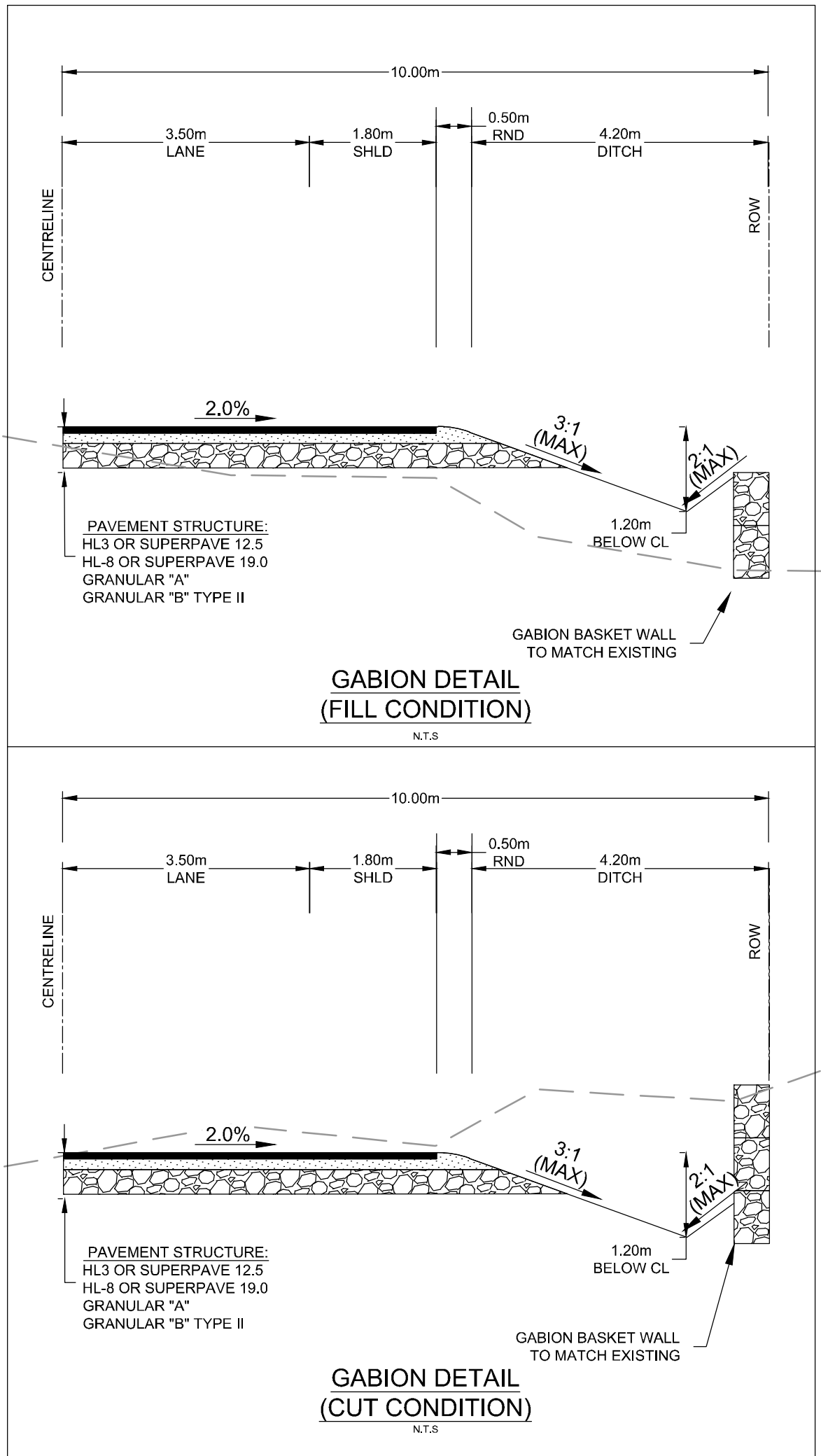
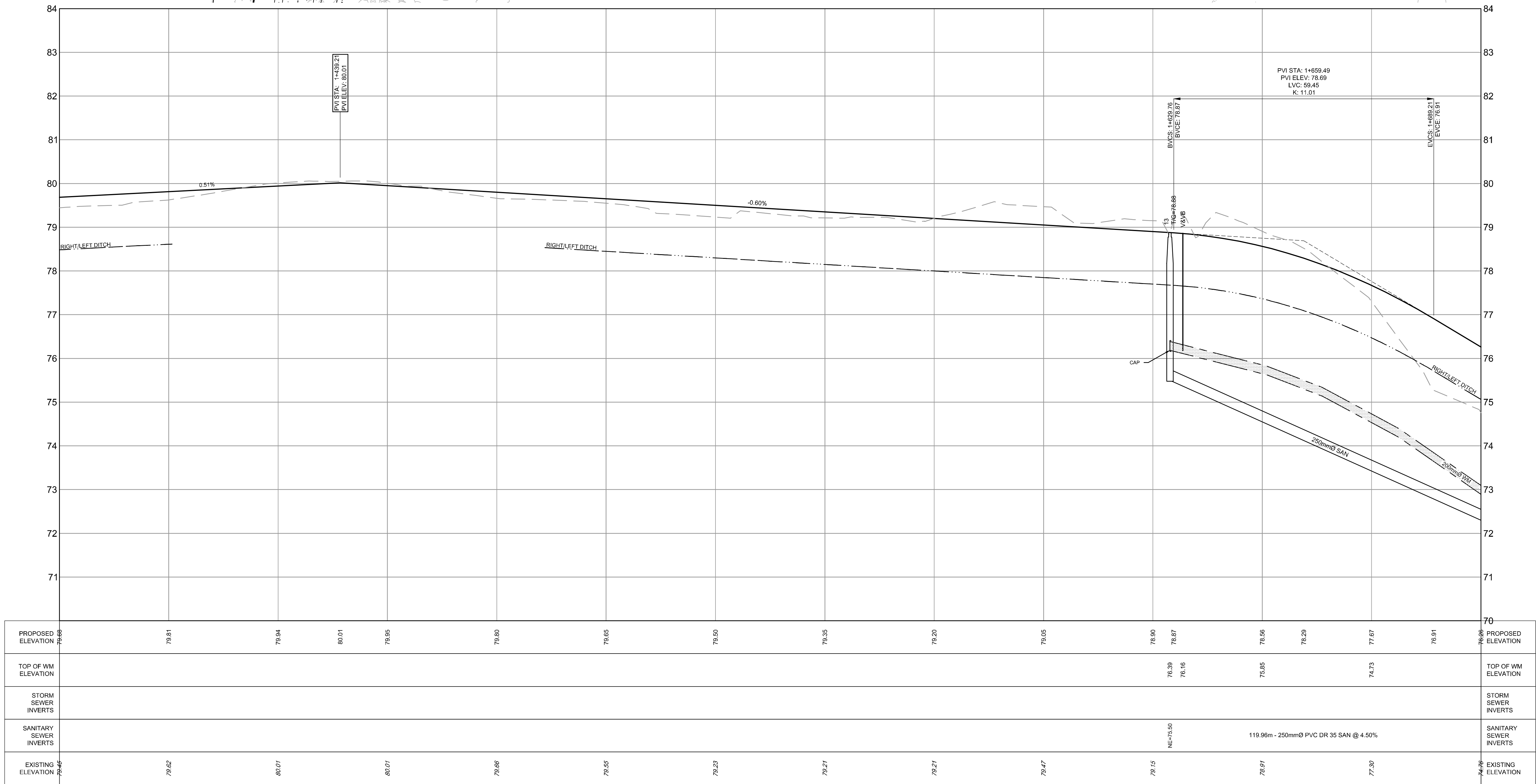
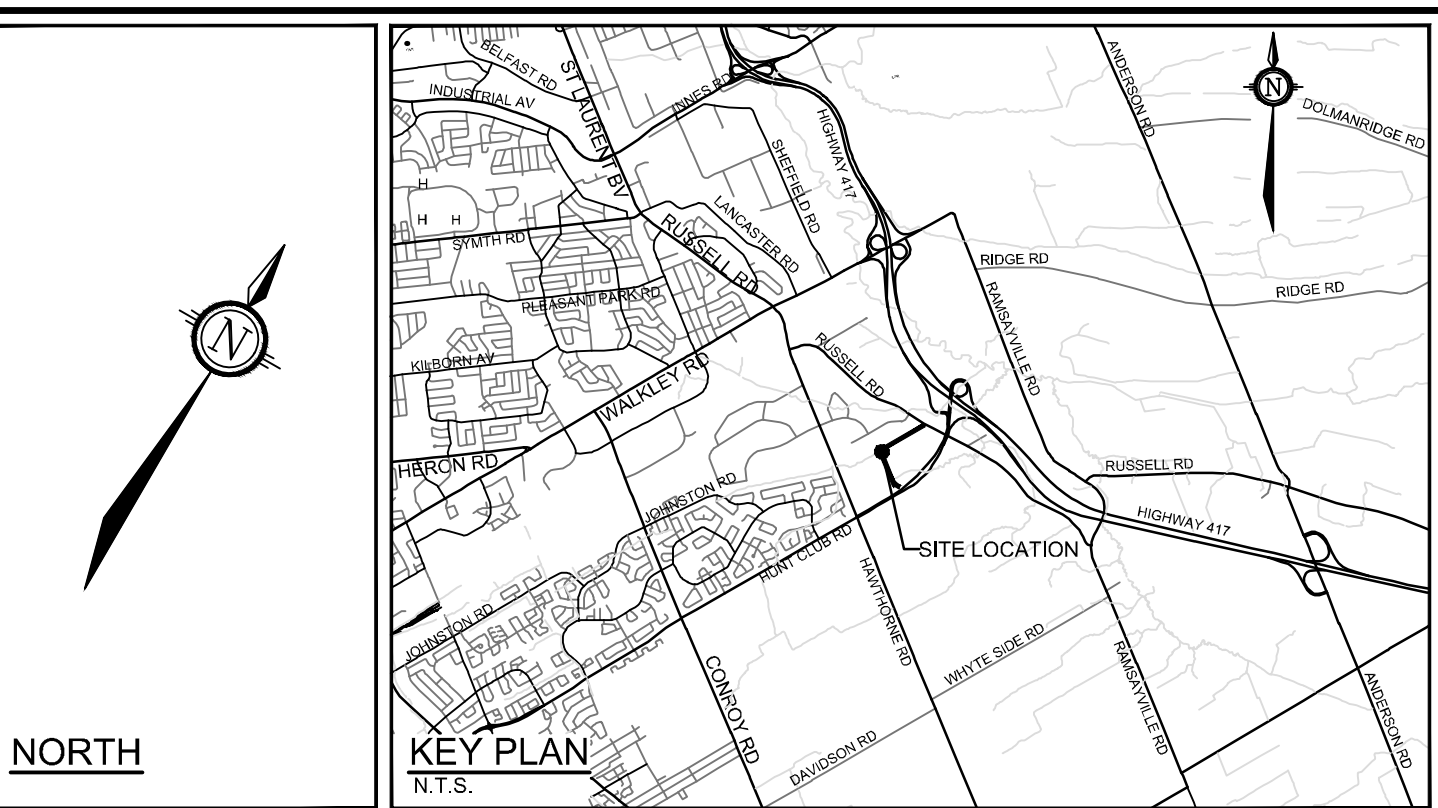
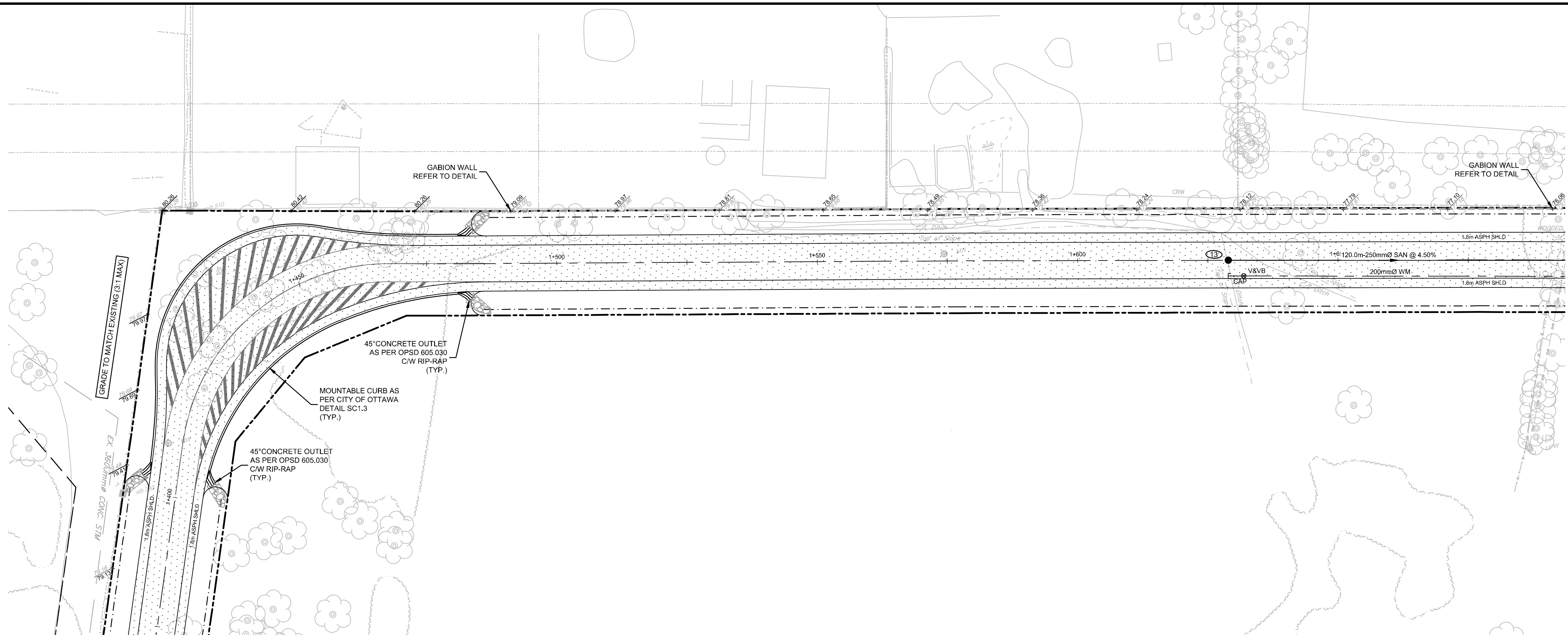
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

PROJECT NO. 119124

REV #2

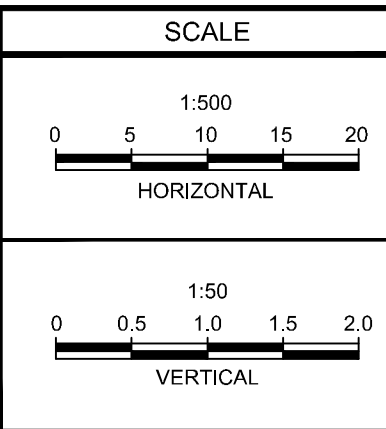
DRAWING NO. 119124 - PP1



NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS,
WATERMANS, SEWERS AND OTHER
UNDERGROUND AND OVERGROUND UTILITIES AND
STRUCTURES IS NOT NECESSARILY SHOWN ON
THE CONTRACT DRAWINGS, AND WHERE SHOWN,
THE ACCURACY OF THE POSITION OF SUCH
UTILITIES AND STRUCTURES IS NOT GUARANTEED.
BEFORE STARTING WORK, DETERMINE THE EXACT
LOCATION OF ALL SUCH UTILITIES AND
STRUCTURES AND ASSUME ALL LIABILITY FOR
DAMAGE TO THEM.

NOT FOR
CONSTRUCTION

| No. | REVISION | DATE | BY |
|-----|--------------------------|-----------|-----|
| 2 | REVISED PER RMA COMMENTS | DEC 04/20 | ARM |
| 1 | ISSUED FOR CLIENT REVIEW | AUG 21/20 | ARM |



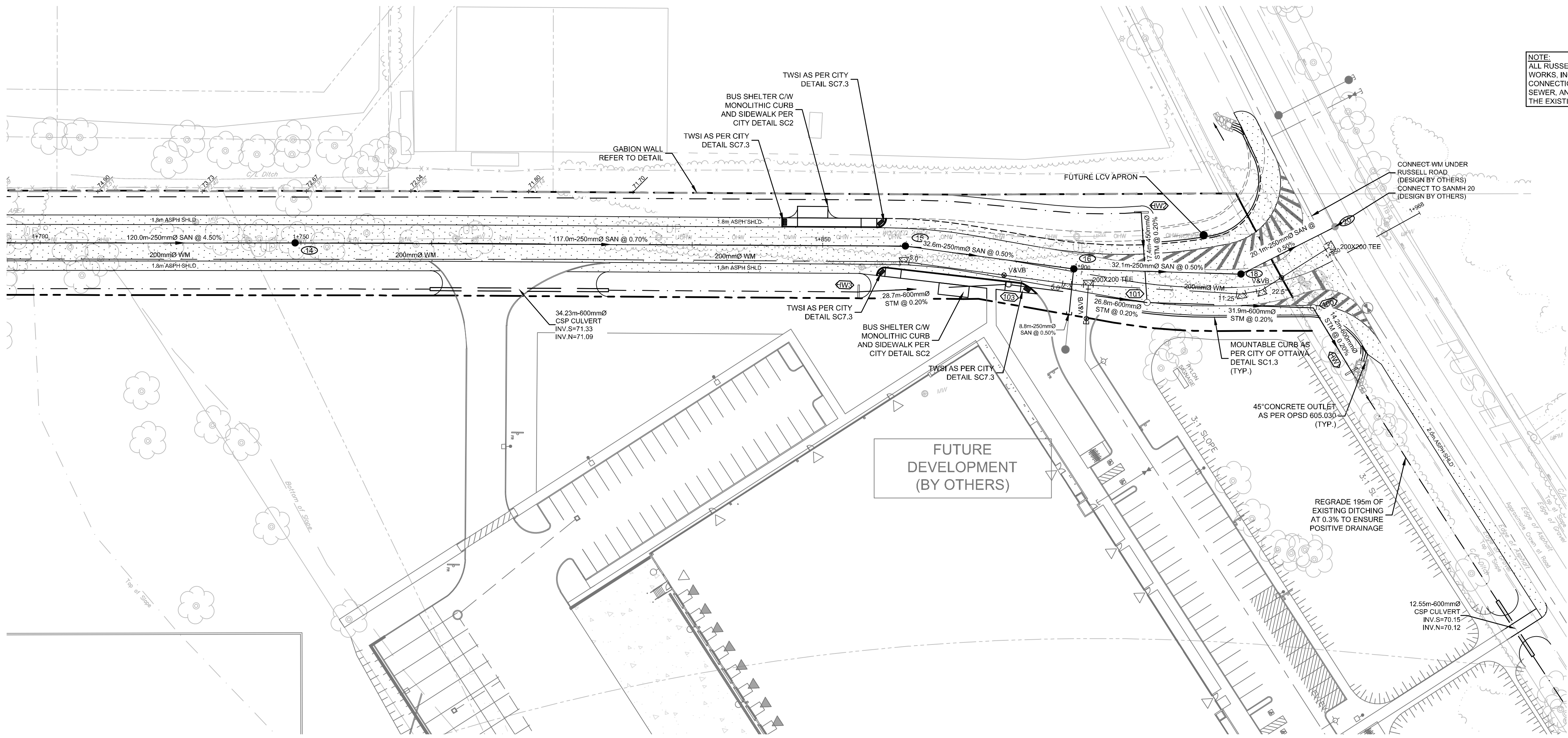
| | |
|----------|-----|
| DESIGN | ARM |
| CHECKED | JLS |
| DRAWN | ARM |
| CHECKED | JLS |
| APPROVED | JLS |

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
LAST MILE DRIVE
DRAWING NAME
PLAN AND PROFILE
1+375.00 - 1+700.00

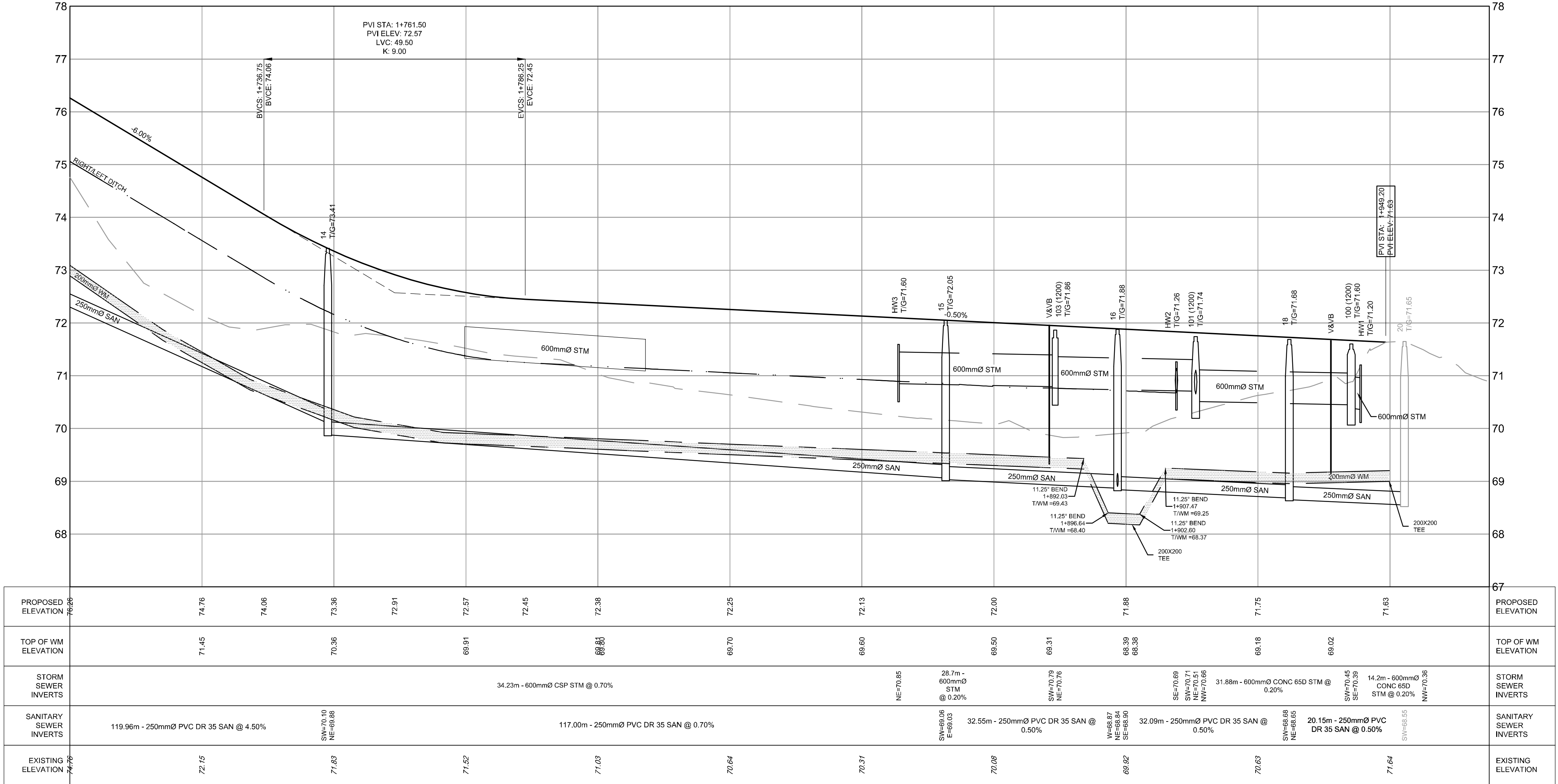
| | |
|-------------|------------|
| PROJECT No. | 119124 |
| REV | REV #2 |
| DRAWING No. | 119124-PP2 |



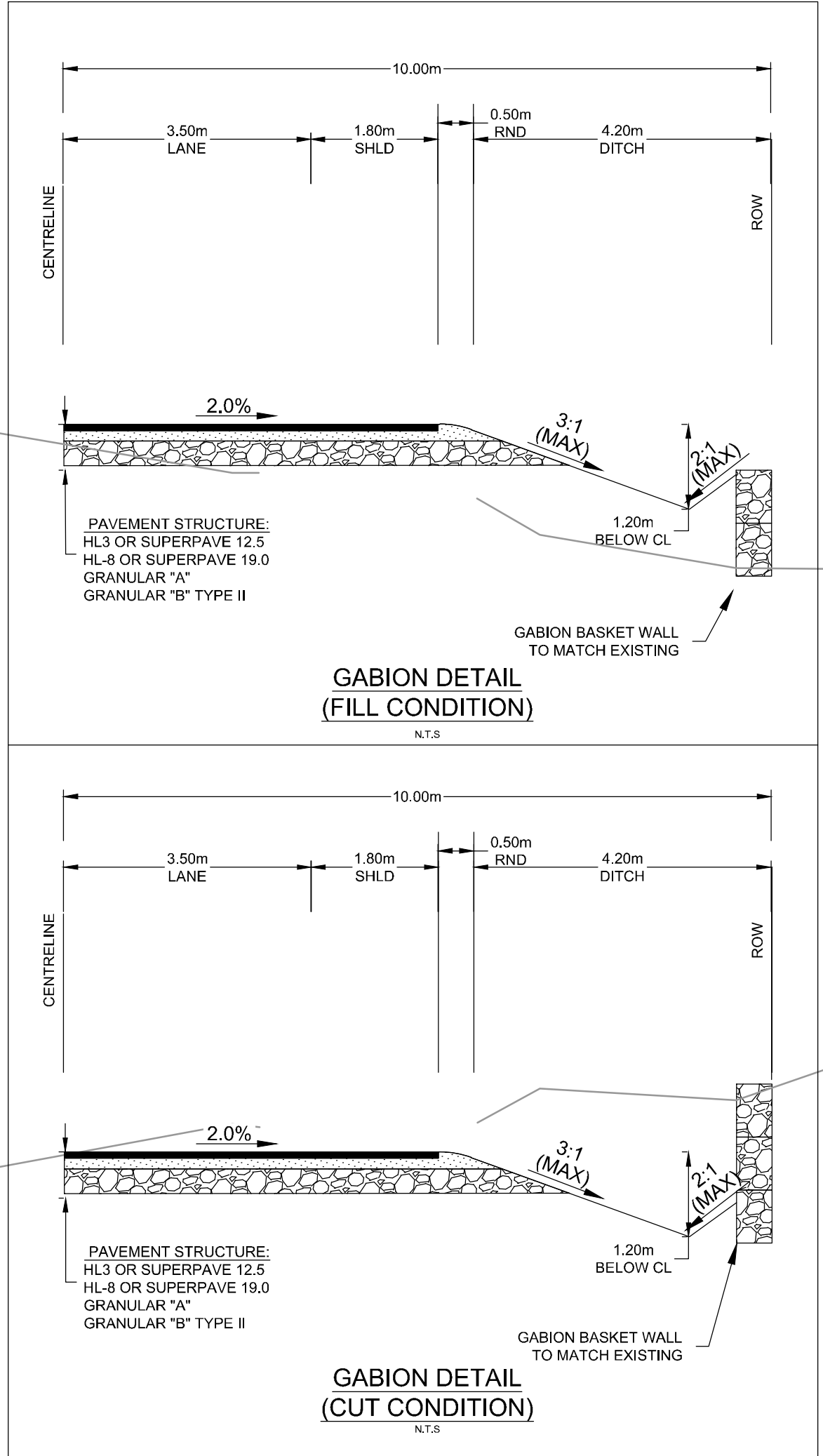
NOTE:
ALL RUSSELL ROAD INFRASTRUCTURE
WORKS, INCLUDING THE SANITARY
CONNECTION TO THE EXISTING TRUNK
SEWER, AND WATERMAIN CONNECTION TO
THE EXISTING MAIN ARE BY OTHERS.

NORTH

KEY PLAN
N.T.S.



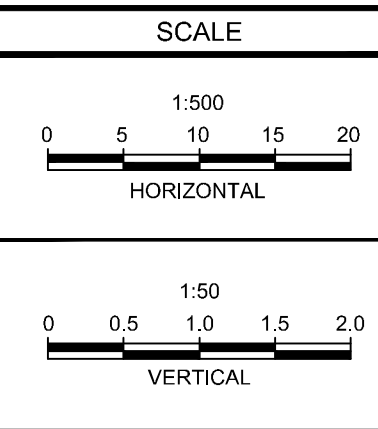
| PROPOSED ELEVATION | 74.76 | 74.66 | 73.36 | 72.91 | 72.57 | 72.45 | 72.36 | 72.25 | 72.13 | 72.00 | 71.88 | 71.75 | 71.63 | 67 |
|------------------------------|--|----------------------|----------------------|-------|-------|-------|--|-------|----------------------|-------|----------------------|-------|-------|------------------------------|
| TOP OF WM ELEVATION | 71.45 | | 70.36 | | 69.91 | | 69.80 | 69.70 | 69.60 | 69.50 | 69.39 | 69.16 | 69.02 | TOP OF WM ELEVATION |
| STORM SEWER INVERTS | | | | | | | | | | | | | | STORM SEWER INVERTS |
| SANITARY SEWER INVERTS | 119.96m - 250mmØ PVC DR 35 SAN @ 4.50% | SW=70.10 NE=68.66 | | | | | 117.00m - 250mmØ PVC DR 35 SAN @ 0.70% | | | | | | | SANITARY SEWER INVERTS |
| EXISTING ELEVATION | 72.15 | 71.63 | 71.63 | 71.57 | | 71.63 | 70.64 | 70.37 | 70.09 | 69.92 | 70.63 | | 71.64 | EXISTING ELEVATION |
| CHAINAGE | 1+725 | 1+725 | 1+740.00 1+740.00 | 1+775 | | 1+800 | 1+825 | 1+850 | 1+850.57 1+850.57 | 1+875 | 1+895.41 1+895.41 | 1+900 | 1+925 | 1+950.00 1+950.00 |



NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS,
WATERMAINS, SEWERS AND OTHER
UNDERGROUND AND OVERGROUND UTILITIES AND
STRUCTURES IS NOT NECESSARILY SHOWN ON
THE CONTRACT DRAWINGS, AND WHERE SHOWN,
THE ACCURACY OF THE POSITION OF SUCH
UTILITIES AND STRUCTURES IS NOT GUARANTEED.
BEFORE STARTING WORK, DETERMINE THE EXACT
LOCATION OF ALL SUCH UTILITIES AND
STRUCTURES AND ASSUME ALL LIABILITY FOR
DAMAGE TO THEM.

NOT FOR
CONSTRUCTION

| No. | REVISION | DATE | BY |
|-----|--------------------------|-----------|-----|
| 2 | REVISED PER RMA COMMENTS | DEC 04/20 | ARM |
| 1 | ISSUED FOR CLIENT REVIEW | AUG 21/20 | ARM |



| DESIGN | ARM |
|----------|-----|
| CHECKED | JLS |
| DRAWN | ARM |
| CHECKED | JLS |
| APPROVED | JLS |

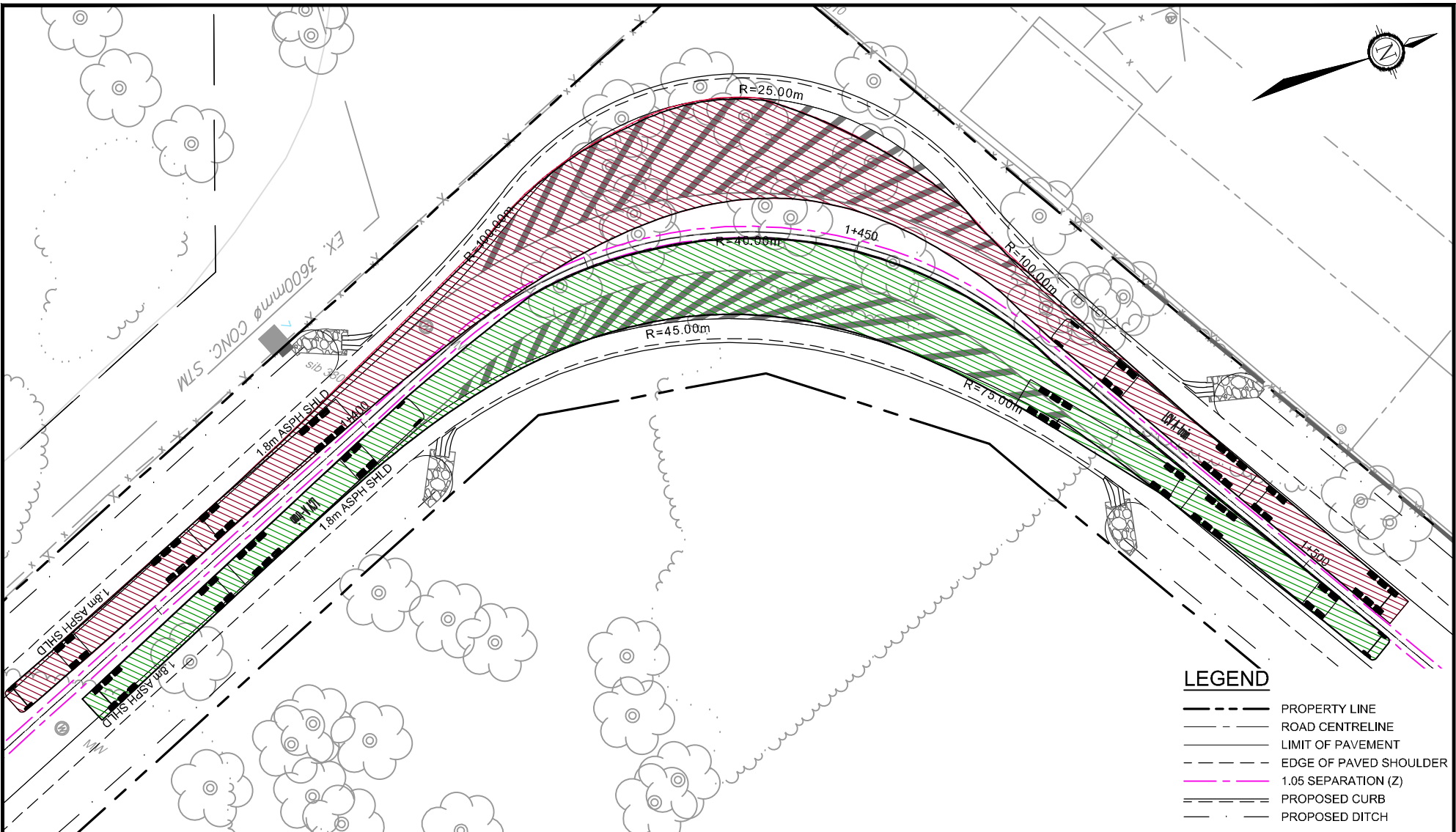
FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
LAST MILE DRIVE
DRAWING NAME
PLAN AND PROFILE
1+700.00 - 1+956.45

| PROJECT No. | 119124 |
|-------------|------------|
| REV | REV #2 |
| DRAWING No. | 119124-PP3 |

M:\2019\119124\CAD\Design\Figures\AutoTurn\Bend design-25 - LCV.dwg, LCV-25m, Nov 06, 2020 - 9:30am, amestwarp



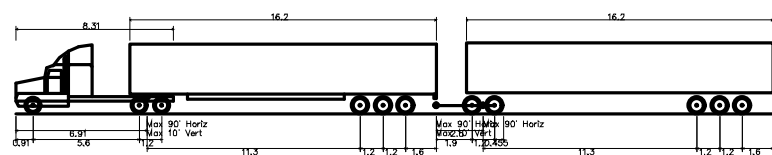
LEGEND

- PROPERTY LINE
- ROAD CENTRELINE
- LIMIT OF PAVEMENT
- EDGE OF PAVED SHOULDER
- 1.05 SEPARATION (Z)
- PROPOSED CURB
- PROPOSED DITCH



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



LCV A-train
Overall Length 40.010m
Overall Width 2.600m
Overall Body Height 3.755m
Min. Body Ground Clearance 0.418m
Max. Track Width 2.600m
Lock-to-lock time 6.00s
Max Steering Angle (Virtual) 40.00°

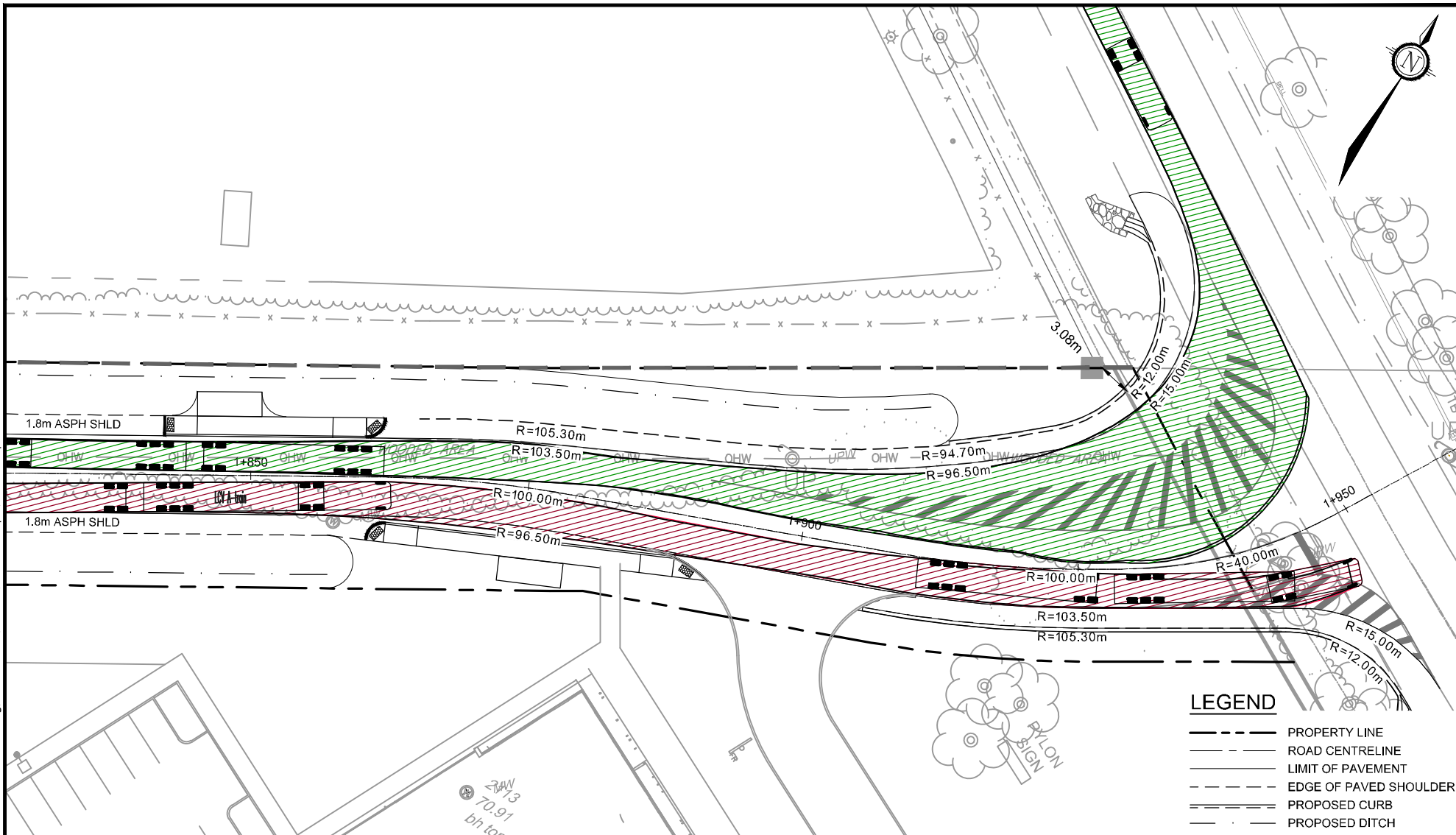
4120 RUSSELL ROAD

82° CORNER - 25m RADIUS (LCV A-TRAIN DESIGN VEHICLE)

SCALE 1 : 500

DATE DEC 2020 JOB 119124 FIGURE 1

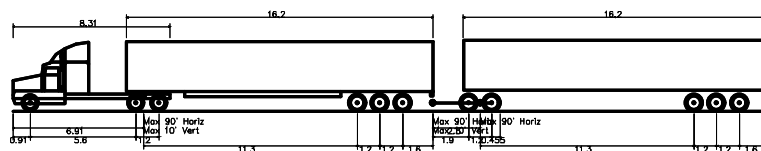
M:\2019\119124\CAD\Design\Figures\AutoTurn\Russell-Last Mile - LCV.dwg, LCV-ENTER, Dec 04, 2020 - 4:12pm, amestwarp



NOVATECH

Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



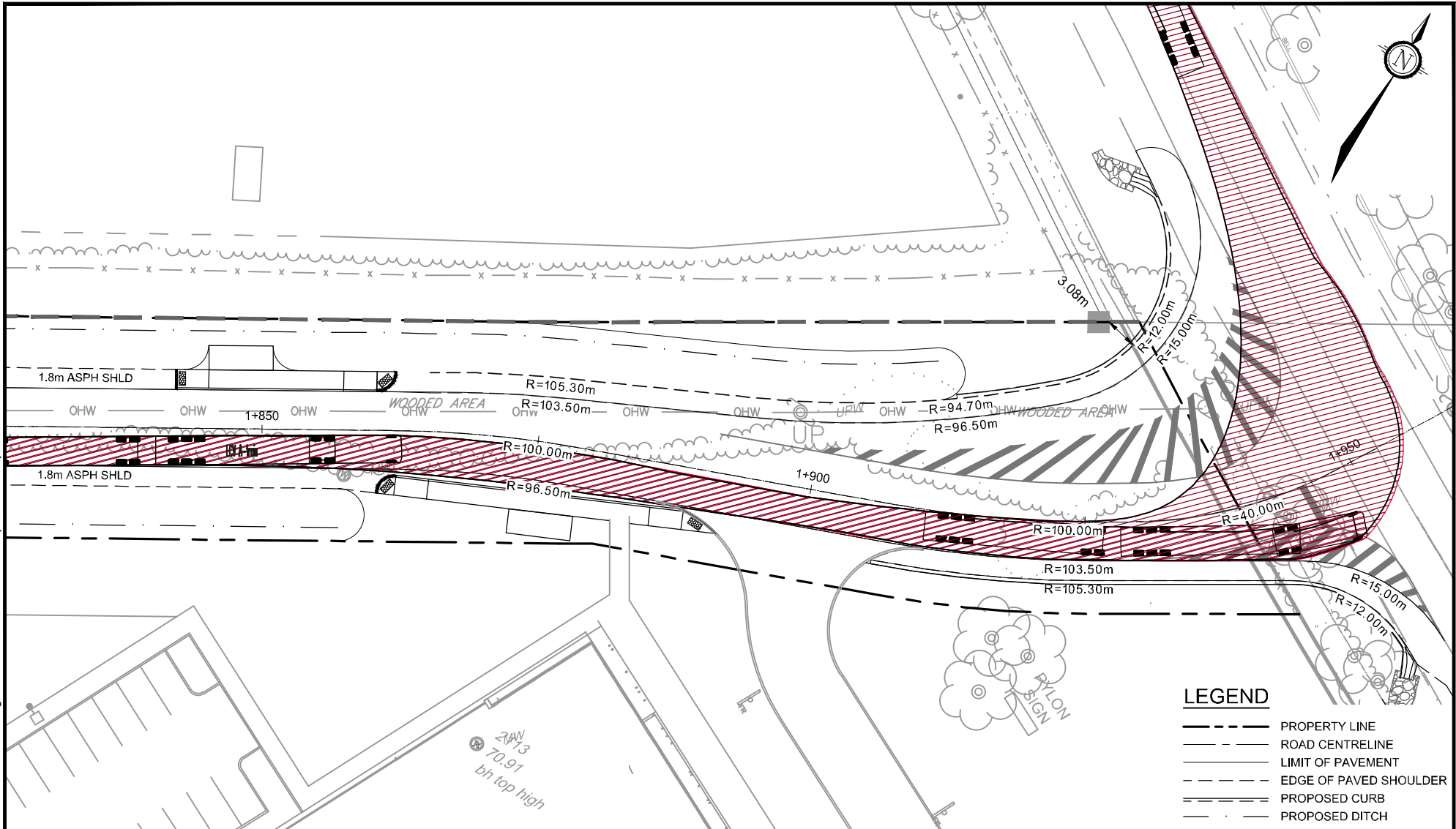
4120 RUSSELL ROAD

LAST MILE DRIVE - RUSSELL -ENTER (LCV A-TRAIN DESIGN VEHICLE)

SCALE 1 : 500

DATE DEC 2020 JOB 119124 FIGURE 2

M:\2019\11\19\24\CAD\Design\Figures\AutoTurn\Russell-Last Mile - LCV.dwg, LCV-EXIT, Dec 04, 2020 - 4:12pm, amestwarp



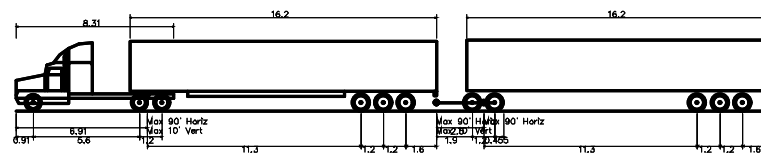
LEGEND

- PROPERTY LINE
- ROAD CENTRELINE
- LIMIT OF PAVEMENT
- EDGE OF PAVED SHOULDER
- PROPOSED CURB
- PROPOSED DITCH

NOVATECH

Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



LCV A-train
Overall Length 40.010m
Overall Width 2.600m
Overall Body Height 3.755m
Min Body Ground Clearance 0.418m
Max Track Width 2.600m
Lock-to-lock time 6.00s
Max Steering Angle (Virtual) 40.00°

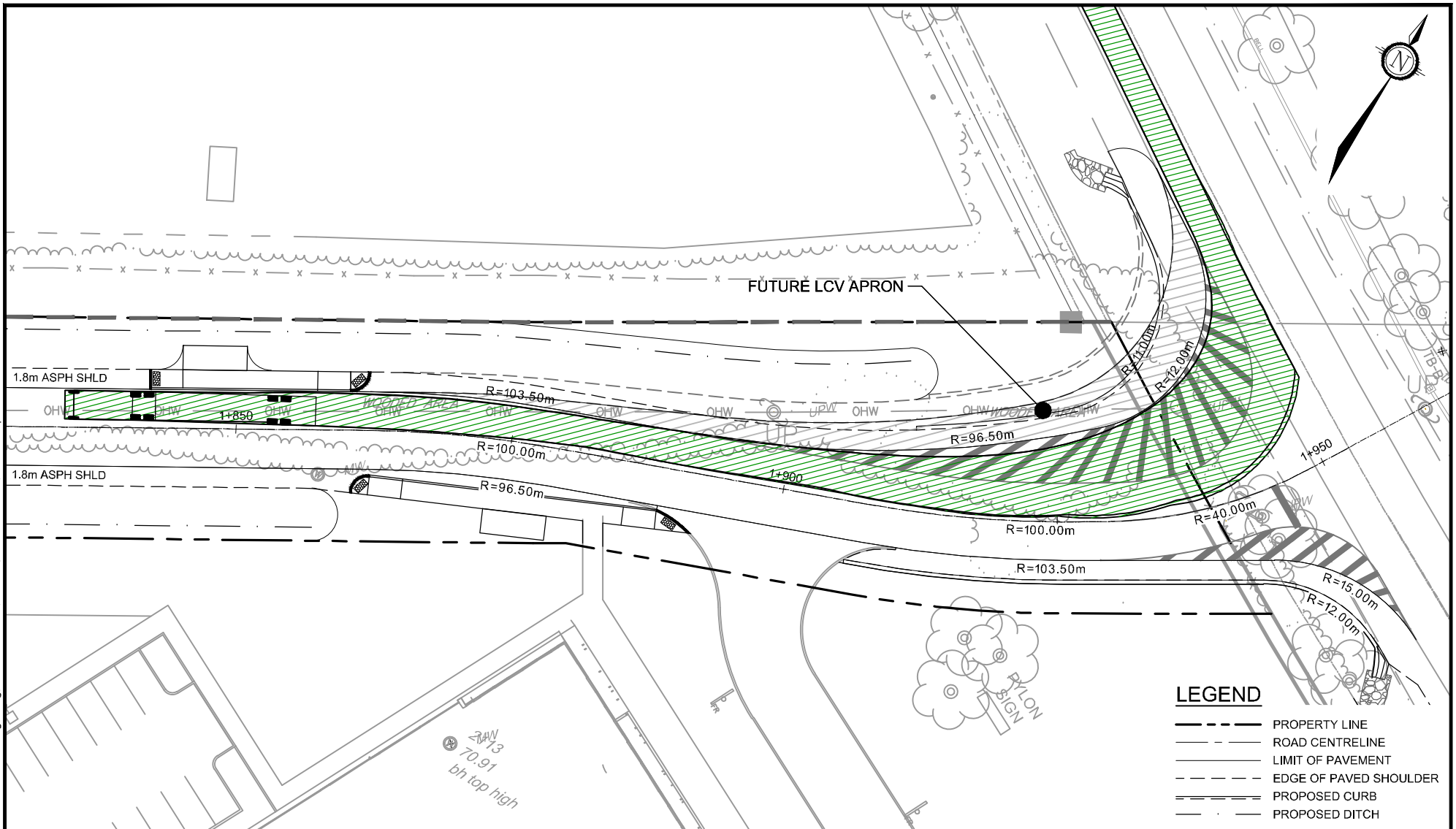
4120 RUSSELL ROAD

LAST MILE DRIVE - RUSSELL - EXIT (LCV A-TRAIN DESIGN VEHICLE)

SCALE 1 : 500

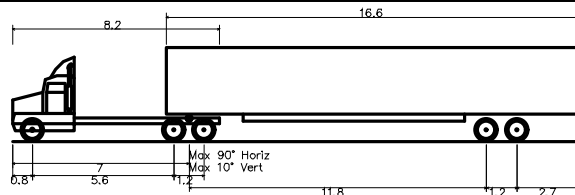
DATE DEC 2020 JOB 119124 FIGURE 3

M:\2019\119124\CAD\Design\Figures\AutoTurn\Russell-WB-20-shift align.dwg, Nov 06, 2020 - 9:41am, amestwarp



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



WB-20 - Tractor & Semi-Trailer
Overall Length 22.700m
Overall Width 2.600m
Overall Body Height 3.735m
Min Body Ground Clearance 0.435m
Track Width 2.600m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 10.700m

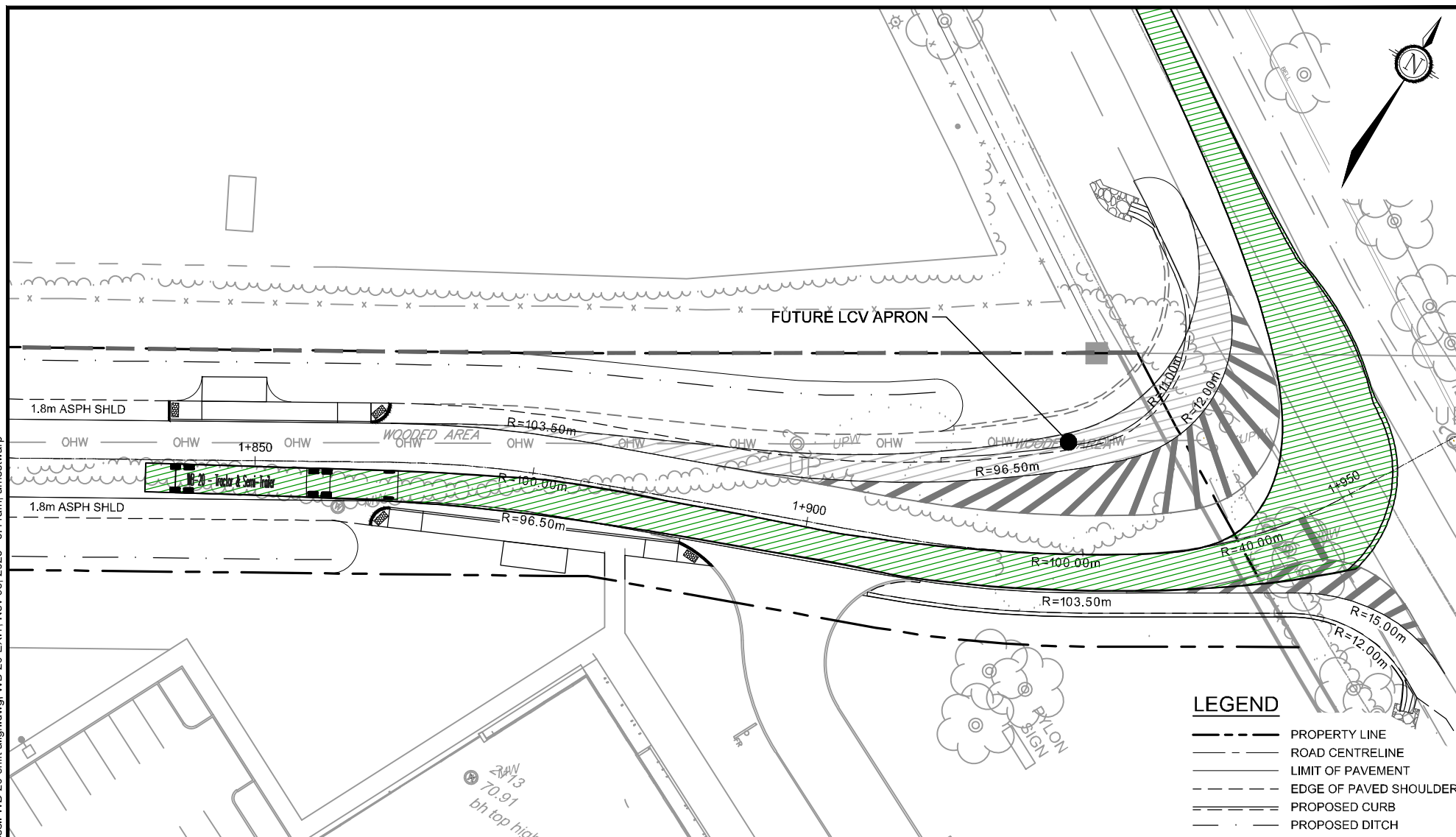
4120 RUSSELL ROAD

LAST MILE DRIVE - RUSSELL -ENTER
(WB-20 DESIGN VEHICLE)

SCALE 1 : 500

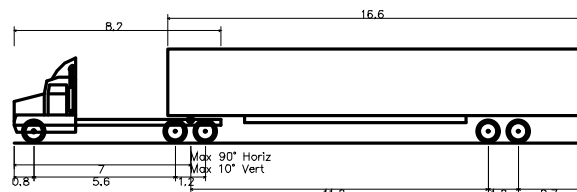
DATE DEC 2020 JOB 119124 FIGURE 4

M:\2019\119124\CAD\Design\Figures\AutoTurn\Russell-WB-20-shift align.dwg, WB-20-EXIT, Nov 06, 2020 - 9:41am, amestwarp



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



WB-20 - Tractor & Semi-Trailer
Overall Length 22.700m
Overall Width 2.600m
Overall Body Height 3.730m
Min Body Ground Clearance 0.435m
Track Width 2.600m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 10.700m

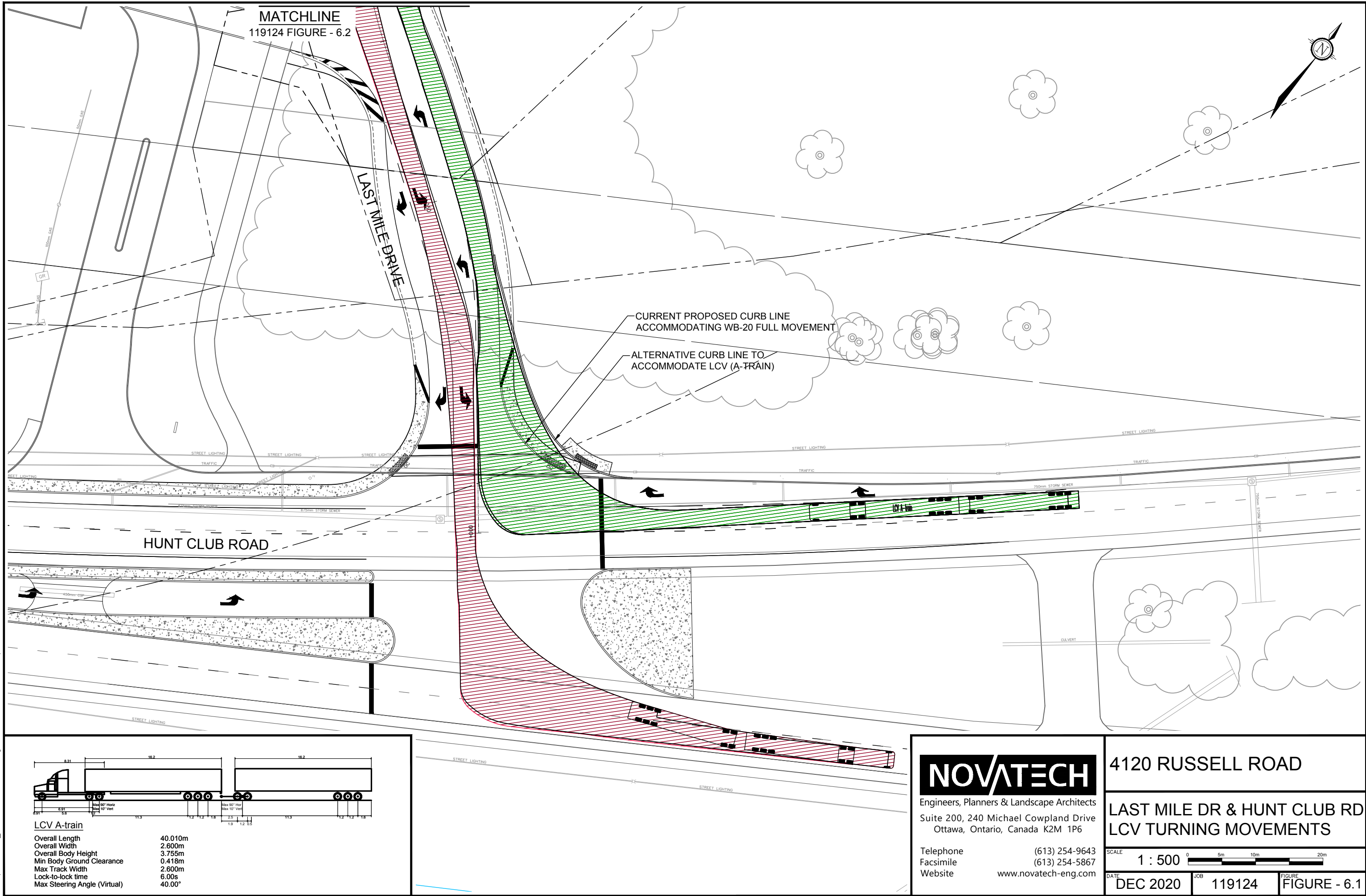
4120 RUSSELL ROAD

LAST MILE DRIVE - RUSSELL - EXIT
(WB-20 DESIGN VEHICLE)

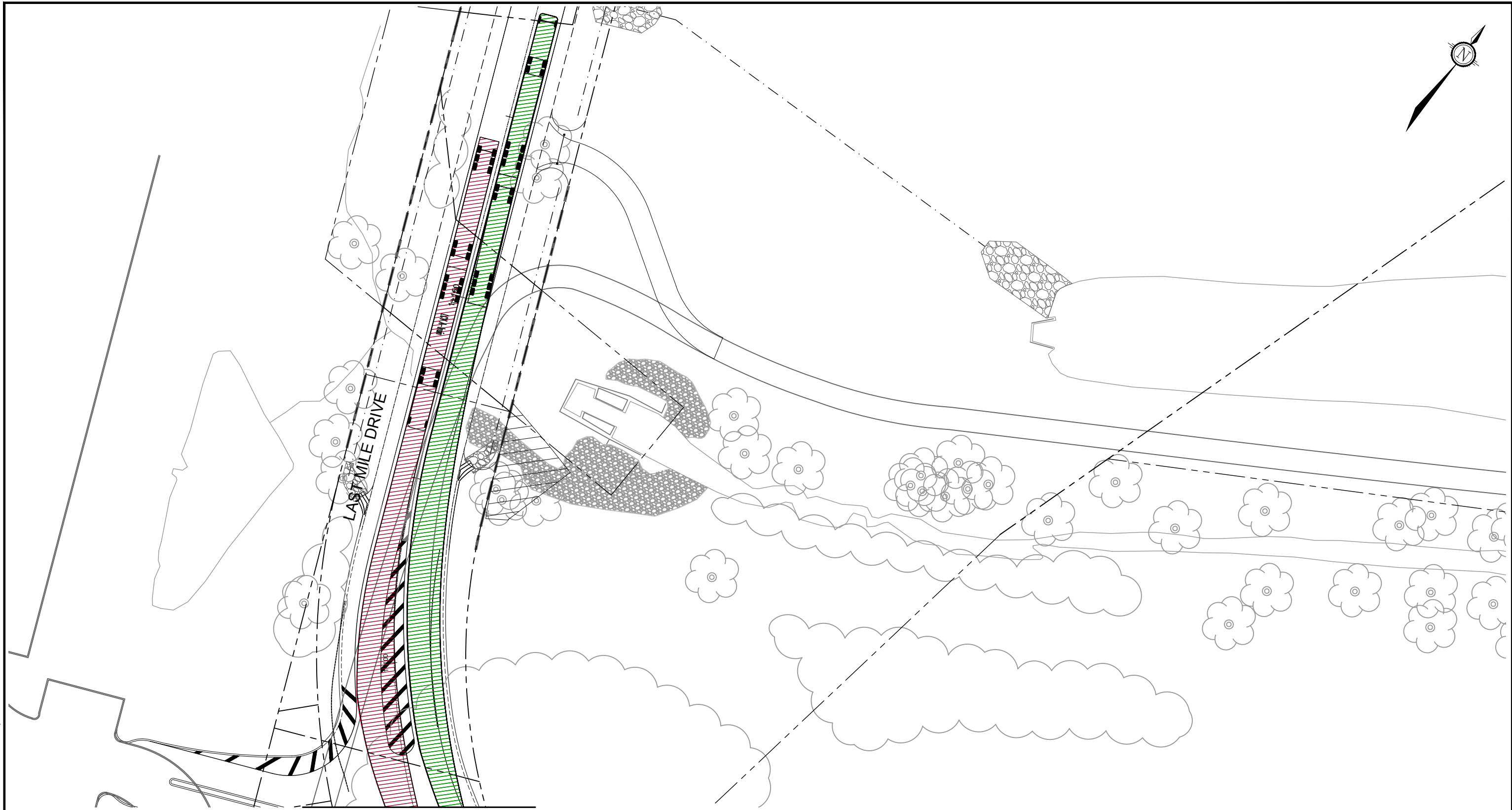
SCALE 1 : 500

DATE DEC 2020 JOB 119124 FIGURE 5

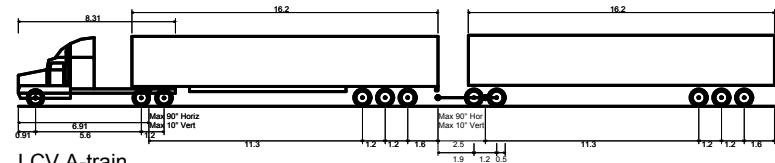
C:\temp\AcPublish_1444\119124-LCV-TM.dwg, FIG 6.1, Nov 12, 2020 - 3:21pm, rhiller



C:\temp\AcPublish_1444\119124-LCV-TM.dwg, FIG 6.2, Nov 12, 2020 - 3:21pm, rhiller



MATCHLINE
119124 FIGURE-6.1



LCV A-train
Overall Length 40.010m
Overall Width 2.600m
Overall Body Height 3.755m
Min Body Ground Clearance 0.418m
Max Track Width 2.600m
Lock-to-lock time 6.00s
Max Steering Angle (Virtual) 40.00°

NOVATECH

Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

4120 RUSSELL ROAD

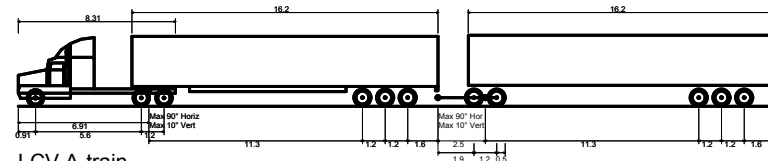
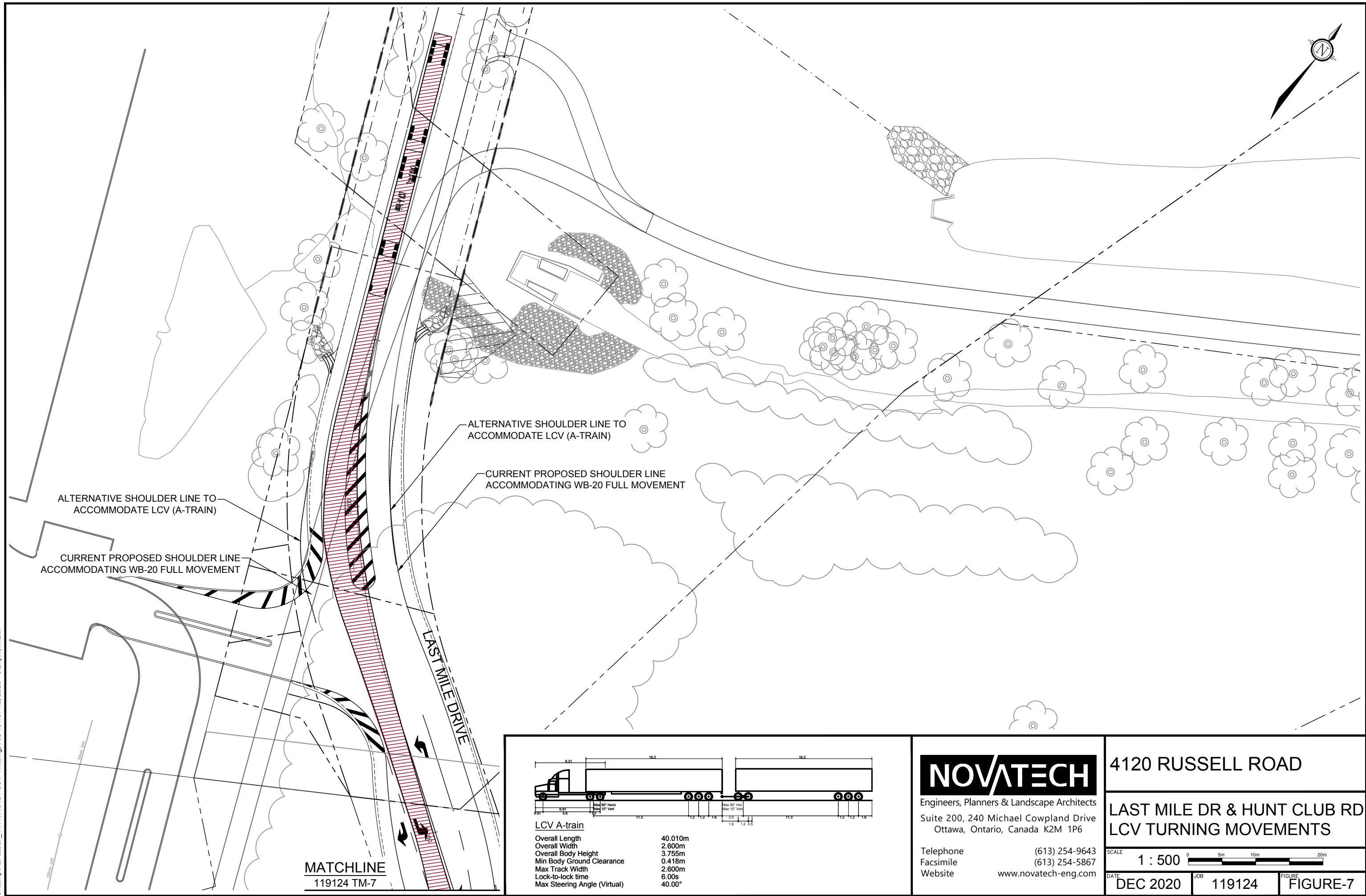
LAST MILE DR & HUNT CLUB RD
LCV TURNING MOVEMENTS

SCALE 1 : 500 0 5m 10m 20m

DATE DEC 2020 JOB 119124 FIGURE - 6.2

CUT11V17 DWG 270mm X 420mm

C:\temp\AcPublish_1444\119124-LCV-TM.dwg, FIG 7, Nov 12, 2020 - 3:21pm, rhiller



LCV A-train
Overall Length 40.010m
Overall Width 2.600m
Overall Body Height 3.755m
Min Body Ground Clearance 0.418m
Max Track Width 2.600m
Lock-to-lock time 6.00s
Max Steering Angle (Virtual) 40.00°

NOVATECH

Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

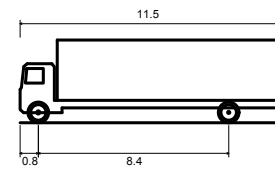
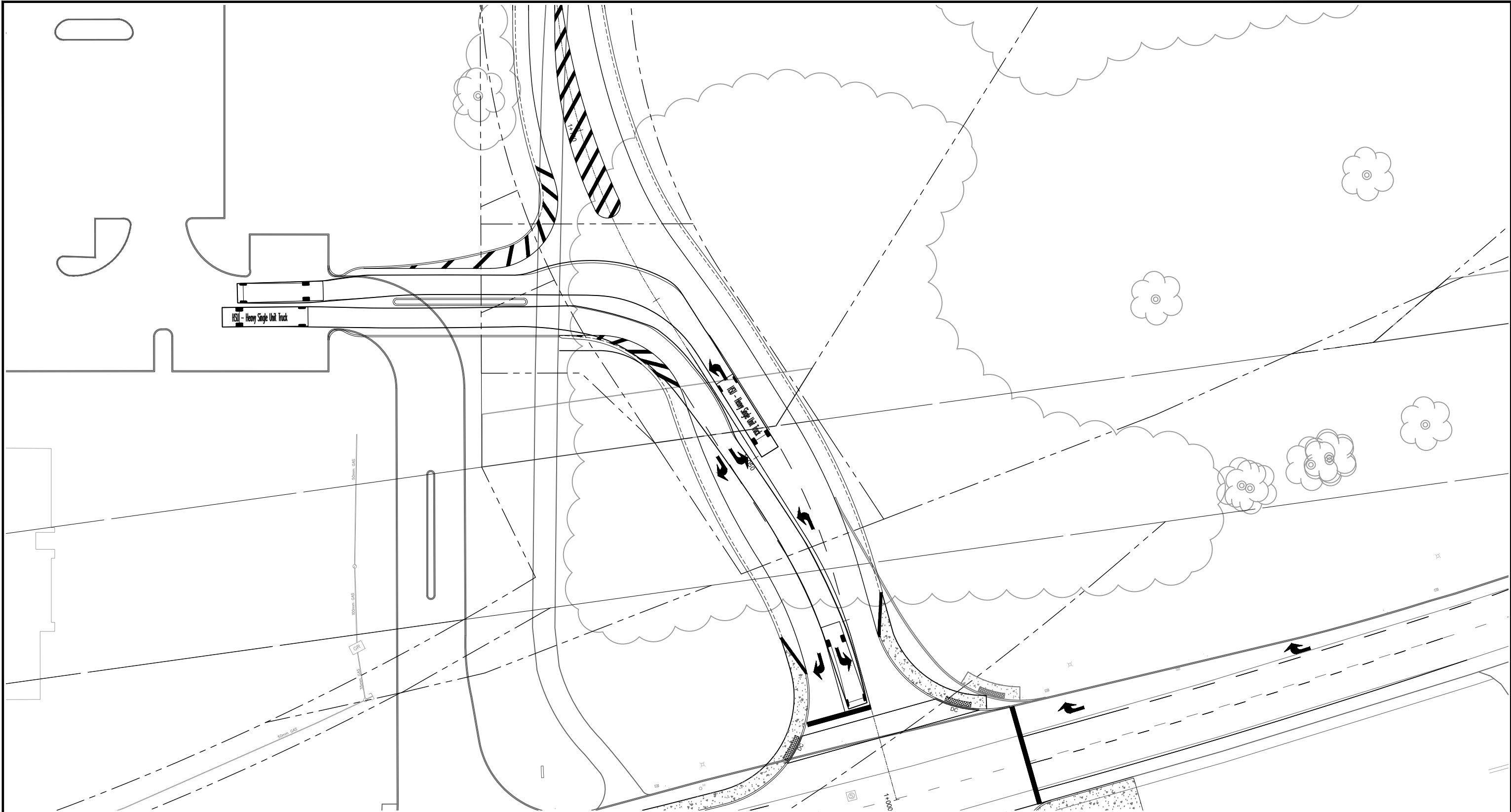
4120 RUSSELL ROAD

LAST MILE DR & HUNT CLUB RD
LCV TURNING MOVEMENTS

SCALE 1 : 500

DATE DEC 2020 JOB 119124 FIGURE-7

C:\temp\AcPublish\1444119124-HSU-TM.dwg, TM11, Dec 04, 2020 - 5:20pm, rhillier



HSU - Heavy Single Unit Truck

| | |
|-----------------------------|---------|
| Overall Length | 11.500m |
| Overall Width | 2.600m |
| Overall Body Height | 3.650m |
| Min Body Ground Clearance | 0.445m |
| Track Width | 2.600m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 14.100m |



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LAST MILE DRIVE

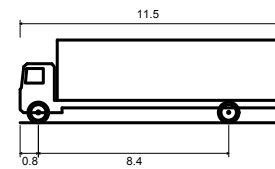
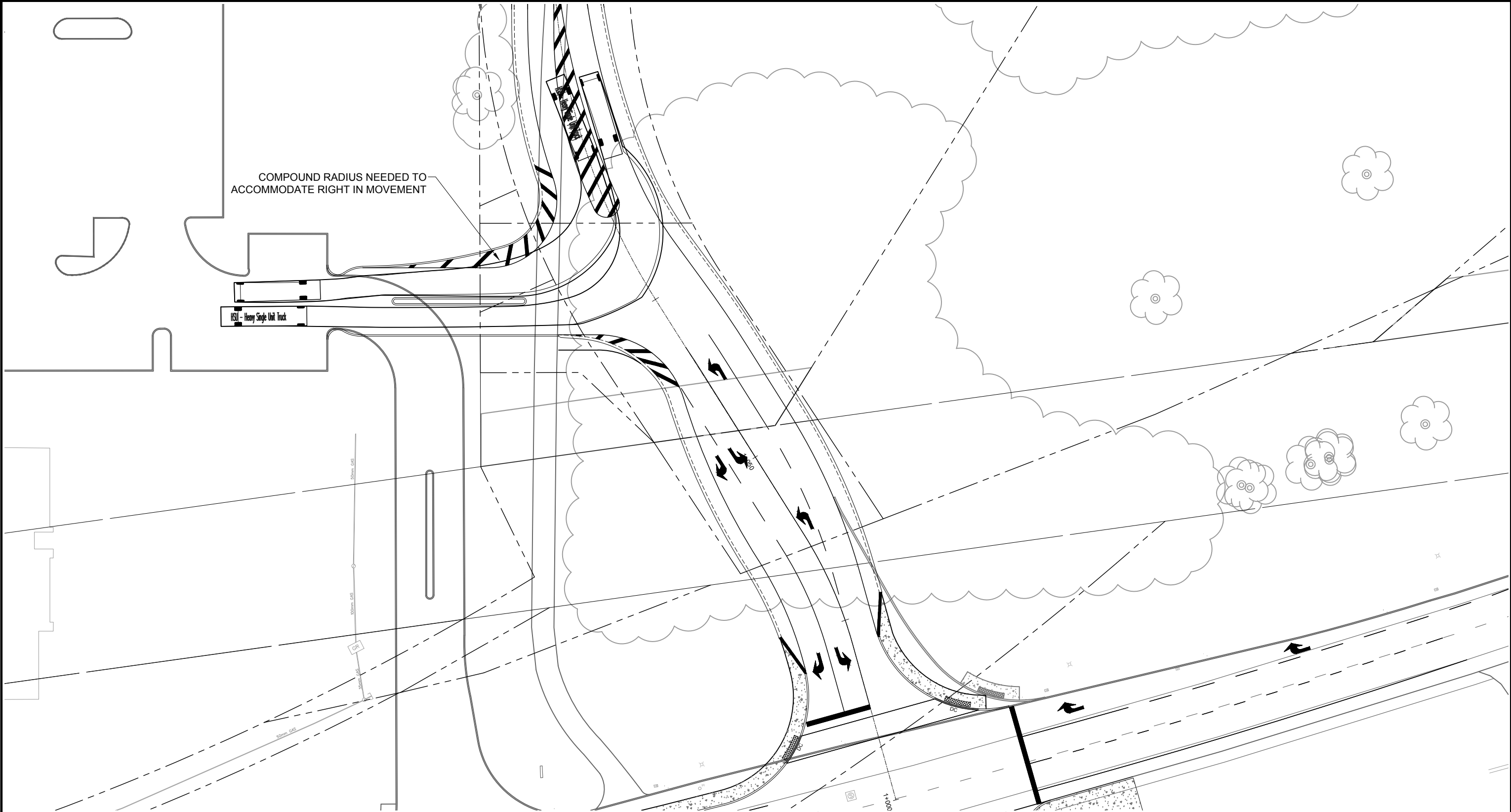
HYDRO ACCESS
TURNING MOVEMENTS

SCALE 1 : 500 0 5m 10m 20m

DATE DEC 2020 JOB 119124 FIGURE TM-11

CUT11V17 DWG 270mm X 122mm

C:\temp\AcPublish\1444119124-HSU-TM.dwg, TM12, Dec 04, 2020 - 5:20pm, rhillier



HSU - Heavy Single Unit Truck

| | |
|-----------------------------|---------|
| Overall Length | 11.500m |
| Overall Width | 2.600m |
| Overall Body Height | 3.650m |
| Min Body Ground Clearance | 0.445m |
| Track Width | 2.600m |
| Lock-to-lock time | 4.00s |
| Curb to curb Turning Radius | 14.100m |

NOVATECH

Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LAST MILE DRIVE

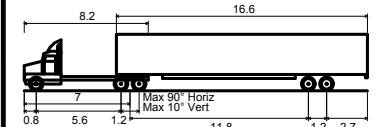
HYDRO ACCESS
TURNING MOVEMENTS

SCALE 1 : 500 0 5m 10m 20m

DATE DEC 2020 JOB 119124 FIGURE TM-12.2

CUT11V17 DWG 270mm x 122mm

C:\temp\AcPublish\1444119124-HSU-TM.dwg, TM14, Dec 04, 2020 - 5:20pm, rhiller



| | |
|---|---------|
| WB-20 - Tractor & Semi-Trailer | |
| Overall Length | 22.700m |
| Overall Width | 2.600m |
| Overall Body Height | 3.730m |
| Min Body Ground Clearance | 0.435m |
| Track Width | 2.600m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 14.300m |



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LAST MILE DRIVE

HYDRO ACCESS
TURNING MOVEMENTS

SCALE 1 : 500 0 5m 10m 20m

DATE DEC 2020 JOB 119124 FIGURE TM-14

CUT11V17 DWG 270mm X 122mm

C:\temp\AcPublish\1444119124-HSU-TM.dwg, TM15, Dec 04, 2020 - 5:20pm, rhiller



WB-20 - Tractor & Semi-Trailer

| | |
|-----------------------------|---------|
| Overall Length | 22.700m |
| Overall Width | 2.600m |
| Overall Body Height | 3.730m |
| Min Body Ground Clearance | 0.435m |
| Track Width | 2.600m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 14.300m |

Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LAST MILE DRIVE

HYDRO ACCESS
TURNING MOVEMENTS

SCALE 1 : 500

DATE DEC 2020

JOB 119124

FIGURE TM-15

C:\temp\AcPublish\1444119124-HSU-TM.dwg, TM16, Dec 04, 2020 - 5:20pm, rhiller



WB-20 - Tractor & Semi-Trailer

| | |
|-----------------------------|---------|
| Overall Length | 22.700m |
| Overall Width | 2.600m |
| Overall Body Height | 3.730m |
| Min Body Ground Clearance | 0.435m |
| Track Width | 2.600m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 14.300m |

Engineers, Planners & Landscape Architects

Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LAST MILE DRIVE

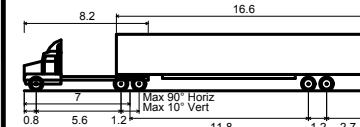
HYDRO ACCESS
TURNING MOVEMENTS

SCALE 1 : 500

DATE DEC 2020 JOB 119124 FIGURE TM-16

CUT11V17 DWG 270mm X 122mm

C:\temp\AcPublish\1444119124-HSU-TM.dwg, TM17, Dec 04, 2020 - 5:20pm, rhillier



| | |
|---|---------|
| WB-20 - Tractor & Semi-Trailer | |
| Overall Length | 22.700m |
| Overall Width | 2.600m |
| Overall Body Height | 3.730m |
| Min Body Ground Clearance | 0.435m |
| Track Width | 2.600m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 14.300m |



Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LAST MILE DRIVE

HYDRO ACCESS
TURNING MOVEMENTS

SCALE 1 : 500 0 5m 10m 20m

DATE DEC 2020 JOB 119124 FIGURE TM-17











CUT11V17 DWG 270mm X 122mm

APPENDIX K

Traffic Analysis Reports











Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

Existing Traffic AM Peak Hour

| | | | | | | | | | |
|-----------------------------------|---|---|---|---|---|---|--|--|--|
| |  |  |  |  |  |  | | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR | | | |
| Lane Configurations |  |  | |  |  | | | | |
| Traffic Volume (veh/h) | 2 | 796 | 0 | 817 | 623 | 0 | | | |
| Future Volume (Veh/h) | 2 | 796 | 0 | 817 | 623 | 0 | | | |
| Sign Control | Stop | | | Free | Free | | | | |
| Grade | 0% | | | 0% | 0% | | | | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | | | |
| Hourly flow rate (vph) | 2 | 884 | 0 | 908 | 692 | 0 | | | |
| Pedestrians | | | | | | | | | |
| Lane Width (m) | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | |
| Percent Blockage | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | |
| Median type | | | | None | None | | | | |
| Median storage veh) | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | |
| vC, conflicting volume | 1600 | 692 | 692 | | | | | | |
| vC1, stage 1 conf vol | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | |
| vCu, unblocked vol | 1600 | 692 | 692 | | | | | | |
| tC, single (s) | 6.5 | 6.3 | 4.1 | | | | | | |
| tC, 2 stage (s) | | | | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.2 | | | | | | |
| p0 queue free % | 98 | 0 | 100 | | | | | | |
| cM capacity (veh/h) | 114 | 435 | 912 | | | | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | | | | |
| Volume Total | 2 | 884 | 908 | 692 | | | | | |
| Volume Left | 2 | 0 | 0 | 0 | | | | | |
| Volume Right | 0 | 884 | 0 | 0 | | | | | |
| cSH | 114 | 435 | 1700 | 1700 | | | | | |
| Volume to Capacity | 0.02 | 2.03 | 0.53 | 0.41 | | | | | |
| Queue Length 95th (m) | 0.4 | 430.2 | 0.0 | 0.0 | | | | | |
| Control Delay (s) | 37.3 | 492.5 | 0.0 | 0.0 | | | | | |
| Lane LOS | E | F | | | | | | | |
| Approach Delay (s) | 491.4 | | 0.0 | 0.0 | | | | | |
| Approach LOS | F | | | | | | | | |
| Intersection Summary | | | | | | | | | |
| Average Delay | | | 175.1 | | | | | | |
| Intersection Capacity Utilization | | | 93.3% | ICU Level of Service | F | | | | |
| Analysis Period (min) | | | 15 | | | | | | |












Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

Existing Traffic PM Peak Hour

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (veh/h) | 11 | 1291 | 0 | 1016 | 137 | 0 |
| Future Volume (Veh/h) | 11 | 1291 | 0 | 1016 | 137 | 0 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Hourly flow rate (vph) | 12 | 1434 | 0 | 1129 | 152 | 0 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1281 | 152 | 152 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1281 | 152 | 152 | | | |
| tC, single (s) | 6.7 | 6.3 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.8 | 3.4 | 2.2 | | | |
| p0 queue free % | 92 | 0 | 100 | | | |
| cM capacity (veh/h) | 160 | 884 | 1441 | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | |
| Volume Total | 12 | 1434 | 1129 | 152 | | |
| Volume Left | 12 | 0 | 0 | 0 | | |
| Volume Right | 0 | 1434 | 0 | 0 | | |
| cSH | 160 | 884 | 1700 | 1700 | | |
| Volume to Capacity | 0.08 | 1.62 | 0.66 | 0.09 | | |
| Queue Length 95th (m) | 1.7 | 531.1 | 0.0 | 0.0 | | |
| Control Delay (s) | 29.3 | 299.5 | 0.0 | 0.0 | | |
| Lane LOS | D | F | | | | |
| Approach Delay (s) | 297.2 | | 0.0 | 0.0 | | |
| Approach LOS | F | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 157.6 | | | |
| Intersection Capacity Utilization | | | 98.7% | ICU Level of Service | F | |
| Analysis Period (min) | | | 15 | | | |

Site 1 National Capital Business Park
12: Hunt Club & Access

2023 Future Background AM Peak Hour

| |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|
| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations |  |  |  | |  |  |
| Traffic Volume (vph) | 43 | 1062 | 1449 | 134 | 89 | 52 |
| Future Volume (vph) | 43 | 1062 | 1449 | 134 | 89 | 52 |
| Satd. Flow (prot) | 1701 | 3402 | 3358 | 0 | 1701 | 1522 |
| Flt Permitted | 0.122 | | | | 0.950 | |
| Satd. Flow (perm) | 218 | 3402 | 3358 | 0 | 1701 | 1522 |
| Satd. Flow (RTOR) | | | 16 | | | 7 |
| Lane Group Flow (vph) | 43 | 1062 | 1583 | 0 | 89 | 52 |
| Turn Type | Perm | NA | NA | | Prot | Perm |
| Protected Phases | | 2 | 6 | | 4 | |
| Permitted Phases | 2 | | | | | 4 |
| Total Split (s) | 34.0 | 34.0 | 34.0 | | 36.2 | 36.2 |
| Total Lost Time (s) | 6.4 | 6.4 | 6.4 | | 5.8 | 5.8 |
| Act Effct Green (s) | 51.8 | 51.8 | 51.8 | | 10.6 | 10.6 |
| Actuated g/C Ratio | 0.74 | 0.74 | 0.74 | | 0.15 | 0.15 |
| v/c Ratio | 0.27 | 0.42 | 0.64 | | 0.35 | 0.22 |
| Control Delay | 10.4 | 5.5 | 7.8 | | 30.5 | 25.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 10.4 | 5.5 | 7.8 | | 30.5 | 25.5 |
| LOS | B | A | A | | C | C |
| Approach Delay | | 5.7 | 7.8 | | 28.7 | |
| Approach LOS | | A | A | | C | |
| Queue Length 50th (m) | 1.7 | 25.5 | 49.0 | | 9.9 | 4.9 |
| Queue Length 95th (m) | 7.9 | 40.7 | 78.5 | | 20.2 | 12.6 |
| Internal Link Dist (m) | | 217.7 | 853.4 | | 137.8 | |
| Turn Bay Length (m) | 40.0 | | | | | 40.0 |
| Base Capacity (vph) | 161 | 2511 | 2483 | | 736 | 663 |
| Starvation Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.27 | 0.42 | 0.64 | | 0.12 | 0.08 |

Intersection Summary

Cycle Length: 70.2

Actuated Cycle Length: 70.2

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 8.0




Intersection LOS: A

Intersection Capacity Utilization 65.3%

ICU Level of Service C











Analysis Period (min) 15

Splits and Phases: 12: Hunt Club & Access

| | |
|---|---|
|  |  |
| Ø2 (R) | Ø4 |
| 34 s | 36.2 s |
|  | |
| Ø6 (R) | |
| 34 s | |

















Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

2023 Future Background AM Peak Hour

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (veh/h) | 2 | 913 | 0 | 921 | 669 | 0 |
| Future Volume (Veh/h) | 2 | 913 | 0 | 921 | 669 | 0 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 2 | 913 | 0 | 921 | 669 | 0 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1590 | 669 | 669 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1590 | 669 | 669 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.2 | | | |
| p0 queue free % | 98 | 0 | 100 | | | |
| cM capacity (veh/h) | 115 | 449 | 931 | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | |
| Volume Total | 2 | 913 | 921 | 669 | | |
| Volume Left | 2 | 0 | 0 | 0 | | |
| Volume Right | 0 | 913 | 0 | 0 | | |
| cSH | 115 | 449 | 1700 | 1700 | | |
| Volume to Capacity | 0.02 | 2.03 | 0.54 | 0.39 | | |
| Queue Length 95th (m) | 0.4 | 443.8 | 0.0 | 0.0 | | |
| Control Delay (s) | 36.8 | 493.4 | 0.0 | 0.0 | | |
| Lane LOS | E | F | | | | |
| Approach Delay (s) | 492.4 | | 0.0 | 0.0 | | |
| Approach LOS | F | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 179.9 | | | |
| Intersection Capacity Utilization | | | 103.5% | ICU Level of Service | | G |
| Analysis Period (min) | | | 15 | | | |

















Site 1 National Capital Business Park
15: Last Mile Drive/Building F & Russell

2023 Future Background AM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 1 | 82 | 126 | 12 | 596 | 0 | 127 | 2 | 1 | 0 | 1 | 0 |
| Future Volume (Veh/h) | 1 | 82 | 126 | 12 | 596 | 0 | 127 | 2 | 1 | 0 | 1 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 1 | 82 | 126 | 12 | 596 | 0 | 127 | 2 | 1 | 0 | 1 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 596 | | | 208 | | | 768 | 767 | 145 | 769 | 830 | 596 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 596 | | | 208 | | | 768 | 767 | 145 | 769 | 830 | 596 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 99 | | | 59 | 99 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 966 | | | 1345 | | | 312 | 326 | 894 | 310 | 299 | 498 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 209 | 608 | 130 | 1 | | | | | | | | |
| Volume Left | 1 | 12 | 127 | 0 | | | | | | | | |
| Volume Right | 126 | 0 | 1 | 0 | | | | | | | | |
| cSH | 966 | 1345 | 314 | 299 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.01 | 0.41 | 0.00 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.2 | 13.7 | 0.1 | | | | | | | | |
| Control Delay (s) | 0.1 | 0.3 | 24.4 | 17.1 | | | | | | | | |
| Lane LOS | A | A | C | C | | | | | | | | |
| Approach Delay (s) | 0.1 | 0.3 | 24.4 | 17.1 | | | | | | | | |
| Approach LOS | | | C | C | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 3.5 | | | | | | | | | |
| Intersection Capacity Utilization | | | 63.0% | | ICU Level of Service | | | | B | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |












Site 1 National Capital Business Park
16: Site 1/Building F & Russell

2023 Future Background AM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 1 | 82 | 0 | 0 | 608 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 1 | 82 | 0 | 0 | 608 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 1 | 82 | 0 | 0 | 608 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 608 | | | 82 | | | 692 | 692 | 82 | 692 | 692 | 608 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 608 | | | 82 | | | 692 | 692 | 82 | 692 | 692 | 608 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 956 | | | 1497 | | | 354 | 363 | 969 | 354 | 363 | 490 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 83 | 608 | 0 | 0 | | | | | | | | |
| Volume Left | 1 | 0 | 0 | 0 | | | | | | | | |
| Volume Right | 0 | 0 | 0 | 0 | | | | | | | | |
| cSH | 956 | 1700 | 1700 | 1700 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.36 | 0.00 | 0.00 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| Control Delay (s) | 0.1 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| Lane LOS | A | | A | A | | | | | | | | |
| Approach Delay (s) | 0.1 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| Approach LOS | | | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 0.0 | | | | | | | | | |
| Intersection Capacity Utilization | | | 37.1% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

Site 1 National Capital Business Park
12: Hunt Club & Last Mile

2023 Future Background PM Peak Hour

| |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|
| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations |  |  |  | |  |  |
| Traffic Volume (vph) | 57 | 1334 | 1480 | 124 | 77 | 57 |
| Future Volume (vph) | 57 | 1334 | 1480 | 124 | 77 | 57 |
| Satd. Flow (prot) | 1701 | 3402 | 3361 | 0 | 1701 | 1522 |
| Flt Permitted | 0.121 | | | | 0.950 | |
| Satd. Flow (perm) | 217 | 3402 | 3361 | 0 | 1701 | 1522 |
| Satd. Flow (RTOR) | | | 16 | | | 16 |
| Lane Group Flow (vph) | 57 | 1334 | 1604 | 0 | 77 | 57 |
| Turn Type | Perm | NA | NA | | Prot | Perm |
| Protected Phases | | 2 | 6 | | 4 | |
| Permitted Phases | 2 | | | | | 4 |
| Total Split (s) | 41.4 | 41.4 | 41.4 | | 31.8 | 31.8 |
| Total Lost Time (s) | 6.4 | 6.4 | 6.4 | | 5.8 | 5.8 |
| Act Effct Green (s) | 55.0 | 55.0 | 55.0 | | 10.4 | 10.4 |
| Actuated g/C Ratio | 0.75 | 0.75 | 0.75 | | 0.14 | 0.14 |
| v/c Ratio | 0.35 | 0.52 | 0.63 | | 0.32 | 0.25 |
| Control Delay | 12.6 | 6.1 | 7.4 | | 31.9 | 24.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 12.6 | 6.1 | 7.4 | | 31.9 | 24.5 |
| LOS | B | A | A | | C | C |
| Approach Delay | | 6.3 | 7.4 | | 28.8 | |
| Approach LOS | | A | A | | C | |
| Queue Length 50th (m) | 2.5 | 36.5 | 50.2 | | 9.0 | 4.7 |
| Queue Length 95th (m) | 11.5 | 54.8 | 76.5 | | 19.0 | 13.3 |
| Internal Link Dist (m) | | 218.6 | 862.2 | | 131.3 | |
| Turn Bay Length (m) | 40.0 | | | | | 40.0 |
| Base Capacity (vph) | 163 | 2558 | 2531 | | 604 | 550 |
| Starvation Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.35 | 0.52 | 0.63 | | 0.13 | 0.10 |

Intersection Summary

Cycle Length: 73.2

Actuated Cycle Length: 73.2

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 7.8




Intersection LOS: A

Intersection Capacity Utilization 68.5%

ICU Level of Service C











Analysis Period (min) 15

Splits and Phases: 12: Hunt Club & Last Mile

| | |
|---|---|
|  |  |
| Ø2 (R) | Ø4 |
| 41.4 s | 31.8 s |
|  | |
| Ø6 (R) | |
| 41.4 s | |

















Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

2023 Future Background PM Peak Hour

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (veh/h) | 11 | 1437 | 0 | 1117 | 166 | 0 |
| Future Volume (Veh/h) | 11 | 1437 | 0 | 1117 | 166 | 0 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 11 | 1437 | 0 | 1117 | 166 | 0 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1283 | 166 | 166 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1283 | 166 | 166 | | | |
| tC, single (s) | 6.7 | 6.3 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.8 | 3.4 | 2.2 | | | |
| p0 queue free % | 93 | 0 | 100 | | | |
| cM capacity (veh/h) | 159 | 868 | 1424 | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | |
| Volume Total | 11 | 1437 | 1117 | 166 | | |
| Volume Left | 11 | 0 | 0 | 0 | | |
| Volume Right | 0 | 1437 | 0 | 0 | | |
| cSH | 159 | 868 | 1700 | 1700 | | |
| Volume to Capacity | 0.07 | 1.66 | 0.66 | 0.10 | | |
| Queue Length 95th (m) | 1.5 | 546.2 | 0.0 | 0.0 | | |
| Control Delay (s) | 29.3 | 314.2 | 0.0 | 0.0 | | |
| Lane LOS | D | F | | | | |
| Approach Delay (s) | 312.1 | | 0.0 | 0.0 | | |
| Approach LOS | F | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 165.5 | | | |
| Intersection Capacity Utilization | | | 109.8% | ICU Level of Service | H | |
| Analysis Period (min) | | | 15 | | | |

















Site 1 National Capital Business Park
15: Last Mile/Building F & Russell

2023 Future Background PM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 0 | 442 | 84 | 1 | 90 | 0 | 166 | 1 | 12 | 0 | 2 | 1 |
| Future Volume (Veh/h) | 0 | 442 | 84 | 1 | 90 | 0 | 166 | 1 | 12 | 0 | 2 | 1 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 0 | 442 | 84 | 1 | 90 | 0 | 166 | 1 | 12 | 0 | 2 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 90 | | | 526 | | | 578 | 576 | 484 | 588 | 618 | 90 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 90 | | | 526 | | | 578 | 576 | 484 | 588 | 618 | 90 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 60 | 100 | 98 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1486 | | | 1026 | | | 420 | 423 | 577 | 406 | 401 | 960 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 526 | 91 | 179 | 3 | | | | | | | | |
| Volume Left | 0 | 1 | 166 | 0 | | | | | | | | |
| Volume Right | 84 | 0 | 12 | 1 | | | | | | | | |
| cSH | 1486 | 1026 | 428 | 497 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.00 | 0.42 | 0.01 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 14.2 | 0.1 | | | | | | | | |
| Control Delay (s) | 0.0 | 0.1 | 19.3 | 12.3 | | | | | | | | |
| Lane LOS | | A | C | B | | | | | | | | |
| Approach Delay (s) | 0.0 | 0.1 | 19.3 | 12.3 | | | | | | | | |
| Approach LOS | | | C | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 4.4 | | | | | | | | | |
| Intersection Capacity Utilization | | | 53.8% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

Site 1 National Capital Business Park
16: Site 1/Building F & Russell

2023 Future Background PM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 0 | 454 | 0 | 0 | 90 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Future Volume (Veh/h) | 0 | 454 | 0 | 0 | 90 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 0 | 454 | 0 | 0 | 90 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 90 | | | 454 | | | 545 | 544 | 454 | 544 | 544 | 90 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 90 | | | 454 | | | 545 | 544 | 454 | 544 | 544 | 90 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1486 | | | 1091 | | | 444 | 442 | 600 | 445 | 442 | 960 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 454 | 90 | 0 | 1 | | | | | | | | |
| Volume Left | 0 | 0 | 0 | 0 | | | | | | | | |
| Volume Right | 0 | 0 | 0 | 1 | | | | | | | | |
| cSH | 1486 | 1700 | 1700 | 960 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.05 | 0.00 | 0.00 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 8.8 | | | | | | | | |
| Lane LOS | | | A | A | | | | | | | | |
| Approach Delay (s) | 0.0 | 0.0 | 0.0 | 8.8 | | | | | | | | |
| Approach LOS | | | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 0.0 | | | | | | | | | |
| Intersection Capacity Utilization | | | 35.2% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

Site 1 National Capital Business Park
12: Hunt Club & Last Mile












2023 Future Background AM Peak Hour Unsignalized



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|------|------|-------|------|----------------------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 43 | 1062 | 1449 | 134 | 89 | 52 |
| Future Volume (Veh/h) | 43 | 1062 | 1449 | 134 | 89 | 52 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 43 | 1062 | 1449 | 134 | 89 | 52 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | 6 |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1583 | | | | 2133 | 792 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1583 | | | | 2133 | 792 |
| tC, single (s) | 4.2 | | | | 6.9 | 7.0 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 89 | | | | 0 | 84 |
| cM capacity (veh/h) | 397 | | | | 36 | 326 |
| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | SB 1 |
| Volume Total | 43 | 531 | 531 | 966 | 617 | 141 |
| Volume Left | 43 | 0 | 0 | 0 | 0 | 89 |
| Volume Right | 0 | 0 | 0 | 0 | 134 | 52 |
| cSH | 397 | 1700 | 1700 | 1700 | 1700 | 55 |
| Volume to Capacity | 0.11 | 0.31 | 0.31 | 0.57 | 0.36 | 2.57 |
| Queue Length 95th (m) | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 | 101.0 |
| Control Delay (s) | 15.2 | 0.0 | 0.0 | 0.0 | 0.0 | 869.7 |
| Lane LOS | C | | | | | F |
| Approach Delay (s) | 0.6 | | | 0.0 | | 869.7 |
| Approach LOS | | | | | | F |
| Intersection Summary | | | | | | |
| Average Delay | | | 43.6 | | | |
| Intersection Capacity Utilization | | | 58.7% | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | |












Site 1 National Capital Business Park
12: Hunt Club & Last Mile

2023 Future Background PM Peak Hour Unsignalized

| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations |  |  |  | |  |  |
| Traffic Volume (veh/h) | 57 | 1334 | 1480 | 124 | 77 | 57 |
| Future Volume (Veh/h) | 57 | 1334 | 1480 | 124 | 77 | 57 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 57 | 1334 | 1480 | 124 | 77 | 57 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | 6 |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1604 | | | | 2323 | 802 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1604 | | | | 2323 | 802 |
| tC, single (s) | 4.2 | | | | 6.9 | 7.0 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 85 | | | | 0 | 82 |
| cM capacity (veh/h) | 390 | | | | 26 | 321 |
| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | SB 1 |
| Volume Total | 57 | 667 | 667 | 987 | 617 | 134 |
| Volume Left | 57 | 0 | 0 | 0 | 0 | 77 |
| Volume Right | 0 | 0 | 0 | 0 | 124 | 57 |
| cSH | 390 | 1700 | 1700 | 1700 | 1700 | 43 |
| Volume to Capacity | 0.15 | 0.39 | 0.39 | 0.58 | 0.36 | 3.13 |
| Queue Length 95th (m) | 3.6 | 0.0 | 0.0 | 0.0 | 0.0 | Err |
| Control Delay (s) | 15.8 | 0.0 | 0.0 | 0.0 | 0.0 | Err |
| Lane LOS | C | | | | | F |
| Approach Delay (s) | 0.6 | | | 0.0 | | Err |
| Approach LOS | | | | | | F |
| Intersection Summary | | | | | | |
| Average Delay | | | 428.5 | | | |
| Intersection Capacity Utilization | | | 61.2% | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | |

Site 1 National Capital Business Park
12: Hunt Club & Last Mile

2023 Total Traffic AM Peak Hour

| |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|
| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations |  |  |  | |  |  |
| Traffic Volume (vph) | 49 | 1062 | 1449 | 146 | 93 | 54 |
| Future Volume (vph) | 49 | 1062 | 1449 | 146 | 93 | 54 |
| Satd. Flow (prot) | 1701 | 3402 | 3354 | 0 | 1701 | 1522 |
| Flt Permitted | 0.120 | | | | 0.950 | |
| Satd. Flow (perm) | 215 | 3402 | 3354 | 0 | 1701 | 1522 |
| Satd. Flow (RTOR) | | | 18 | | | 7 |
| Lane Group Flow (vph) | 49 | 1062 | 1595 | 0 | 93 | 54 |
| Turn Type | Perm | NA | NA | | Prot | Perm |
| Protected Phases | | 2 | 6 | | 4 | |
| Permitted Phases | 2 | | | | | 4 |
| Total Split (s) | 34.0 | 34.0 | 34.0 | | 36.2 | 36.2 |
| Total Lost Time (s) | 6.4 | 6.4 | 6.4 | | 5.8 | 5.8 |
| Act Effct Green (s) | 51.7 | 51.7 | 51.7 | | 10.7 | 10.7 |
| Actuated g/C Ratio | 0.74 | 0.74 | 0.74 | | 0.15 | 0.15 |
| v/c Ratio | 0.31 | 0.42 | 0.64 | | 0.36 | 0.23 |
| Control Delay | 12.0 | 5.6 | 8.0 | | 30.6 | 25.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 12.0 | 5.6 | 8.0 | | 30.6 | 25.6 |
| LOS | B | A | A | | C | C |
| Approach Delay | | 5.9 | 8.0 | | 28.8 | |
| Approach LOS | | A | A | | C | |
| Queue Length 50th (m) | 2.0 | 25.5 | 49.7 | | 10.4 | 5.1 |
| Queue Length 95th (m) | 9.7 | 41.2 | 80.4 | | 20.9 | 13.0 |
| Internal Link Dist (m) | | 217.7 | 853.4 | | 137.8 | |
| Turn Bay Length (m) | 40.0 | | | | | 40.0 |
| Base Capacity (vph) | 158 | 2507 | 2477 | | 736 | 663 |
| Starvation Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.31 | 0.42 | 0.64 | | 0.13 | 0.08 |

Intersection Summary

Cycle Length: 70.2

Actuated Cycle Length: 70.2

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 8.2




Intersection LOS: A

Intersection Capacity Utilization 65.7%

ICU Level of Service C











Analysis Period (min) 15

Splits and Phases: 12: Hunt Club & Last Mile

| | |
|---|---|
|  |  |
| Ø2 (R) | Ø4 |
| 34 s | 36.2 s |
|  | |
| Ø6 (R) | |
| 34 s | |

















Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

2023 Total Traffic AM Peak Hour

| | | | | | | | | |
|-----------------------------------|---|---|---|---|---|---|--|--|
| |  |  |  |  |  |  | | |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR | | |
| Lane Configurations |  |  | |  |  | | | |
| Traffic Volume (veh/h) | 2 | 923 | 0 | 924 | 671 | 0 | | |
| Future Volume (Veh/h) | 2 | 923 | 0 | 924 | 671 | 0 | | |
| Sign Control | Stop | | | Free | Free | | | |
| Grade | 0% | | | 0% | 0% | | | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Hourly flow rate (vph) | 2 | 923 | 0 | 924 | 671 | 0 | | |
| Pedestrians | | | | | | | | |
| Lane Width (m) | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | |
| Percent Blockage | | | | | | | | |
| Right turn flare (veh) | | | | | | | | |
| Median type | | | | None | None | | | |
| Median storage (veh) | | | | | | | | |
| Upstream signal (m) | | | | | | | | |
| pX, platoon unblocked | | | | | | | | |
| vC, conflicting volume | 1595 | 671 | 671 | | | | | |
| vC1, stage 1 conf vol | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | |
| vCu, unblocked vol | 1595 | 671 | 671 | | | | | |
| tC, single (s) | 6.5 | 6.3 | 4.1 | | | | | |
| tC, 2 stage (s) | | | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.2 | | | | | |
| p0 queue free % | 98 | 0 | 100 | | | | | |
| cM capacity (veh/h) | 114 | 448 | 929 | | | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | | | |
| Volume Total | 2 | 923 | 924 | 671 | | | | |
| Volume Left | 2 | 0 | 0 | 0 | | | | |
| Volume Right | 0 | 923 | 0 | 0 | | | | |
| cSH | 114 | 448 | 1700 | 1700 | | | | |
| Volume to Capacity | 0.02 | 2.06 | 0.54 | 0.39 | | | | |
| Queue Length 95th (m) | 0.4 | 453.2 | 0.0 | 0.0 | | | | |
| Control Delay (s) | 37.0 | 505.8 | 0.0 | 0.0 | | | | |
| Lane LOS | E | F | | | | | | |
| Approach Delay (s) | 504.7 | | 0.0 | 0.0 | | | | |
| Approach LOS | F | | | | | | | |
| Intersection Summary | | | | | | | | |
| Average Delay | | | 185.3 | | | | | |
| Intersection Capacity Utilization | | | 104.3% | ICU Level of Service | G | | | |
| Analysis Period (min) | | | 15 | | | | | |

















Site 1 National Capital Business Park
15: Last Mile/Building F & Russell

2023 Total Traffic AM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 1 | 86 | 132 | 12 | 597 | 0 | 129 | 2 | 1 | 0 | 1 | 0 |
| Future Volume (Veh/h) | 1 | 86 | 132 | 12 | 597 | 0 | 129 | 2 | 1 | 0 | 1 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 1 | 86 | 132 | 12 | 597 | 0 | 129 | 2 | 1 | 0 | 1 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 597 | | | 218 | | | 776 | 775 | 152 | 777 | 841 | 597 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 597 | | | 218 | | | 776 | 775 | 152 | 777 | 841 | 597 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 99 | | | 58 | 99 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 965 | | | 1334 | | | 308 | 322 | 886 | 306 | 295 | 497 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 219 | 609 | 132 | 1 | | | | | | | | |
| Volume Left | 1 | 12 | 129 | 0 | | | | | | | | |
| Volume Right | 132 | 0 | 1 | 0 | | | | | | | | |
| cSH | 965 | 1334 | 310 | 295 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.01 | 0.43 | 0.00 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.2 | 14.3 | 0.1 | | | | | | | | |
| Control Delay (s) | 0.1 | 0.3 | 25.0 | 17.3 | | | | | | | | |
| Lane LOS | A | A | C | C | | | | | | | | |
| Approach Delay (s) | 0.1 | 0.3 | 25.0 | 17.3 | | | | | | | | |
| Approach LOS | | | C | C | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 3.6 | | | | | | | | | |
| Intersection Capacity Utilization | | | 63.2% | | ICU Level of Service | | | | B | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |












Site 1 National Capital Business Park
16: Site 1/Building F & Russell

2023 Total Traffic AM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 1 | 82 | 4 | 2 | 608 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 1 | 82 | 4 | 2 | 608 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 1 | 82 | 4 | 2 | 608 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 608 | | | 86 | | | 698 | 698 | 84 | 699 | 700 | 608 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 608 | | | 86 | | | 698 | 698 | 84 | 699 | 700 | 608 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 956 | | | 1492 | | | 350 | 360 | 967 | 349 | 359 | 490 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 87 | 610 | 2 | 0 | | | | | | | | |
| Volume Left | 1 | 2 | 1 | 0 | | | | | | | | |
| Volume Right | 4 | 0 | 1 | 0 | | | | | | | | |
| cSH | 956 | 1492 | 514 | 1700 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.1 | 0.0 | | | | | | | | |
| Control Delay (s) | 0.1 | 0.0 | 12.0 | 0.0 | | | | | | | | |
| Lane LOS | A | A | B | A | | | | | | | | |
| Approach Delay (s) | 0.1 | 0.0 | 12.0 | 0.0 | | | | | | | | |
| Approach LOS | | | B | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 0.1 | | | | | | | | | |
| Intersection Capacity Utilization | | | 45.0% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

Site 1 National Capital Business Park
12: Hunt Club & Last Mile

2023 Total Traffic PM Peak Hour

| |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|
| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations |  |  |  | |  |  |
| Traffic Volume (vph) | 60 | 1334 | 1480 | 129 | 89 | 63 |
| Future Volume (vph) | 60 | 1334 | 1480 | 129 | 89 | 63 |
| Satd. Flow (prot) | 1701 | 3402 | 3361 | 0 | 1701 | 1522 |
| Flt Permitted | 0.119 | | | | 0.950 | |
| Satd. Flow (perm) | 213 | 3402 | 3361 | 0 | 1701 | 1522 |
| Satd. Flow (RTOR) | | | 17 | | | 16 |
| Lane Group Flow (vph) | 60 | 1334 | 1609 | 0 | 89 | 63 |
| Turn Type | Perm | NA | NA | | Prot | Perm |
| Protected Phases | | 2 | 6 | | 4 | |
| Permitted Phases | 2 | | | | | 4 |
| Total Split (s) | 41.4 | 41.4 | 41.4 | | 31.8 | 31.8 |
| Total Lost Time (s) | 6.4 | 6.4 | 6.4 | | 5.8 | 5.8 |
| Act Effct Green (s) | 54.8 | 54.8 | 54.8 | | 10.7 | 10.7 |
| Actuated g/C Ratio | 0.75 | 0.75 | 0.75 | | 0.15 | 0.15 |
| v/c Ratio | 0.38 | 0.52 | 0.64 | | 0.36 | 0.27 |
| Control Delay | 14.3 | 6.3 | 7.7 | | 32.3 | 24.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 14.3 | 6.3 | 7.7 | | 32.3 | 24.9 |
| LOS | B | A | A | | C | C |
| Approach Delay | | 6.6 | 7.7 | | 29.3 | |
| Approach LOS | | A | A | | C | |
| Queue Length 50th (m) | 2.7 | 36.5 | 50.4 | | 10.5 | 5.4 |
| Queue Length 95th (m) | 13.4 | 57.3 | 80.5 | | 21.0 | 14.3 |
| Internal Link Dist (m) | | 218.6 | 862.2 | | 131.3 | |
| Turn Bay Length (m) | 40.0 | | | | | 40.0 |
| Base Capacity (vph) | 159 | 2545 | 2518 | | 604 | 550 |
| Starvation Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.38 | 0.52 | 0.64 | | 0.15 | 0.11 |

Intersection Summary

Cycle Length: 73.2

Actuated Cycle Length: 73.2

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 8.2




Intersection LOS: A

Intersection Capacity Utilization 71.1%

ICU Level of Service C











Analysis Period (min) 15

Splits and Phases: 12: Hunt Club & Last Mile

| | |
|---|---|
|  |  |
| Ø2 (R) | Ø4 |
| 41.4 s | 31.8 s |
|  | |
| Ø6 (R) | |
| 41.4 s | |

















Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

2023 Total Traffic PM Peak Hour

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (veh/h) | 11 | 1441 | 0 | 1127 | 167 | 0 |
| Future Volume (Veh/h) | 11 | 1441 | 0 | 1127 | 167 | 0 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 11 | 1441 | 0 | 1127 | 167 | 0 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1294 | 167 | 167 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1294 | 167 | 167 | | | |
| tC, single (s) | 6.7 | 6.3 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.8 | 3.4 | 2.2 | | | |
| p0 queue free % | 93 | 0 | 100 | | | |
| cM capacity (veh/h) | 157 | 867 | 1423 | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | |
| Volume Total | 11 | 1441 | 1127 | 167 | | |
| Volume Left | 11 | 0 | 0 | 0 | | |
| Volume Right | 0 | 1441 | 0 | 0 | | |
| cSH | 157 | 867 | 1700 | 1700 | | |
| Volume to Capacity | 0.07 | 1.66 | 0.66 | 0.10 | | |
| Queue Length 95th (m) | 1.6 | 550.4 | 0.0 | 0.0 | | |
| Control Delay (s) | 29.7 | 317.2 | 0.0 | 0.0 | | |
| Lane LOS | D | F | | | | |
| Approach Delay (s) | 315.1 | | 0.0 | 0.0 | | |
| Approach LOS | F | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 166.6 | | | |
| Intersection Capacity Utilization | | | 110.1% | ICU Level of Service | H | |
| Analysis Period (min) | | | 15 | | | |

















Site 1 National Capital Business Park
15: Last Mile/Building F & Russell

2023 Total Traffic PM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 0 | 444 | 86 | 1 | 94 | 0 | 172 | 1 | 12 | 0 | 2 | 1 |
| Future Volume (Veh/h) | 0 | 444 | 86 | 1 | 94 | 0 | 172 | 1 | 12 | 0 | 2 | 1 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 0 | 444 | 86 | 1 | 94 | 0 | 172 | 1 | 12 | 0 | 2 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 94 | | | 530 | | | 585 | 583 | 487 | 596 | 626 | 94 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 94 | | | 530 | | | 585 | 583 | 487 | 596 | 626 | 94 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 59 | 100 | 98 | 100 | 99 | 100 |
| cM capacity (veh/h) | 1481 | | | 1022 | | | 416 | 420 | 574 | 402 | 396 | 955 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 530 | 95 | 185 | 3 | | | | | | | | |
| Volume Left | 0 | 1 | 172 | 0 | | | | | | | | |
| Volume Right | 86 | 0 | 12 | 1 | | | | | | | | |
| cSH | 1481 | 1022 | 423 | 492 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.00 | 0.44 | 0.01 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 15.2 | 0.1 | | | | | | | | |
| Control Delay (s) | 0.0 | 0.1 | 19.9 | 12.4 | | | | | | | | |
| Lane LOS | | A | C | B | | | | | | | | |
| Approach Delay (s) | 0.0 | 0.1 | 19.9 | 12.4 | | | | | | | | |
| Approach LOS | | | C | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 4.6 | | | | | | | | | |
| Intersection Capacity Utilization | | | 54.4% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

Site 1 National Capital Business Park
16: Site 1/Building F & Russell

2023 Total Traffic PM Peak Hour











| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 0 | 454 | 2 | 1 | 90 | 0 | 4 | 0 | 2 | 0 | 0 | 1 |
| Future Volume (Veh/h) | 0 | 454 | 2 | 1 | 90 | 0 | 4 | 0 | 2 | 0 | 0 | 1 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 0 | 454 | 2 | 1 | 90 | 0 | 4 | 0 | 2 | 0 | 0 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 90 | | | 456 | | | 548 | 547 | 455 | 549 | 548 | 90 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 90 | | | 456 | | | 548 | 547 | 455 | 549 | 548 | 90 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 99 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1486 | | | 1089 | | | 442 | 440 | 599 | 440 | 439 | 960 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 456 | 91 | 6 | 1 | | | | | | | | |
| Volume Left | 0 | 1 | 4 | 0 | | | | | | | | |
| Volume Right | 2 | 0 | 2 | 1 | | | | | | | | |
| cSH | 1486 | 1089 | 484 | 960 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.00 | 0.01 | 0.00 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.3 | 0.0 | | | | | | | | |
| Control Delay (s) | 0.0 | 0.1 | 12.5 | 8.8 | | | | | | | | |
| Lane LOS | | A | B | A | | | | | | | | |
| Approach Delay (s) | 0.0 | 0.1 | 12.5 | 8.8 | | | | | | | | |
| Approach LOS | | | B | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 0.2 | | | | | | | | | |
| Intersection Capacity Utilization | | | 36.1% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

4055 & 4120 Russell Road
12: Hunt Club & Last Mile

2023 Total Traffic AM Peak Hour Unsignalized



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|-----------------------------------|------|------|-------|------|----------------------|-------|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 49 | 1062 | 1449 | 146 | 93 | 54 |
| Future Volume (Veh/h) | 49 | 1062 | 1449 | 146 | 93 | 54 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 49 | 1062 | 1449 | 146 | 93 | 54 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | 6 |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1595 | | | | 2151 | 798 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1595 | | | | 2151 | 798 |
| tC, single (s) | 4.2 | | | | 6.9 | 7.0 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 88 | | | | 0 | 83 |
| cM capacity (veh/h) | 393 | | | | 35 | 323 |
| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | SB 1 |
| Volume Total | 49 | 531 | 531 | 966 | 629 | 147 |
| Volume Left | 49 | 0 | 0 | 0 | 0 | 93 |
| Volume Right | 0 | 0 | 0 | 0 | 146 | 54 |
| cSH | 393 | 1700 | 1700 | 1700 | 1700 | 52 |
| Volume to Capacity | 0.12 | 0.31 | 0.31 | 0.57 | 0.37 | 2.81 |
| Queue Length 95th (m) | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 107.9 |
| Control Delay (s) | 15.5 | 0.0 | 0.0 | 0.0 | 0.0 | 984.7 |
| Lane LOS | C | | | | | F |
| Approach Delay (s) | 0.7 | | | 0.0 | | 984.7 |
| Approach LOS | | | | | | F |
| Intersection Summary | | | | | | |
| Average Delay | | | 51.0 | | | |
| Intersection Capacity Utilization | | | 59.3% | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | |

| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations |  |  |  | |  | |
| Traffic Volume (veh/h) | 60 | 1334 | 1480 | 128 | 89 | 63 |
| Future Volume (Veh/h) | 60 | 1334 | 1480 | 128 | 89 | 63 |
| Sign Control | | Free | Free | | Stop | |
| Grade | | 0% | 0% | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 60 | 1334 | 1480 | 128 | 89 | 63 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | None | None | | | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1608 | | | | 2331 | 804 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1608 | | | | 2331 | 804 |
| tC, single (s) | 4.2 | | | | 6.9 | 7.0 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 2.2 | | | | 3.5 | 3.3 |
| p0 queue free % | 85 | | | | 0 | 80 |
| cM capacity (veh/h) | 389 | | | | 25 | 320 |
| Direction, Lane # | EB 1 | EB 2 | EB 3 | WB 1 | WB 2 | SB 1 |
| Volume Total | 60 | 667 | 667 | 987 | 621 | 152 |
| Volume Left | 60 | 0 | 0 | 0 | 0 | 89 |
| Volume Right | 0 | 0 | 0 | 0 | 128 | 63 |
| cSH | 389 | 1700 | 1700 | 1700 | 1700 | 41 |
| Volume to Capacity | 0.15 | 0.39 | 0.39 | 0.58 | 0.37 | 3.74 |
| Queue Length 95th (m) | 3.8 | 0.0 | 0.0 | 0.0 | 0.0 | Err |
| Control Delay (s) | 15.9 | 0.0 | 0.0 | 0.0 | 0.0 | Err |
| Lane LOS | C | | | | | F |
| Approach Delay (s) | 0.7 | | | 0.0 | | Err |
| Approach LOS | | | | | | F |
| Intersection Summary | | | | | | |
| Average Delay | | | 482.2 | | | |
| Intersection Capacity Utilization | | | 68.6% | | ICU Level of Service | C |
| Analysis Period (min) | | | 15 | | | |

Site 1 National Capital Business Park
12: Hunt Club & Last Mile

2028 Future Background AM Peak Hour



| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|-------|-------|-------|-----|-------|------|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 43 | 1112 | 1520 | 134 | 89 | 52 |
| Future Volume (vph) | 43 | 1112 | 1520 | 134 | 89 | 52 |
| Satd. Flow (prot) | 1701 | 3402 | 3361 | 0 | 1701 | 1522 |
| Flt Permitted | 0.111 | | | | 0.950 | |
| Satd. Flow (perm) | 199 | 3402 | 3361 | 0 | 1701 | 1522 |
| Satd. Flow (RTOR) | | | 15 | | | 5 |
| Lane Group Flow (vph) | 43 | 1112 | 1654 | 0 | 89 | 52 |
| Turn Type | Perm | NA | NA | | Prot | Perm |
| Protected Phases | | 2 | 6 | | 4 | |
| Permitted Phases | 2 | | | | | 4 |
| Total Split (s) | 34.0 | 34.0 | 34.0 | | 36.2 | 36.2 |
| Total Lost Time (s) | 6.4 | 6.4 | 6.4 | | 5.8 | 5.8 |
| Act Effct Green (s) | 52.5 | 52.5 | 52.5 | | 9.1 | 9.1 |
| Actuated g/C Ratio | 0.75 | 0.75 | 0.75 | | 0.13 | 0.13 |
| v/c Ratio | 0.29 | 0.44 | 0.66 | | 0.41 | 0.26 |
| Control Delay | 11.6 | 5.4 | 7.9 | | 32.8 | 27.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 11.6 | 5.4 | 7.9 | | 32.8 | 27.6 |
| LOS | B | A | A | | C | C |
| Approach Delay | | 5.6 | 7.9 | | 30.9 | |
| Approach LOS | | A | A | | C | |
| Queue Length 50th (m) | 1.6 | 25.6 | 50.0 | | 10.1 | 5.2 |
| Queue Length 95th (m) | 8.7 | 43.6 | 86.0 | | 20.2 | 12.8 |
| Internal Link Dist (m) | | 217.7 | 853.4 | | 137.8 | |
| Turn Bay Length (m) | 40.0 | | | | | 40.0 |
| Base Capacity (vph) | 148 | 2543 | 2516 | | 736 | 661 |
| Starvation Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.29 | 0.44 | 0.66 | | 0.12 | 0.08 |

Intersection Summary

Cycle Length: 70.2

Actuated Cycle Length: 70.2

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 8.1

Intersection LOS: A

Intersection Capacity Utilization 64.2%

ICU Level of Service C











Analysis Period (min) 15

Splits and Phases: 12: Hunt Club & Last Mile

| | | | | |
|------|--------|--|--------|----|
| | Ø2 (R) | | | Ø4 |
| 34 s | | | 36.2 s | |
| | Ø6 (R) | | | |
| 34 s | | | | |

















Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

2028 Future Background AM Peak Hour

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (veh/h) | 2 | 953 | 0 | 962 | 700 | 0 |
| Future Volume (Veh/h) | 2 | 953 | 0 | 962 | 700 | 0 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 2 | 953 | 0 | 962 | 700 | 0 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1662 | 700 | 700 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1662 | 700 | 700 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.2 | | | |
| p0 queue free % | 98 | 0 | 100 | | | |
| cM capacity (veh/h) | 104 | 431 | 906 | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | |
| Volume Total | 2 | 953 | 962 | 700 | | |
| Volume Left | 2 | 0 | 0 | 0 | | |
| Volume Right | 0 | 953 | 0 | 0 | | |
| cSH | 104 | 431 | 1700 | 1700 | | |
| Volume to Capacity | 0.02 | 2.21 | 0.57 | 0.41 | | |
| Queue Length 95th (m) | 0.4 | 492.4 | 0.0 | 0.0 | | |
| Control Delay (s) | 40.3 | 573.4 | 0.0 | 0.0 | | |
| Lane LOS | E | F | | | | |
| Approach Delay (s) | 572.3 | | 0.0 | 0.0 | | |
| Approach LOS | F | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 208.8 | | | |
| Intersection Capacity Utilization | | | 107.8% | ICU Level of Service | G | |
| Analysis Period (min) | | | 15 | | | |

















Site 1 National Capital Business Park
15: Last Mile/Building F & Russell

2028 Future Background AM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 1 | 83 | 126 | 12 | 616 | 0 | 127 | 2 | 1 | 0 | 1 | 0 |
| Future Volume (Veh/h) | 1 | 83 | 126 | 12 | 616 | 0 | 127 | 2 | 1 | 0 | 1 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 1 | 83 | 126 | 12 | 616 | 0 | 127 | 2 | 1 | 0 | 1 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 616 | | | 209 | | | 788 | 788 | 146 | 790 | 851 | 616 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 616 | | | 209 | | | 788 | 788 | 146 | 790 | 851 | 616 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 99 | | | 58 | 99 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 949 | | | 1344 | | | 302 | 317 | 893 | 300 | 291 | 485 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 210 | 628 | 130 | 1 | | | | | | | | |
| Volume Left | 1 | 12 | 127 | 0 | | | | | | | | |
| Volume Right | 126 | 0 | 1 | 0 | | | | | | | | |
| cSH | 949 | 1344 | 304 | 291 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.01 | 0.43 | 0.00 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.2 | 14.4 | 0.1 | | | | | | | | |
| Control Delay (s) | 0.1 | 0.3 | 25.4 | 17.4 | | | | | | | | |
| Lane LOS | A | A | D | C | | | | | | | | |
| Approach Delay (s) | 0.1 | 0.3 | 25.4 | 17.4 | | | | | | | | |
| Approach LOS | | | D | C | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 3.6 | | | | | | | | | |
| Intersection Capacity Utilization | | | 64.1% | | ICU Level of Service | | | | C | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |












Site 1 National Capital Business Park
16: Site 1/Building F & Russell

2028 Future Background AM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 1 | 83 | 0 | 0 | 628 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 1 | 83 | 0 | 0 | 628 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 1 | 83 | 0 | 0 | 628 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 628 | | | 83 | | | 713 | 713 | 83 | 713 | 713 | 628 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 628 | | | 83 | | | 713 | 713 | 83 | 713 | 713 | 628 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 940 | | | 1495 | | | 343 | 353 | 968 | 343 | 353 | 477 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 84 | 628 | 0 | 0 | | | | | | | | |
| Volume Left | 1 | 0 | 0 | 0 | | | | | | | | |
| Volume Right | 0 | 0 | 0 | 0 | | | | | | | | |
| cSH | 940 | 1700 | 1700 | 1700 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.37 | 0.00 | 0.00 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| Control Delay (s) | 0.1 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| Lane LOS | A | | A | A | | | | | | | | |
| Approach Delay (s) | 0.1 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| Approach LOS | | | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 0.0 | | | | | | | | | |
| Intersection Capacity Utilization | | | 38.2% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

Site 1 National Capital Business Park
12: Hunt Club & Last Mile

2028 Future Background PM Peak Hour

| |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|
| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations |  |  |  | |  |  |
| Traffic Volume (vph) | 57 | 1394 | 1551 | 124 | 77 | 57 |
| Future Volume (vph) | 57 | 1394 | 1551 | 124 | 77 | 57 |
| Satd. Flow (prot) | 1701 | 3402 | 3364 | 0 | 1701 | 1522 |
| Flt Permitted | 0.111 | | | | 0.950 | |
| Satd. Flow (perm) | 199 | 3402 | 3364 | 0 | 1701 | 1522 |
| Satd. Flow (RTOR) | | | 15 | | | 13 |
| Lane Group Flow (vph) | 57 | 1394 | 1675 | 0 | 77 | 57 |
| Turn Type | Perm | NA | NA | | Prot | Perm |
| Protected Phases | | 2 | 6 | | 4 | |
| Permitted Phases | 2 | | | | | 4 |
| Total Split (s) | 41.4 | 41.4 | 41.4 | | 31.8 | 31.8 |
| Total Lost Time (s) | 6.4 | 6.4 | 6.4 | | 5.8 | 5.8 |
| Act Effct Green (s) | 55.8 | 55.8 | 55.8 | | 8.7 | 8.7 |
| Actuated g/C Ratio | 0.76 | 0.76 | 0.76 | | 0.12 | 0.12 |
| v/c Ratio | 0.38 | 0.54 | 0.65 | | 0.38 | 0.30 |
| Control Delay | 14.3 | 5.9 | 7.4 | | 34.4 | 27.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 14.3 | 5.9 | 7.4 | | 34.4 | 27.3 |
| LOS | B | A | A | | C | C |
| Approach Delay | | 6.2 | 7.4 | | 31.4 | |
| Approach LOS | | A | A | | C | |
| Queue Length 50th (m) | 2.3 | 36.1 | 50.3 | | 9.2 | 5.2 |
| Queue Length 95th (m) | 13.3 | 59.4 | 83.7 | | 19.0 | 13.6 |
| Internal Link Dist (m) | | 218.6 | 862.2 | | 131.3 | |
| Turn Bay Length (m) | 30.0 | | | | | 40.0 |
| Base Capacity (vph) | 151 | 2595 | 2569 | | 604 | 548 |
| Starvation Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.38 | 0.54 | 0.65 | | 0.13 | 0.10 |

Intersection Summary

Cycle Length: 73.2

Actuated Cycle Length: 73.2

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 7.9




Intersection LOS: A

Intersection Capacity Utilization 64.7%

ICU Level of Service C











Analysis Period (min) 15

Splits and Phases: 12: Hunt Club & Last Mile

| | |
|---|---|
|  |  |
| Ø2 (R) | Ø4 |
| 41.4 s | 31.8 s |
|  | |
| Ø6 (R) | |
| 41.4 s | |

















Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

2028 Future Background PM Peak Hour

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (veh/h) | 11 | 1501 | 0 | 1167 | 173 | 0 |
| Future Volume (Veh/h) | 11 | 1501 | 0 | 1167 | 173 | 0 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 11 | 1501 | 0 | 1167 | 173 | 0 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1340 | 173 | 173 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1340 | 173 | 173 | | | |
| tC, single (s) | 6.7 | 6.3 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.8 | 3.4 | 2.2 | | | |
| p0 queue free % | 93 | 0 | 100 | | | |
| cM capacity (veh/h) | 147 | 860 | 1416 | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | |
| Volume Total | 11 | 1501 | 1167 | 173 | | |
| Volume Left | 11 | 0 | 0 | 0 | | |
| Volume Right | 0 | 1501 | 0 | 0 | | |
| cSH | 147 | 860 | 1700 | 1700 | | |
| Volume to Capacity | 0.07 | 1.74 | 0.69 | 0.10 | | |
| Queue Length 95th (m) | 1.7 | 606.2 | 0.0 | 0.0 | | |
| Control Delay (s) | 31.5 | 353.9 | 0.0 | 0.0 | | |
| Lane LOS | D | F | | | | |
| Approach Delay (s) | 351.6 | | 0.0 | 0.0 | | |
| Approach LOS | F | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 186.4 | | | |
| Intersection Capacity Utilization | | | 114.4% | ICU Level of Service | H | |
| Analysis Period (min) | | | 15 | | | |

















Site 1 National Capital Business Park
15: Last Mile/Building F & Russell

2028 Future Background PM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 0 | 456 | 84 | 2 | 92 | 0 | 166 | 1 | 12 | 0 | 2 | 1 |
| Future Volume (Veh/h) | 0 | 456 | 84 | 2 | 92 | 0 | 166 | 1 | 12 | 0 | 2 | 1 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 0 | 456 | 84 | 2 | 92 | 0 | 166 | 1 | 12 | 0 | 2 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 92 | | | 540 | | | 596 | 594 | 498 | 606 | 636 | 92 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 92 | | | 540 | | | 596 | 594 | 498 | 606 | 636 | 92 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 59 | 100 | 98 | 100 | 99 | 100 |
| cM capacity (veh/h) | 1484 | | | 1013 | | | 408 | 413 | 566 | 394 | 391 | 957 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 540 | 94 | 179 | 3 | | | | | | | | |
| Volume Left | 0 | 2 | 166 | 0 | | | | | | | | |
| Volume Right | 84 | 0 | 12 | 1 | | | | | | | | |
| cSH | 1484 | 1013 | 416 | 487 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.00 | 0.43 | 0.01 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 14.8 | 0.1 | | | | | | | | |
| Control Delay (s) | 0.0 | 0.2 | 20.0 | 12.4 | | | | | | | | |
| Lane LOS | | A | C | B | | | | | | | | |
| Approach Delay (s) | 0.0 | 0.2 | 20.0 | 12.4 | | | | | | | | |
| Approach LOS | | | C | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 4.5 | | | | | | | | | |
| Intersection Capacity Utilization | | | 54.6% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |












Site 1 National Capital Business Park
16: Site 1/Building F & Russell

2028 Future Background PM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 0 | 468 | 0 | 0 | 92 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Future Volume (Veh/h) | 0 | 468 | 0 | 0 | 92 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 0 | 468 | 0 | 0 | 92 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 92 | | | 468 | | | 561 | 560 | 468 | 560 | 560 | 92 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 92 | | | 468 | | | 561 | 560 | 468 | 560 | 560 | 92 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1484 | | | 1078 | | | 433 | 433 | 589 | 434 | 433 | 957 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 468 | 92 | 0 | 1 | | | | | | | | |
| Volume Left | 0 | 0 | 0 | 0 | | | | | | | | |
| Volume Right | 0 | 0 | 0 | 1 | | | | | | | | |
| cSH | 1484 | 1700 | 1700 | 957 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.05 | 0.00 | 0.00 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 8.8 | | | | | | | | |
| Lane LOS | | | A | A | | | | | | | | |
| Approach Delay (s) | 0.0 | 0.0 | 0.0 | 8.8 | | | | | | | | |
| Approach LOS | | | A | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 0.0 | | | | | | | | | |
| Intersection Capacity Utilization | | | 36.0% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

Site 1 National Capital Business Park
12: Hunt Club & Last Mile

2028 Total Traffic AM Peak Hour

| |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|
| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations |  |  |  | |  |  |
| Traffic Volume (vph) | 49 | 1112 | 1520 | 146 | 93 | 54 |
| Future Volume (vph) | 49 | 1112 | 1520 | 146 | 93 | 54 |
| Satd. Flow (prot) | 1701 | 3402 | 3358 | 0 | 1701 | 1522 |
| Flt Permitted | 0.109 | | | | 0.950 | |
| Satd. Flow (perm) | 195 | 3402 | 3358 | 0 | 1701 | 1522 |
| Satd. Flow (RTOR) | | | 17 | | | 5 |
| Lane Group Flow (vph) | 49 | 1112 | 1666 | 0 | 93 | 54 |
| Turn Type | Perm | NA | NA | | Prot | Perm |
| Protected Phases | | 2 | 6 | | 4 | |
| Permitted Phases | 2 | | | | | 4 |
| Total Split (s) | 34.0 | 34.0 | 34.0 | | 36.2 | 36.2 |
| Total Lost Time (s) | 6.4 | 6.4 | 6.4 | | 5.8 | 5.8 |
| Act Effct Green (s) | 52.3 | 52.3 | 52.3 | | 9.2 | 9.2 |
| Actuated g/C Ratio | 0.75 | 0.75 | 0.75 | | 0.13 | 0.13 |
| v/c Ratio | 0.34 | 0.44 | 0.66 | | 0.42 | 0.26 |
| Control Delay | 13.7 | 5.5 | 8.1 | | 32.8 | 27.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 13.7 | 5.5 | 8.1 | | 32.8 | 27.6 |
| LOS | B | A | A | | C | C |
| Approach Delay | | 5.8 | 8.1 | | 30.9 | |
| Approach LOS | | A | A | | C | |
| Queue Length 50th (m) | 2.0 | 26.0 | 51.5 | | 10.5 | 5.4 |
| Queue Length 95th (m) | 11.1 | 44.1 | 88.2 | | 20.9 | 13.3 |
| Internal Link Dist (m) | | 217.7 | 853.4 | | 137.8 | |
| Turn Bay Length (m) | 40.0 | | | | | 40.0 |
| Base Capacity (vph) | 145 | 2536 | 2508 | | 736 | 661 |
| Starvation Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.34 | 0.44 | 0.66 | | 0.13 | 0.08 |

Intersection Summary

Cycle Length: 70.2

Actuated Cycle Length: 70.2

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 8.4




Intersection LOS: A

Intersection Capacity Utilization 64.9%

ICU Level of Service C











Analysis Period (min) 15

Splits and Phases: 12: Hunt Club & Last Mile

| | |
|---|---|
|  |  |
| Ø2 (R) | Ø4 |
| 34 s | 36.2 s |
|  | |
| Ø6 (R) | |
| 34 s | |

















Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

2028 Total Traffic AM Peak Hour

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (veh/h) | 2 | 963 | 0 | 965 | 702 | 0 |
| Future Volume (Veh/h) | 2 | 963 | 0 | 965 | 702 | 0 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 2 | 963 | 0 | 965 | 702 | 0 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1667 | 702 | 702 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1667 | 702 | 702 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.2 | | | |
| p0 queue free % | 98 | 0 | 100 | | | |
| cM capacity (veh/h) | 103 | 430 | 905 | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | |
| Volume Total | 2 | 963 | 965 | 702 | | |
| Volume Left | 2 | 0 | 0 | 0 | | |
| Volume Right | 0 | 963 | 0 | 0 | | |
| cSH | 103 | 430 | 1700 | 1700 | | |
| Volume to Capacity | 0.02 | 2.24 | 0.57 | 0.41 | | |
| Queue Length 95th (m) | 0.4 | 501.8 | 0.0 | 0.0 | | |
| Control Delay (s) | 40.6 | 586.5 | 0.0 | 0.0 | | |
| Lane LOS | E | F | | | | |
| Approach Delay (s) | 585.3 | | 0.0 | 0.0 | | |
| Approach LOS | F | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 214.6 | | | |
| Intersection Capacity Utilization | | | 108.6% | ICU Level of Service | G | |
| Analysis Period (min) | | | 15 | | | |

















Site 1 National Capital Business Park
15: Last Mile/Building F & Russell

2028 Total Traffic AM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 1 | 87 | 132 | 12 | 617 | 0 | 129 | 2 | 1 | 0 | 1 | 0 |
| Future Volume (Veh/h) | 1 | 87 | 132 | 12 | 617 | 0 | 129 | 2 | 1 | 0 | 1 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 1 | 87 | 132 | 12 | 617 | 0 | 129 | 2 | 1 | 0 | 1 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 617 | | | 219 | | | 796 | 796 | 153 | 798 | 862 | 617 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 617 | | | 219 | | | 796 | 796 | 153 | 798 | 862 | 617 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 99 | | | 57 | 99 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 949 | | | 1333 | | | 298 | 313 | 885 | 296 | 287 | 484 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 220 | 629 | 132 | 1 | | | | | | | | |
| Volume Left | 1 | 12 | 129 | 0 | | | | | | | | |
| Volume Right | 132 | 0 | 1 | 0 | | | | | | | | |
| cSH | 949 | 1333 | 300 | 287 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.01 | 0.44 | 0.00 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.2 | 15.0 | 0.1 | | | | | | | | |
| Control Delay (s) | 0.1 | 0.3 | 26.1 | 17.6 | | | | | | | | |
| Lane LOS | A | A | D | C | | | | | | | | |
| Approach Delay (s) | 0.1 | 0.3 | 26.1 | 17.6 | | | | | | | | |
| Approach LOS | | | D | C | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 3.7 | | | | | | | | | |
| Intersection Capacity Utilization | | | 64.3% | | ICU Level of Service | | | | C | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |












Site 1 National Capital Business Park
16: Site 1/Building F & Russell

2028 Total Traffic AM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 1 | 83 | 4 | 2 | 628 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Future Volume (Veh/h) | 1 | 83 | 4 | 2 | 628 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 1 | 83 | 4 | 2 | 628 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | None | | | None | | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 628 | | | 87 | | | 719 | 719 | 85 | 720 | 721 | 628 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 628 | | | 87 | | | 719 | 719 | 85 | 720 | 721 | 628 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 100 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 940 | | | 1490 | | | 339 | 350 | 966 | 338 | 349 | 477 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 88 | 630 | 2 | 0 | | | | | | | | |
| Volume Left | 1 | 2 | 1 | 0 | | | | | | | | |
| Volume Right | 4 | 0 | 1 | 0 | | | | | | | | |
| cSH | 940 | 1490 | 502 | 1700 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.1 | 0.0 | | | | | | | | |
| Control Delay (s) | 0.1 | 0.0 | 12.2 | 0.0 | | | | | | | | |
| Lane LOS | A | A | B | A | | | | | | | | |
| Approach Delay (s) | 0.1 | 0.0 | 12.2 | 0.0 | | | | | | | | |
| Approach LOS | | | B | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | 0.1 | | | | | | | | | | | |
| Intersection Capacity Utilization | 46.1% | | | ICU Level of Service | | | | | A | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | |

Site 1 National Capital Business Park
12: Hunt Club & Last Mile

2028 Total Traffic PM Peak Hour

| |  |  |  |  |  |  |
|------------------------|---|---|---|---|---|---|
| Lane Group | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations |  |  |  | |  |  |
| Traffic Volume (vph) | 60 | 1394 | 1551 | 129 | 89 | 63 |
| Future Volume (vph) | 60 | 1394 | 1551 | 129 | 89 | 63 |
| Satd. Flow (prot) | 1701 | 3402 | 3361 | 0 | 1701 | 1522 |
| Flt Permitted | 0.108 | | | | 0.950 | |
| Satd. Flow (perm) | 193 | 3402 | 3361 | 0 | 1701 | 1522 |
| Satd. Flow (RTOR) | | | 16 | | | 13 |
| Lane Group Flow (vph) | 60 | 1394 | 1680 | 0 | 89 | 63 |
| Turn Type | Perm | NA | NA | | Prot | Perm |
| Protected Phases | | 2 | 6 | | 4 | |
| Permitted Phases | 2 | | | | | 4 |
| Total Split (s) | 41.4 | 41.4 | 41.4 | | 31.8 | 31.8 |
| Total Lost Time (s) | 6.4 | 6.4 | 6.4 | | 5.8 | 5.8 |
| Act Effct Green (s) | 55.4 | 55.4 | 55.4 | | 9.2 | 9.2 |
| Actuated g/C Ratio | 0.76 | 0.76 | 0.76 | | 0.13 | 0.13 |
| v/c Ratio | 0.41 | 0.54 | 0.66 | | 0.42 | 0.31 |
| Control Delay | 17.2 | 6.2 | 7.8 | | 34.6 | 27.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 |
| Total Delay | 17.2 | 6.2 | 7.8 | | 34.6 | 27.4 |
| LOS | B | A | A | | C | C |
| Approach Delay | | 6.7 | 7.8 | | 31.6 | |
| Approach LOS | | A | A | | C | |
| Queue Length 50th (m) | 2.6 | 37.3 | 52.3 | | 10.6 | 5.8 |
| Queue Length 95th (m) | #19.0 | 61.9 | 88.1 | | 21.0 | 14.7 |
| Internal Link Dist (m) | | 218.6 | 862.2 | | 131.3 | |
| Turn Bay Length (m) | 30.0 | | | | | 40.0 |
| Base Capacity (vph) | 146 | 2573 | 2545 | | 604 | 548 |
| Starvation Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | | 0 | 0 |
| Reduced v/c Ratio | 0.41 | 0.54 | 0.66 | | 0.15 | 0.11 |

Intersection Summary

Cycle Length: 73.2

Actuated Cycle Length: 73.2

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 8.4

Intersection LOS: A

Intersection Capacity Utilization 68.0%








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: 12: Hunt Club & Last Mile

| | | |
|---|---|---|
|  |  |  |
|  |  | |
| 41.4 s | | 31.8 s |
|  |  | |
| 41.4 s | | |

















Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

2028 Total Traffic PM Peak Hour

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (veh/h) | 11 | 1505 | 0 | 1177 | 174 | 0 |
| Future Volume (Veh/h) | 11 | 1505 | 0 | 1177 | 174 | 0 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 11 | 1505 | 0 | 1177 | 174 | 0 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1351 | 174 | 174 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1351 | 174 | 174 | | | |
| tC, single (s) | 6.7 | 6.3 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.8 | 3.4 | 2.2 | | | |
| p0 queue free % | 92 | 0 | 100 | | | |
| cM capacity (veh/h) | 144 | 859 | 1415 | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | |
| Volume Total | 11 | 1505 | 1177 | 174 | | |
| Volume Left | 11 | 0 | 0 | 0 | | |
| Volume Right | 0 | 1505 | 0 | 0 | | |
| cSH | 144 | 859 | 1700 | 1700 | | |
| Volume to Capacity | 0.08 | 1.75 | 0.69 | 0.10 | | |
| Queue Length 95th (m) | 1.7 | 610.4 | 0.0 | 0.0 | | |
| Control Delay (s) | 32.0 | 357.0 | 0.0 | 0.0 | | |
| Lane LOS | D | F | | | | |
| Approach Delay (s) | 354.6 | | 0.0 | 0.0 | | |
| Approach LOS | F | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 187.5 | | | |
| Intersection Capacity Utilization | | | 114.7% | ICU Level of Service | | H |
| Analysis Period (min) | | | 15 | | | |

















Site 1 National Capital Business Park
15: Last Mile/Building F & Russell

2028 Total Traffic PM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 0 | 458 | 86 | 1 | 96 | 0 | 172 | 1 | 12 | 0 | 2 | 1 |
| Future Volume (Veh/h) | 0 | 458 | 86 | 1 | 96 | 0 | 172 | 1 | 12 | 0 | 2 | 1 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 0 | 458 | 86 | 1 | 96 | 0 | 172 | 1 | 12 | 0 | 2 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 96 | | | 544 | | | 601 | 599 | 501 | 612 | 642 | 96 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 96 | | | 544 | | | 601 | 599 | 501 | 612 | 642 | 96 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 58 | 100 | 98 | 100 | 99 | 100 |
| cM capacity (veh/h) | 1479 | | | 1010 | | | 405 | 411 | 564 | 392 | 388 | 952 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 544 | 97 | 185 | 3 | | | | | | | | |
| Volume Left | 0 | 1 | 172 | 0 | | | | | | | | |
| Volume Right | 86 | 0 | 12 | 1 | | | | | | | | |
| cSH | 1479 | 1010 | 413 | 484 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.00 | 0.45 | 0.01 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 15.8 | 0.1 | | | | | | | | |
| Control Delay (s) | 0.0 | 0.1 | 20.6 | 12.5 | | | | | | | | |
| Lane LOS | | A | C | B | | | | | | | | |
| Approach Delay (s) | 0.0 | 0.1 | 20.6 | 12.5 | | | | | | | | |
| Approach LOS | | | C | B | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 4.7 | | | | | | | | | |
| Intersection Capacity Utilization | | | 55.2% | | ICU Level of Service | | | | B | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |











Site 1 National Capital Business Park
16: Site 1/Building F & Russell

2028 Total Traffic PM Peak Hour

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | | |  | | |  | |
| Traffic Volume (veh/h) | 0 | 468 | 2 | 1 | 92 | 0 | 4 | 0 | 2 | 0 | 0 | 1 |
| Future Volume (Veh/h) | 0 | 468 | 2 | 1 | 92 | 0 | 4 | 0 | 2 | 0 | 0 | 1 |
| Sign Control | | Free | | | Free | | | Stop | | | Stop | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 0 | 468 | 2 | 1 | 92 | 0 | 4 | 0 | 2 | 0 | 0 | 1 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage (veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 92 | | | 470 | | | 564 | 563 | 469 | 565 | 564 | 92 |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 92 | | | 470 | | | 564 | 563 | 469 | 565 | 564 | 92 |
| tC, single (s) | 4.1 | | | 4.1 | | | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 2.2 | | | 2.2 | | | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 |
| p0 queue free % | 100 | | | 100 | | | 99 | 100 | 100 | 100 | 100 | 100 |
| cM capacity (veh/h) | 1484 | | | 1076 | | | 431 | 431 | 588 | 429 | 430 | 957 |
| Direction, Lane # | EB 1 | WB 1 | NB 1 | SB 1 | | | | | | | | |
| Volume Total | 470 | 93 | 6 | 1 | | | | | | | | |
| Volume Left | 0 | 1 | 4 | 0 | | | | | | | | |
| Volume Right | 2 | 0 | 2 | 1 | | | | | | | | |
| cSH | 1484 | 1076 | 473 | 957 | | | | | | | | |
| Volume to Capacity | 0.00 | 0.00 | 0.01 | 0.00 | | | | | | | | |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.3 | 0.0 | | | | | | | | |
| Control Delay (s) | 0.0 | 0.1 | 12.7 | 8.8 | | | | | | | | |
| Lane LOS | | A | B | A | | | | | | | | |
| Approach Delay (s) | 0.0 | 0.1 | 12.7 | 8.8 | | | | | | | | |
| Approach LOS | | | B | A | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| Average Delay | | | 0.2 | | | | | | | | | |
| Intersection Capacity Utilization | | | 36.8% | | ICU Level of Service | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |











Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

2033 Future Background AM Peak Hour

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (veh/h) | 2 | 992 | 0 | 1002 | 731 | 0 |
| Future Volume (Veh/h) | 2 | 992 | 0 | 1002 | 731 | 0 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 2 | 992 | 0 | 1002 | 731 | 0 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1733 | 731 | 731 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1733 | 731 | 731 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.2 | | | |
| p0 queue free % | 98 | 0 | 100 | | | |
| cM capacity (veh/h) | 94 | 414 | 883 | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | |
| Volume Total | 2 | 992 | 1002 | 731 | | |
| Volume Left | 2 | 0 | 0 | 0 | | |
| Volume Right | 0 | 992 | 0 | 0 | | |
| cSH | 94 | 414 | 1700 | 1700 | | |
| Volume to Capacity | 0.02 | 2.40 | 0.59 | 0.43 | | |
| Queue Length 95th (m) | 0.5 | 539.9 | 0.0 | 0.0 | | |
| Control Delay (s) | 44.2 | 657.7 | 0.0 | 0.0 | | |
| Lane LOS | E | F | | | | |
| Approach Delay (s) | 656.5 | | 0.0 | 0.0 | | |
| Approach LOS | F | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 239.3 | | | |
| Intersection Capacity Utilization | | | 112.1% | ICU Level of Service | H | |
| Analysis Period (min) | | | 15 | | | |











Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

2033 Future Background PM Peak Hour

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (veh/h) | 11 | 1566 | 0 | 1218 | 180 | 0 |
| Future Volume (Veh/h) | 11 | 1566 | 0 | 1218 | 180 | 0 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 11 | 1566 | 0 | 1218 | 180 | 0 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1398 | 180 | 180 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1398 | 180 | 180 | | | |
| tC, single (s) | 6.7 | 6.3 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.8 | 3.4 | 2.2 | | | |
| p0 queue free % | 92 | 0 | 100 | | | |
| cM capacity (veh/h) | 135 | 853 | 1408 | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | |
| Volume Total | 11 | 1566 | 1218 | 180 | | |
| Volume Left | 11 | 0 | 0 | 0 | | |
| Volume Right | 0 | 1566 | 0 | 0 | | |
| cSH | 135 | 853 | 1700 | 1700 | | |
| Volume to Capacity | 0.08 | 1.84 | 0.72 | 0.11 | | |
| Queue Length 95th (m) | 1.8 | 667.4 | 0.0 | 0.0 | | |
| Control Delay (s) | 34.1 | 394.9 | 0.0 | 0.0 | | |
| Lane LOS | D | F | | | | |
| Approach Delay (s) | 392.4 | | 0.0 | 0.0 | | |
| Approach LOS | F | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 208.0 | | | |
| Intersection Capacity Utilization | | | 119.0% | ICU Level of Service | H | |
| Analysis Period (min) | | | 15 | | | |











Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

2033 Total Traffic AM Peak Hour

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (veh/h) | 2 | 1002 | 0 | 1005 | 733 | 0 |
| Future Volume (Veh/h) | 2 | 1002 | 0 | 1005 | 733 | 0 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 2 | 1002 | 0 | 1005 | 733 | 0 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1738 | 733 | 733 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1738 | 733 | 733 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.2 | | | |
| p0 queue free % | 98 | 0 | 100 | | | |
| cM capacity (veh/h) | 93 | 412 | 881 | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | |
| Volume Total | 2 | 1002 | 1005 | 733 | | |
| Volume Left | 2 | 0 | 0 | 0 | | |
| Volume Right | 0 | 1002 | 0 | 0 | | |
| cSH | 93 | 412 | 1700 | 1700 | | |
| Volume to Capacity | 0.02 | 2.43 | 0.59 | 0.43 | | |
| Queue Length 95th (m) | 0.5 | 549.4 | 0.0 | 0.0 | | |
| Control Delay (s) | 44.5 | 671.4 | 0.0 | 0.0 | | |
| Lane LOS | E | F | | | | |
| Approach Delay (s) | 670.2 | | 0.0 | 0.0 | | |
| Approach LOS | F | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 245.4 | | | |
| Intersection Capacity Utilization | | | 112.9% | ICU Level of Service | H | |
| Analysis Period (min) | | | 15 | | | |

Site 1 National Capital Business Park
6: Hunt Club & Hwy 417 Offramp

2033 Total Traffic PM Peak Hour

| | | | | | | |
|-----------------------------------|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  |  | |  |  | |
| Traffic Volume (veh/h) | 11 | 1570 | 0 | 1228 | 181 | 0 |
| Future Volume (Veh/h) | 11 | 1570 | 0 | 1228 | 181 | 0 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 11 | 1570 | 0 | 1228 | 181 | 0 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | | None | None | |
| Median storage (veh) | | | | | | |
| Upstream signal (m) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1409 | 181 | 181 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1409 | 181 | 181 | | | |
| tC, single (s) | 6.7 | 6.3 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.8 | 3.4 | 2.2 | | | |
| p0 queue free % | 92 | 0 | 100 | | | |
| cM capacity (veh/h) | 133 | 851 | 1407 | | | |
| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | | |
| Volume Total | 11 | 1570 | 1228 | 181 | | |
| Volume Left | 11 | 0 | 0 | 0 | | |
| Volume Right | 0 | 1570 | 0 | 0 | | |
| cSH | 133 | 851 | 1700 | 1700 | | |
| Volume to Capacity | 0.08 | 1.84 | 0.72 | 0.11 | | |
| Queue Length 95th (m) | 1.9 | 671.7 | 0.0 | 0.0 | | |
| Control Delay (s) | 34.6 | 398.0 | 0.0 | 0.0 | | |
| Lane LOS | D | F | | | | |
| Approach Delay (s) | 395.5 | | 0.0 | 0.0 | | |
| Approach LOS | F | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 209.1 | | | |
| Intersection Capacity Utilization | | | 119.3% | ICU Level of Service | H | |
| Analysis Period (min) | | | 15 | | | |

6: Hunt Club & Hwy 417 Offramp Performance by movement

| Movement | EBL | EBR | NBT | SBT | All |
|--------------------|------|-----|-----|-----|-----|
| Denied Del/Veh (s) | 2.8 | 1.2 | 0.0 | 0.7 | 0.6 |
| Total Del/Veh (s) | 35.2 | 3.6 | 0.5 | 1.0 | 1.8 |

Total Zone Performance

| | |
|--------------------|-----|
| Denied Del/Veh (s) | 0.7 |
| Total Del/Veh (s) | 9.8 |

Intersection: 6: Hunt Club & Hwy 417 Offramp

| | |
|-----------------------|-----------|
| Movement | EB |
| Directions Served | L |
| Maximum Queue (m) | 13.2 |
| Average Queue (m) | 1.4 |
| 95th Queue (m) | 7.3 |
| Link Distance (m) | |
| Upstream Blk Time (%) | |
| Queuing Penalty (veh) | |
| Storage Bay Dist (m) | 85.0 |
| Storage Blk Time (%) | |
| Queuing Penalty (veh) | |

Zone Summary

| |
|------------------------------|
| Zone wide Queuing Penalty: 0 |
|------------------------------|

6: Hunt Club & Hwy 417 Offramp Performance by movement

| Movement | EBL | EBR | NBT | SBT | All |
|--------------------|------|------|-----|-----|------|
| Denied Del/Veh (s) | 40.8 | 34.6 | 0.0 | 0.2 | 18.2 |
| Total Del/Veh (s) | 41.5 | 11.5 | 0.7 | 0.7 | 6.5 |

Total Zone Performance

| | |
|--------------------|-------|
| Denied Del/Veh (s) | 18.4 |
| Total Del/Veh (s) | 792.4 |

Intersection: 6: Hunt Club & Hwy 417 Offramp

| Movement | EB | NB |
|-----------------------|------|-----|
| Directions Served | L | T |
| Maximum Queue (m) | 23.1 | 1.3 |
| Average Queue (m) | 4.8 | 0.0 |
| 95th Queue (m) | 16.1 | 1.3 |
| Link Distance (m) | 93.8 | |
| Upstream Blk Time (%) | | |
| Queuing Penalty (veh) | | |
| Storage Bay Dist (m) | 85.0 | |
| Storage Blk Time (%) | | |
| Queuing Penalty (veh) | | |

Zone Summary

Zone wide Queuing Penalty: 0

6: Hunt Club & Hwy 417 Offramp Performance by movement

| Movement | EBL | EBR | NBT | SBT | All |
|--------------------|------|-----|-----|-----|-----|
| Denied Del/Veh (s) | 2.3 | 1.2 | 0.0 | 0.6 | 0.6 |
| Total Del/Veh (s) | 35.6 | 3.7 | 0.5 | 1.0 | 1.8 |

Total Zone Performance

| | |
|--------------------|-----|
| Denied Del/Veh (s) | 0.7 |
| Total Del/Veh (s) | 9.9 |

Intersection: 6: Hunt Club & Hwy 417 Offramp

| | |
|-----------------------|------|
| Movement | EB |
| Directions Served | L |
| Maximum Queue (m) | 8.2 |
| Average Queue (m) | 1.0 |
| 95th Queue (m) | 5.6 |
| Link Distance (m) | |
| Upstream Blk Time (%) | |
| Queuing Penalty (veh) | |
| Storage Bay Dist (m) | 85.0 |
| Storage Blk Time (%) | |
| Queuing Penalty (veh) | |

Zone Summary

| |
|------------------------------|
| Zone wide Queuing Penalty: 0 |
|------------------------------|

6: Hunt Club & Hwy 417 Offramp Performance by movement

| Movement | EBL | EBR | NBT | SBT | All |
|--------------------|------|------|-----|-----|------|
| Denied Del/Veh (s) | 35.3 | 36.6 | 0.0 | 0.2 | 19.3 |
| Total Del/Veh (s) | 41.0 | 11.5 | 0.8 | 0.7 | 6.6 |

Total Zone Performance

| | |
|--------------------|-------|
| Denied Del/Veh (s) | 19.5 |
| Total Del/Veh (s) | 745.1 |

Intersection: 6: Hunt Club & Hwy 417 Offramp

| Movement | EB | NB | SB |
|-----------------------|------|------|-------|
| Directions Served | L | T | T |
| Maximum Queue (m) | 25.7 | 1.5 | 1.1 |
| Average Queue (m) | 5.1 | 0.1 | 0.0 |
| 95th Queue (m) | 16.7 | 1.6 | 0.8 |
| Link Distance (m) | | 93.8 | 203.1 |
| Upstream Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |
| Storage Bay Dist (m) | 85.0 | | |
| Storage Blk Time (%) | | | |
| Queuing Penalty (veh) | | | |

Zone Summary

Zone wide Queuing Penalty: 0
