



## Planning Committee Agenda

**Monday, April 29, 2024**

**Tom Davies Square**

**Councillor Cormier, Chair**

1:00 p.m. Open Session Council Chamber / Electronic Participation

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1.	<b>Open Session</b>	
2.	<b>Roll Call</b>	
3.	<b>Declarations of Pecuniary Interest and the General Nature Thereof</b>	
4.	<b>Public Hearings</b>	
4.1	<b>700 Paris Street, Sudbury (Stage One)</b>	4
	This report provides a Preliminary Planning Report concerning Official Plan Amendment and Rezoning applications that together would permit the development of three buildings containing 109 retirement home guest rooms and 421 multiple dwelling units with up to three levels of underground shared parking, along with 380 square metres of restaurant use.	
	This report is presented by Wendy Kaufman, Senior Planner.	
	- Letter(s) of concern from concerned citizen(s) have been received.	
4.2	<b>Remington Road, Sudbury</b>	585
	This report provides a recommendation regarding an application for Plan of Subdivision in order to permit the creation of four blocks and one road.	
	This report is presented by Bailey Chabot, Senior Planner.	
4.3	<b>1876,1882, 1890, Bancroft Drive, Sudbury</b>	611
	This report provides a recommendation regarding an application for rezoning to "R3(S)" Medium Density Residential Special, to permit forty row dwelling units.	
	This report is presented by Stephanie Poirier, Senior Planner.	
	- Letter(s) of concern from concerned citizen(s) have been received.	
5.	<b>Members' Motions</b>	
6.	<b>Correspondence for Information Only</b>	
6.1	<b>Parkland Standards</b>	644
	This report provides information regarding the new Parkland Standards Development Review Manual, funded by the Province's Streamline Development Approvals Fund.	
6.2	<b>Updates regarding the Housing Supply and Demand Analysis and Provincial Housing Target</b>	708
	This report provides an update to the Housing Supply and Demand Analysis of Greater Sudbury's housing needs across the housing continuum that is used to develop targets and inform proposed policies and incentives that will form part	



of the City of Greater Sudbury Housing Supply Strategy as well as an update on progress towards achieving the Provincial Housing Target.

7. Addendum
8. Civic Petitions
9. Question Period
10. Adjournment

## **700 Paris Street, Sudbury (Stage One)**

Presented To:	Planning Committee
Meeting Date:	April 29, 2024
Type:	Public Hearing
Prepared by:	Wendy Kaufman Planning Services
Recommended by:	General Manager of Growth and Infrastructure
File Number:	701-6/23-04 & 751-6/23-25

## **Report Summary**

This report provides a Preliminary Planning Report concerning Official Plan Amendment and Rezoning applications that together would permit the development of three buildings containing 109 retirement home guest rooms and 421 multiple dwelling units with up to three levels of underground shared parking, along with 380 square metres of restaurant use.

This report is presented by Wendy Kaufman, Senior Planner.

- Letter(s) of concern from concerned citizen(s) have been received.

## **Resolution**

THAT the City of Greater Sudbury directs staff to complete a review of Files 701-6/23-04 & 751-6/23-25 by 2226553 Ontario Inc. and schedule a second public hearing on this matter before the Planning Committee as outlined in the report entitled “700 Paris Street, Sudbury (Stage One)” from the General Manager of Growth and Infrastructure, presented at the Planning Committee meeting on April 29, 2024.

## **Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans**

The applications to amend the Official Plan and Zoning By-law are operational matters under the Planning Act to which the City is responding. The proposal demonstrates conformity with the Strategic Plan and the Community Energy & Emissions Plan because it proposes residential intensification and housing diversification within a fully serviced settlement area.

## **Financial Implications**

If approved, staff are unable to estimate taxation revenues as the assessment value of these three buildings (as includes retirement home and restaurant) would be determined by Municipal Property Assessment Corporation (MPAC).

Any additional taxation revenue will only occur in the supplemental tax year. Any taxation revenue generated from new development is part of the supplemental taxation in its first year. Therefore, the City does not receive additional taxation revenue in future years from new development, as the tax levy amount to be collected as determined from the budget process, is spread out over all properties within the City.

The amount of development charges will be based on final review of the property by the Building Services department.

## **Report Overview**

Applications for Official Plan Amendment and Rezoning have been submitted in order to permit the development of three buildings containing 109 retirement home guest rooms and 421 multiple dwelling units with up to three levels of underground shared parking, along with 380 square metres of restaurant use. The site was the location of the Sudbury General Hospital from 1950 to 2010. The site is located at the intersection of Paris Street and Facer Street, and Paris Street and Boland Avenue, abutting Bell Park. A site-specific exemption to the Official Plan is required to permit a residential density of 237 units per hectare and 380.0 sqm of commercial space. Zoning relief is requested for building height, setbacks, reduced lot area per unit, and reduced courts between buildings.

The application is subject to a two-stage public hearing process. This is a Preliminary Planning Report intended to introduce the application, provide departmental and agency comments received to date, and obtain additional input on the proposal from the public and the proponents.

Following the Stage 1 hearing, staff will complete the review of the file and schedule a second public hearing before Planning Committee, at which time a Planning recommendation will be presented for consideration. Additional public notice will be provided at that time. Public written submissions will continue to be received following the Stage 1 hearing.

## Staff Report

### Proposal:

An application has been received to amend the Official Plan for the City of Greater Sudbury to permit a residential density of 237 units per hectare and 380.0 square metres of commercial space.

An application has been received to amend By-law 2010-100Z being the City of Greater Sudbury Zoning By-law from “R4(3)”, High Density Residential Special to an amended “R4(3)”, High Density Residential Special to permit a maximum of three buildings consisting of:

- A retirement home with a maximum of 109 guest rooms and a maximum height of 40.0 metres and 12 storeys;
- A multiple dwelling with a maximum of 199 units and a maximum height of 56.0 metres and 16 storeys;
- A multiple dwelling with a maximum of 222 units with a maximum height of 69.0 metres and 20 storeys; and
- Restaurant use up to a maximum of 380.0 square metres.

Zoning relief is requested for building height, setbacks, reduced lot area per unit, and reduced courts between buildings.

These applications would permit the development of three buildings containing 109 retirement home guest rooms and 421 multiple dwelling units with up to three levels of underground shared parking, along with 380.0 sqm of restaurant use. Separate buildings with step-backs and varying building height are proposed, rather than a slab-style building design. A range of building materials and façade treatments are proposed, such as brick, concrete, metal, and glass, and sustainable building design measures. The site design includes realigning the Paris Street driveway to align with Boland Avenue, construction of a sidewalk on the south side of Facer Street between Paris Street and Bell Park Road, the reconstruction of Bell Park Road south of Facer Street to a 6.0 m wide private driveway, widening of the sidewalk on Paris Street, and inclusion of bike lanes and a bus lay-by. The plans also include an internal sidewalk network with pedestrian connections to the proposed sidewalk on Facer Street and Paris Street. Landscaped areas with trees are proposed along the property's outer boundaries.

Building A is a 16-storey (56.0 m) multiple dwelling building at the south end of the parcel with 199 multiple dwelling units intended for market rental purposes, with 32.5% (64) 1-bedroom units, 66.5% (133) 2-bedroom units, and 1.0% (2) 3-bedroom units, all with private balconies. Amenity spaces will be provided on the first, second and thirteenth floors (common indoor and outdoor areas, gym, games room). Pedestrian access is provided via the residential lobby area at grade along Paris Street and via an entrance to the east along Bell Park Road.

Building B is a 20-storey (68.2 m) multiple dwelling building in the middle of the parcel with 222 multiple dwelling units intended for freehold condominium tenure, with 17.1% (38) 1-bedroom units, 68.0% (151) 2-bedroom units, and 14.9% (33) 3-bedroom units, all with private balconies. Amenity space will be provided on the first, thirteenth, fourteenth and twentieth floors (common indoor and outdoor areas). Pedestrian access is provided via the residential lobby at grade along Paris Street and via an entrance along Bell Park Road.

Building C is a 12-storey (40.0m) retirement home at the north end of the parcel with 109 guest rooms, all with private balconies. A total of 123.8 sqm of accessory health/medical space is proposed. The majority of the parking will be provided in a 1-storey underground parking garage, which is connected to the rest of the residential development. Six surface-level parking spaces are provided for visitor parking.

Pedestrian access is provided via the residential lobby on the ground floor along Paris Street.

A 288.0 sqm restaurant with 149.0 sqm of indoor dining and a 139.0 sqm covered rooftop terrace is proposed on the twentieth floor of Building B. It will be open to the public and include 21 surface-level parking

spaces. Pedestrian access will be provided through Building B via the main lobby at grade along Paris Street. An 85.0 sqm café/restaurant is proposed on the ground floor of Building C that will be open to the public and will include 6 surface-level parking spaces.

A total of 647 parking spaces will be located on the site. Of these, 55 surface parking spaces will be provided for the restaurant uses and visitor parking for the retirement home. A 3-storey underground parking garage is proposed, accessible from Bell Park Road and Paris Street via three points (southerly entrance at Building A, Bell Park Road entrance between Buildings A and B, northerly entrance to Building B).

The following materials were submitted in support of the application:

- Architectural Drawings and Renderings by ACK Architects (dated June 19th, 2023)
  - A1, EL.1, EL.2, EL.3, EL.3b, EL.4, EL.5, EL.6, EL.7
  - SP1, SP1.1, UG1, UG2
  - A1.1, A1.2, A1.3, A1.4, A1.5
  - A2.1, A2.2, A2.3, A2.4, A2.5, A2.6
  - A3.1, A3.2, A3.3, A3.4, A3.5
- Traffic Impact Study prepared by JD Engineering (dated December 23, 2022)
  - Transportation Demand Management embedded.
- Sun Shadow Study prepared by ACK Architects
- Preliminary Pedestrian Level Wind Assessment prepared by Theakston Environmental (dated September 19, 2023)
- Geotechnical and Rock Probe Investigation (dated August 10, 2016) and related geotechnical email from Building Services (April 24th, 2023)
- Conservation Authority 3:1 Slope Correspondence (dated June 2023)
- Sanitary & Water Capacity Analysis Response Letter (dated October 17, 2023)
- Planning Justification Report (Dated December 2023)
- Source Water Protection Application

**Existing Zoning:** “R4(3)”, High Density Residential Special

**(c) R4(3) (210 MULTIPLE DWELLING UNITS)**  
**McKim Township Maps Lot 5, Con 2; Lot 5, Con 3**

Notwithstanding any other provision hereof to the contrary, within any area designated R4(3) on the *Zone Maps*, all provisions of this By-law applicable to the **R4 Zone** shall apply subject to the following modifications:

- i) The *lot line* abutting Paris Street shall be deemed to be the *front lot line*;
- ii) The only permitted uses shall be *multiple dwellings* with a maximum of 210 *dwelling units* of which, a maximum of 85 *dwelling units* shall be permitted in a new *building* to be located on the *lot* after November 20, 2012;
- iii) The maximum number of *multiple dwelling buildings* permitted on the *lot* shall be two;
- iv) The *existing building* as located on the *lot* shall be permitted and the enlargement of the *existing building* shall be permitted within the *setbacks* to the *existing building*;
- v) Notwithstanding (iv) above, the maximum addition permitted to the *existing* helipad structure shall be one *storey* located above the helipad platform;
- vi) The minimum *setback* from Facer Street to a *multiple dwelling* shall be 55 metres;

- vii) The minimum *setback* from the *rear lot line* and *interior side lot line* to a *parking structure* shall be 2 metres;
- viii) The minimum *setback* from the *rear lot line* and *interior side lot line* to *multiple dwelling units* in a *building* located above a *parking structure* shall be 7.5 metres;
- ix) The maximum *building height* shall be eight storeys and 32 metres;
- x) The minimum *setback* from the *front lot line* to a *multiple dwelling* comprising a new *building* to be located on the *lot* after November 20, 2012, shall be 11.3 metres;
- xi) The maximum number of surface *parking spaces* on the *lot* not including *loading spaces* shall be 20;
- xii) The minimum width of a *landscape strip abutting* Paris Street shall be 2.6 metres and from Paris Street to the *existing building* the minimum width of the *landscape strip* shall be 1.3 metres;
- xiii) Loading spaces shall also be permitted in the *corner side yard*.

**Requested Zoning:** Amended “R4(3)”, High Density Residential Special

**(c) R4(3) (MULTIPLE DWELLING UNITS AND RETIREMENT HOME)  
McKim Township Maps Lot 5, Con 2; Lot 5, Con 3**

Notwithstanding any other provision hereof to the contrary, within any area designated R4(3) on the *Zone Maps*, all provisions of this By-law applicable to the **R4 Zone** shall apply subject to the following modifications:

- i) The only permitted *uses* shall be:
  - (a) a *retirement home* with a maximum of 109 *guest rooms* and a maximum *height* of 40.0 metres and 12 *storeys*;
  - (b) a *multiple dwelling* with a maximum of 199 *dwelling units* and a maximum *height* of 56.0 metres and 16 *storeys*;
  - (c) a *multiple dwelling* with a maximum of 222 *dwelling units* and a maximum *height* of 69.0 metres and 20 *storeys*; and
  - (d) *restaurant uses* not to exceed a maximum *net floor area* of 380.0 square metres.
- ii) The *lot line* abutting Paris Street shall be deemed to be the *front lot line*;
- iii) The *lot line* abutting Facer Street shall be deemed to be the *corner side lot line*;
- iv) The *lot line* opposite the front lot line shall be deemed the *rear lot line*;
- v) Any *lot line* not deemed a *front*, *exterior side*, or *rear lot line* shall be deemed to be an *interior side lot line*;
- vi) The minimum *corner side yard setback* shall be 18.0 metres from Facer Street;
- vii) The minimum *rear yard setback* shall be 0.0 metres;
- viii) The minimum *interior side yard setback* shall be 0.0 metres;

- iv) A minimum lot area of 41 square metres per *multiple dwelling unit* shall be required;
- and
- v) The minimum *required court* shall be 15.0 metres between *buildings*.

### **Location and Site Description:**

The subject lands are described as PINs 73584-0652 & 73591-0047, Part 2, Plan 53R-3947, Part of Lot 5, Concessions 2 & 3, Township of McKim (700 Paris Street, Sudbury). The lands are located at the intersection of Paris Street and Facer Street, and Paris Street and Boland Avenue, abutting Bell Park. The lands have an area of 1.78 ha (4.42 acres) with approximately 70 m (230 feet) of frontage on Facer Street and 220 m (725 feet) frontage on Paris Street.

The site was the location of the Sudbury General Hospital from 1950 to 2010, when the hospital services were combined with the one-site hospital now known as Health Sciences North. The land was subsequently purchased by the applicant. The site is currently occupied by the former hospital building which varies in height up to six storeys facing Paris Street and up to eight storeys facing Bell Park.

Paris Street is a primary arterial road in this location, and the lands are serviced with municipal water and sanitary sewer. The lands are located on a transit route with stops located on both sides of Paris Street in this location.

To the west of Paris Street and north of Facer Street is a well-established low density residential neighbourhood with dwellings dating from the early 1900s. To the south and east are City-owned parklands known as Bell Park. A City-owned parking lot consisting of approximately 290 spaces abuts to the south of the subject lands. Access to the City parking lot currently crosses the applicant's lands at the driveway entrance onto Paris Street.

The subject lands are within the Source Water Protection Intake Protection Zone 1 and 2 with a Vulnerability Score of 10 and 9. Water/Wastewater staff has advised that no activity or activities engaged in or proposed to be engaged in on the above noted property are considered to be significant drinking water threats at this time.

### **Surrounding Land Uses:**

The area surrounding the site includes:

North:	Facer Street, low density residential use
East:	Bell Park and Bell Park Road
South:	City-owned parking lot
West:	Paris Street, low density residential use, vacant land zoned R1-5

### **Previous Planning Applications**

In 2012, Council approved the subject lands to be rezoned from "I", Institutional and "P", Park to "R4", Residential High Density to permit the development of 210 units with a 332-space parking garage and a further 20 parking spaces at grade along with site-specific relief ([File 751-6/12-14](#)). The proposal originally included a wellness centre and a 418 sqm restaurant on the former helipad, but the commercial uses were removed from the proposal following public consultation and concerns raised regarding commercial use. A holding provision was used to require an agreement be entered into regarding reciprocal access agreements between the owner and the City for Bell Park Road, which crosses both City lands and the subject lands, and

which is used by both parties. The hold was lifted following the parties entering into the agreement, which will require the granting of the easements as part of the required site plan process.

### **Public Consultation:**

The notice of complete application was circulated to the public and surrounding property owners on January 29, 2024 to properties within 122 m of the subject lands. The statutory notice of the Stage 1 public hearing was provided by newspaper on April 6, 2024. A courtesy mail-out was circulated to the public and surrounding property owners on April 4, 2024.

The applicant was advised of the City's policy recommending that applicants consult with their neighbours, ward councillor and key stakeholders to inform area residents on the application prior to the public hearing.

Written submissions received to date are attached for review. Written submissions will continue to be accepted following the Stage 1 hearing.

### **Policy & Regulatory Framework:**

The property is subject to the following policy and regulatory framework:

- [2020 Provincial Policy Statement](#)
- [2011 Growth Plan for Northern Ontario](#)
- [Official Plan for the City of Greater Sudbury, 2006](#)
- [Zoning By-law 2010-100Z](#)

Provincial Policy Statements and geographically specific Provincial Plans, along with municipal Official Plans, provide a policy framework for planning and development in the Province. This framework is implemented through a range of land use controls such as zoning by-laws, plans of subdivision and site plans.

### **Provincial Policy Statement (PPS):**

Municipalities in the Province of Ontario are required under Section 3 of the [Planning Act](#) to ensure that decisions affecting planning matters are consistent with the Provincial Policy Statement.

Policy 1.1.1 states that healthy, liveable and safe communities are sustained by:

- a) promoting efficient development and land use patterns which sustain the financial well-being of the Province and municipalities over the long term;
- b) accommodating an appropriate affordable and market-based range and mix of residential types (including single-detached, additional residential units, multi-unit housing, affordable housing and housing for older persons), employment (including industrial and commercial), institutional (including places of worship, cemeteries and long-term care homes), recreation, park and open space, and other uses to meet long-term needs; and
- e) promoting the integration of land use planning, growth management, transit-supportive development, intensification, and infrastructure planning to achieve cost-effective development patterns, optimization of transit investments, and standards to minimize land consumption and servicing costs.

Policy 1.1.3.1 identifies that settlement areas are to be the focus of growth and their vitality and regeneration is to be promoted, and policy 1.1.3.2 requires densities which efficiently use land, resources and infrastructure and avoid the need for their unjustified and/or uneconomical expansion. Development in this manner is intended to minimize impacts to air quality and climate change and promote energy efficiency, while supporting the use of active transportation and public transit.



Policy 1.1.3.3 states that planning authorities shall identify appropriate locations and promote opportunities for transit-supportive development, accommodating a significant supply and range of housing options through intensification and redevelopment where this can be accommodated taking into account existing building stock or areas, including brownfield sites, and the availability of suitable existing or planned infrastructure and public service facilities required to accommodate projected needs.

Policy 1.1.3.4 states that appropriate development standards should be promoted which facilitate intensification, redevelopment and compact form, while avoiding or mitigating risks to public health and safety.

Policy 1.1.3.5 states that planning authorities shall establish and implement minimum targets for intensification and redevelopment within built-up areas, based on local conditions. However, where provincial targets are established through provincial plans, the provincial target shall represent the minimum target for affected areas.

Policy 1.1.3.6 states that new development taking place in designated growth areas should occur adjacent to the existing built-up area and should have a compact form, mix of uses and densities that allow for the efficient use of land, infrastructure and public service facilities.

Policy 1.3.1 states that planning authorities shall promote economic development and competitiveness by:

- a) providing for an appropriate mix and range of employment, institutional, and broader mixed uses to meet long-term needs;
- b) providing opportunities for a diversified economic base, including maintaining a range and choice of suitable sites for employment uses which support a wide range of economic activities and ancillary uses, and take into account the needs of existing and future businesses; and
- d) encouraging compact, mixed-use development that incorporates compatible employment uses to support liveable and resilient communities, with consideration of housing policy 1.4.

Policy 1.4.3 states that planning authorities shall provide for an appropriate range and mix of housing options and densities to meet projected market-based and affordable housing needs of current and future residents of the regional market area by:

- b) permitting and facilitating:
  - 1. all housing options required to meet the social, health, economic and well-being requirements of current and future residents, including special needs requirements and needs arising from demographic changes and employment opportunities; and
  - 2. all types of residential intensification, including additional residential units, and redevelopment in accordance with policy 1.1.3.3;
- c) directing the development of new housing towards locations where appropriate levels of infrastructure and public service facilities are or will be available to support current and projected needs;
- d) promoting densities for new housing which efficiently use land, resources, infrastructure and public service facilities, and support the use of active transportation and transit in areas where it exists or is to be developed;
- e) requiring transit-supportive development and prioritizing intensification, including potential air rights development, in proximity to transit, including corridors and stations; and
- f) establishing development standards for residential intensification, redevelopment and new

residential development which minimize the cost of housing and facilitate compact form, while maintaining appropriate levels of public health and safety.

Policy 1.7.1 states that long-term economic prosperity should be supported by:

- a) promoting opportunities for economic development and community investment-readiness;
- b) encouraging residential uses to respond to dynamic market-based needs and provide necessary housing supply and range of housing options for a diverse workforce; and
- c) optimizing the long-term availability and use of land, resources, infrastructure and public service facilities.

Policy 1.8.1 states that planning authorities shall support energy conservation and efficiency, improved air quality, reduced greenhouse gas emissions, and preparing for the impacts of a changing climate through land use and development patterns which:

- a) promote compact form and a structure of nodes and corridors;
- b) promote the use of active transportation and transit in and between residential, employment (including commercial and industrial) and institutional uses and other areas;
- e) encourage transit-supportive development and intensification to improve the mix of employment and housing uses to shorten commute journeys and decrease transportation congestion; and
- g) maximize vegetation within settlement areas, where feasible.

Policy 2.2.1 states that planning authorities shall protect, improve or restore the quality and quantity of water by:

- f) implementing necessary restrictions on development and site alteration to:
  - 1. protect all municipal drinking water supplies and designated vulnerable areas; and
- i) ensuring stormwater management practices minimize stormwater volumes and contaminant loads, and maintain or increase the extent of vegetative and pervious surfaces.

### **Growth Plan for Northern Ontario:**

Municipalities in the Province of Ontario are required under Section 3 of the *Planning Act* to ensure that decisions affecting planning matters conform with the Growth Plan for Northern Ontario, which speaks broadly to the provision of housing. These applications conform to or do not conflict with the GPNO.

### **Official Plan for the City of Greater Sudbury:**

The subject land is designated as Living Area 1, which permits a range of residential uses and neighbourhood-based institutional uses such as retirement homes. At the time of writing this report, the City is considering an official plan amendment related to Phase 2 of the City's Nodes and Corridors Strategy. This strategy identifies Paris Street as a corridor, though no changes to the designation are proposed in the draft amendment.

Section 2.3 of the Official Plan regarding reinforcement of the urban structure states that growth must continue to be directed to capitalize on existing investments, make the most efficient use of existing infrastructure and public service facilities, protect our rural and agricultural assets, and preserve our natural features and areas. Reinforcing the urban structure also creates a more energy efficient land use pattern and supports climate change mitigation. Section 2.3.2 directs that settlement area land use patterns will be based

on densities and land uses that make the most efficient use of land, resources, infrastructure and public service facilities, minimize negative impacts on air quality and climate change, promote energy efficiency and support public transit, active transportation and the efficient movement of goods. Intensification and development within the built boundary is encouraged.

Section 2.3.3 encourages all forms of intensification and establishes a 20% residential intensification target. Intensification will be encouraged on sites with suitable existing or planned infrastructure and public service facilities. Intensification will be compatible with the existing and planned character of an area in terms of the size and shape of the lot, as well as the siting, coverage, massing, height, traffic, parking, servicing, landscaping, and amenity areas of the proposal. Intensification is encouraged on sites that are no longer viable for the purpose for which they were intended such as former institutional sites. Section 2.3.3.9 establishes that the following criteria, amongst other matters, may be used to evaluate applications for intensification:

- a. the suitability of the site in terms of size and shape of the lot, soil conditions, topography and drainage;
- b. the compatibility proposed development on the existing and planned character of the area;
- c. the provision of on-site landscaping, fencing, planting and other measures to lessen any impact the proposed development may have on the character of the area;
- d. the availability of existing and planned infrastructure and public service facilities;
- e. the provision of adequate ingress/egress, off street parking and loading facilities, and safe and convenient vehicular circulation;
- f. the impact of traffic generated by the proposed development on the road network and surrounding land uses;
- g. the availability of existing or planned, or potential to enhance, public transit and active transportation infrastructure;
- h. the level of sun-shadowing and wind impact on the surrounding public realm;
- i. impacts of the proposed development of surrounding natural features and areas and cultural heritage resources;
- j. the relationship between the proposed development and any natural or manmade hazards; and,
- k. the provision of any facilities, services and matters if the application is made pursuant to Section 37 of the Planning Act..

Section 3.2 outlines general policies applied to Living Areas.

Section 3.2(2) states that medium density housing is permitted in all Living Area I designations where full municipal services are available. High density housing is permitted only in the community of Sudbury.

Section 3.2(3) states that new residential development must be compatible with the existing physical character of established neighbourhoods, with consideration given to the size and configuration of lots, predominant built form, building setbacks, building heights and other provisions applied to nearby properties under the Zoning Bylaw.

Section 3.2 (6) states that local institutional uses such as retirement homes, that are compatible with the residential function of neighbourhoods are allowed in all Living Area designations.

Section 3.2(9) states that small-scale commercial uses that are intended to serve the convenience needs of local residents are permitted in all Living Areas by rezoning. Such uses are intended to be isolated rather than forming a group or cluster that could potentially change the residential character of an area. These uses, which may include confectionary stores, laundromats, and other personal service establishments, are limited to a maximum of 150 m<sup>2</sup> of floor space per location. Zoning applications for local commercial uses will be reviewed on the basis of general conformity with the following policies:

- a. access to and traffic generated by the site will not create adverse traffic problems on surrounding roads;
- b. lighting and signage are located so as not to create any adverse visual impact on the surrounding residences;
- c. the use will provide landscaping and buffering in a manner that is in harmony with adjoining and nearby residential properties; and,
- d. the proposed small-scale commercial use must form a good fit with the existing neighbourhood fabric.

Section 3.2.1 outlines policies for the Living Area 1 designation.

Section 3.2.1 states that high density housing is permitted only in the community of Sudbury. All housing types, excluding single detached dwellings, are permitted in high density residential areas to a maximum net density of 150 units per hectare. Densities in the downtown may exceed this maximum, as set out in the Zoning By-law. 4. High density housing should be located on sites in close proximity to Arterial Roads, public transit, main employment and commercial areas, open space areas, and community/recreational services with adequate servicing capacity and a road system that can accommodate growth. Sites should be of a suitable size to provide adequate landscaping and amenity features.

Policy 3.2.1(6) states that in considering applications to rezone land in Living Area I, Council will ensure amongst other matters that:

- a. the site is suitable in terms of size and shape to accommodate the proposed density and building form;
- b. the proposed development is compatible with the surrounding neighbourhood in terms of scale, massing, height, siting, setbacks, and the location of parking and amenity areas;
- c. adequate on-site parking, lighting, landscaping and amenity areas are provided; and,
- d. the impact of traffic on local streets is minimal.

Section 4.4 provides policies for institutional areas. Policy 4.4(3) states that rezoning applications related to the conversion of surplus institutional buildings and the rezoning of vacant lands held by institutions will be considered based on the following criteria:

- i. the need for such lands or buildings for other public uses, and their long-term value to the community;
- j. the compatibility of the proposed uses with surrounding land uses and the intent of the policies in this Official Plan with respect to the proposed use;
- k. for conversion to residential uses, the appropriateness of the proposed density; and,
- l. the policies of Sections 2.3.2, 11.3.2 and 11.8, and Chapters 13.0 Heritage Resources and 14.0 Urban Design.

Policy 7.3.1(7) enables the City to require the dedication of land for park or other recreational purposes in accordance with the provisions of Section 42 of the Planning Act. The Planning Act establishes that the conveyance or payment in lieu of parkland for residential developments may be calculated as 1 hectare per 600 dwelling units, but shall not exceed 10% of the land or the value of the land.

Policy 8.3.1(1) states that development, certain land use activities and public works within the vulnerable areas will conform with the policies on List A of the Greater Sudbury Source Protection Plan.

Section 11.3.2 outlines policies intended to encourage proposals that are transit-supportive, whereby the viability of public transit is enhanced by the proposed development. Urban design and community development that facilitates the provision of public transit will be promoted. Mixed uses and higher density housing along Arterial Roads and at other strategic locations are encouraged as a means of enhancing the feasibility of transit services, increasing ridership, alleviating traffic congestion and reducing reliance on the automobile. Buildings should be sited as close to the street as possible to reduce walking distances for transit users. Pedestrian walkways, intersections of major roads, and pedestrian access systems are to be integrated with transit stops, and wherever possible, connected to trail systems.

Residential intensification and conversion of surplus institutional buildings projects are also subject to the urban design policies set out under Section 14.4. Policy 1 states that development and intensification will be located and organized to fit with its existing or planned context. It will frame and support adjacent streets, parks and open spaces to improve activity, comfort and safety by:

- a. generally locating buildings parallel to the street or along the edge of a park or open space with a consistent front yard setback. On a corner site, development and intensification should be located along both street frontages and give prominence to the corner. On a site that terminates a street corridor, the development should acknowledge the prominence of that site;
- b. massing buildings to define the edges of streets, parks and open spaces in good proportion;
- c. creating appropriate transitions in scale to neighbouring existing or planned buildings;
- d. locating main building entrances so that they are clearly visible and easily accessible from the public sidewalk;
- e. providing ground floor uses that have views into surrounding streets, parks and open spaces; and,
- f. minimizing shadowing and uncomfortable wind conditions on surrounding streets, parks and open spaces to preserve their utility.

Policy 14.4(2) states development and intensification will locate and organize vehicle parking, vehicular access, service areas and utilities to minimize their impact on the property and on surrounding properties and the public realm by:

- a. minimizing the number of curb cuts and driveways that cross the public sidewalk;
- b. limiting surface parking between the front face of the building and the public street and sidewalk;
- c. locating servicing and utilities towards the sides or rear of the building and screening the servicing from views from adjacent streets;
- d. integrating servicing and utility functions within the building, where possible; and,
- e. providing adequate landscaping and buffering between adjacent properties.

Policy 14.7(1) states that new land uses or design features that would detract from the enhancement of

major focal point areas within the City, such as Science North, the Big Nickel, Bell Park, Tom Davies Square and Laurentian University are discouraged. The open space character and natural aesthetic environment of the Paris Street corridor, especially that section between Walford Road and York Street, will be preserved and enhanced. In particular, the view corridor to and from Science North will be protected.

Policy 14.7(5) states that view corridors to lakes should be preserved.

Policy 14.9(1) states that the City will encourage urban design solutions that minimize non-renewable resource consumption, maximize the use of renewable energy and takes into account the impact of climate change by:

- a. encouraging compact, mixed use and infill developments that concentrate complementary land uses and support active transportation and public transit.

Policy 16.2(1) states that it is a policy of this plan to support development that is age-friendly including the creation of smaller, unique, shared and transitional housing opportunities for an aging population through the rezoning process, where necessary, promotes 'aging in place' and is in close proximity to amenities and services in the Downtown, Regional Centres, Town Centres and Mixed Use Commercial areas.

Policy 17.2 (1) states that to encourage a greater mix of housing types and tenure, it is policy of this Plan to:

- a. encourage a wide range of housing types and forms suitable to meet the housing needs of all current and future residents;
- b. encourage production of smaller (one and two bedroom) units to accommodate the growing number of smaller households;
- c. promote a range of housing types suitable to the needs of senior citizens; and
- e. support new development that is planned, designated, zoned and designed in a manner that contributes to creating complete communities – designed to have a mix of land uses, supportive of transit development, the provision of a full range of housing including affordable housing, inclusive of all ages and abilities, and meet the daily and lifetime needs of all residents.

### **Zoning By-law 2010-100Z:**

Under the Zoning By-law, a retirement home is defined as a special needs facility, which in turn is defined as a type of institutional use. A retirement home contains guest rooms and is separate and distinct from a multiple dwelling, which is comprised of three or more self-contained dwelling units (i.e., apartments).

The zone standards for retirement homes and multiple dwellings in the R4 zone are similar, with the same minimum 30.0 m lot frontage and 45.0 m lot depth required, as well as 15.0 m front yard setback, and 10.0 m corner side yard setback. The interior side yard setback is 10.0 m + 1.0 metre for each storey > five storeys above finished grade, which is 28 m from the rear lot line (10.0 m + 18.0 m for 23 storeys), and 21 m from the southerly lot line (10.0 m + 11.0 m for 16 storeys). Maximum lot coverage is 50%, and the minimum landscaped open space is 30%.

The minimum lot area for a multiple dwelling is 65.0 sqm per unit, and the minimum lot area for a retirement home is 1350.0 sqm.

The maximum building height is 20.0 m for a retirement home, and 63.0 m for a multiple dwelling.

Court requirements are only applicable to multiple dwellings and require that opposing walls of one or more multiple dwellings on the same lot to be not less than 15.0 m where both walls contain balconies or windows

into a habitable room.

A 10% parking rate reduction applies because the site is adjacent to a GOVA transit route. The parking requirements for each use are listed as follows:

- Two multiple dwelling: 1.5 spaces/unit =  $199 \times 1.5$  and  $222 \times 1.5 - 10\% = 269$  and 300
- Retirement home: 4 spaces, plus 0.5 parking spaces for each of the first 30 guest rooms, plus 0.25 parking spaces for each additional guest rooms plus  $1/20$  sqm gross floor area used for medical, health or personal services – 10% =  $4 + (0.5 \times 30) + (0.25 \times 79) + (1/20 \times 123.8) - 10\% = 41$
- Café and Restaurant:  $1/12.5$  sqm net floor area =  $1/12.5 \times 80$  and  $1/12.5 \times 288 - 10\% = 6$  and 21

Accessible spaces are required to be provided at the rate of 1 space per every 50 spaces or part thereof. One loading space is required for a multiple dwelling containing 50 or more dwelling units. Bicycle parking for a multiple dwelling shall be provided at the rate of 0.5 spaces per dwelling unit. Bicycle parking for an institutional use, which includes a retirement home, shall be provided at the rate of 2 spaces on a lot, plus 1 space per 500 sqm gross floor area to a maximum requirement of 24 per lot. Parking is not permitted to be located in the required front or corner side yard.

#### **Site Plan Control:**

Further to comments from Development Engineering, a site plan control agreement was registered on the property on October 7, 2014, which aligns with the previous rezoning application approved in 2012. The proposed development will be subject to site plan control if approved, and an amended site plan control agreement will be required. This amendment will address, but is not limited to, the upgrades required to the transportation network, site servicing, site grading, and stormwater management.

#### **Department/Agency Review:**

No concerns were raised by Roads Operations, Drainage Section, Strategic and Environmental Planning, Water/Wastewater – Source Water Protection, Conservation Sudbury, or Transit.

Development Engineering has provided the following comments:

- A water and sewer capacity analysis was performed and municipal water and sewer are available within the road right of way and is able to facilitate the requested development.
- There is a registered site plan control agreement dated October 7, 2014. This agreement will need to be amended to reflect the newly proposed development.
- It is our understanding that there are upgrades to the transportation network as a result of this development. It is our opinion that a holding designation be placed on the zoning such that the required upgrades would need to be made at the time of development of the site plan by way of an offsite servicing agreement.
- Based on the requested rezoning and amendment to the Official Plan, Development Engineering has no objection provided that development proceed by way of amendment to the site plan control agreement. This amendment will address, but not limited to, the upgrades required to the transportation network, site servicing, site grading, and stormwater management.

Roads Section has no concerns with the proposed reconstruction of Bell Park Road or the use of the road to service the proposed site, and does not support this road becoming a publicly maintained road. Property along the frontage of Paris Street and Facer Street will be required to be transferred to the City. The south side of Facer Street will be required to be upgraded to an urban standard from Paris Street to Bell Park Road.

Transportation & Innovation Services staff has reviewed the Traffic Impact Study and has concerns with vehicles trying to access Facer Street or McNaughton Street via Paris Street as no left turn lane is provided on Paris Street. When the Hospital site was in operation both intersections had a high instance of collisions

due to left turning vehicles. For this reason, the access to the site from Bell Park Road shall be limited to service vehicles only. All residents, visitors and patrons must access the parking garage from the intersection of Boland Avenue and Paris Street. In addition, Facer Street at Paris Street is required to be modified to permit right-in, right-out turning movements only.

It is noted that in the 2032 total traffic projections (with improvements) the following movements are operating at level of service (LOS) 'E'. The City requires that any movement with LOS 'E' be addressed further.

- Paris Street @ Brady Street: eastbound left (EBL) PM Peak (LOS 'C' in 2032 background)
- Paris Street @ John Street: westbound through (WBT) PM Peak (LOS 'D' in 2032 background)
- Paris Street @ Boland Avenue: southbound left (SBL) PM Peak (LOS 'A' in 2032 background)

In addition to the Paris Street at Boland Avenue intersection operating at LOS 'E' for the SBL movement, it is also noted that the projected 95th percentile queue exceeds the available storage capacity of the left turn lane. Staff is concerned this will result in motorists choosing to use Facer Street as an alternative access to the site, as well, the left turn queue will block through movements at the intersection. For these reasons the south bound left turn lane storage length must be extended to match the anticipated queue lengths.

Active transportation staff has commented that transportation demand management measures also include the promotion of the City's ride share program "Smart Commute", and that the Paris/Notre Dame Bikeway project will need to be incorporated into the site plan.

Building Services has commented on the loading space for Building C, which can be addressed through refinement of the site plan. The applicant is advised that at time of building permit review and site plan agreement review, verification will be required for the construction of the retirement home in conformance with the Retirement Homes Act and the Zoning By-law. Further By-law requirements may need to be addressed upon submission of complete building plans.

Leisure Services has advised that The City will be seeking cash-in-lieu for parkland dedication as permitted under the Planning Act.

### **Preliminary Planning Review and Considerations:**

Further to comments from Development Engineering and Transportation & Innovation pertaining to road improvement requirements, a holding symbol will be recommended to ensure that required upgrades are made at the time of development of the site.

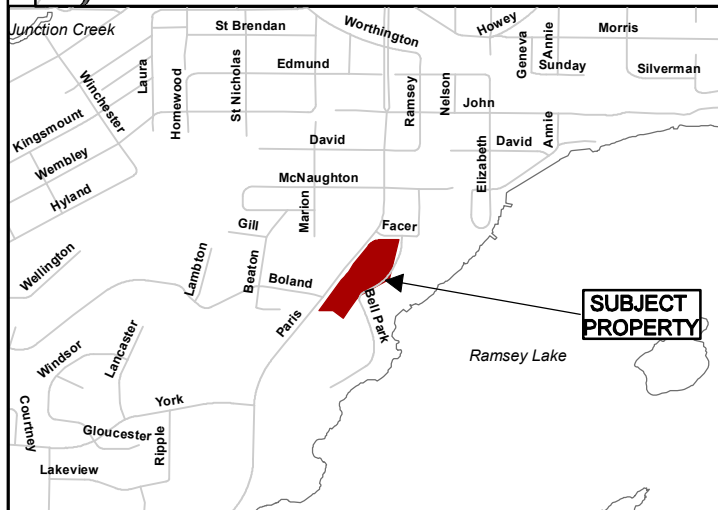
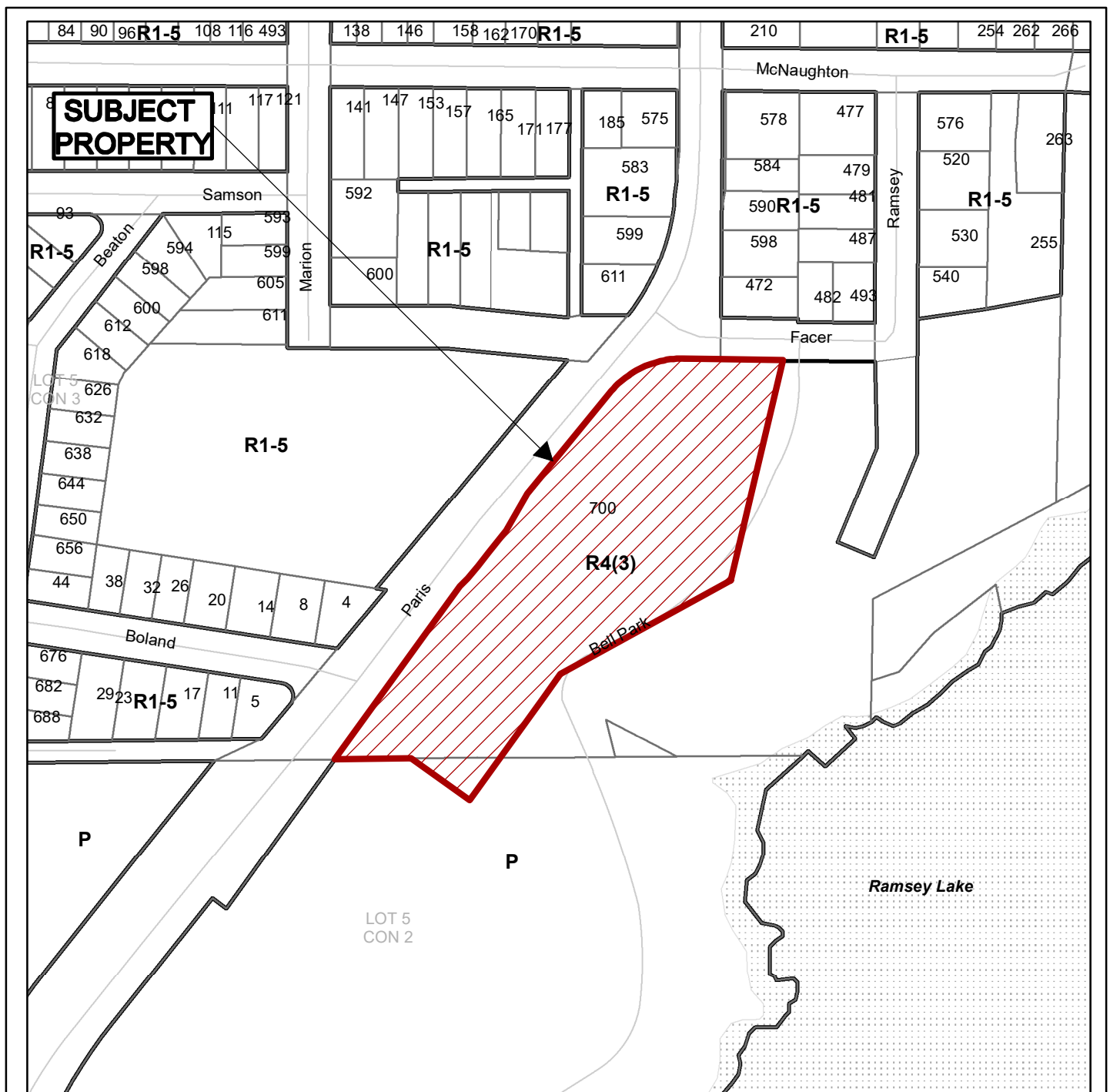
Staff has advised the proponent on March 19, 2024 that the following information is required to be provided for staff to review prior to scheduling the second public hearing:

- Further to comments from Transportation & Innovation, updates to the Traffic Impact Study are required to address the three intersection movements operating at a level of service 'E'.
- Peer review of the submitted Preliminary Pedestrian Level Wind Assessment prepared by Theakston Environmental (dated September 19, 2023).

### **Conclusion:**

It is recommended that Staff completes the review of Files 701-6/23-04 & 751-6/23-25 and schedule a second public hearing on this matter before the Planning Committee, at which time a Planning recommendation will be presented for consideration by the Committee. Additional public notice will be provided at that time. Written submissions from the public will continue to be received in advance of the Stage 2 hearing.





## Growth and Infrastructure Department



Subject Property being PINs 73584-0652 & 73591-0047,  
Plan 53R-3947, Lot 5, Concession 2 & 3,  
Township of McKim, 700 Paris Street, Sudbury,  
City of Greater Sudbury

NTS  
Sketch 1

751-6/23-25  
Date: 2023 01 10

# Appendix 1

## Departmental & Agency Comments

File: 701-6/23-04 & 751-6/23-25

**RE:** Application for Official Plan Amendment & Rezoning – 2226553 Ontario Inc.  
PINs 73584-0652 & 73591-0047, Part 2, Plan 53R-3947, Part of Lot 5, Concessions 2 & 3, Township of McKim (700 Paris Street, Sudbury)

---

### Development Engineering

A water and sewer capacity analysis were performed and municipal water and sewer are available within the road right of way and is able to facilitate the requested development.

There is a registered site plan control agreement dated October 7, 2014. This agreement will need to be amended to reflect the newly proposed development.

It is our understanding that there are upgrades to the transportation network as a result of this development. It is our opinion that a holding designation be placed on the zoning such that the required upgrades would need to be made at the time of development of the site plan by way of an offsite servicing agreement.

Based on the requested rezoning and amendment to the Official Plan, Development Engineering has no objection provided that development proceed by way of amendment to the site plan control agreement. This amendment will address, but not limited to, the upgrades required to the transportation network, site servicing, site grading, and stormwater management.

### Infrastructure Capital Planning Services (ICPS):

#### Roads

Bell Park Road is currently a service road and not a publicly maintained roadway. Staff have no concerns with the proposed reconstruction of the road or the use of the road to service the proposed site. Staff however do not support this road becoming a publicly maintained road.

The owner should be aware that as part of the site plan an irregular piece of property will need to be transferred to the City along the frontage of Paris Street and Facer Street. The provided sketch appears to show this new right-of-way limit. As well, Facer Street will be required to be upgraded to an urban standard, on the south side, from Paris Street to Bell Park Road.

#### Transportation and Innovation Support

Staff has reviewed the provided Traffic Impact Study and has concerns with vehicles trying to access Facer Street or McNaughton Street via Paris Street as no left turn lane is provided on Paris Street. When the Hospital site was in operation both intersections had a high instance of collisions due to left turning vehicles. For this reason, the access to the site from Bell Park Road shall be limited to service vehicles only. All residents, visitors and patrons must access the parking garage from the intersection of Boland Avenue and Paris Street. In addition, Facer Street at Paris Street is required to be modified to permit right-in, right-out turning movements only.

It is noted that in the 2032 total traffic projections (with improvements) the following movements are operating at LOS 'E'. The City requires that any movement with LOS 'E' be addressed further.

- Paris Street @ Brady Street: EBL PM Peak (LOS 'C' in 2032 background)
- Paris Street @ John Street: WBT PM Peak (LOS 'D' in 2032 background)
- Paris Street @ Boland Avenue: SBL PM Peak (LOS 'A' in 2032 background)

In addition to the Paris Street at Boland Avenue intersection operating at LOS 'E' for the SBL movement, it is also noted that the projected 95th percentile queue exceeds the available storage capacity of the left turn lane. Staff are concerned this will result in motorists choosing to use Facer Street as an alternative access to the site, as well, the left turn queue will block through movements at the intersection. For these reasons the south bound left turn lane storage length must be extended to match the anticipated queue lengths.

#### Active Transportation

In addition to the information provided on the information display board that is recommended as part of the transportation demand management measures, the board shall also include information regarding the City's ride share program "Smart Commute".

This site is within the limits of the City's Paris/Notre Dame Bikeway project. While it appears the bike way has been shown on the provided sketch of the site, the owner should be aware that the bike way design will need to be incorporated as part of the site plan.

#### Roads Operations

No concerns.

#### Drainage

No concerns.

#### Building Services

We have reviewed the application and documents for the requested Zoning By-law Amendment and have the following comment:

- A loading space meeting the dimensional requirements of 5.6.4. has not been provided for Building C.

Applicant to be advised of the following:

- At time of Building Permit review and Site Plan Agreement review, verification will be required for the construction of the Retirement Home in conformance with the Retirement Homes Act and the Zoning By-law.
- Further By-law requirements may need to be addressed upon submission of complete building plans.

#### Leisure Services

The City will be seeking cash-in-lieu for parkland dedication as permitted under the Planning Act.

#### Strategic and Environmental Planning

The applications listed in the subject line do not pose an elevated risk to species protected by the Endangered Species Act or to their habitat.

The proposed developments are anticipated to either have only minor negative effects on the overall natural environment or to have potential negative effects that are to be adequately mitigated as indicated on the relevant site plans and sketches. As such, specific environmental studies are not required beyond those that may have been requested previously.

#### Water/Wastewater - Source Water Protection

No activity or activities engaged in or proposed to be engaged in on the above noted property are considered to be significant drinking water threats at this time. You may undertake the activity or activities described in your application and proceed to apply for a Building Permit or Planning Approval as they are neither prohibited nor restricted for the purpose of Part IV of the Clean Water Act, 2006.

#### Conservation Sudbury (Nickel District Conservation Sudbury)

The subject property is located outside of any regulated hazards and Conservation Sudbury has no objection to the Official Plan Amendment and Zoning By-law Amendments as described in the circulation.

#### Greater Sudbury Transit

Transit do not have comments or concerns related to this application.





**PARIS STREET ELEVATION (FRONT)(WEST)**  
1" = 30'-0"



**BELL PARK ELEVATION (REAR)(EAST)**  
1" = 30'-0"

\* DISCLAIMER: ISSUED FOR PRELIMINARY DESIGN DISCUSSION ONLY

# PARIS STREET DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO

**A · C · K**  
architects  
STUDIO INC.

FRONT AND REAR  
ELEVATIONS

DWG. No.  
**A1**

SCALE: AS SHOWN  
DATE: JUNE 19 2023  
PROJECT No.: 2010-205





\* DISCLAIMER: ISSUED FOR PRELIMINARY DESIGN DISCUSSION ONLY

# PARIS STREET DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO

A · C · K  
architects  
STUDIO INC.

PARIS STREET  
ELEVATIONS

DWG. No.  
EL.1

SCALE: AS SHOWN  
DATE: JUNE 19 2023  
PROJECT No.: 2010-205





\* DISCLAIMER: ISSUED FOR PRELIMINARY DESIGN DISCUSSION ONLY

# PARIS STREET DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO

A · C · K

architects

STUDIO INC.

FACER STREET

ELEVATIONS

DWG. No.

EL.2

SCALE:

AS SHOWN

DATE:

JUNE 19 2023

PROJECT No.:

2010-205





\* DISCLAIMER: ISSUED FOR PRELIMINARY DESIGN DISCUSSION ONLY

# PARIS STREET DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO

A · C · K  
architects  
STUDIO INC.

REAR ELEVATIONS

DWG. No.  
EL.3

SCALE: AS SHOWN  
DATE: JUNE 19 2023  
PROJECT No.: 2010-205





\* DISCLAIMER: ISSUED FOR PRELIMINARY DESIGN DISCUSSION ONLY

# PARIS STREET DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO

A · C · K  
architects  
STUDIO INC.

REAR ELEVATIONS

DWG. No.  
EL.3b

SCALE: AS SHOWN  
DATE: JUNE 19 2023  
PROJECT No.: 2010-205





\* DISCLAIMER: ISSUED FOR PRELIMINARY DESIGN DISCUSSION ONLY

# PARIS STREET DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO

A · C · K  
architects  
STUDIO INC.

REAR ELEVATIONS  
FROM BELL PARK

DWG. No.  
**EL.4**

SCALE: AS SHOWN  
DATE: JUNE 19 2023  
PROJECT No.: 2010-205





\* DISCLAIMER: ISSUED FOR PRELIMINARY DESIGN DISCUSSION ONLY

# PARIS STREET DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO

A · C · K  
architects  
STUDIO INC.

REAR ELEVATIONS  
FROM BELL PARK O2

DWG. No.  
**EL.5**

SCALE: AS SHOWN  
DATE: JUNE 19 2023  
PROJECT No.: 2010-205





\* DISCLAIMER: ISSUED FOR PRELIMINARY DESIGN DISCUSSION ONLY

# PARIS STREET DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO

A · C · K  
architects  
STUDIO INC.

BUILDING C PATIO

DWG. No.  
EL.6

SCALE: AS SHOWN  
DATE: JUNE 19 2023  
PROJECT No.: 2010-205





\* DISCLAIMER: ISSUED FOR PRELIMINARY DESIGN DISCUSSION ONLY

# PARIS STREET DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO

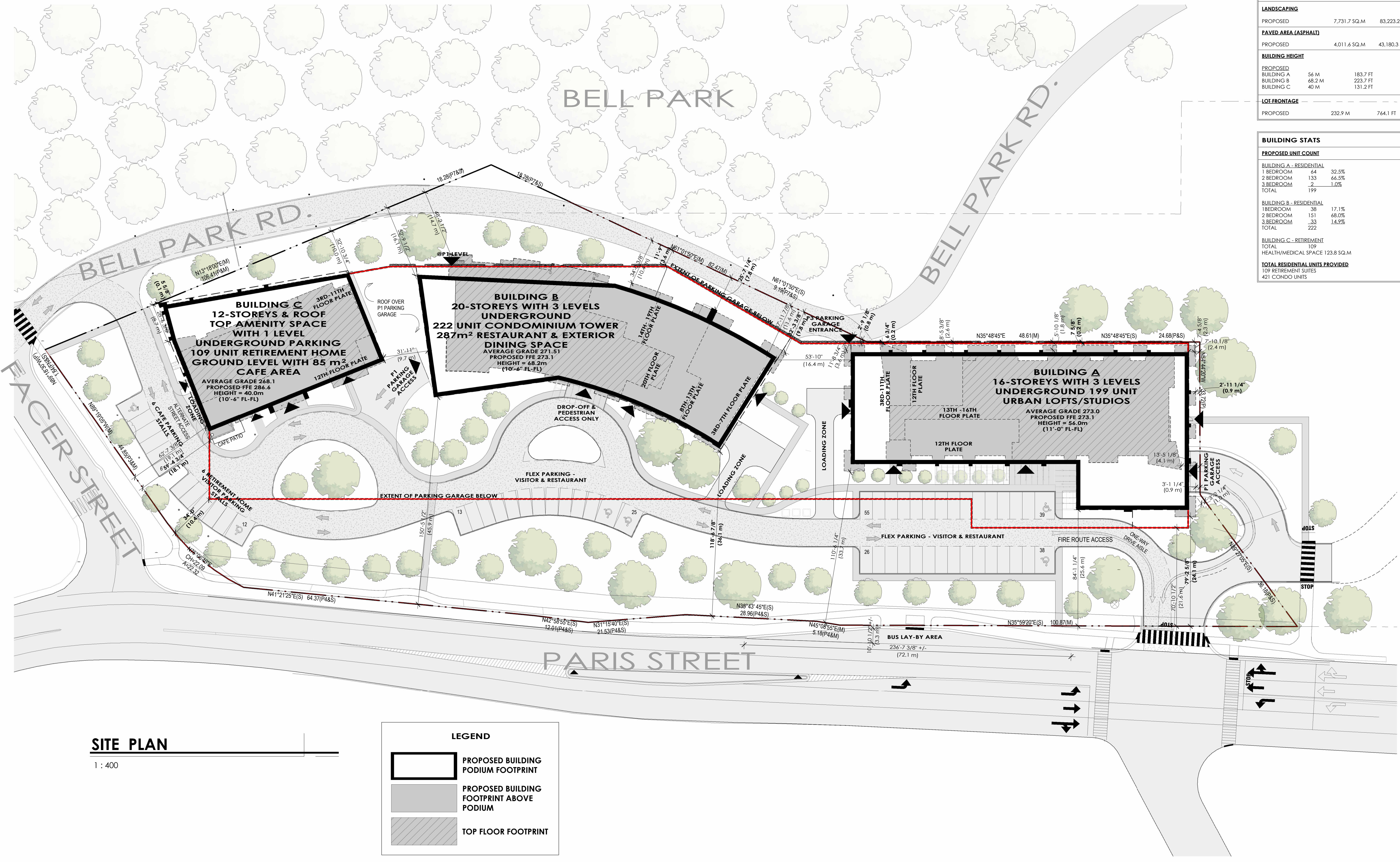
A · C · K  
architects  
STUDIO INC.

REAR OF BUILDINGS

DWG. No.  
EL.7

SCALE: AS SHOWN  
DATE: JUNE 19 2023  
PROJECT No.: 2010-205





SITE STATS (FOR DISCUSSION PURPOSES ONLY)				
700 PARIS STREET, SUDBURY, ONTARIO				
LOT AREA	17,893.1 SQ.M	192,600.2 SF	100%	
LOT COVERAGE (INC. CANOPIES, PROJECTIONS)				
PROPOSED BUILDING A - RESIDENTIAL	2,382.8 SQ.M	25,448.3 SF	13.3%	
BUILDING B - RESIDENTIAL	2,006.5 SQ.M	21,598.2 SF	11.2%	
BUILDING C - RETIREMENT	1,101.0 SQ.M	11,851.4 SF	6.2%	
EXTEND OF P1 GARAGE	659.5 SQ.M	7,098.9 SF	3.7%	
TOTAL PROPOSED	6,149.9 SQ.M	66,196.7 SF	34.4%	
LANDSCAPING				
PROPOSED	7,731.7 SQ.M	83,223.2 SF	43.2%	
PAVED AREA (ASPHALT)				
PROPOSED	4,011.6 SQ.M	43,180.3 SF	22.4%	
BUILDING HEIGHT				
PROPOSED BUILDING A	54 M	183.7 FT		
BUILDING B	68.2 M	223.7 FT		
BUILDING C	40 M	131.2 FT		
LOT FRONTAGE				
PROPOSED	232.9 M	764.1 FT		

BUILDING STATS	
PROPOSED UNIT COUNT	
BUILDING A - RESIDENTIAL	
1 BEDROOM	64 32.5%
2 BEDROOM	133 66.5%
3 BEDROOM	2 1.0%
TOTAL	199
BUILDING B - RESIDENTIAL	
1 BEDROOM	38 17.1%
2 BEDROOM	151 68.0%
3 BEDROOM	33 14.2%
TOTAL	222
BUILDING C - RETIREMENT	
TOTAL	109
HEALTH/MEDICAL SPACE 123.8 SQ.M	
TOTAL RESIDENTIAL UNITS PROVIDED	
109 RETIREMENT SUITES	
421 CONDO UNITS	

PARKING STATS	
PARKING REQUIRED (INC 10% REDUCTION)*	
1.35 SPACES / RESIDENTIAL UNIT (BLDG A)	268.7 SPACES
1.35 SPACES / RESIDENTIAL UNIT (BLDG B)	299.7 SPACES
SPACES FOR RETIREMENT BUILDING**	51.2 SPACES
1 SPACE / 12.5 M2 OF RESTAURANT AREA***	20.7 SPACES
1 SPACE / 12.5 M2 OF CAFE AREA****	6.1 SPACES
TOTAL REQUIRED	646.4 SPACES
REQUIRED BARRIER FREE PARKING	
REQUIRED LOADING AREAS	12.9 SPACES
	3.0 SPACES
PROPOSED PARKING	
SURFACE PARKING	55 SPACES
P1 UNDERGROUND	166 SPACES
P2 UNDERGROUND	217 SPACES
P3 UNDERGROUND	210 SPACES
TOTAL PARKING PROPOSED	648 SPACES
PROPOSED BARRIER FREE SPACES	
PROPOSED LOADING AREA	15 SPACES
	3 SPACES
* 10% PARKING REDUCTION PERMITTED FOR LOCATION TO TRANSIT	
** 4 SPACES PLUS 0.5 SPACES FOR EACH OF THE FIRST 30 ROOMS PLUS 0.25 SPACES FOR EACH ADDITIONAL ROOM. PLUS 1 SPACES FOR 20M2 FOR HEALTH/MEDICAL/PERSONAL SERVICE SPACE (123.8 M2 PROVIDED)	
*** RESTAURANT AREA (INCLUDING OUTDOOR PATIO) - 287.4 SQ.M.	
**** CAFE AREA (NOT INCLUDING OUTDOOR PATIO) - 85.0 SQ.M.	

NO.	DATE:	REVISION:	BY:
1	JULY 29 2019	SCHEMATIC CONCEPTS	JMR/MDA
2	AUG. 7 2019	SCHEMATIC CONCEPTS	JMR/MDA
3	MAY 7 2021	PARKING GARAGE LAYOUT	CH
4	JUNE 18 2021	REVISED BLD. HEIGHTS	CH
5	JUNE 20 2023	FOR SUBMISSION	ACK
6			

COMMISSION:

PARIS STREET DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO

A.C.K

architects

STUDIO INC.

Architectural Offices:

290 Glenvale Ave. St. Catharines, ON, L2T 2L3

905 984 9545

SHEET TITLE:

SITE PLAN

Issued for Re-Zoning

Issued for Site Plan Agreement:

Issued for Permit:

Issued for Tender:

Issued for Construction:

DRAWN BY: JMR

CHECKED BY: MDA

DATE: JUNE 19 2023

SCALE: AS SHOWN

PROJECT No.: 2010-205

DWG. No.

.SP1

SITE PLAN

1 : 400

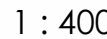
LEGEND

PROPOSED BUILDING PODIUM FOOTPRINT


PROPOSED BUILDING FOOTPRINT ABOVE PODIUM


TOP FLOOR FOOTPRINT






**LEGEND**

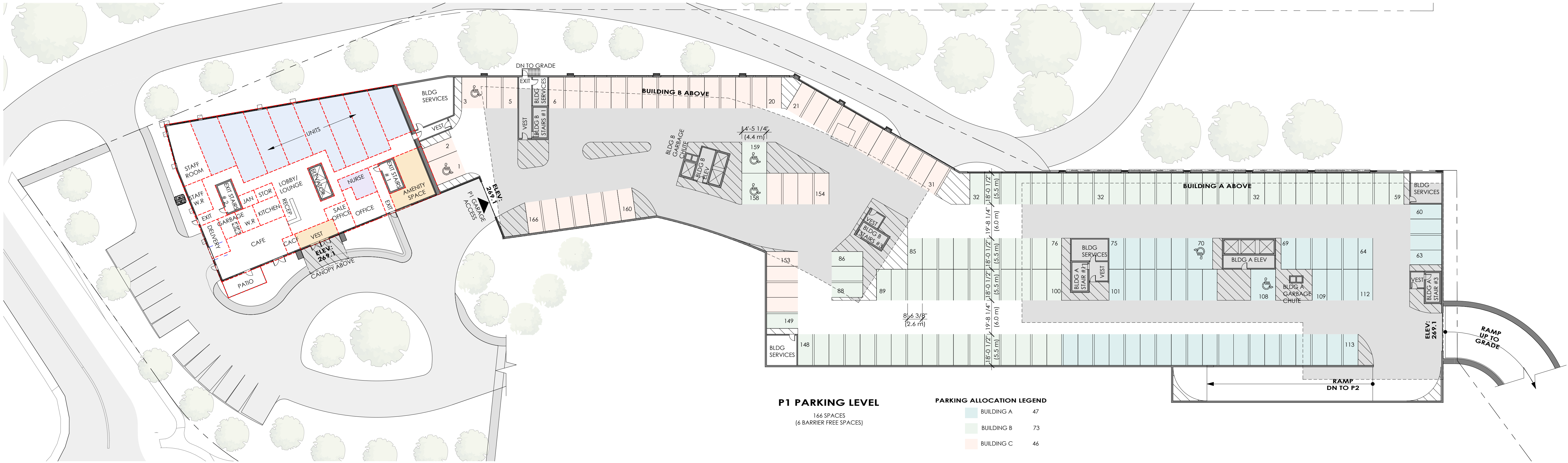
 **PROPOSED  
BUILDING FOOTPRINT**

 **PROPOSED  
BUILDING FOOTPRINT  
ABOVE AND OVERHANG**

 **PREVIOUS BUILDING  
FOOTPRINT**

## .SP1.1





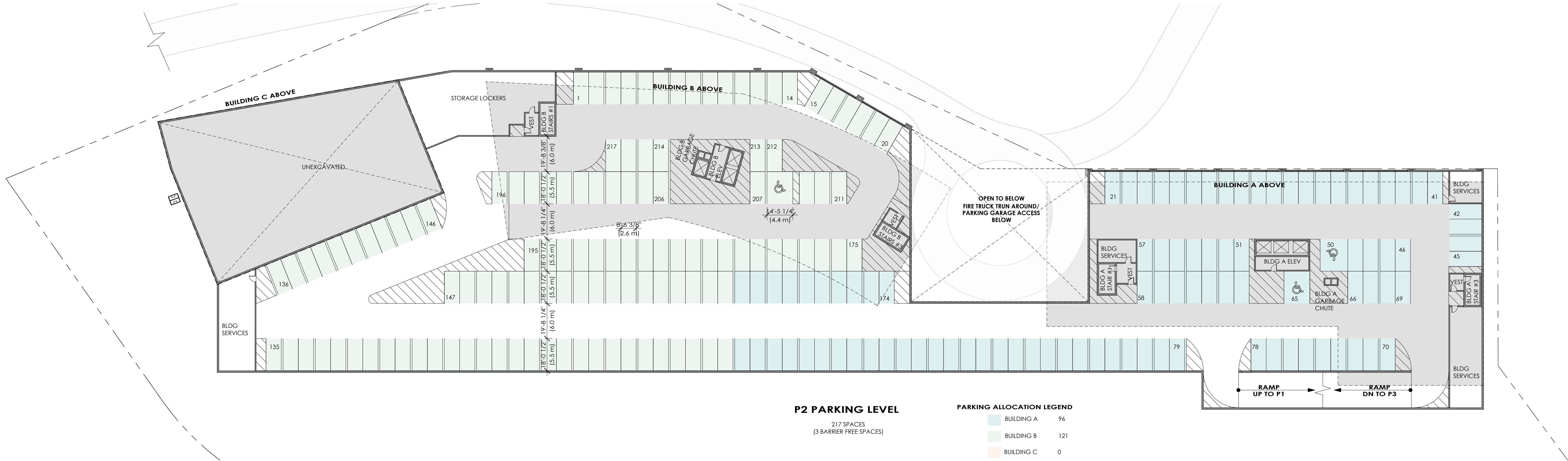
PAKRING LEVEL 1 PLAN

1" = 30'-0"

68,548 S.F

**P1 PARKING LEVEL**  
166 SPACES  
(6 BARRIER FREE SPACES)

PARKING ALLOCATION LEGEND	
<span style="color: #4682B4;">■</span>	BUILDING A 47
<span style="color: #90EE90;">■</span>	BUILDING B 73
<span style="color: #FFDAB9;">■</span>	BUILDING C 46



PARKING LEVEL 2 PLAN

1" = 30'-0"

86,442 S.F

**P2 PARKING LEVEL**  
217 SPACES  
(3 BARRIER FREE SPACES)

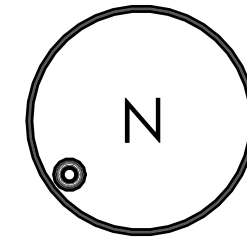
PARKING ALLOCATION LEGEND	
<span style="color: #4682B4;">■</span>	BUILDING A 96
<span style="color: #90EE90;">■</span>	BUILDING B 121
<span style="color: #FFDAB9;">■</span>	BUILDING C 0

NO.	DATE:	REVISION:	BY:
1	JULY 29 2019	SCHEMATIC CONCEPTS	JMR/MDA
2	AUG. 7 2019	SCHEMATIC CONCEPTS	JMR/MDA
3	MAY 7 2021	PARKING GARAGE LAYOUT	CH
4	JUNE 18 2021	REVISED BLD. HEIGHTS	CH
5	JUNE 20 2023	FOR SUBMISSION	ACK
6			

COMMISSION:

PARIS STREET  
DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO



**A · C · K**  
architects  
STUDIO INC.

Architectural Office:  
290 Glenade Ave. St. Catharines, ON, L2T 2L3  
905-954-5545

SHEET TITLE:

UNDERGROUND  
PARKING LEVEL P1  
AND P2

Issued for Re-Zoning

Issued for Site Plan Agreement:

Issued for Permit:

Issued for Tender:

Issued for Construction:

DRAWN BY: JMR DWG. No.

CHECKED BY: MDA

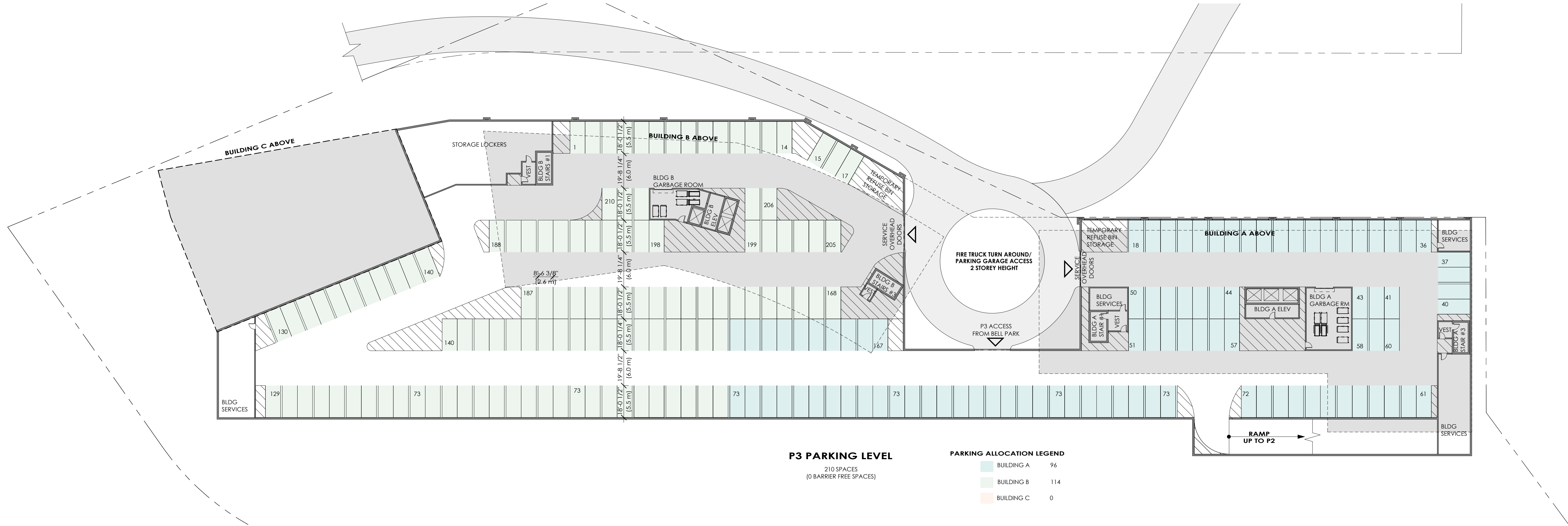
DATE: JUNE 19 2023

SCALE: AS SHOWN

PROJECT No.: 2010-205

.UG1





PARKING LEVEL 3 PLAN

1" = 30'-0"

86,442 S.F

All contractors and/or trades shall verify all dimensions, notes, site and report any discrepancies prior to commencement of the work. This drawing not to be scaled, all drawings, prints and related documents are the property of the architect and must be returned upon request. Reproduction of drawings and related documents in part or in whole is strictly forbidden without written consent. Drawings to be for the purpose for which they are issued.

NO.	DATE:	REVISION:	BY:
1	JULY 29 2019	SCHEMATIC CONCEPTS	JMR/MDA
2	AUG. 7 2019	SCHEMATIC CONCEPTS	JMR/MDA
3	MAY 7 2021	PARKING GARAGE LAYOUT	CH
4	JUNE 18 2021	REVISED BLD. HEIGHTS	CH
5	JUNE 20 2023	FOR SUBMISSION	ACK
6			

COMMISSION:

PARIS STREET DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO

N

**A · C · K**  
architects  
STUDIO INC.

Architectural Office:  
290 Glenade Ave, St. Catharines, ON, L2T 2L3  
905-984-5545

SHEET TITLE:

UNDERGROUND  
PAKRING LEVEL P3

Issued for Re-Zoning

Issued for Site Plan Agreement:

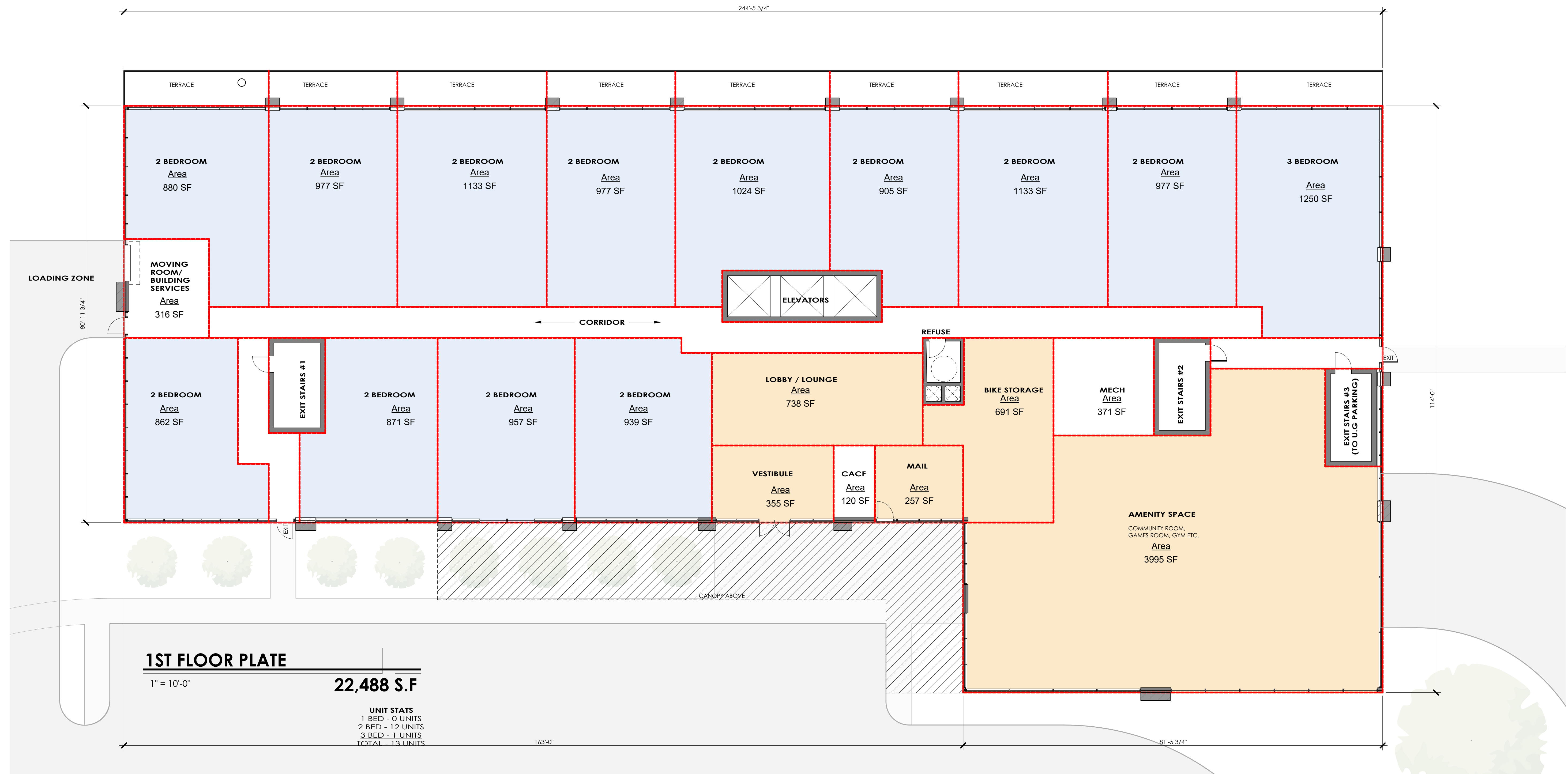
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Issued for Tender:

Issued for Construction:

DRAWN BY:	JMR	DWG. No.
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DATE:	JUNE 19 2023	
SCALE:	AS SHOWN	
PROJECT No.:	2010-205	

.UG2



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# BUILDING A - URBAN LOFTS

700 PARIS STREET, SUDBURY, ONTARIO

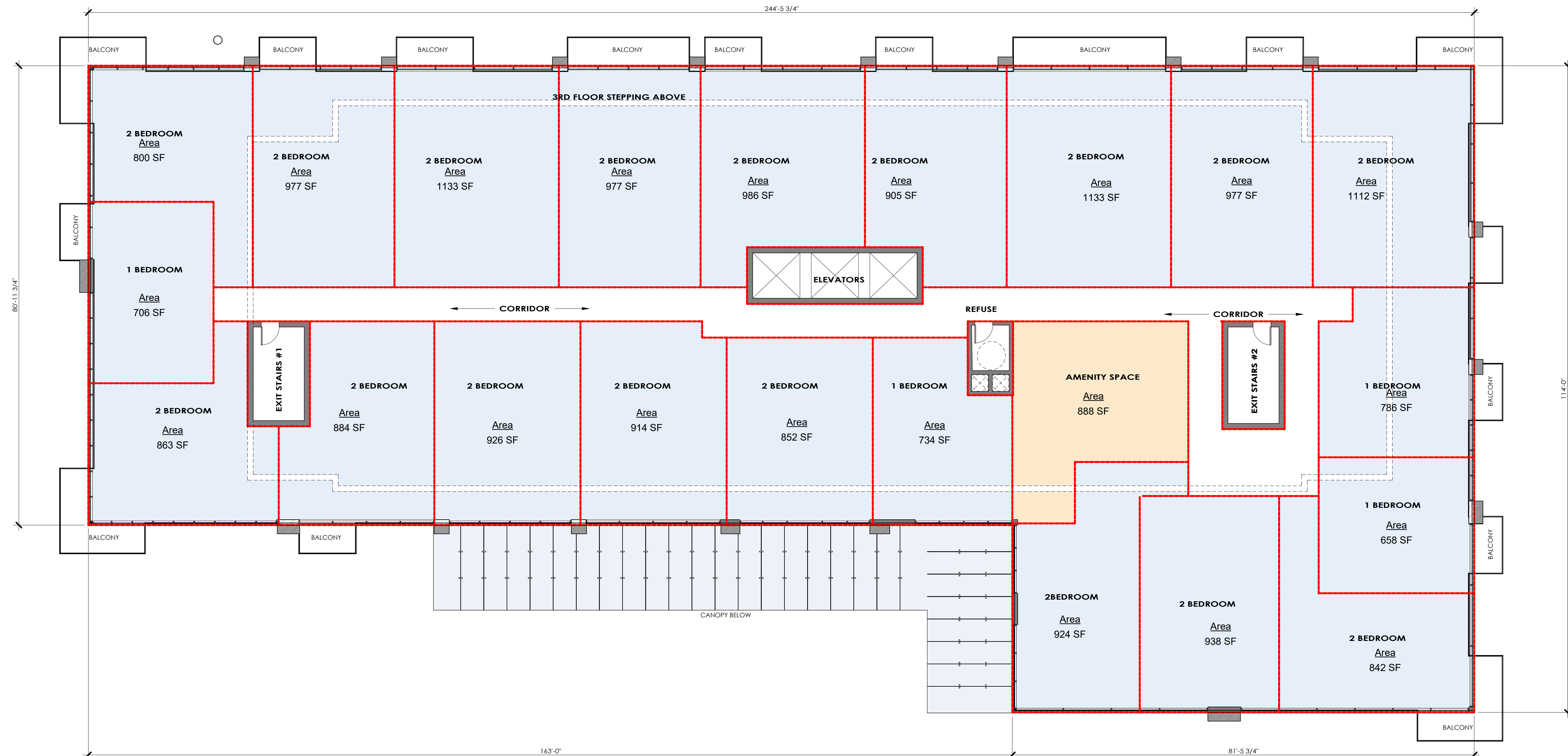
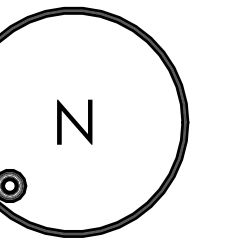
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STUDIO INC.

1ST FLOOR PLATE

DWG. No.

A1.1

SCALE: AS SHOWN  
DATE: MARCH 30 2023  
PROJECT No.: 2021-144



## 2ND FLOOR PLAN

1" = 10'-0"

**22,488 S.F**

UNIT STATS  
1 BED - 4 UNITS  
2 BED - 17 UNITS  
TOTAL - 21 UNITS

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# BUILDING A - URBAN LOFTS

700 PARIS STREET, SUDBURY, ONTARIO

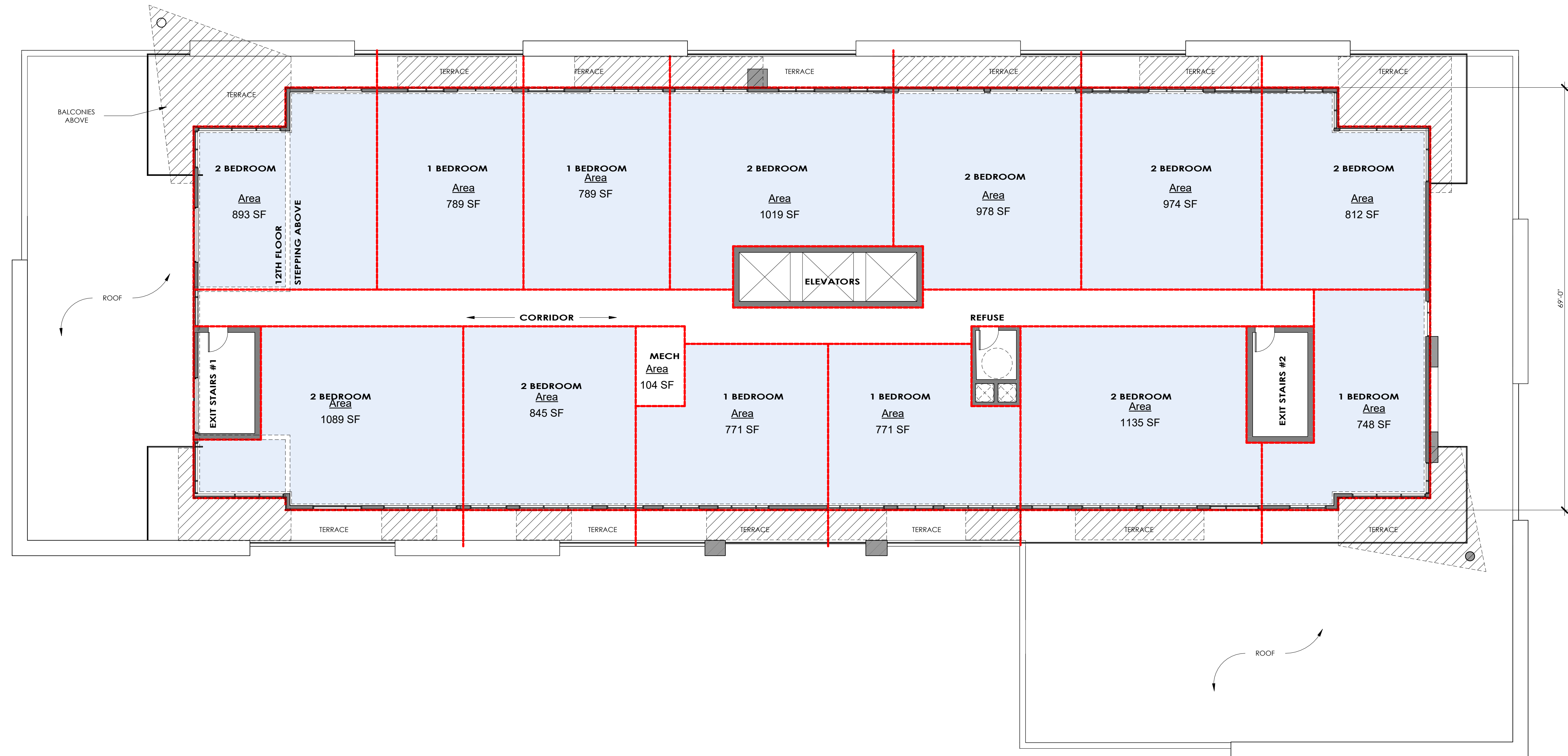
A · C · K  
architects  
STUDIO INC.

2ND FLOOR PLATE

DWG. No.

A1.2

SCALE: AS SHOWN  
DATE: MARCH 30 2023  
PROJECT No.: 2021-144



**3RD - 11TH FLOOR PLATE**

1" = 10'-0"

**13,684 S.F**

UNIT STATS  
1 BED - 5 UNITS  
2 BED - 8 UNITS  
TOTAL - 13 UNITS

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# BUILDING A - URBAN LOFTS

700 PARIS STREET, SUDBURY, ONTARIO

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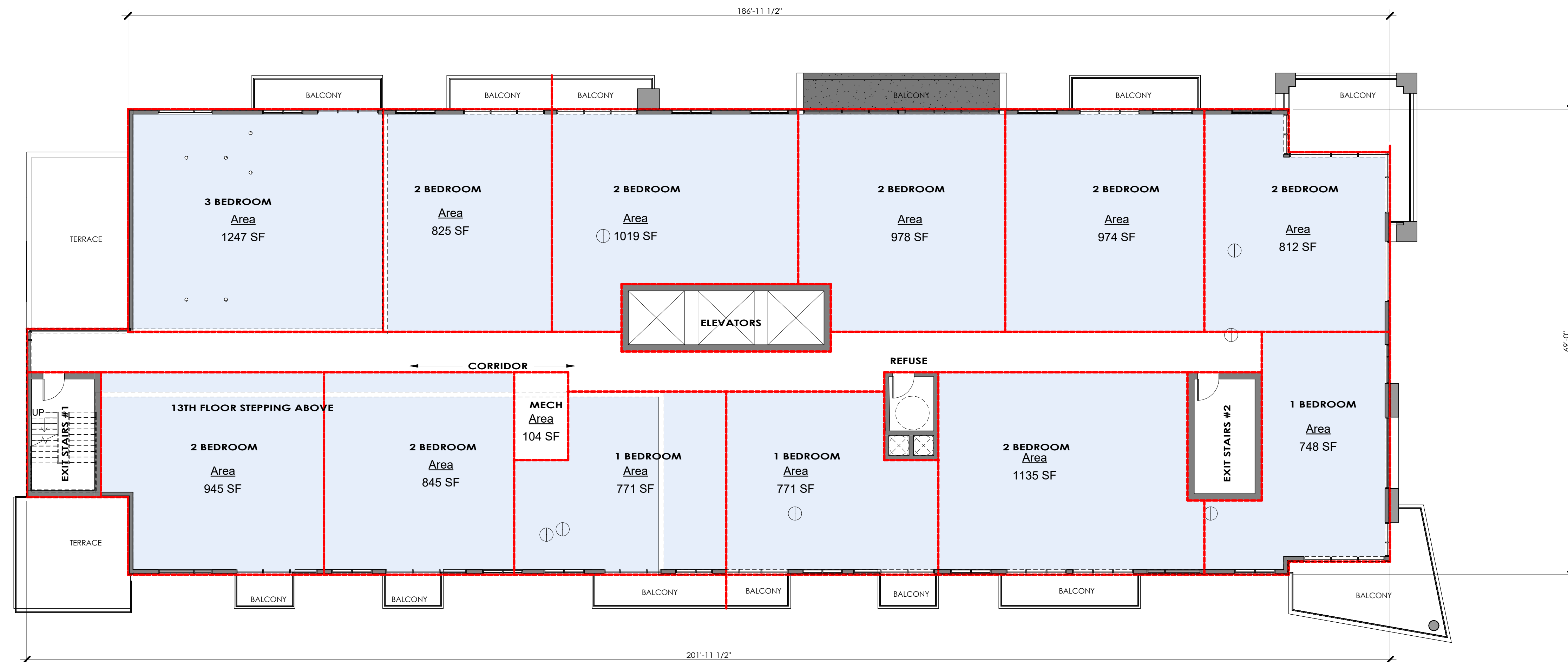
3RD - 11TH FLOOR  
PLATE

DWG. No.

**A1.3**

SCALE: AS SHOWN  
DATE: MARCH 30 2023  
PROJECT No.: 2021-144





## 12TH FLOOR

1" = 10'-0"

**13,320 S.F**

UNIT STATS  
1 BED - 3 UNITS  
2 BED - 8 UNITS  
3 BED - 1 UNITS  
TOTAL - 12 UNITS

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# BUILDING A - URBAN LOFTS

700 PARIS STREET, SUDBURY, ONTARIO

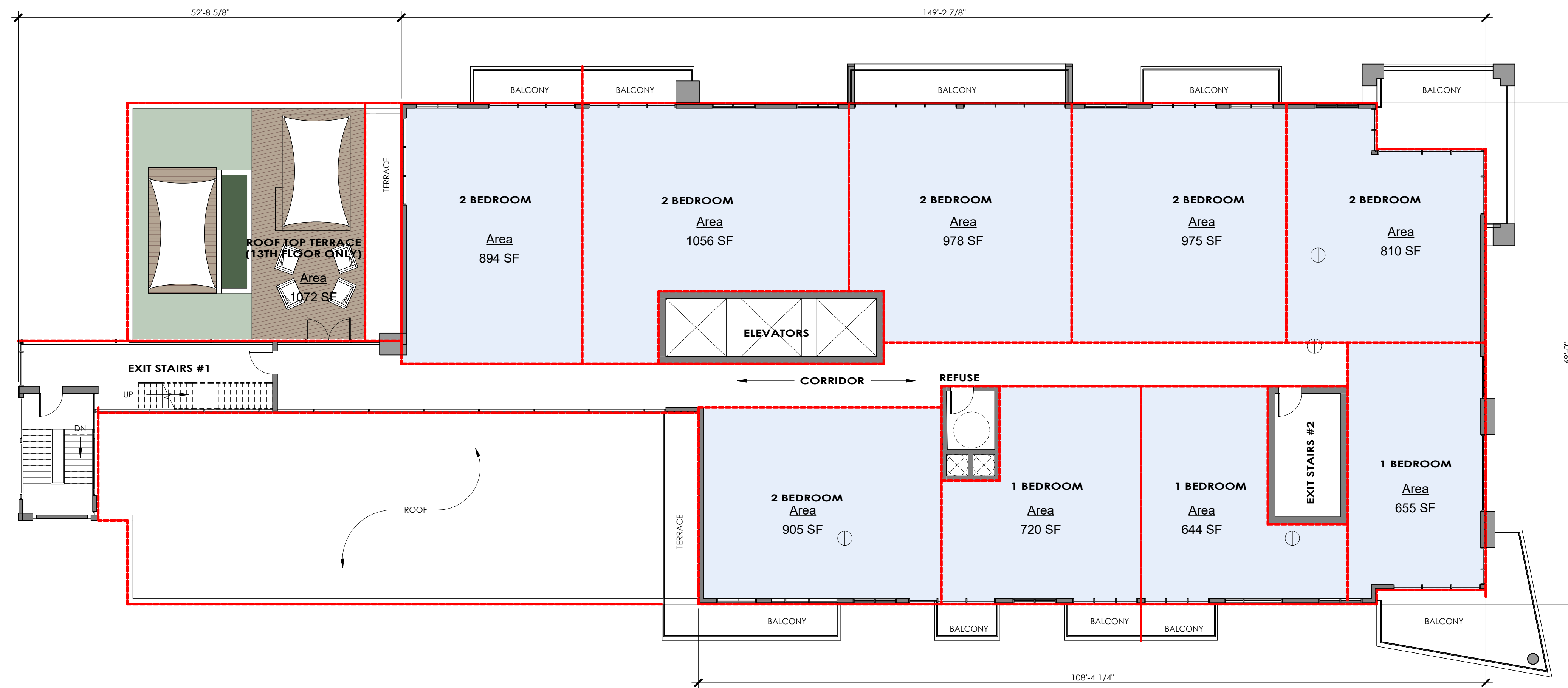
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architects  
STUDIO INC.

12TH FLOOR PLATE

DWG. No.

A1.4

SCALE: AS SHOWN  
DATE: MARCH 30 2023  
PROJECT No.: 2021-144



**13TH - 16TH FLOOR PLATE**

1" = 10'-0"

**9,899 S.F**

UNIT STATS  
1 BED - 3 UNITS  
2 BED - 6 UNITS  
TOTAL - 9 UNITS

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# BUILDING A - URBAN LOFTS

700 PARIS STREET, SUDBURY, ONTARIO

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STUDIO INC.

13TH - 16TH FLOOR  
PLATE

DWG. No.

**A1.5**

SCALE: AS SHOWN  
DATE: MARCH 30 2023  
PROJECT No.: 2021-144



# BUILDING B - CONDO TOWER

A · C · K  
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STUDIO INC.

## A2.1

Page 41 of 767





**2ND FLOOR PLATE**

1" = 10'-0"

**14,507 S.F**

UNIT STATS  
1 BED - 1 UNITS  
2 BED - 11 UNITS  
3 BED - 3 UNITS  
TOTAL - 15 UNITS

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# BUILDING B - CONDO TOWER

700 PARIS STREET, SUDBURY, ONTARIO

**A · C · K**  
architects  
STUDIO INC.

2ND FLOOR PLATE

DWG. No.

**A2.2**

SCALE: AS SHOWN  
DATE: FEB 10 2023  
PROJECT No.: 2021-144





**3RD - 7TH FLOOR PLATE**  
1" = 10'-0"  
**16,443 S.F**  
**UNIT STATS**  
1 BED - 1 UNITS  
2 BED - 10 UNITS  
3 BED - 3 UNITS  
TOTAL - 14 UNITS

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# BUILDING B - CONDO TOWER

700 PARIS STREET, SUDBURY, ONTARIO

**A · C · K**  
architects  
STUDIO INC.

3RD-7TH FLOOR  
PLATE

DWG. No.  
**A2.3**

SCALE: AS SHOWN  
DATE: FEB 10 2023  
PROJECT No.: 2021-144



**8TH - 13TH FLOOR PLATE**

1" = 10'-0"

**13,361 S.F**

UNIT STATS

- 1 BED - 2 UNITS
- 2 BED - 9 UNITS
- 3 BED - 1 UNITS
- TOTAL - 12 UNITS

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# BUILDING B - CONDO TOWER

700 PARIS STREET, SUDBURY, ONTARIO

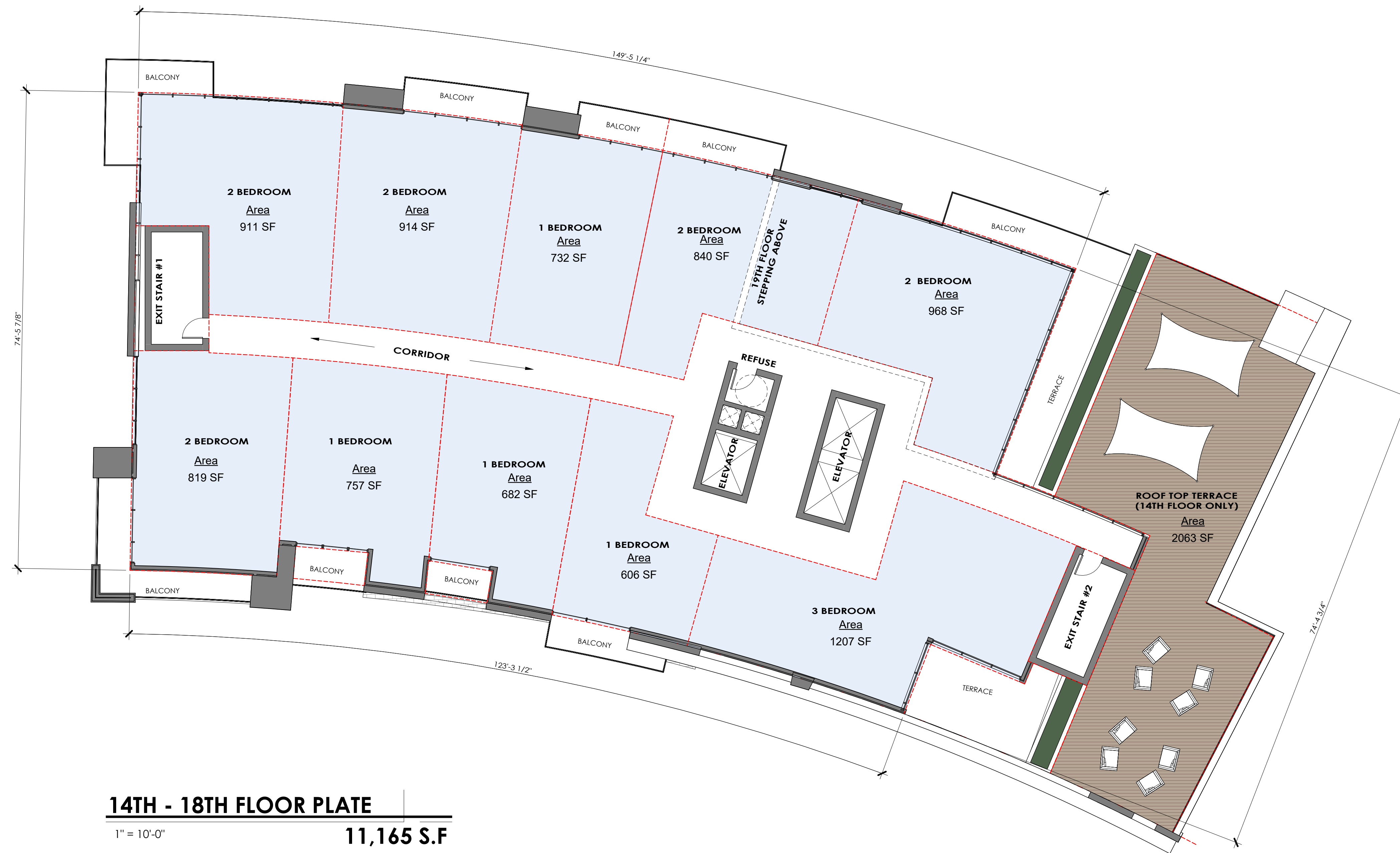
**A · C · K**  
architects  
STUDIO INC.

8TH - 13 FLOOR  
PLATE

DWG. No.  
**A2.4**

SCALE: AS SHOWN  
DATE: FEB 10 2023  
PROJECT No.: 2021-144





### 14TH - 18TH FLOOR PLATE

1" = 10'-0"

**11,165 S.F**

UNIT STATS  
1 BED - 4 UNITS  
2 BED - 5 UNITS  
3 BED - 1 UNITS  
TOTAL - 10 UNITS

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# BUILDING B - CONDO TOWER

700 PARIS STREET, SUDBURY, ONTARIO

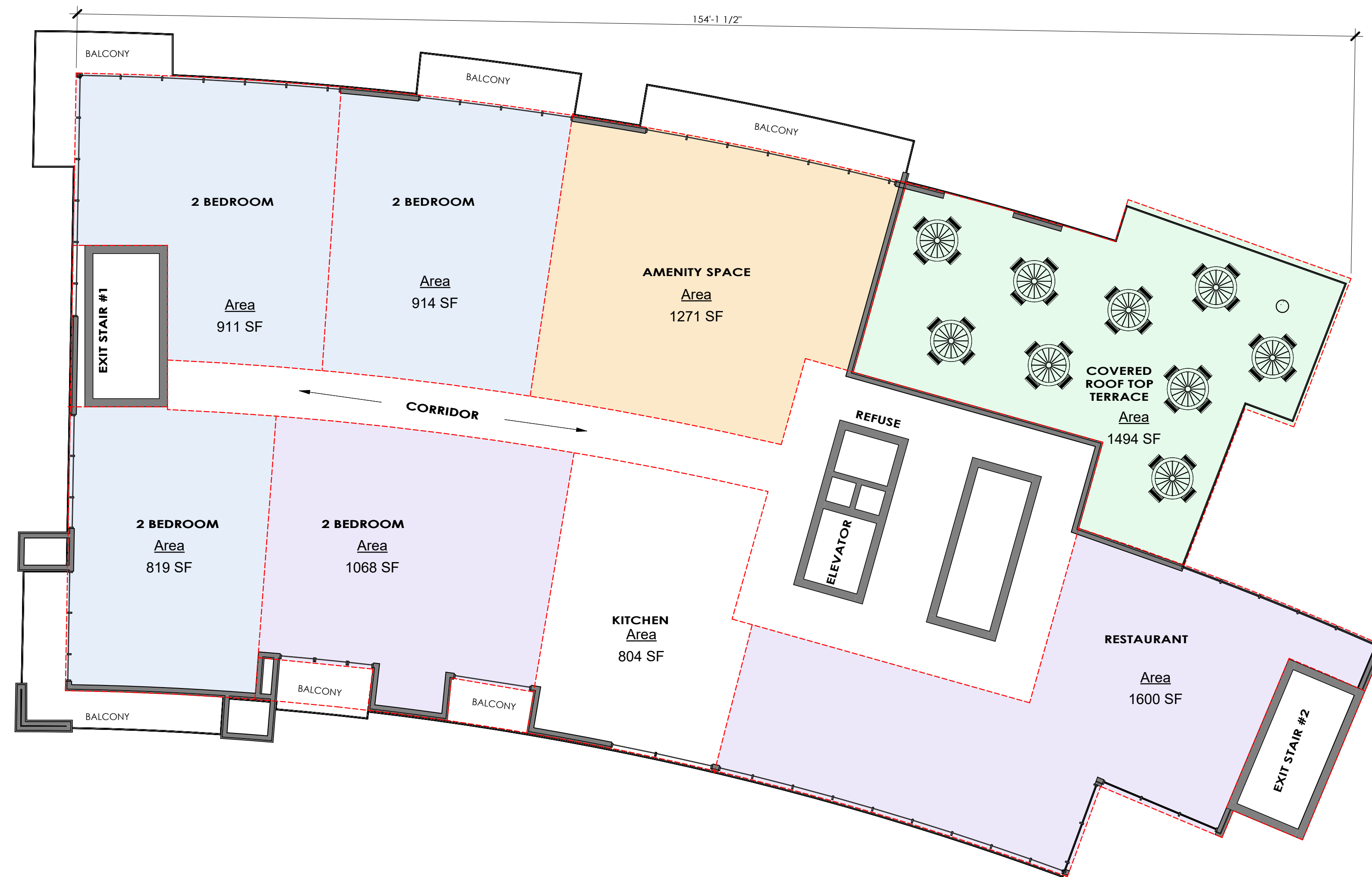
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architects  
STUDIO INC.

14TH - 19TH FLOOR  
PLATE

DWG. No.

**A2.5**

SCALE: AS SHOWN  
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PROJECT No.: 2021-144



**20TH FLOOR**  
1" = 10'-0" **9,480 S.F**

**UNIT STATS**  
1 BED - 0 UNITS  
2 BED - 4 UNITS  
3 BED - 0 UNITS  
TOTAL - 4 UNITS

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# BUILDING B - CONDO TOWER

700 PARIS STREET, SUDBURY, ONTARIO

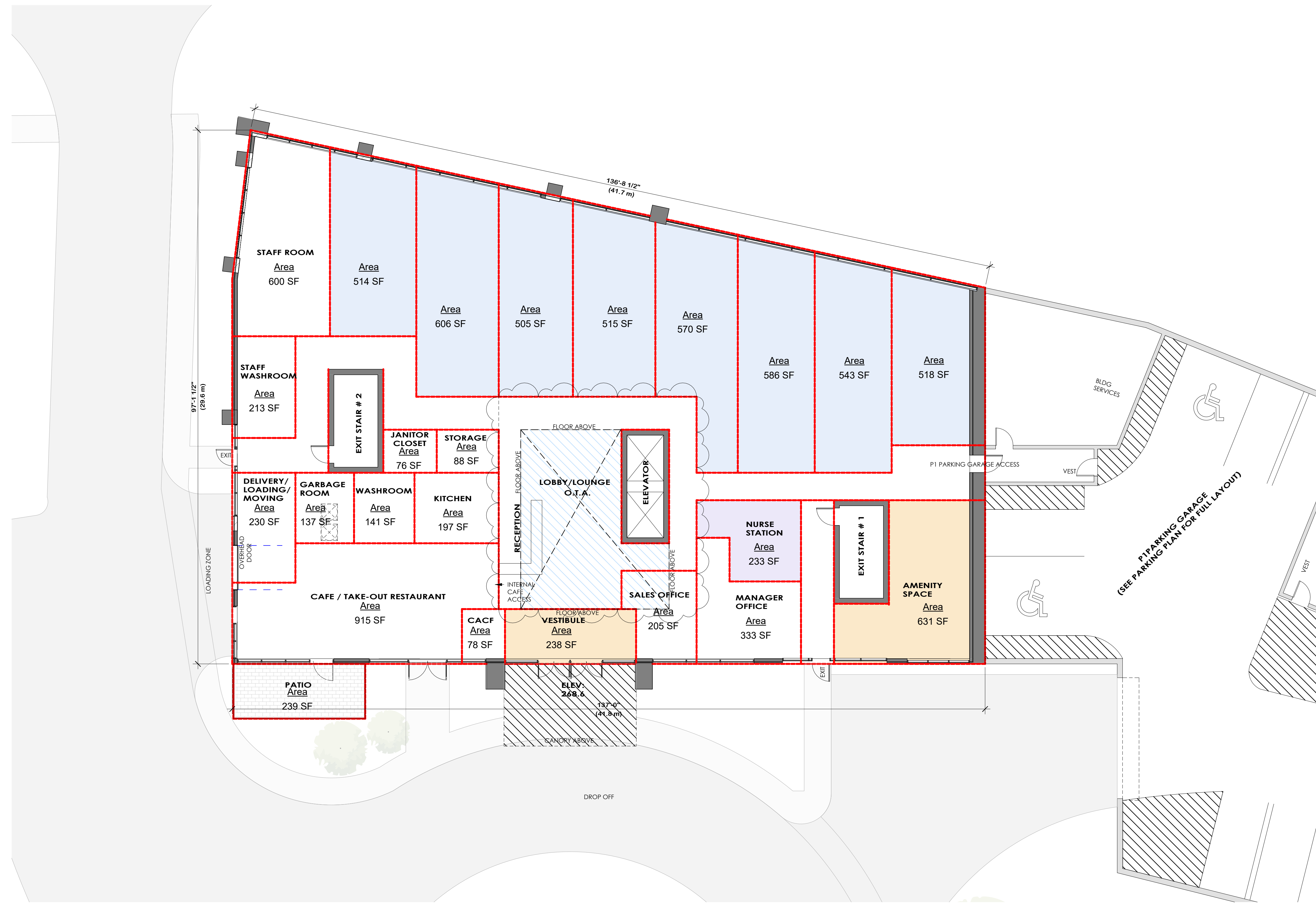
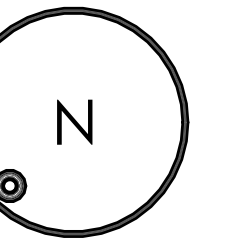
**A · C · K**  
architects  
STUDIO INC.

20TH FLOOR PLATE

DWG. No.  
**A2.6**

SCALE: AS SHOWN  
DATE: FEB 10 2023  
PROJECT No.: 2021-144





**1ST FLOOR PLATE**  
1" = 10'-0"  
**11,345 S.F.**  
(8 UNITS)

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# BUILDING C - RETIREMENT HOME

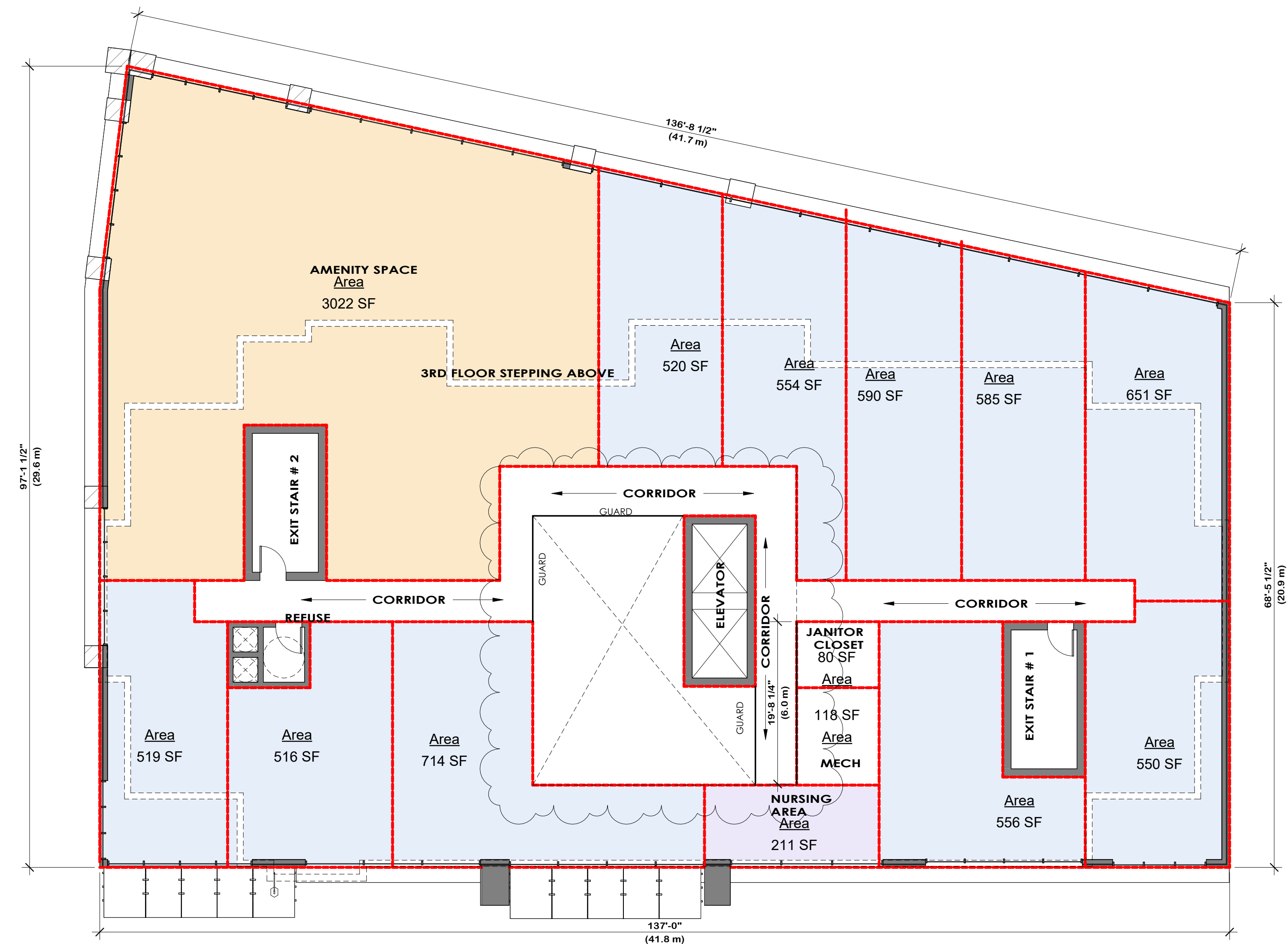
700 PARIS STREET, SUDBURY, ONTARIO

**A · C · K**  
architects  
STUDIO INC.

1ST FLOOR PLATES

DWG. No.  
**A3.1**

SCALE: AS SHOWN  
DATE: JUNE 12 2023  
PROJECT No.: 2021-144



## 2ND FLOOR PLATE

1" = 10'-0"

11,345 S.F

(11 UNITS)

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# BUILDING C - RETIREMENT HOME

700 PARIS STREET, SUDBURY, ONTARIO

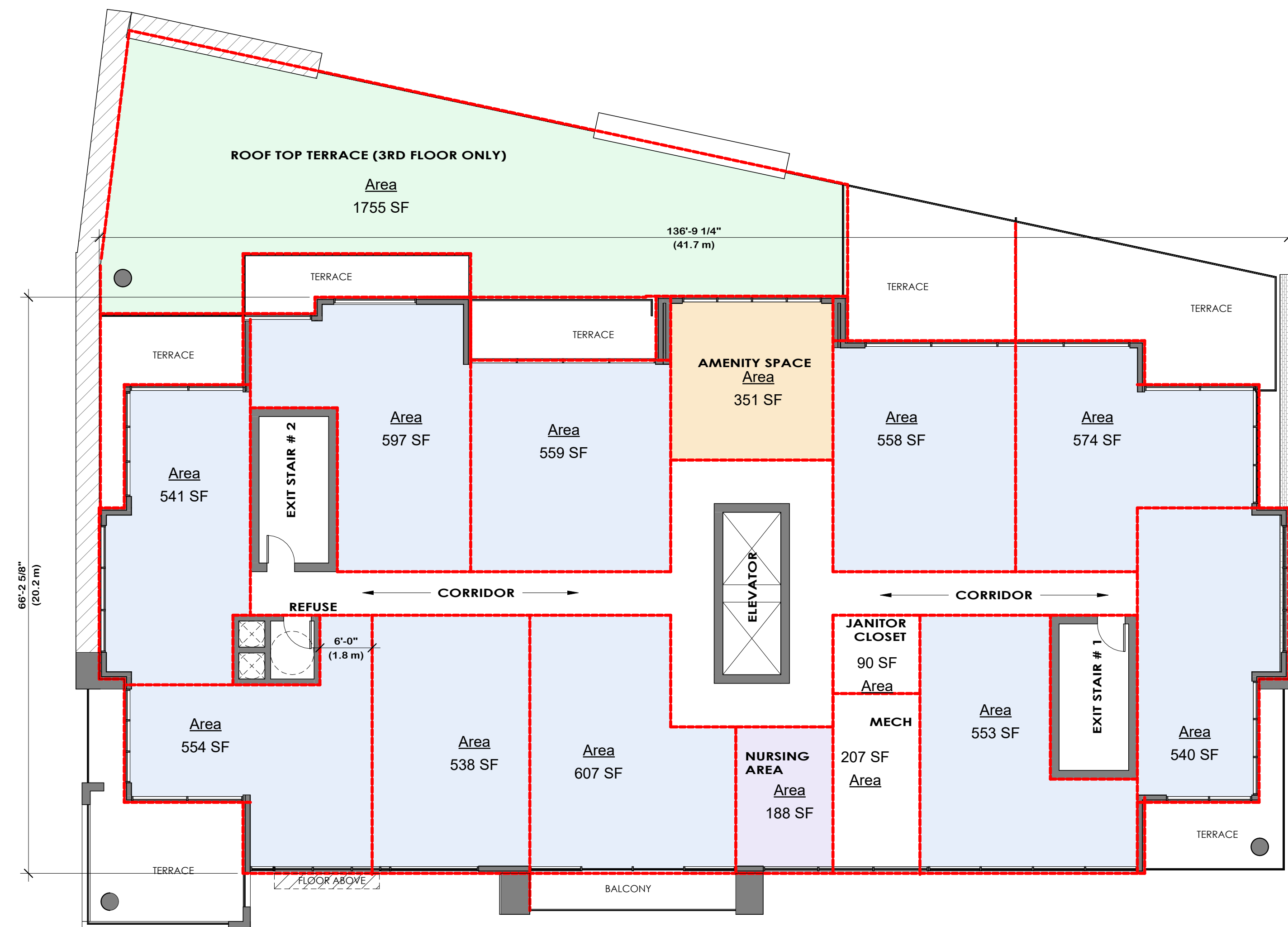
A · C · K  
architects  
STUDIO INC.

2ND FLOOR PLATE

DWG. No.

A3.2

SCALE: AS SHOWN  
DATE: JUNE 12 2023  
PROJECT No.: 2021-144



### 3RD FLOOR PLATE

1" = 10'-0"

7,914 S.F.

(10 UNITS)

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# BUILDING C - RETIREMENT HOME

700 PARIS STREET, SUDBURY, ONTARIO

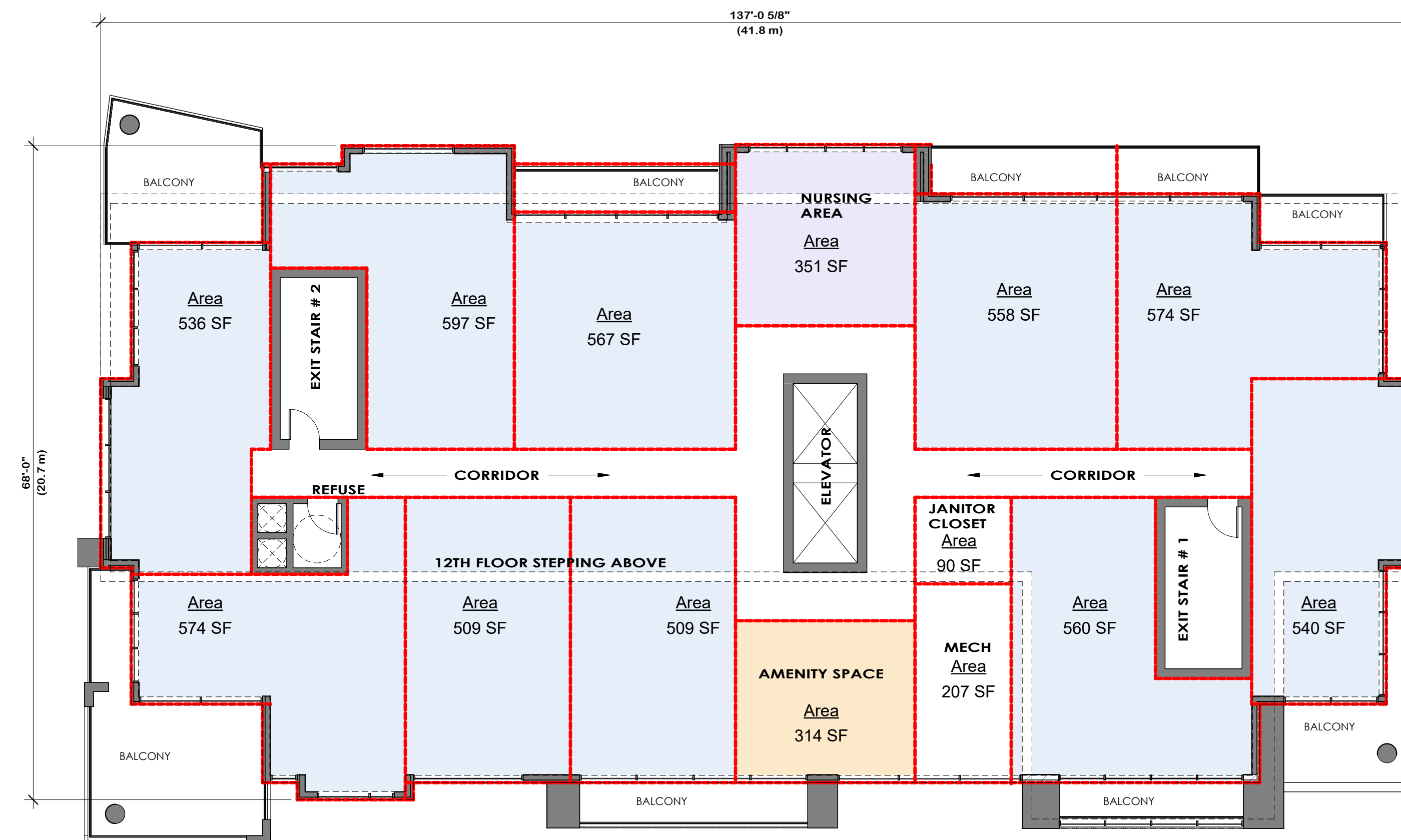
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architects  
STUDIO INC.

3RD FLOOR PLATE

DWG. No.

A3.3

SCALE: AS SHOWN  
DATE: JUNE 12 2023  
PROJECT No.: 2021-144



**4TH - 11TH FLOOR PLATE**  
1" = 10'-0"  
**7,938 S.F**  
(10 UNITS/ FLOOR)

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# BUILDING C - RETIREMENT HOME

700 PARIS STREET, SUDBURY, ONTARIO

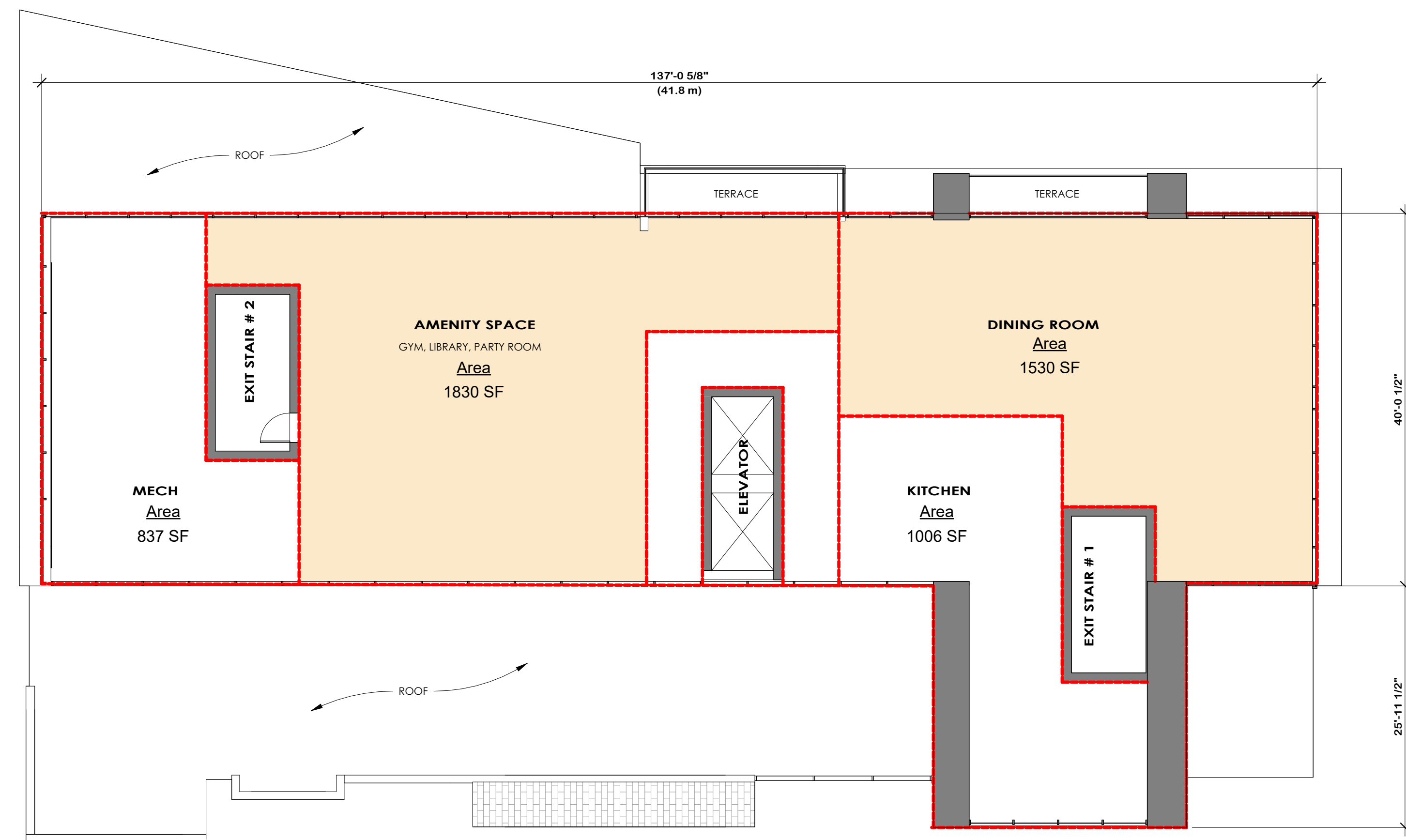
**A · C · K**  
architects  
STUDIO INC.

4TH - 11TH FLOOR  
PLATE

DWG. No.  
**A3.4**

SCALE: AS SHOWN  
DATE: JUNE 12 2023  
PROJECT No.: 2021-144





**PENTHOUSE**  
1" = 10'-0" **6,182 S.F**

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# BUILDING C - RETIREMENT HOME

700 PARIS STREET, SUDBURY, ONTARIO

**A · C · K**  
architects  
STUDIO INC.

12TH FLOOR PLATE

DWG. No.  
**A3.5**

SCALE: AS SHOWN  
DATE: JUNE 12 2023  
PROJECT No.: 2021-144

# 700 Paris Street

## City of Greater Sudbury

### Traffic Impact Study for 2226553 Ontario Inc.

Type of Document:  
Final Report

Project Number:  
JDE – 21192

Date Submitted:  
December 23<sup>rd</sup>, 2022



John Northcote, P.Eng.  
Professional License #: 100124071



**JD Northcote Engineering Inc.**  
86 Cumberland Street  
Barrie, ON  
705.725.4035  
[www.JDEngineering.ca](http://www.JDEngineering.ca)

## Legal Notification

This report was prepared by **JD Northcote Engineering Inc.** for the account of **2226553 Ontario Inc.**

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. **JD Northcote Engineering Inc.** accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

## Executive Summary

This report summarizes the traffic impact study prepared for the proposed development on a site municipally known as 700 Paris Street, located on the east side of Paris Street between Boland Avenue and Facer Street, in the City of Greater Sudbury [City]. The report assesses the impact of traffic related to the development on the adjacent roadway and provides recommendations to accommodate this traffic in a safe and efficient manner.

The proposed development is anticipated to consist of a 16-storey building with 198 units, a 20-storey building with 250 units and a ground-floor restaurant (500 sq.m. of GFA) and a 10-storey retirement home with 100 rooms.

The proposed development will redevelop the existing site which was formerly the location St. Joseph Hospital. The St. Joseph Hospital has been closed since 2012.

The proposed development will share the existing access with the municipal parking lot south of the proposed development [Paris Driveway], located at the east leg of the Paris Street / Boland Avenue & Existing Driveway intersection. The proposed development will include a full-movement access driveway onto Bell Park Road [Bell Park Access] and an ingress only parking lot access onto Bell Park Road [Bell Park Ingress].

The scope of this analysis includes a review of the following intersections:

- Paris Street / Brady Street;
- Paris Street / Van Horne Street;
- Paris Street / John Street;
- Paris Street / McNaughton Street;
- Paris Street / Facer Street;
- Facer Street / Bell Park Road;
- Paris Street / Boland Avenue & Paris Driveway;
- Paris Street / York Street; and
- Paris Street / Ramsey Lake Road.

## Conclusions

1. The proposed development is expected to generate a total of 202 AM and 206 PM peak hour primary trips and 18 PM peak hour pass-by trips.
2. Background traffic and pedestrian counts were commissioned for the existing intersections of Paris Street / Van Horne Street, Paris Street / McNaughton Street, Paris Street / Facer Street, Facer Street / Bell Park Road and Paris Street / York Street completed on Wednesday, April 20<sup>th</sup> 2022. Background traffic and pedestrian counts at the study area intersections were also obtained from the City.
3. An intersection operation analysis was completed at the study area intersections, using the existing (2022) and background (2027 & 2032) traffic volumes, with the adjacent development traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the proposed development. These improvements are warranted based on the anticipated growth in the City and traffic generated by future developments in the study area without the proposed development. The following improvements are recommended:

#### **Existing (2022) Traffic Volumes**

- **Paris Street / John Street and Paris Street / Ramsey Lake Road**
  - Optimize signal timing plan.

#### **Background (2027) Traffic Volumes**

- **Paris Street / Van Horne Street, Paris Street / McNaughton Street, Paris Street / Boland Avenue & Paris Driveway and Paris Street / York Street**
  - Optimize signal timing plan.

#### **Background (2032) Traffic Volumes**

- **Paris Street / Brady Street**
    - Adjust eastbound pavement markings to accommodate a double left-turn lane.
    - Adjust eastbound signal heads to accommodate a protected eastbound left turn phase.
    - Optimize signal timing plan.
  - **Paris Street / Ramsey Lake Road**
    - Widen Ramsey Lake Road to accommodate westbound double right turn lane with a 100 metre storage length and 60 metre taper length
    - Optimize signal timing plan.
4. An estimate of the amount of traffic that would be generated by the Subject Site was prepared and assigned to the study area streets and intersections.
5. An intersection operation analysis was completed under total (2027 & 2032) traffic volumes with the proposed development operational at the study area intersections. The following improvements are recommended prior to build-out of the proposed development:

#### **Opening Day (2027) Traffic Volumes**

##### **Paris Street / Boland Avenue & Paris Driveway**

- Shift the Paris Driveway to align with Boland Avenue.
- The westbound configuration of Paris Driveway at the intersection shall include a left turn lane and through-right lane.

##### **Facer Street**

- Construct sidewalk on the south side of the road between Paris Street and Bell Park Road.

##### **Bell Park Road**

- Reconstruct Bell Park Road south of Facer Street to a 6.0 metre wide paved condominium road.
  - Bell Park Road shall have a posted speed limit of 20 km/h once Bell Park Road is reconstructed.
6. The proposed development will shift the location of the Paris Driveway slightly further north at the intersection to align with Boland Avenue. It is recommended the westbound lane configuration at the Paris Street / Boland Avenue & Paris Driveway intersection include a left turn lane and through-right lane. A single ingress and egress lane at the Paris Driveway will

provide the necessary capacity to service the proposed development. The Paris Driveway will provide ingress and egress access to the underground parking and surface parking.

7. The Bell Park Access will operate as full-movement access driveway. A single ingress and egress lane at the Bell Park Access will provide the necessary capacity to service the proposed development. The Bell Park Ingress will operate efficiently with a single ingress only driveway. A single ingress lane at the Bell Park Ingress will provide the necessary capacity to service the proposed development. Bell Park Access will provide ingress and egress access to the surface parking and the Bell Park Ingress will provide ingress only access to the underground parking.
8. There are no issues regarding the sight distance available for the proposed Paris Driveway and Bell Park Access.
9. The proposed parking supply for the proposed development meets the minimum parking requirement specified in the City's Zoning By-law 2010-100Z.
10. In summary the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

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APPENDIX I – NCHRP Internal Capture Reports

# 1 Introduction

## 1.1 Background

**2226553 Ontario Inc.** [The Client] is proposing a development on a site municipally known as 700 Paris Street, located on the east side of Paris Street between Boland Avenue and Facer Street, in the City of Greater Sudbury [City]. The proposed development is anticipated to consist of a 16-storey building with 198 units, a 20-storey building with 250 units and a ground-floor restaurant (500 sq.m. of GFA) and a 10-storey retirement home with 100 rooms.

The proposed development will redevelop the existing site which was formerly the location St. Joseph Hospital. The St. Joseph Hospital has been closed since 2012.

The proposed development will share the existing access with the municipal parking lot south of the proposed development [Paris Driveway], located at the east leg of the Paris Street / Boland Avenue & Existing Driveway intersection. The Paris Driveway will provide ingress and egress access to the underground parking and surface parking.

The proposed development will include a full-movement access driveway onto Bell Park Road [Bell Park Access] and an ingress only parking lot access onto Bell Park Road [Bell Park Ingress]. Bell Park Access will provide ingress and egress access to the surface parking and the Bell Park Ingress will provide ingress only access to the underground parking.

The Client has retained **JD Northcote Engineering Inc.** [JD Engineering] to prepare this traffic impact study in support of the proposed development.

## 1.2 Study Area

**Figure 1** illustrates the location of the subject site and study area intersections in relation to the surrounding area. The Draft Plan by ACK Architects is attached in **Appendix A**.

The subject site is bound by Paris Street to the west, Facer Street to the north, Bell Park Road to the east and existing municipal parking lot to the south.

Through our consultation with the City, the following intersections will be analysed as part of the study:

- Paris Street / Brady Street;
- Paris Street / Van Horne Street;
- Paris Street / John Street;
- Paris Street / McNaughton Street;
- Paris Street / Facer Street;
- Facer Street / Bell Park Road;
- Paris Street / Boland Avenue & Paris Driveway;
- Paris Street / York Street; and
- Paris Street / Ramsey Lake Road.

**Figure 1 – Proposed Site Location and Study Area**



### 1.3 Study Scope and Objectives

The purpose of this study is to identify the potential impacts to traffic flow at the site access and on the surrounding roadway network. The study analysis includes the following tasks:

- Determine existing traffic volumes and circulation patterns;
- Estimate future traffic volumes if the proposed development was not constructed, including the impact of additional proposed developments in the area;
- Complete level-of-service [LOS] analysis of horizon year (without the proposed development) traffic conditions and identify operational deficiencies;
- Estimate the amount of traffic that would be generated by the proposed development and assign to the roadway network;
- Complete LOS analysis of horizon year (with the proposed development) traffic conditions and identify additional operational deficiencies;
- Identify improvement options to address operational deficiencies;
- Calculate lane improvements for the Site Access based on the Transportation Association of Canada [TAC] and Ontario Ministry of Transportation [MTO] guidelines;
- Review the proposed configuration of the site accesses;
- Review the suitability of the proposed parking supply; and
- Document findings and recommendations in a final report.

### 1.4 Horizon Year and Analysis Periods

Traffic scenarios for the existing (2022) and horizon (2027 & 2032) year were selected for analysis of traffic operations in the study area. The weekday morning [AM] and weekday afternoon [PM] peak hours have been selected as the analysis periods for this study.

## 2 Information Gathering

### 2.1 Street and Intersection Characteristics

**Paris Street** is a primary arterial road with an urban cross-section and sidewalks on both sides of the road in the study area. Paris Street is a two-lane roadway south of Van Horne Street and a three-lane roadway north of Van Horne Street. Paris Street has a multi-use paths on both sides of the road south of Boland Avenue. Paris Street north of John Street has a posted speed limit of 50 km/h, Paris Street between John Street and York Street has a posted speed limit of 40 km/h and Paris Street south of York Street has a posted speed limit of 60km/h. Paris Street is under jurisdiction of the City.

**Brady Street** is a two-lane primary arterial road with an urban cross-section and sidewalks on both sides of the road. Brady Street has a posted speed limit of 50 km/h and is under jurisdiction of the City.

**Van Horne Street** is a secondary arterial road with an urban cross-section and sidewalks on both sides of the road. Van Horne Street has an unposted (assumed) speed limit of 50km/h east of Paris Street and a posted speed limit of 40 km/h west of Brady Street. Van Horne Street is under jurisdiction of the City.

**John Street** is a two-lane local road with an urban cross-section and a sidewalk on both sides of the road east of Paris Street and no sidewalk west of Paris Street. John Street has an unposted (assumed) speed limit of 50km/h and is under jurisdiction of the City.

**McNaughton Street** is a two-lane local road with an urban cross-section and a sidewalk on the south side of the road east of Paris Street and no sidewalk west of Paris Street. McNaughton Street has an unposted (assumed) speed limit of 50km/h and is under jurisdiction of the City.

**Facer Street** is a two-lane local road with an urban cross-section and no sidewalk. Facer Street has an unposted (assumed) speed limit of 50km/h and is under jurisdiction of the City.

**Bell Park Road** is a two-lane local road with a rural cross-section and a gravel surface. Bell Park Road has an unposted (assumed) speed limit of 50km/h and is under jurisdiction of the City.

**Boland Avenue** is a two-lane collector road with an urban cross-section and a sidewalk on the south side of the road. Boland Avenue has an unposted (assumed) speed limit of 50km/h and is under jurisdiction of the City.

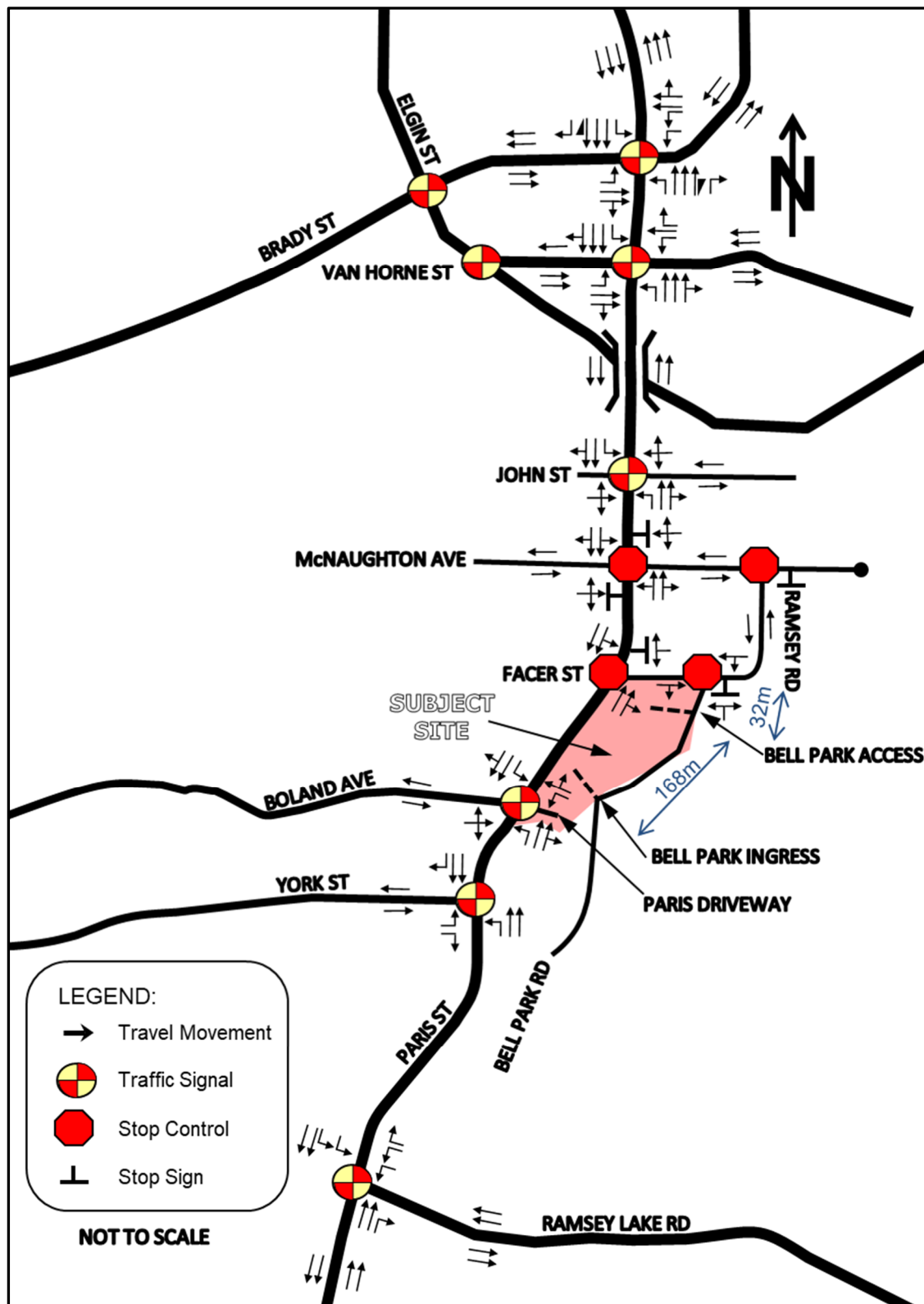
**York Street** is a two-lane collector road with an urban cross-section including sidewalks and bike lanes on the both sides of the road. York Street has a posted speed limit of 40km/h and is under jurisdiction of the City.

**Ramsey Lake Road** is a four-lane secondary arterial road with an urban cross-section and sidewalks on both sides of the road. Ramsey Lake Road has a posted speed limit of 60 km/h and is under jurisdiction of the City.

The existing intersection lane configuration within the study area is illustrated in **Figure 2**.



Figure 2 – Existing Lane Configuration within Study Area



## 2.2 Local Transportation Infrastructure Improvements

Based on a review of the City's Transportation Master Plan (2016) [TMP] and 2022 Capital Budget, there are no planned road improvements in the study area.

The City is planning to construct a bikeway path along Paris Street & Notre Dame Street from Van Horne Street to Wilma Street located north of the study area. Construction of the bikeway is planned to start construction in 2022 which will coincide with the rehabilitation of the Bridge of Nations, which includes the addition of a cycle track as part of the improvements.

## 2.3 Transit Access

The City's bus service [GOVA Transit] provides one bus route near the subject site. The Route 1 (Main Line) bus route provides service along Paris Street.

Route 1 operates from 06:15 – 24:00 on weekdays with service every 15 minutes and from 07:15 – 23:30 on the weekend with service every 15 minutes. The closest bus stop for Route 1 northbound and southbound route are located at the northeast (85 metres from the subject site) and northwest (25 metres from the subject site) corner of the Paris Street / Boland Avenue intersection.

## 2.4 Other Developments within the Study Area

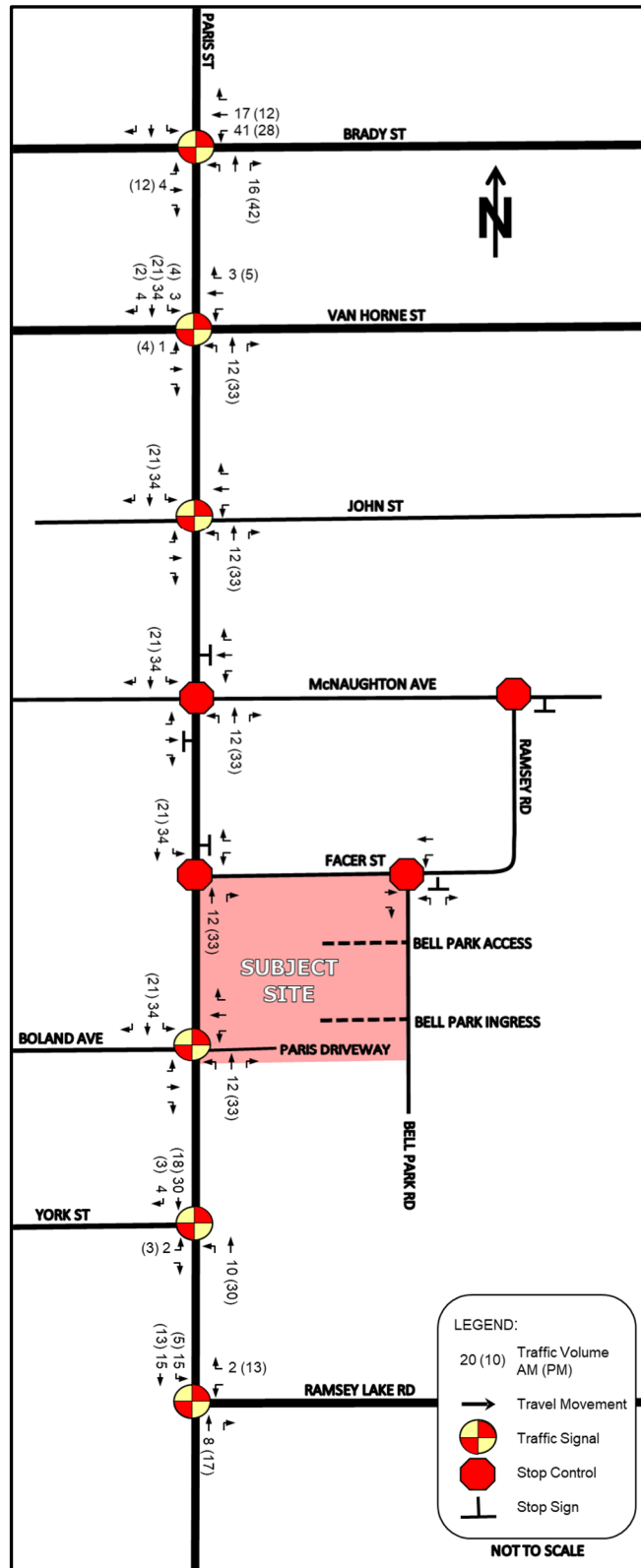
Based on correspondence with the City's planning department, the Manitou Residential Development is the only other development that would impact traffic in the study area.

2356268 Ontario Ltd. is proposing a residential development located northeast of the Paris Street / Van Horne Street intersection [Manitou Residential Development]. The Manitou Residential Development will consist of two high-rise buildings with a total of 826 dwelling units. The buildings will contain 476 units for active older adults and 350 units at rental rates geared to income. Transplan Associates completed a traffic impact study [TIS] for the Manitou Residential Development (dated May 2018) [Transplan TIS]. The Manitou Residential Development is site plan approved with no timeline for build-out.

The traffic generation and assignment for the Manitou Residential Development was obtained from the Transplan TIS (excerpts provided in **Appendix B**) and assumed in the study area.

**Figure 3** illustrates the traffic assignment for the Manitou Residential Development, during the AM and PM peak hour.

Figure 3 – Manitou Residential Development Traffic Assignment



## 2.5 Background Traffic Growth

Based on correspondence with the City a 1.5% background traffic growth rate was applied on collector and arterial roads in the study area. The 1.5% background traffic growth rate was applied on Paris Street, Van Horne Street, Boland Avenue, York Street and Ramsey Lake Road. Based on a review of the surrounding development and road network, no background traffic growth was applied on John Street, McNaughton Street, Facer Street and Bell Park Road.

## 2.6 Traffic Counts

Detailed turning movements traffic and pedestrian counts were obtained from the City and commissioned by JD Engineering at the study area intersections. **Table 1** summarizes the traffic count data collection information.

**Table 1 - Traffic Count Data**

Intersection (N-S Street / E-W Street)	Count Date	AM Peak Hour	PM Peak Hour	Source
Paris Street / Brady Street	Thursday, August 5 <sup>th</sup> 2021	-	16:00 – 17:00	City
	Friday, August 6 <sup>th</sup> 2021	07:30 – 08:30	-	
Paris Street / Van Horne Street	Thursday, August 5 <sup>th</sup> 2021	-	16:00 – 17:00	City
	Friday, August 6 <sup>th</sup> 2021	07:30 – 08:30	-	
	Wednesday, April 20 <sup>th</sup> 2022	07:45 – 08:45	16:00 – 17:00	JD Eng*
Paris Street / John Street	Thursday, July 18 <sup>th</sup> 2019	-	16:00 – 17:00	City
	Friday, July 19 <sup>th</sup> 2019	08:00 – 09:00	-	
Paris Street / McNaughton Street	Wednesday, April 20 <sup>th</sup> 2022	07:45 – 08:45	16:00 – 17:00	JD Eng*
Paris Street / Facer Street	Wednesday, April 20 <sup>th</sup> 2022	07:45 – 08:45	16:00 – 17:00	JD Eng*
Facer Street / Bell Park Road	Wednesday, April 20 <sup>th</sup> 2022	08:00 – 09:00	16:15 – 17:15	JD Eng*
Paris Street / Boland Avenue & Paris Driveway	Monday, August 9 <sup>th</sup> 2021	-	15:45 – 16:45	City
	Tuesday, August 9 <sup>th</sup> 2021	07:30 – 08:30	-	
Paris Street / York Street	Tuesday, July 23 <sup>rd</sup> 2019	-	16:00 – 17:00	City
	Wednesday, July 24 <sup>th</sup> 2019	07:45 – 08:45	-	
	Wednesday, April 20 <sup>th</sup> 2022	07:45 – 08:45	16:00 – 17:00	JD Eng*
Paris Street / Ramsey Lake Road	Tuesday, August 6 <sup>th</sup> 2019	-	15:45 – 16:45	City
	Wednesday, August 7 <sup>th</sup> 2019	08:00 – 09:00	-	

\*\* Traffic counts were completed by Ontario Traffic Inc. on behalf of JD Engineering.

Detailed traffic count data can be found in **Appendix C**.

The peak hours of traffic generation for all other peak hours at the study area intersections generally aligned with the anticipated peak hour of traffic generation by the proposed development.

To determine the equivalent existing (2022) traffic volumes, the background traffic growth rate noted in Section 2.5 was applied to the traffic counts completed in 2019 and 2021.

Heavy vehicle percentages and pedestrian crossings from the traffic count data have also been included in the Synchro analysis.



As a result of the physical distancing requirements associated with COVID-19, the traffic counts completed in 2019, 2021 and 2022 [2019 Counts, 2021 Counts & 2022 Counts respectively] are notably different in comparison, with the critical scenario generally observed in the 2019 Counts. For the purposes of this report, we have adjusted the traffic volumes to illustrate the critical scenarios observed in the AM and PM peak hours. The following sections will discuss the adjustments made at the study area intersections for use in the traffic model.

Based on our review, there is a notable difference between the traffic patterns observed for the intersections in the City's downtown core (Paris Street at Brady Street and Van Horne Street) [Internal Downtown Intersections] and the intersections south of the downtown area (Paris Street at John Street, McNaughton Street, Facer Street, Boland Avenue, York Street and Ramsey Lake Road) [External Downtown Intersections]; Consequently, the following sections will review slightly different methodologies for both areas.

## 2.6.1 Internal Downtown Intersections

### 2.6.1.1 AM Peak Hour

Based on a comparison of the 2021 and 2022 Counts at the Paris Street / Van Horne Street intersection, the 2022 Counts were 31% higher than the 2021 Counts. For the AM peak hour, the 2022 Counts were used at the Paris Street / Van Horne Street intersection and the 2021 Counts with a 31% factor applied was used at the Paris Street / Brady Street intersection. The southbound traffic at the Paris Street / Van Horne Street intersection was adjusted to match the south leg egress traffic at the Paris Street / Brady Street intersection to accurately depict the traffic volumes<sup>1</sup>. It is noted, the south leg of traffic at the Paris Street / Van Horne Street intersection is consistent with the north leg 2019 Counts at the Paris Street / John Street intersection.

### 2.6.1.2 PM Peak Hour

Based on a comparison of the 2021 and 2022 Counts at the Paris Street / Van Horne Street intersection, there is a marginal difference between the counts. Based on a comparison of the 2019 Counts and 2022 Counts at the Paris Street / York Street intersection, the 2019 Counts were 18% higher than the 2022 Counts. Since there is marginal difference between the 2021 and 2022 Counts, the Internal Downtown Intersections were increased by 18% in the PM peak hour. The southbound traffic on Paris Street between Brady Street, Van Horne Street and John Street were adjusted to match at each leg to accurately depict the traffic volumes<sup>1</sup>. It is noted, the south leg of traffic at the Paris Street / Van Horne Street intersection is consistent with the north leg 2019 Counts at the Paris Street / John Street intersection.

## 2.6.2 External Downtown Intersections

### 2.6.2.1 AM Peak Hour

Based on a comparison of the 2019 and 2022 Counts at the Paris Street / York Street intersection, the 2019 Counts were higher than the 2022 Counts by 17%, 4% and 16% in the northbound, southbound and west leg movements respectively, at the intersection. The 2022 Counts at the External Downtown Intersections were increased by 17%, 4% and 16% for the northbound through, southbound through and side street traffic volumes respectively in the AM peak hour.

The northbound and southbound through traffic volumes from the 2021 Counts at the Paris Street / Boland Avenue & Paris Driveway intersection were adjusted to match the north leg of the Paris Street / York Street intersection. The side street traffic at the Paris Street / Boland Avenue & Paris Driveway

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<sup>1</sup> There are no driveways onto Paris Street, between the intersections, in the southbound direction.

intersection were increased by 31% in the AM peak hour, based on the increase between 2021 to 2022 Counts as noted in Section 2.6.1.1.

#### 2.6.2.2 PM Peak Hour

Based on a comparison of the 2019 and 2022 Counts at the Paris Street / York Street intersection, the 2019 Counts were higher than the 2022 Counts by 15%, 24% and 16% in the northbound, southbound and west leg movements respectively, at the intersection. The 2022 Counts at the External Downtown Intersections were increased by 15%, 24% and 16% for the northbound through, southbound through and side street traffic volumes respectively in the PM peak hour.

The northbound and southbound through traffic volumes from the 2021 Counts at the Paris Street / Boland Avenue & Paris Driveway intersection were adjusted to match the north leg of the Paris Street / York Street intersection. The side street traffic at the Paris Street / Boland Avenue & Paris Driveway intersection were increased by 18% in the PM peak hour, based on the increase between 2021 to 2022 Counts as noted in Section 2.6.1.2.

**Figure 4** illustrates the existing (2022) AM and PM peak hour traffic volumes in the study area.

## 2.7 Horizon Year Traffic Volumes

In addition to the adjacent development traffic volumes (outlined in Section 2.4), the background (2027 & 2032) traffic volumes were estimated for the AM and PM peak hour by applying the background traffic growth rates discussed in Section 2.5 to the existing traffic volumes.

**Figures 5** and **6** illustrates the background (2027 & 2032) AM and PM peak hour traffic volumes respectively, in the study area.

Figure 4 – Existing (2022) Traffic Volumes

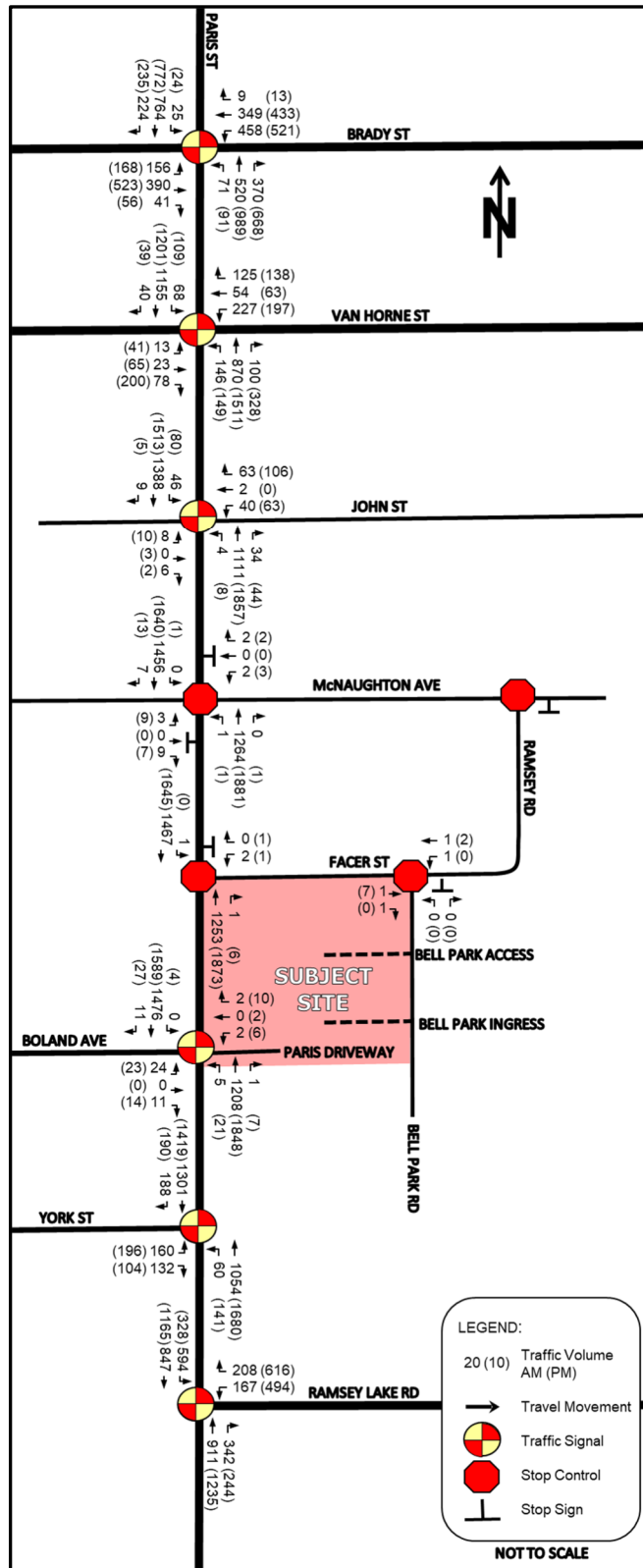
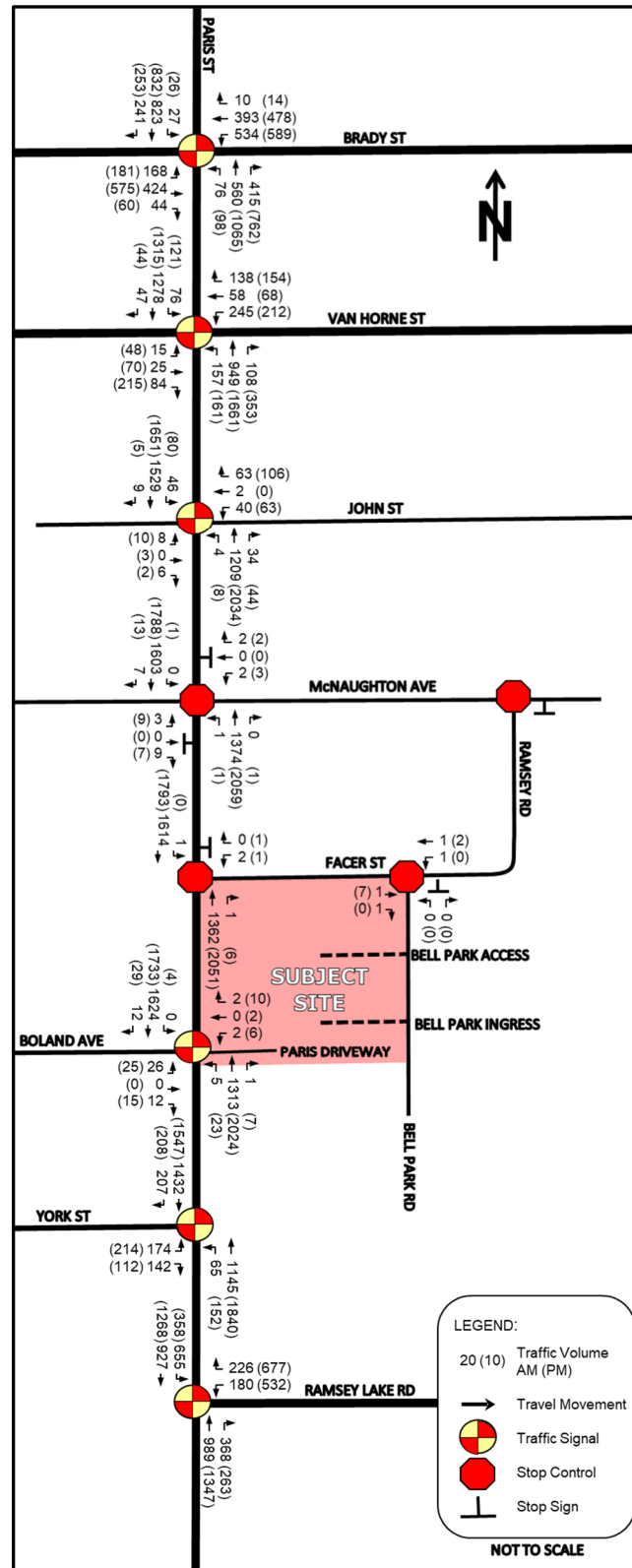
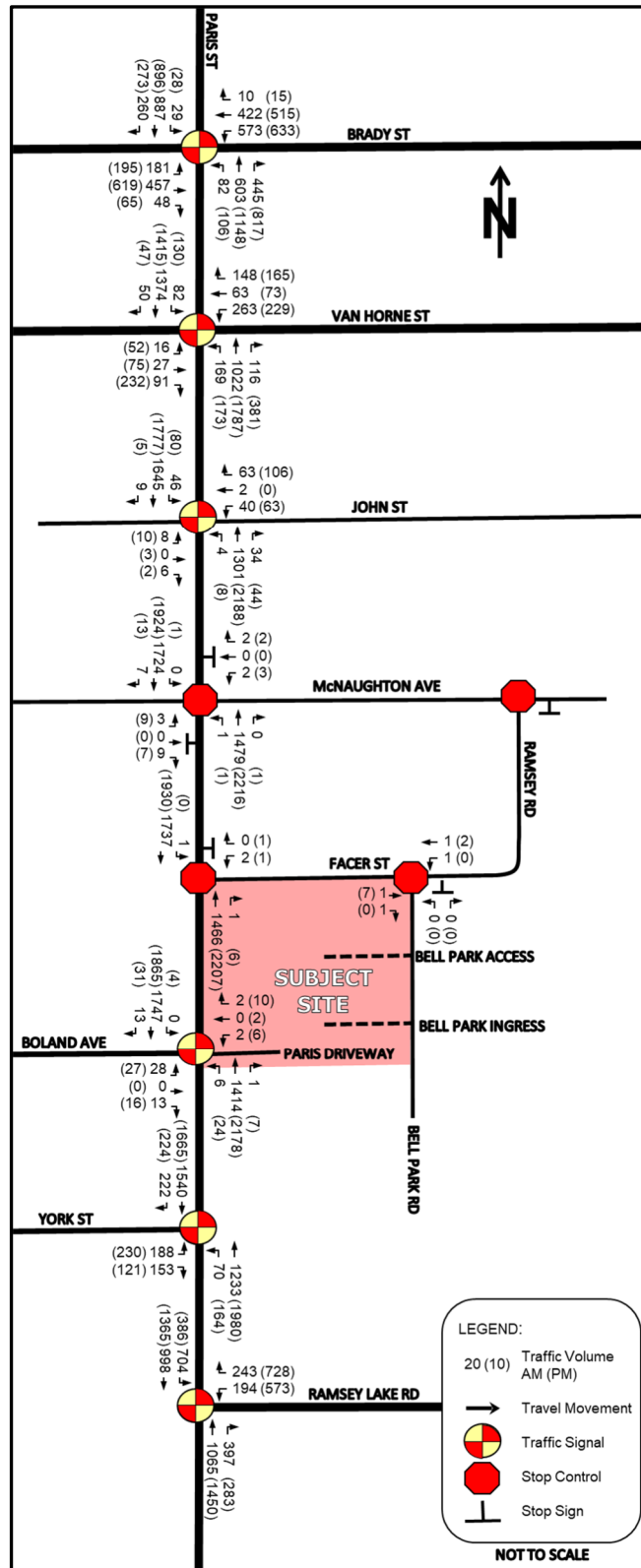


Figure 5 – Background (2027) Traffic Volumes



### Figure 6 – Background (2032) Traffic Volumes





## 3 Intersection Operation with Proposed Development

### 3.1 Intersection Capacity Analysis Criteria

Intersection performance was measured using the traffic analysis software, Synchro 11, a deterministic model that employs Highway Capacity Manual and Intersection Capacity Utilization methodologies for analysing intersection operations. These procedures are accepted by provincial and municipal agencies throughout North America.

Synchro 11 enables the study area to be graphically defined in terms of streets and intersections, along with their geometric and traffic control characteristics. The user is able to evaluate both signalized and unsignalized intersections in relation to each other, thus not only providing level of service for the individual intersections, but also enabling an assessment of the impact the various intersections in a network have on each other in terms of spacing, traffic congestion, delay, and queuing.

Individual turning movements with a volume-to-capacity [V/C] ratio of 0.85 or greater are considered to be critical movements and have been highlighted in the LOS tables.

The intersection operations were also evaluated in terms of the LOS. LOS is a common measure of the quality of performance at an intersection and is defined in terms of vehicular delay. This delay includes deceleration delay, queue move-up time, stopped delay, and acceleration delay. LOS is expressed on a scale of A through F, where LOS A represents very little delay (i.e. less than 10 seconds per vehicle) and LOS F represents very high delay (i.e. greater than 50 seconds per vehicle for a stop sign controlled intersection and greater than 80 seconds per vehicle for a signalized intersection).

The LOS criteria for signalized and stop sign controlled intersections are shown in **Table 2**. A description of traffic performance characteristics is included for each LOS.

**Table 2 – Level of Service Criteria for Intersections**

LOS	LOS Description	Control Delay (seconds per vehicle)	
		Signalized Intersections	Stop Controlled Intersections
A	Very low delay; most vehicles do not stop ( <b>Excellent</b> )	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop ( <b>Very Good</b> )	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping ( <b>Good</b> )	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop ( <b>Satisfactory</b> )	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of <b>acceptable</b> delay	between 55.0 and 80.0	between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection ( <b>Unacceptable</b> )	greater than 80.0	greater than 50.0

### 3.2 Existing (2022) Intersection Operation

The results of the LOS analysis under existing (2022) traffic volumes during the AM and PM peak hours can be found below in **Table 3**. The existing intersection geometry and traffic control has been utilized in this scenario. Detailed output of the Synchro analysis can be found in **Appendix D**.

**Table 3 – Existing (2022) LOS**

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Storage				Model	Storage
Paris Street / Brady Street (signalized)	0.64	26.8	C	-	-	0.70	30.2	C	-	-
EBL	0.43	23.4	C	36	57	0.46	27.1	C	44	57
EBTR	0.69	36.5	D	66	-	0.76	44.0	D	109	-
WBL	0.72	36.7	D	78	85	0.71	41.9	D	89	85
WBTR	0.41	26.7	C	52	-	0.42	30.0	C	72	-
NBL	0.32	18.6	B	20	70	0.34	21.6	C	24	70
NBT	0.36	23.5	C	47	-	0.59	29.9	C	92	-
NBR	0.33	9.5	A	41	-	0.60	14.3	B	111	-
SBL	0.11	22.7	C	9	24	0.14	24.8	C	9	24
SBT	0.63	29.9	C	74	-	0.51	31.3	C	74	-
SBR	0.32	19.0	B	39	-	0.26	20.3	C	34	-
Paris Street / Van Horne Street (signalized)	0.67	16.2	B	-	-	0.72	17.8	B	-	-
EBL	0.05	25.4	C	7	21	0.14	26.2	C	14	21
EBTR	0.07	25.4	C	8	-	0.20	26.5	C	18	-
WBL	0.81	45.4	D	68	133	0.82	50.9	D	61	133
WBT	0.14	26.0	C	18	-	0.14	26.1	C	19	-
WBR	0.09	25.6	C	14	62	0.09	25.8	C	14	62
NBL	0.62	12.8	B	27	34	0.54	10.4	B	21	34
NBTR	0.40	11.9	B	58	-	0.70	16.3	B	127	-
SBL	0.22	7.5	A	11	48	0.50	12.5	B	19	48
SBTR	0.48	12.9	B	71	-	0.46	12.6	B	68	-
Paris Street / John Street (signalized)	0.61	8.1	A	-	-	0.84	16.6	B	-	-
EB	0.01	21.8	C	0	-	0.07	29.4	C	7	-
WB	0.28	23.3	C	20	-	0.49	33.0	C	33	-
NBL	0.02	6.0	A	2	33	0.05	6.9	A	3	33
NBTR	0.63	9.6	A	82	-	0.94	23.4	C	245	-
SBL	0.17	4.9	A	5	23	0.39	16.7	B	11	23
SBTR	0.61	5.6	A	69	-	0.62	6.3	A	97	-
Paris Street / McNaughton Street (unsignalized)	-	0.2	A	-	-	-	0.1	D	-	-
EB	0.06	23.4	C	2	-	0.05	15.7	C	2	-
WB	0.03	33.9	D	1	-	0.02	20.0	C	1	-

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Storage				Model	Storage
Paris Street / Facer Street (unsignalized)	-	0.1	A	-	-	-	0.0	B	-	-
WB	0.01	30.9	D	1	-	0.01	17.9	C	1	-
Bell Park Road / Facer Street (unsignalized)	-	1.8	A	-	-	-	0.0	A	-	-
WB	0.00	0.0	A	0	-	0.00	0.0	A	0	-
Paris Street / Boland Avenue & Paris Driveway (signalized)	0.57	3.9	A	-	-	0.70	5.6	A	-	-
EB	0.02	25.5	C	7	-	0.04	29.1	C	9	-
WBL	0.02	25.5	C	2	-	0.06	29.1	C	5	-
WBTR	0.00	25.4	C	0	-	0.03	28.9	C	5	-
NBL	0.03	2.1	A	2	40	0.16	2.8	A	4	40
NBTR	0.49	3.2	A	46	-	0.76	5.9	A	108	-
SBL	0.00	0.0	A	0	100	0.03	2.2	A	1	100
SBTR	0.61	3.9	A	65	-	0.66	4.6	A	79	-
Paris Street / York Street (signalized)	0.71	13.1	B	-	-	0.80	15.8	B	-	-
EBL	0.56	29.7	C	49	21	0.64	34.0	C	58	21
EBR	0.10	25.3	C	16	-	0.07	26.9	C	14	-
NBL	0.27	9.4	A	8	123	0.49	13.2	B	25	123
NBT	0.51	6.5	A	67	-	0.74	9.9	A	135	-
SBT	0.78	16.0	B	141	-	0.84	20.5	C	160	-
SBR	0.14	8.9	A	11	72	0.13	10.5	B	12	72
Paris Street / Ramsey Lake Road (signalized)	0.65	17.6	B	-	-	0.96	31.4	C	-	-
WBL	0.35	29.4	C	25	158	0.72	44.4	D	87	158
WBR	0.25	11.7	B	34	-	0.88	38.4	D	223	-
NBT	0.73	22.4	C	92	-	0.93	42.5	D	217	-
NBR	0.36	17.5	B	35	37	0.31	22.6	C	49	37
SBL	0.69	27.5	C	87	175	0.50	40.1	D	56	175
SBT	0.37	4.7	A	41	-	0.54	9.8	A	90	-

The results of the analysis indicate that the intersections of Paris Street / John Street and Paris Street / Ramsey Lake Road are operating marginally outside the typical design limits noted in Section 3.1 during the PM peak hour. It is recommended the signal timing at these intersections are adjusted to optimize the use of the existing infrastructure.

A summary of the results of the Synchro analysis with the above-noted improvements, during the PM peak hour, can be found below in **Table 4**. Detailed output of the Synchro analysis can be found in **Appendix D**.

**Table 4 – Existing (2022) LOS with Improvements**

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Storage				Model	Storage
Paris Street / John Street (signalized)	-	-	-	-	-	0.81	14.0	B	-	-
EB	-	-	-	-	-	0.06	33.4	C	10	-
WB	-	-	-	-	-	0.56	39.2	D	51	-
NBL	-	-	-	-	33	0.05	6.2	A	3	33
NBTR	-	-	-	-	-	0.87	17.2	B	215	-
SBL	-	-	-	-	23	0.55	20.4	C	15	23
SBTR	-	-	-	-	-	0.61	6.7	A	101	-
Paris Street / Ramsey Lake Road (signalized)	-	-	-	-	-	0.96	31.2	C	-	-
WBL	-	-	-	-	158	0.60	37.9	D	82	158
WBR	-	-	-	-	-	0.92	45.0	D	245	-
NBT	-	-	-	-	-	0.89	36.0	D	185	-
NBR	-	-	-	-	37	0.29	21.0	C	42	37
SBL	-	-	-	-	175	0.71	51.0	D	63	175
SBT	-	-	-	-	-	0.58	12.7	B	105	-

The results of the LOS analysis indicate that the intersections of Paris Street / John Street and Paris Street / Ramsey Lake Road are operating outside the typical design limits as noted in Section 3.1; however, no improvements are recommended as the intersection is operating within theoretical capacity (V/C of 1.0) and the methodology noted in Section 2.6 assumed conservative traffic volumes along Paris Street in the study area. The northbound movements in the PM peak hour exceeds the capacity for a two-lane roadway in each direction (1800 vph); it is recommended the City monitor the traffic volumes and queuing on Paris Street to determine if improvements are warranted and prioritize transportation demand management [TDM] strategies and promote active transportation to reduce automobile traffic along Paris Street in the downtown area.

The anticipated queue for northbound movements at the Paris Street / John Street intersection will extend past the intersections of Paris Street at David Street (90 metres) and McNaughton Street (192 metres). As noted above, northbound traffic volumes are approaching the capacity for a two-lane roadway (1800 vph); it is recommended the City monitor the northbound queue at the intersection and prioritize TDM strategies and promote active transportation to reduce automobile traffic along Paris Street in the downtown area.

The anticipated queue for eastbound left turn movements at the Paris Street / York Street intersection exceeds the existing storage and taper length; however, the excess queue will not block any intersections. Consequently, there are no issues with the anticipated eastbound left turn queue.

The anticipated queue for all other highlighted auxiliary left turn movements exceed the existing storage, however, the excess queue can be accommodated by the taper length.

There are no other issues regarding the anticipated queuing for all other movements at the study area intersections.

An analysis was completed for left turn movements at the unsignalized intersections in the study area, based on the criteria outlined in Appendix 9A of the MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads (dated June 2017) [MTO DS]. Based on the above noted criteria a

left-turn lane is not warranted at the unsignalized intersections in the study area (results are provided in **Appendix G**).

A review of the need for additional auxiliary right turn lanes was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all right turn movements; consequently, additional right turn lane improvements are not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized intersections in the study area (results are provided in **Appendix H**).

No improvements are recommended for the existing (2022) scenario.

### 3.3 Background (2027) Intersection Operation

The results of the LOS analysis under background (2027) traffic volumes during the AM and PM peak hours can be found below in **Table 5**. The signal timing improvements noted in Section 3.2 and additional signal timing improvements at all other intersections were applied in this scenario to optimize the use of the existing infrastructure. Detailed output of the Synchro analysis can be found in **Appendix E**.

**Table 5 – Background (2027) LOS**

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Storage				Model	Storage
Paris Street / Brady Street (signalized)	0.69	30.1	C	-	-	0.80	31.5	C	-	-
EBL	0.47	26.1	C	42	57	0.49	27.8	C	44	57
EBTR	0.74	41.4	D	84	-	0.77	45.2	D	110	-
WBL	0.74	39.3	D	92	85	0.76	45.7	D	106	85
WBTR	0.41	27.5	C	64	-	0.42	29.6	C	76	-
NBL	0.39	22.6	C	24	70	0.39	24.5	C	30	70
NBT	0.40	27.8	C	56	-	0.53	26.8	C	96	-
NBR	0.38	10.8	B	49	-	0.69	13.4	B	171	-
SBL	0.11	24.8	C	11	24	0.21	33.7	C	15	24
SBT	0.69	34.6	C	91	-	0.63	38.1	D	91	-
SBR	0.32	21.4	C	42	-	0.35	25.3	C	52	-
Paris Street / Van Horne Street (signalized)	0.68	18.9	B	-	-	0.79	20.1	C	-	-
EBL	0.05	23.0	C	7	21	0.15	26.5	C	16	21
EBTR	0.07	23.1	C	8	-	0.24	27.2	C	24	-
WBL	0.80	40.9	D	73	133	0.82	51.0	D	66	133
WBT	0.13	23.6	C	19	-	0.14	26.4	C	20	-
WBR	0.10	23.4	C	14	62	0.19	26.9	C	22	62
NBL	0.59	15.1	B	38	34	0.62	14.4	B	41	34
NBTR	0.46	13.8	B	74	-	0.76	18.7	B	167	-
SBL	0.28	10.5	B	14	48	0.69	25.6	C	44	48
SBTR	0.63	18.9	B	109	-	0.54	16.3	B	101	-
Paris Street / John Street (signalized)	0.66	8.6	A	-	-	0.86	15.6	B	-	-
EB	0.01	23.1	C	0	-	0.07	37.6	D	10	-
WB	0.29	24.8	C	20	-	0.60	45.2	D	51	-
NBL	0.03	5.8	A	2	33	0.06	5.9	A	3	33
NBTR	0.66	9.8	A	91	-	0.91	19.5	B	268	-
SBL	0.19	5.2	A	5	23	0.61	28.9	C	20	23
SBTR	0.66	6.0	A	81	-	0.65	6.9	A	119	-
Paris Street / McNaughton Street (unsignalized)	-	0.1	A	-	-	-	0.1	C	-	-
EB	0.06	21.6	C	2	-	0.03	12.4	B	1	-
WB	0.03	29.5	D	1	-	0.02	17.6	C	1	-
Paris Street / Facer Street (unsignalized)	-	0.1	B	-	-	-	0.0	C	-	-
WB	0.01	29.9	D	1	-	0.01	15.8	C	1	-
NB	0.59	0.0	A	0	-	0.85	0.0	A	0	-
Bell Park Road / Facer Street (unsignalized)	-	1.8	A	-	-	-	0.0	A	-	-
WB	0.04	0.0	A	-	-	0.02	0.0	A	0	-



Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Storage				Model	Storage
Paris Street / Boland Avenue & Paris Driveway (signalized)	0.61	4.7	A	-	-	0.75	6.8	A	-	-
EB	0.04	26.9	C	9	-	0.24	36.5	D	16	-
WBL	0.02	26.8	C	3	-	0.07	34.8	C	7	-
WBTR	0.00	26.7	C	0	-	0.03	34.5	C	7	-
NBL	0.03	2.3	A	1	40	0.20	2.8	A	4	40
NBTR	0.54	3.8	A	51	-	0.79	6.2	A	141	-
SBL	0.00	0.0	A	0	100	0.04	1.9	A	1	100
SBTR	0.67	4.9	A	76	-	0.69	4.5	A	99	-
Paris Street / York Street (signalized)	0.74	13.0	B	-	-	0.81	16.9	B	-	-
EBL	0.62	33.8	C	62	21	0.71	43.1	D	86	21
EBR	0.26	28.6	C	29	-	0.08	31.7	C	17	-
NBL	0.41	11.7	B	8	123	0.67	26.1	C	48	123
NBT	0.54	6.8	A	76	-	0.79	11.1	B	157	-
SBT	0.78	14.7	B	145	-	0.82	19.1	B	162	-
SBR	0.15	7.8	A	9	72	0.15	9.7	A	10	72
Paris Street / Ramsey Lake Road (signalized)	0.68	20.3	C	-	-	1.04	38.8	D	-	-
WBL	0.37	34.4	C	32	158	0.67	41.4	D	89	158
WBR	0.29	14.3	B	48	-	1.05	79.9	E	284	-
NBT	0.74	24.9	C	127	-	0.93	39.8	D	217	-
NBR	0.42	19.8	B	56	37	0.32	20.6	C	48	37
SBL	0.75	33.5	C	103	175	0.81	58.2	E	74	175
SBT	0.39	5.0	A	53	-	0.62	13.0	B	120	-

The results of the LOS analysis indicate that the intersections of Paris Street / John Street and Paris Street / Ramsey Lake Road are operating outside the typical design limits as noted in Section 3.1; however, no improvements are recommended as the intersection is only operating marginally outside theoretical capacity (V/C of 1.0) and the methodology noted in Section 2.6 assumed conservative traffic volumes along Paris Street in the study area. The northbound and southbound movements in the PM peak hour exceeds the capacity for a two-lane roadway in each direction (1800 vph); it is recommended the City monitor the traffic volumes and queuing on Paris Street to determine if improvements are warranted as development proceeds and prioritize TDM strategies and promote active transportation to reduce automobile traffic along Paris Street in the downtown area.

The results of the LOS analysis indicate that the northbound movement at the Paris Street / Facer Street intersection is operating outside the typical design limits as noted in Section 3.1; however, since there are no queuing issues and the V/C ratio only marginally exceeds the typical design limits, no improvements are recommended.

The anticipated queue for northbound movements at the Paris Street / John Street intersection will extend past the intersections of Paris Street at David Street (90 metres) and McNaughton Street (192 metres). As noted above, northbound traffic volumes are approaching the capacity for a two-lane roadway (1800 vph); it is recommended the City monitor the northbound queue at the intersection and

prioritize TDM strategies and promote active transportation to reduce automobile traffic along Paris Street in the downtown area.

The anticipated queue for eastbound left turn movements at the Paris Street / York Street intersection exceeds the existing storage and taper length; however, the excess queue will not block any intersections. Consequently, there are no issues with the anticipated eastbound left turn queue.

The anticipated queue for all other highlighted auxiliary left turn movements exceed the existing storage, however, the excess queue can be accommodated by the taper length.

An analysis was completed for left turn movements at the unsignalized intersections in the study area, based on the criteria outlined in Appendix 9A of the MTO DS. Based on the above noted criteria a left-turn lane is not warranted at the unsignalized intersections in the study area (results are provided in **Appendix G**).

A review of the need for additional auxiliary right turn lanes was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all right turn movements; consequently, additional right turn lane improvements are not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized intersections in the study area (results are provided in **Appendix H**).

No further improvements are recommended for the background (2027) scenario.

### 3.4 Background (2032) Intersection Operation

The results of the LOS analysis under background (2032) traffic volumes during the AM and PM peak hours can be found below in **Table 6**. The signal timing improvements noted in Section 3.2 and 3.3 have been utilized in this scenario. Detailed output of the Synchro analysis can be found in **Appendix E**.



**Table 6 – Background (2032) LOS**

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Storage				Model	Storage
Paris Street / Brady Street (signalized)	0.73	32.5	D	-	-	0.85	34.5	C	-	-
EBL	0.51	27.9	C	46	57	0.53	30.0	C	48	57
EBTR	0.78	45.7	D	93	-	0.81	50.0	D	119	-
WBL	0.79	43.3	D	103	85	0.83	52.6	D	121	85
WBTR	0.43	29.0	C	70	-	0.45	32.0	C	83	-
NBL	0.44	24.3	C	25	70	0.44	26.3	C	32	70
NBT	0.42	29.3	C	61	-	0.56	28.6	C	105	-
NBR	0.41	11.4	B	57	-	0.74	15.9	B	200	-
SBL	0.13	26.1	C	11	24	0.24	35.4	D	17	75
SBT	0.72	37.1	D	99	-	0.64	40.0	D	99	-
SBR	0.35	22.7	C	46	-	0.37	26.4	C	57	-
Paris Street / Van Horne Street (signalized)	0.73	20.7	C	-	-	0.87	23.2	C	-	-
EBL	0.06	23.0	C	8	21	0.16	26.4	C	18	21
EBTR	0.07	23.0	C	9	-	0.27	27.2	C	27	-
WBL	0.83	44.0	D	78	133	0.92	69.2	E	88	133
WBT	0.14	23.6	C	20	-	0.14	26.2	C	22	-
WBR	0.10	23.3	C	14	62	0.21	26.8	C	25	62
NBL	0.63	19.2	B	42	34	0.73	22.2	C	45	34
NBTR	0.51	15.0	B	81	-	0.82	20.8	C	146	-
SBL	0.33	11.5	B	15	48	0.75	32.5	C	40	48
SBTR	0.70	21.0	C	120	-	0.58	17.1	B	88	-
Paris Street / John Street (signalized)	0.69	8.6	A	-	-	0.90	17.7	B	-	-
EB	0.01	24.5	C	0	-	0.08	41.7	D	10	-
WB	0.30	26.3	C	21	-	0.64	52.2	D	51	-
NBL	0.03	5.6	A	2	33	0.06	5.6	A	3	33
NBTR	0.68	9.9	A	102	-	0.94	22.7	C	351	-
SBL	0.20	5.6	A	5	23	0.65	38.4	D	24	23
SBTR	0.70	6.3	A	93	-	0.68	7.0	A	138	-
Paris Street / McNaughton Street (unsignalized)	-	0.1	B	-	-	-	0.2	C	-	-
EB	0.06	22.2	C	2	-	0.03	12.9	B	1	-
WB	0.03	29.2	D	1	-	0.02	20.3	C	1	-
Paris Street / Facer Street (unsignalized)	-	0.1	C	-	-	-	0.0	D	-	-
WB	0.01	31.0	D	1	-	0.01	17.2	C	1	-
NB	0.64	0.0	A	0	-	0.91	0.0	A	0	-

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Storage				Model	Storage
Bell Park Road / Facer Street (unsignalized)	-	1.8	A	-	-	-	0.0	A	-	-
WB	0.04	0.0	A	0	-	0.02	0.0	A	0	-
Paris Street / Boland Avenue & Paris Driveway (signalized)	0.65	4.9	A	-	-	0.79	7.2	A	-	-
EB	0.07	28.8	C	9	-	0.23	41.4	D	17	-
WBL	0.02	28.4	C	3	-	0.07	40.0	D	7	-
WBTR	0.00	28.3	C	0	-	0.02	39.6	D	7	-
NBL	0.05	2.3	A	2	40	0.25	3.6	A	6	40
NBTR	0.57	3.8	A	58	-	0.84	7.9	A	182	-
SBL	0.00	0.0	A	0	100	0.05	2.1	A	1	100
SBTR	0.70	5.2	A	202	-	0.73	5.4	A	121	-
Paris Street / York Street (signalized)	0.78	14.3	B	-	-	0.86	19.3	B	-	-
EBL	0.66	37.3	D	67	21	0.77	50.4	D	100	21
EBR	0.32	31.0	C	34	-	0.08	34.6	C	18	-
NBL	0.48	14.7	B	10	123	0.79	43.3	D	63	123
NBT	0.58	7.4	A	85	-	0.83	13.0	B	185	-
SBT	0.82	16.2	B	167	-	0.85	20.5	C	185	-
SBR	0.16	7.9	A	10	72	0.17	9.6	A	12	72
Paris Street / Ramsey Lake Road (signalized)	0.71	22.5	C	-	-	1.12	48.5	D	-	-
WBL	0.39	37.1	D	34	158	0.73	44.3	D	97	158
WBR	0.32	15.6	B	53	-	1.15	117.0	F	317	-
NBT	0.78	27.8	C	145	-	0.98	48.8	D	259	-
NBR	0.47	21.6	C	67	37	0.34	20.7	C	53	37
SBL	0.79	37.5	D	123	175	0.88	67.6	E	83	175
SBT	0.41	5.4	A	63	-	0.66	13.7	B	136	-

The results of the LOS analysis indicate that the Paris Street / Brady Street intersection is operating outside the typical design limits as noted in Section 3.1. It is recommended the eastbound pavement markings be adjusted to accommodate a double left-turn lane; the recommended eastbound lane configuration will include double left turn lanes, a single through lane and a single through-right turn lane. It is recommended the eastbound signal heads are adjusted to include a protected eastbound left turn phase and adjust the signal timing plan, to accommodate the double eastbound left turn lanes.

The results of the LOS analysis indicate that the Paris Street / Ramsey Lake Road intersection is operating outside the typical design limits as noted in Section 3.1. It is recommended Ramsey Lake Road is widened to accommodate a westbound double right turn lane with a 100 metre storage length and 60 metre taper length; the recommended westbound lane configuration will include double left turn lanes and a double right lane. It is recommended the signal timing plan is adjusted to accommodate the double westbound right turn lane improvement.

A summary of the results of the Synchro analysis with the above-noted improvements, during the PM peak hour, can be found below in **Table 7**. Detailed output of the Synchro analysis can be found in **Appendix E**.



**Table 7 – Background (2032) LOS with Improvements**

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Storage				Model	Storage
Paris Street / Brady Street (signalized)	0.73	33.1	C	-	-	0.85	35.0	D	-	-
EBL	0.53	46.4	D	38	57	0.57	53.8	D	41	57
EBTR	0.78	46.3	D	93	-	0.81	50.0	D	119	-
WBL	0.79	43.9	D	101	85	0.83	52.6	D	121	85
WBTR	0.41	28.4	C	68	-	0.44	31.0	C	81	-
NBL	0.44	24.2	C	25	70	0.44	26.3	C	32	70
NBT	0.42	28.4	C	61	-	0.56	28.6	C	105	-
NBR	0.41	11.3	B	57	-	0.74	15.9	B	200	-
SBL	0.13	26.0	C	11	24	0.24	35.4	D	17	75
SBT	0.71	36.8	D	99	-	0.64	40.0	D	99	-
SBR	0.31	19.3	B	49	-	0.33	23.0	C	59	-
Paris Street / Ramsey Lake Road (signalized)	0.72	20.5	C	-	-	0.89	31.6	C	-	-
WBL	0.48	38.1	D	34	158	0.84	51.8	D	107	158
WBR	0.18	14.4	B	26	-	0.68	29.0	C	117	-
NBT	0.77	25.4	C	128	-	0.94	39.9	D	249	-
NBR	0.46	19.9	B	59	37	0.33	18.9	B	50	37
SBL	0.76	33.8	C	105	175	0.82	57.5	E	77	175
SBT	0.40	4.3	A	46	-	0.63	11.1	B	121	-

The results of the LOS analysis indicate that the intersections of Paris Street / Brady Street, Paris Street / Van Horne Street, Paris Street / John Street, Paris Street / York Street and Paris Street / Ramsey Lake Road operates outside the typical design limits noted in Section 3.1 in the PM peak hour; however, no improvements are recommended as the intersection is still operating within theoretical capacity (V/C < 1.0). The northbound and southbound movements in the PM peak hour exceeds the capacity for a two-lane roadway in each direction (1800 vph); it is recommended the City monitor the traffic volumes and queuing on Paris Street to determine if further improvements are warranted and prioritize TDM strategies and promote active transportation to reduce automobile traffic along Paris Street in the downtown area.

The anticipated queue for northbound and southbound movements at the intersections of Paris Street / John Street, Paris Street / Facer Street and Paris Street / McNaughton Street intersection will marginally extend past intersections along Paris Street. As noted above, northbound traffic volumes are approaching the capacity for a two-lane roadway; it is recommended the City monitor the queuing at the intersections and prioritize TDM strategies and promote active transportation to reduce automobile traffic along Paris Street in the downtown area.

The anticipated queue for eastbound left turn movements at the Paris Street / York Street intersection exceeds the existing storage and taper length; however, the excess queue will not block any intersections. Consequently, there are no issues with the anticipated eastbound left turn queue.

The anticipated queue for all other highlighted auxiliary left turn movements exceed the existing storage, however, the excess queue can be accommodated by the taper length.

An analysis was completed for left turn movements at the unsignalized intersections in the study area, based on the criteria outlined in Appendix 9A of the MTO DS. Based on the above noted criteria a left-turn lane is not warranted at the unsignalized intersections in the study area (results are provided in **Appendix G**).

A review of the need for additional auxiliary right turn lanes was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all right turn movements; consequently, additional right turn lane improvements are not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized intersections in the study area (results are provided in **Appendix H**).

No further improvements are recommended for the background (2032) scenario.

## 4 Proposed Development Traffic Generation and Assignment

### 4.1 Traffic Generation

The traffic generation for the proposed development has been based on the ITE Trip Generation Manual. The following ITE land uses have been applied to estimate the traffic from the proposed development:

- ITE land use 222 (Multi-Family Housing (High-Rise)) – General Urban / Suburban Setting
- ITE land use 251 (Senior Adult Housing - Single-Family) – General Urban / Suburban Setting
- ITE land use 932 (High-Turnover (Sit-Down) Restaurant) – General Urban / Suburban Setting

The estimated trip generation of the proposed development is illustrated below in **Table 8**. The AM and PM peak hour traffic generation for the proposed development is not expected to exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.



**Table 8 – Estimated Traffic Generation of Proposed Development**

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Multi-Family Housing High-Rise ITE Land Use: 222	448 units	41	80	121	81	63	144
Senior Adult Housing - Single-Family ITE Land Use: 251	100 rooms	13	26	39	27	18	45
High-Turnover (Sit-Down) Restaurant ITE Land Use: 932	500 sq.m. (5,382 sq.ft).	29	23	52	30	19	49
<b>TOTAL TRIP GENERATION</b>		<b>83</b>	<b>129</b>	<b>212</b>	<b>138</b>	<b>100</b>	<b>228</b>
INTERNAL CAPTURE*		-5	-5	-10	-7	-7	-14
<b>NET GENERATION</b>		<b>78</b>	<b>124</b>	<b>202</b>	<b>131</b>	<b>93</b>	<b>224</b>
PASS-BY TRIPS (ITE Land Use: 932)**		0	0	0	-9	-9	-18
<b>TOTAL TRAFFIC GENERATION</b>		<b>78</b>	<b>124</b>	<b>202</b>	<b>122</b>	<b>84</b>	<b>206</b>

\* The internal capture rate has been calculated using the methodology outlined in the National Cooperative Highway Research Program (NCHRP) Report 684. Internal capture reports are provided in **Appendix I**.

\*\* Pass-by trips for the AM and PM peak hour are 0% and 43% respectively, according to the ITE data for ITE land use 932.

In order to be conservative, no transportation modal split reduction has been applied to the above-noted traffic generation calculation.

## 4.2 Traffic Assignment

For the purposes of this study, it has been assumed that all traffic generated by the proposed development will be new traffic and would not be in the study area if the development was not constructed.

The distribution of traffic for the proposed development is assumed to follow the existing trip distribution of the traffic counts in Section 2.6. The distribution of trips is illustrated in **Table 9** using the methodology outlined above.

**Table 9 – Proposed Development Traffic Distribution Summary**

Scenario	Direction	Ingress / Egress Traffic Direction								
		North via Paris Street	South via Paris Street	West via Brady Street	East via Brady Street	West via Van Horne Street	East via Van Horne Street	West via Boland Avenue	West via York Street	East via Ramsey Lake Road
AM	In	21%	25%	12%	17%	2%	8%	1%	6%	8%
	Out	14%	21%	14%	17%	5%	4%	0%	5%	20%
PM	In	16%	23%	12%	15%	5%	6%	1%	5%	17%
	Out	18%	25%	12%	18%	4%	8%	1%	5%	9%

**Figures 7 to 9** illustrates the traffic assignment for the residential and restaurant (primary and pass-by trips) components for the proposed development, during the AM and PM peak hour.

Figure 7 – Traffic Assignment for Proposed Development (Residential Trips)

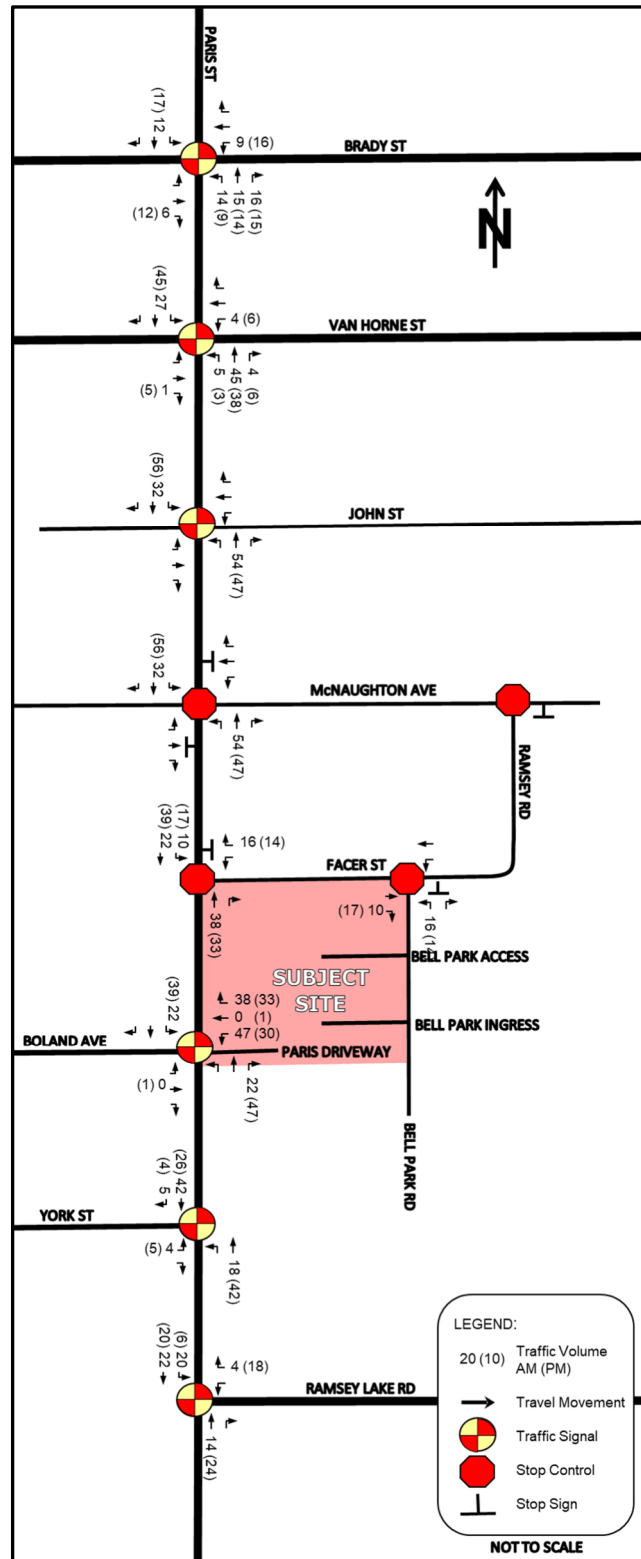
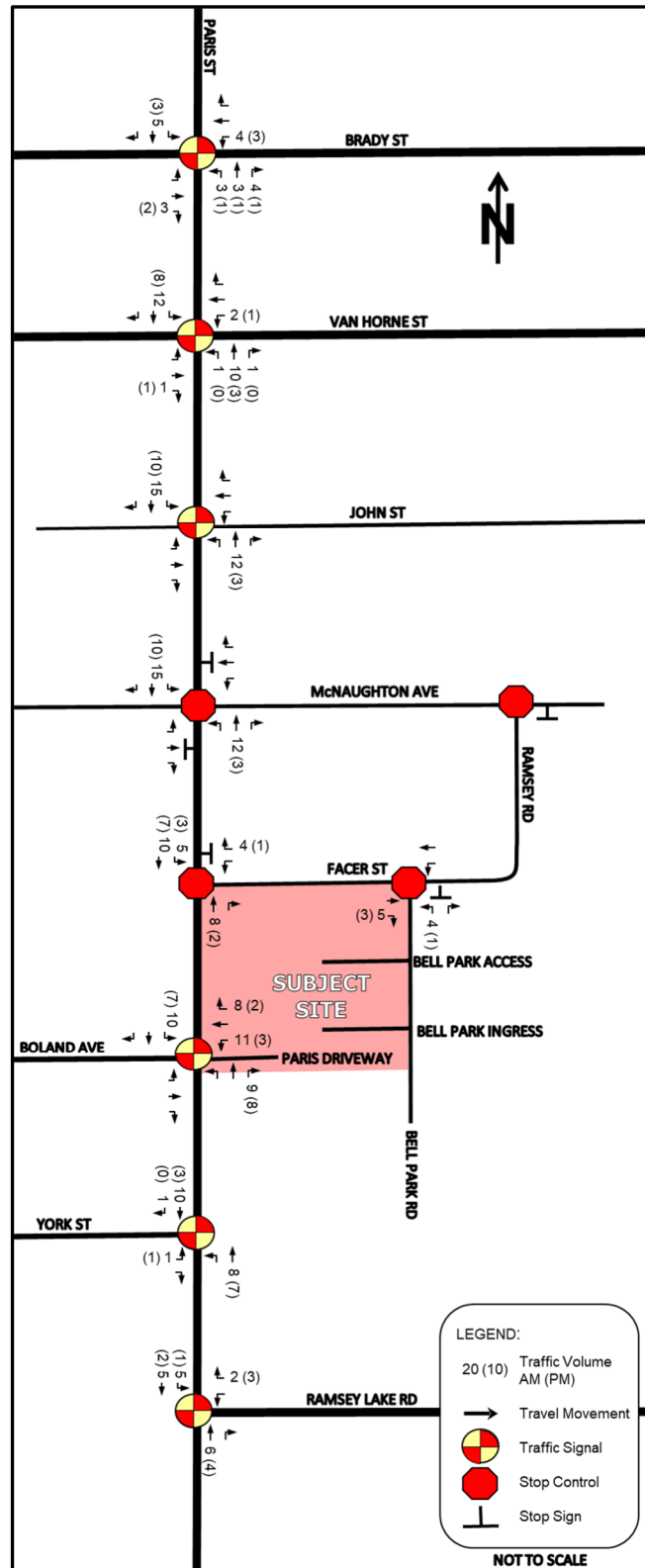
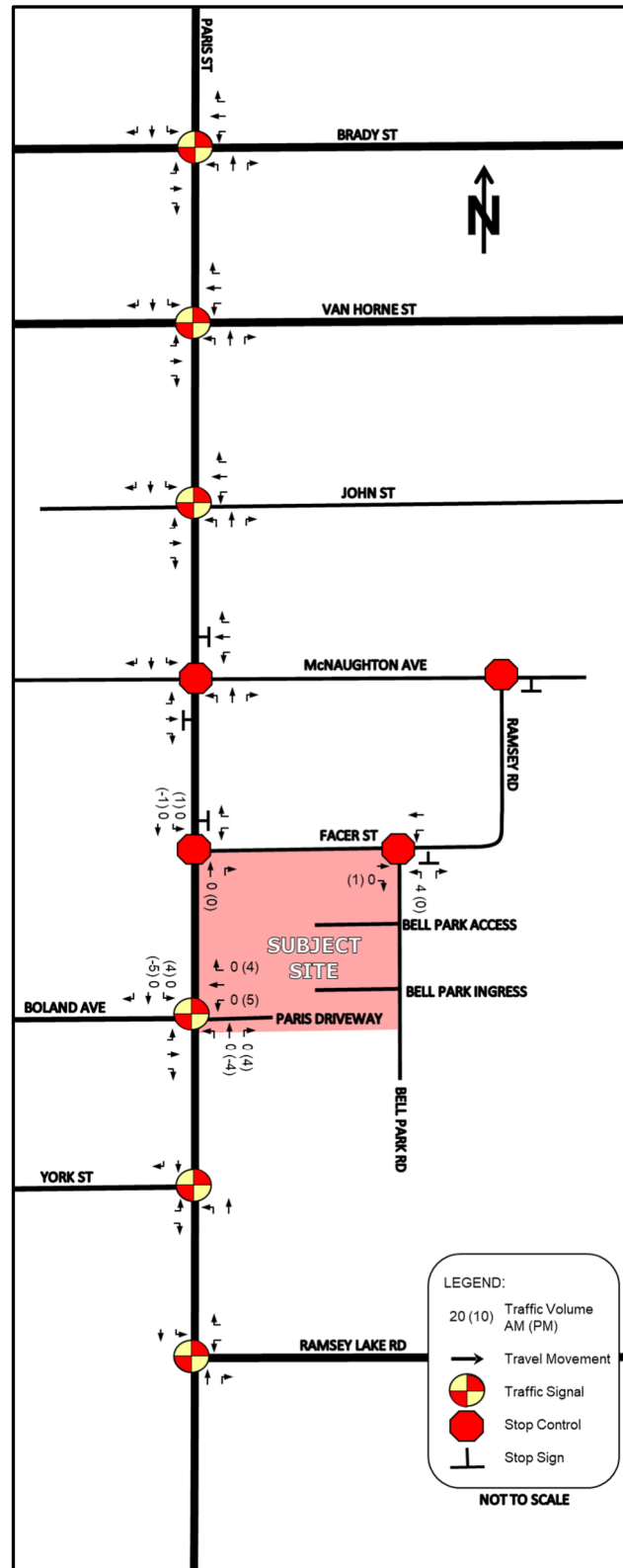




Figure 8 – Traffic Assignment for Proposed Development (Restaurant Primary Trips)



**Figure 9 – Traffic Assignment for Proposed Development (Restaurant Pass-by Trips)**



#### 4.3 Total Horizon Year Traffic Volumes with the Proposed Development

For the total (2027 & 2032) horizon year traffic volumes, the proposed development traffic was added to the background (2027 & 2032) traffic volumes. The resulting total (2027 & 2032) horizon year traffic volume for the AM and PM peak hour are illustrated in **Figure 10** and **11**, respectively.



Figure 10 – Total (2027) Traffic Volumes

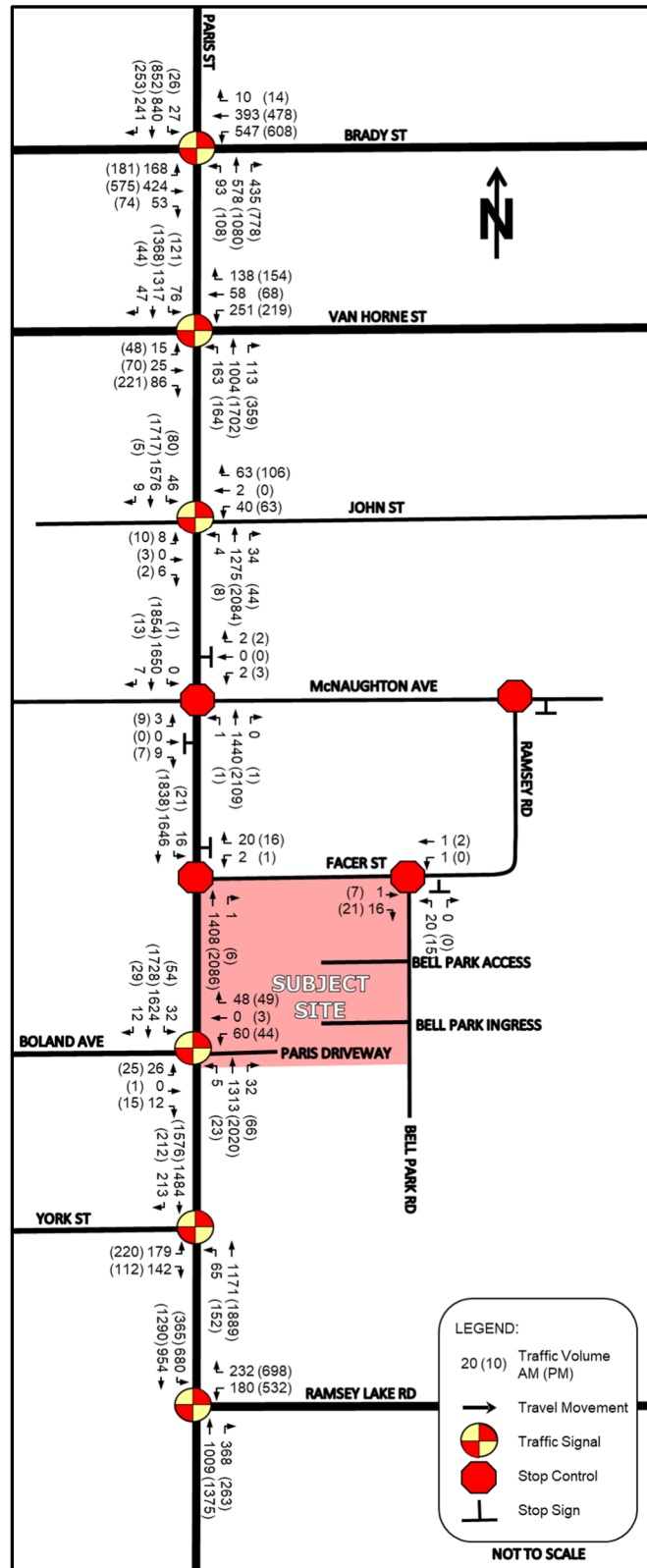
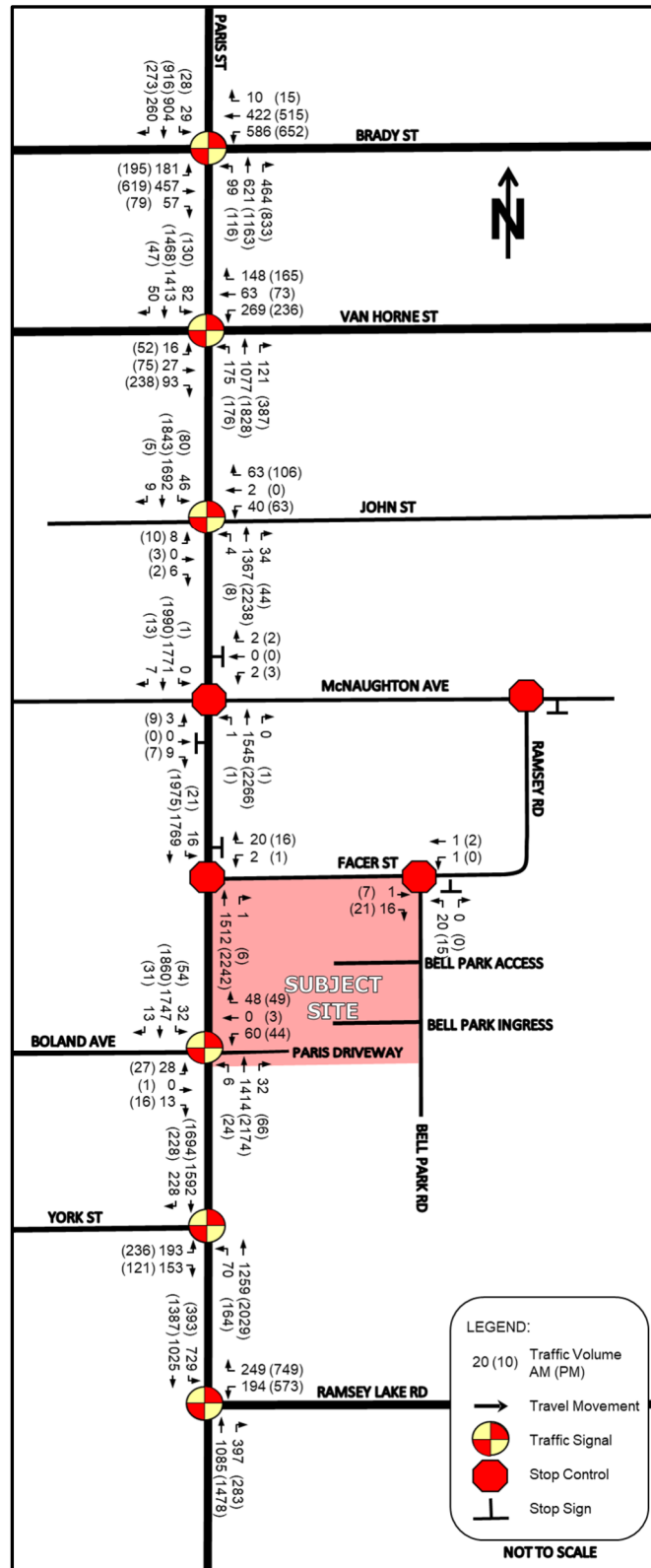


Figure 11 – Total (2032) Traffic Volumes



## 5 Intersection Operation with Proposed Development

### 5.1 Total (2027) Intersection Operation

The results of the LOS analysis under total (2027) traffic volumes during the AM and PM peak hours can be found below in **Table 10**. The infrastructure improvements and signal timing improvements noted in Section 3.3 have been utilized in this scenario.

The proposed development will shift the location of the Paris Driveway slightly further north at the intersection to align with Boland Avenue. It is recommended the westbound lane configuration at the Paris Street / Boland Avenue & Paris Driveway intersection include a left turn lane and through-right lane.

Detailed output of the Synchro analysis can be found in **Appendix F**.



**Table 10 – Total (2027) LOS**

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Storage				Model	Storage
Paris Street / Brady Street (signalized)	0.70	32.2	C	-	-	0.82	32.5	C	-	-
EBL	0.49	29.0	C	43	57	0.49	28.5	C	44	57
EBTR	0.78	46.4	D	88	-	0.78	46.6	D	112	-
WBL	0.79	44.3	D	97	85	0.78	47.5	D	110	85
WBTR	0.42	30.0	C	65	-	0.42	29.8	C	76	-
NBL	0.40	21.9	C	28	70	0.43	25.5	C	32	70
NBT	0.38	27.2	C	58	-	0.54	27.5	B	98	-
NBR	0.40	10.7	B	53	-	0.71	14.1	C	178	-
SBL	0.11	26.1	C	11	24	0.21	34.6	D	15	24
SBT	0.69	36.3	D	94	-	0.64	39.3	C	94	-
SBR	0.32	22.9	C	42	-	0.35	26.1		53	-
Paris Street / Van Horne Street (signalized)	0.70	19.5	C	-	-	0.81	21.6	C	-	-
EBL	0.05	23.0	C	7	21	0.14	26.3	C	16	21
EBTR	0.07	23.1	C	9	-	0.25	27.1	C	25	-
WBL	0.81	41.9	D	76	133	0.84	52.6	D	69	133
WBT	0.13	23.6	C	19	-	0.13	26.1	C	20	-
WBR	0.10	23.3	C	14	62	0.19	26.7	C	22	62
NBL	0.61	16.9	B	40	34	0.66	17.7	B	48	34
NBTR	0.49	14.3	B	79	-	0.78	19.9	B	177	-
SBL	0.30	11.0	B	14	48	0.70	27.3	C	44	48
SBTR	0.66	19.6	B	114	-	0.56	17.2	B	108	-
Paris Street / John Street (signalized)	0.67	8.4	A	-	-	0.87	16.2	B	-	-
EB	0.01	24.2	C	0	-	0.07	38.9	D	10	-
WB	0.30	25.9	C	21	-	0.61	47.1	D	51	-
NBL	0.03	5.6	A	2	33	0.06	5.8	A	3	33
NBTR	0.67	9.8	A	99	-	0.92	20.5	C	292	-
SBL	0.20	5.5	A	5	23	0.62	31.4	C	21	23
SBTR	0.67	6.0	A	86	-	0.67	7.1	A	128	-
Paris Street / McNaughton Street (unsignalized)	-	0.1	B	-	-	-	0.1	C	-	-
EB	0.04	18.0	C	2	-	0.03	12.8	B	1	-
WB	0.02	23.5	C	1	-	0.02	16.2	C	1	-
Paris Street / Facer Street (unsignalized)	-	0.8	C	-	-	-	0.4	D	-	-
WB	0.04	11.7	B	2	-	0.07	20.7	C	2	-
Bell Park Road / Facer Street (unsignalized)	-	4.7	A	-	-	-	2.9	A	-	-
WB	0.04	8.8	A	1	-	0.02	8.7	A		-

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Storage				Model	Storage
Paris Street / Boland Avenue & Paris Driveway (signalized)	0.67	7.3	A	-	-	0.76	7.7	A	-	-
EB	0.03	23.1	C	9	-	0.30	48.8	D	18	-
WBL	0.37	25.3	C	20	-	0.48	51.2	D	23	-
WBTR	0.03	23.1	C	9	-	0.33	48.8	D	22	-
NBL	0.04	3.3	A	2	40	0.18	2.8	A	5	40
NBTR	0.60	5.7	A	67	-	0.79	6.6	A	178	-
SBL	0.17	4.0	A	6	100	0.79	45.7	D	23	100
SBTR	0.73	7.3	A	96	-	0.66	4.6	A	114	-
Paris Street / York Street (signalized)	0.76	13.5	B	-	-	0.83	17.5	B	-	-
EBL	0.63	35.3	D	64	21	0.73	45.3	D	93	21
EBR	0.27	29.6	C	30	-	0.08	32.6	C	17	-
NBL	0.42	12.8	B	8	123	0.68	28.9	C	51	123
NBT	0.55	7.0	A	78	-	0.80	11.8	B	166	-
SBT	0.80	15.4	B	156	-	0.82	19.4	B	167	-
SBR	0.15	7.8	A	10	72	0.15	9.7	A	11	72
Paris Street / Ramsey Lake Road (signalized)	0.69	21.0	C	-	-	1.07	41.8	D	-	-
WBL	0.37	35.2	D	32	158	0.67	41.7	D	89	158
WBR	0.30	14.5	B	50	-	1.09	93.2	F	298	-
NBT	0.76	26.1	C	132	-	0.94	41.9	D	236	-
NBR	0.43	20.4	C	58	37	0.32	20.6	C	48	37
SBL	0.76	34.3	C	114	175	0.83	60.2	E	76	175
SBT	0.40	5.1	A	57	-	0.63	13.2	B	124	-

The results of the LOS analysis indicate that the intersections of Paris Street / John Street and Paris Street / Ramsey Lake Road are operating outside the typical design limits as noted in Section 3.1; however, no improvements are recommended as the intersection is operating marginally outside the theoretical capacity (V/C of 1.0) and the methodology noted in Section 2.6 assumed conservative traffic volumes along Paris Street in the study area. The northbound and southbound movements in the PM peak hour exceeds the capacity for a two-lane roadway in each direction (1800 vph); it is recommended the City monitor the traffic volumes and queuing on Paris Street to determine if improvements are warranted and prioritize TDM strategies and promote active transportation to reduce automobile traffic along Paris Street in the downtown area.

The results of the LOS analysis indicate that the northbound movement at the Paris Street / Facer Street intersection is operating outside the typical design limits as noted in Section 3.1; however, since there are no queuing issues and the V/C ratio only marginally exceeds the typical design limits, no improvements are recommended.

The anticipated queue for northbound movements at the Paris Street / John Street intersection will extend past the intersections of Paris Street at David Street (90 metres) and McNaughton Street (192 metres). As noted above, northbound traffic volumes are approaching the capacity for a two-lane roadway (1800 vph); it is recommended the City monitor the northbound queue at the intersection and

prioritize TDM strategies and promote active transportation to reduce automobile traffic along Paris Street in the downtown area.

The anticipated queue for eastbound left turn movements at the Paris Street / York Street intersection exceeds the existing storage and taper length; however, the excess queue will not block any intersections. Consequently, there are no issues with the anticipated eastbound left turn queue.

The anticipated queue for all other highlighted auxiliary left turn movements exceed the existing storage, however, the excess queue can be accommodated by the taper length.

An analysis was completed for left turn movements at the unsignalized intersections in the study area, based on the criteria outlined in Appendix 9A of the MTO DS.

Based on the above noted criteria a southbound left turn lane is warranted at the Paris Street / Facer Street intersection; however, left turn movements will only block the left lane (turning lane) 9% of the time during the critical PM peak hour scenario. Furthermore, southbound through vehicles will be able to use the right-lane (curb-lane) in the event the turning lane is blocked. Consequently, a southbound left turn lane is not recommended at the Paris Street / Facer Street intersection

Based on the above noted criteria a left-turn lane is not warranted at all other unsignalized intersections in the study area (results are provided in **Appendix G**).

A review of the need for additional auxiliary right turn lanes was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all right turn movements; consequently, additional right turn lane improvements are not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized intersections in the study area (results are provided in **Appendix H**).

No further improvements are recommended for the background (2027) scenario.

## 5.2 Total (2032) Intersection Operation

The results of the LOS analysis under total (2032) traffic volumes during the AM and PM peak hours can be found below in **Table 11**. The infrastructure and signal timing improvements noted in Section 3.3, 3.4 and 5.1 have been utilized in this scenario. Detailed output of the Synchro analysis can be found in **Appendix F**.



**Table 11 – Total (2032) LOS**

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Storage				Model	Storage
Paris Street / Brady Street (signalized)	0.75	35.4	D	-	-	0.87	36.1	D	-	-
EBL	0.56	50.2	D	38	57	0.58	55.2	E	41	57
EBTR	0.83	52.7	D	100	-	0.83	51.8	D	122	-
WBL	0.82	49.0	D	105	85	0.84	53.9	D	127	85
WBTR	0.43	30.8	C	69	-	0.43	31.0	C	81	-
NBL	0.45	23.8	C	29	70	0.49	27.4	C	34	70
NBT	0.40	28.6	C	63	-	0.57	29.3	C	107	-
NBR	0.43	11.2	B	61	-	0.76	16.5	B	209	-
SBL	0.13	27.3	C	11	24	0.25	36.5	D	17	75
SBT	0.72	38.7	D	102	-	0.67	41.4	D	102	-
SBR	0.31	20.9	C	50	-	0.37	23.9	C	60	-
Paris Street / Van Horne Street (signalized)	0.75	21.5	C	-	-	0.89	24.4	C	-	-
EBL	0.06	22.9	C	8	21	0.15	26.1	C	18	21
EBTR	0.07	23.0	C	9	-	0.27	27.0	C	28	-
WBL	0.84	45.2	D	83	133	0.94	72.6	E	92	133
WBT	0.14	23.5	C	20	-	0.14	26.0	C	22	-
WBR	0.10	23.3	C	14	62	0.21	26.6	C	25	62
NBL	0.65	20.7	C	43	34	0.78	29.3	C	50	34
NBTR	0.54	15.7	B	87	-	0.84	22.2	C	152	-
SBL	0.35	12.0	B	15	48	0.76	34.4	C	40	48
SBTR	0.72	22.1	C	125	-	0.61	17.9	B	92	-
Paris Street / John Street (signalized)	0.71	8.7	A	-	-	0.91	18.3	B	-	-
EB	0.01	25.2	C	0	-	0.08	43.7	D	10	-
WB	0.31	27.2	C	21	-	0.67	55.9	E	51	-
NBL	0.03	5.4	A	2	33	0.07	5.5	A	3	33
NBTR	0.70	10.1	B	111	-	0.95	23.7	C	265	-
SBL	0.22	6.0	A	5	23	0.66	41.1	D	25	23
SBTR	0.71	6.3	A	99	-	0.70	7.1	A	149	-
Paris Street / McNaughton Street (unsignalized)	-	0.1	B	-	-	-	0.2	D	-	-
EB	0.05	18.1	C	2	-	0.03	12.5	B	1	-
WB	0.02	22.6	C	1	-	0.02	18.9	C	1	-
Paris Street / Facer Street (unsignalized)	-	1.1	C	-	-	-	0.5	D	-	-
WB	0.04	11.7	B	2	-	0.07	21.0	C	2	-
NB	0.66	0.0	A	0	-	0.93	0.0	D	0	-
Bell Park Road / Facer Street (unsignalized)	-	4.7	A	-	-	-	2.9	A	-	-
WB	0.04	8.8	A	1	-	0.02	8.7	A	1	-

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Storage				Model	Storage
Paris Street / Boland Avenue & Paris Driveway (signalized)	0.71	7.6	A	-	-	0.82	9.0	A	-	-
EB	0.05	24.9	C	9	-	0.33	49.4	D	19	-
WBL	0.39	27.4	C	20	-	0.48	51.4	D	23	-
WBTR	0.08	25.0	C	11	-	0.37	49.5	D	23	-
NBL	0.05	3.2	A	2	40	0.24	3.4	A	6	40
NBTR	0.63	5.7	A	76	-	0.85	8.4	A	223	-
SBL	0.19	4.0	A	6	100	0.84	62.7	E	25	100
SBTR	0.76	7.7	A	113	-	0.71	5.2	A	135	-
Paris Street / York Street (signalized)	0.80	14.9	B	-	-	0.88	20.2	C	-	-
EBL	0.67	38.6	D	69	21	0.79	52.8	D	105	21
EBR	0.33	31.7	C	34	-	0.09	35.5	D	18	-
NBL	0.48	15.9	B	11	123	0.81	47.4	D	65	123
NBT	0.59	7.6	A	88	-	0.85	13.8	B	197	-
SBT	0.84	17.3	B	179	-	0.85	20.9	C	192	-
SBR	0.17	8.0	A	11	72	0.17	9.6	A	12	72
Paris Street / Ramsey Lake Road (signalized)	0.73	21.0	C	-	-	0.91	32.8	C	-	-
WBL	0.49	39.0	D	34	158	0.84	52.3	D	107	158
WBR	0.18	14.6	B	27	-	0.70	30.1	C	121	-
NBT	0.78	26.2	C	131	-	0.96	42.2	D	257	-
NBR	0.46	20.2	C	60	37	0.33	18.9	B	50	37
SBL	0.78	34.6	C	116	175	0.84	59.9	E	80	175
SBT	0.41	4.3	A	48	-	0.64	11.4	B	125	-

The results of the LOS analysis indicate that the intersections of Paris Street / Brady Street, Paris Street / Van Horne Street, Paris Street / John Street, Paris Street / York Street and Paris Street / Ramsey Lake Road operates outside the typical design limits noted in Section 3.1 in the PM peak hour; however, no improvements are recommended as the intersection is still operating within the theoretical capacity (V/C < 1.0). The northbound and southbound movements in the PM peak hour exceeds the capacity for a two-lane roadway in each direction (1800 vph); it is recommended the City monitor the traffic volumes and queuing on Paris Street to determine if further improvements are warranted and prioritize TDM strategies and promote active transportation to reduce automobile traffic along Paris Street in the downtown area.

The results of the LOS analysis indicate that the northbound movement at the Paris Street / Facer Street intersection is operating outside the typical design limits as noted in Section 3.1; however, since there are no queuing issues and the V/C ratio only marginally exceeds the typical design limits, no improvements are recommended.

The anticipated queue for northbound and southbound movements at the intersections of Paris Street / John Street, Paris Street / Facer Street and Paris Street / McNaughton Street intersection will marginally extend past intersections along Paris Street. As noted above, northbound traffic volumes are approaching the capacity for a two-lane roadway; it is recommended the City monitor the queuing

at the intersections and prioritize TDM strategies and promote active transportation to reduce automobile traffic along Paris Street in the downtown area.

The anticipated queue for eastbound left turn movements at the Paris Street / York Street intersection exceeds the existing storage and taper length; however, the excess queue will not block any intersections. Consequently, there are no issues with the anticipated eastbound left turn queue.

The anticipated queue for all other highlighted auxiliary left turn movements exceed the existing storage, however, the excess queue can be accommodated by the taper length.

Based on the above noted criteria a southbound left turn lane is warranted at the Paris Street / Facer Street intersection; however, left turn movements will only block the left lane (turning lane) 10% of the time during the critical PM peak hour scenario. Furthermore, southbound through vehicles will be able to use the right-lane (curb-lane) in the event the turning lane is blocked. Consequently, a southbound left turn lane is not recommended at the Paris Street / Facer Street intersection.

Based on the above noted criteria a left-turn lane is not warranted at all other unsignalized intersections in the study area (results are provided in **Appendix G**).

A review of the need for additional auxiliary right turn lanes was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all right turn movements; consequently, additional right turn lane improvements are not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized intersections in the study area (results are provided in **Appendix H**).

No further improvements are recommended for the background (2032) scenario.

### 5.3 Sight Distance Review

A review of the available sight distance for the proposed Paris Driveway, Bell Park Access and Bell Park Ingress was completed as part of this analysis.

The sight distance north (greater than 140 metres) and south (greater than 150 metres) of the Paris Driveway exceed the minimum stopping and intersection sight distance requirements as identified in the Transportation Association of Canada Design Guide for Canadian Roads (2017) [TAC Guidelines] for a design speed of 50 km/h (65 metres & 105 metres respectively).

The proposed development will reconstruct and pave Bell Park Road prior to build-out of the proposed development. The current sightlines on Bell Park Road at the Bell Park Access will change as a result. The sight distance at the Bell Park Access is based on the sight distance triangles observed in the proposed road configuration in the site plan (provided in **Appendix A**).

The following sight distance was observed south of the Bell Park Access (75 metres). It is recommended Bell Park Road from Facer Street to the Bell Park Ingress have a posted speed limit of 20 km/h, once Bell Park Road is reconstructed; with a posted speed limit of 20 km/h the sight distance noted exceeds the minimum stopping and intersection sight distance requirements as identified in the TAC Guidelines for the proposed posted speed of 20 km/h (design speed of 30 km/h) – 35 metres & 65 metres respectively.

The sight distance west of the Bell Park Access (19 metres) is less than the stopping sight distance requirements as identified in the TAC Guidelines for the proposed posted speed of 20 km/h (design speed of 30 km/h) – 35 metres; however, vehicles will be turning onto Bell Park Road from Facer Street



at much slower speeds; furthermore, there are no issues with driveway spacing requirements identified in Section 5.5. Consequently, there are no issues with the proposed location of the Bell Park Access.

The sight distance available at the proposed Paris Driveway, Bell Park Access and Bell Park Ingress are acceptable for the intended use.

## 5.4 Site Access

The proposed development will shift the location of the Paris Driveway slightly further north at the intersection to align with Boland Avenue. It is recommended the westbound lane configuration at the Paris Street / Boland Avenue & Paris Driveway intersection include a left turn lane and through-right lane, as noted in Section 5.1. A single ingress and egress lane at the Paris Driveway will provide the necessary capacity to service the proposed development. The Paris Driveway will provide ingress and egress access to the underground parking and surface parking.

The Bell Park Access will operate as full-movement access driveway. A single ingress and egress lane at the Bell Park Access will provide the necessary capacity to service the proposed development. Bell Park Access will provide ingress and egress access to the surface parking

The Bell Park Ingress will operate efficiently with a single ingress only driveway. A single ingress lane at the Bell Park Ingress will provide the necessary capacity to service the proposed development. Bell Park Ingress will provide ingress only access to the underground parking.

The proposed spacing between the Bell Park Access and Facer Street (22 metres – measured edge of driveway to edge of road) exceeds the minimum driveway spacing requirements identified in the TAC Guidelines Figure 8.8.2 – 15 metres for a local road.

The proposed spacing between the Bell Park Access and Bell Park Ingress (148 metres – measured edge to edge of driveway) are greater than the minimum driveway spacing requirements as per the TAC Guidelines – Figure 8.9.2 (Driveway Spacing Guidelines – Locals and Collectors).

## 5.5 Parking Review

The proposed parking supply meets the requirements as noted in the City's Zoning By-law 2010–100Z [Zoning By-law]. **Table 12** illustrates the parking requirement for the proposed development, according to the Zoning By-law.

**Table 12 – Zoning By-law Requirement Parking Calculation**

Unit Type	Section	Parking Standard	Proposed Units	Required Parking	Proposed Parking
Residential Dwelling, Multiple	5.5.1	1.5 sp./unit	448	672 spaces	672 spaces
Retirement Home		4 spaces plus 0.5 parking spaces for each of the first 30 guest rooms plus 0.25 spaces for each additional guest rooms 1/20 sq.m. gross floor area used for medical, health or personal services	100	38 spaces	38 spaces
Restaurant	5.3	1 spaces per 1/12.5 sq.m. net floor area	500 sq.m.	40 spaces	40 spaces
<b>TOTAL REQUIRED PARKING SPACES</b>				<b>750 spaces</b>	<b>750 spaces</b>
Accessible Parking	5.2.3.5	2 sp. plus 1 space for each additional 50 sp. greater than 100 sp.	750	15 spaces	15 spaces
Bicycle Parking (Residential)	5.8	0.5 sp./unit	448	224 spaces	224 spaces
Bicycle Parking (Restaurant)	5.8	2 spaces on a lot, plus 1 space per 500 sq.m. gross floor area to a maximum requirement of 24/lot	500 sq.m.	3 spaces	3 spaces
<b>TOTAL REQUIRED BICYCLE PARKING SPACES</b>				<b>227 spaces</b>	<b>227 spaces</b>

## 6 Transportation Demand Management

As noted in Section 3.4 and 5.2, the traffic volumes along Paris Street in the study area are reaching overcapacity and further widening of the road is not feasible. It is recommended the City, implement TDM measures to reduce single-occupancy vehicles and improve the accessibility of transit and non-auto modes of transportation. The following transportation demand management measures are recommended as part of the proposed development:

- Construct sidewalk on the south side of Facer Street extending from Facer Street to Bell Park Road;
- The proposed development includes an internal sidewalk network with pedestrian connections to the proposed sidewalk on Facer Street and the existing municipal pedestrian infrastructure on Paris Street;
- The proposed development includes 227 bicycle parking spaces;
- An information display board will be provided in a central location in the apartment buildings to display travel information such as bicycle maps, local transit map/schedule and other relevant information;
- Information packages will be distributed to new residents including transit and cycling maps; and
- Subsidized transit passes be provided to residents.

## 7 Summary

**2226553 Ontario Inc.** retained **JD Engineering** to prepare this traffic impact study in support of the proposed development on a site municipally known as 700 Paris Street, located on the east side of Paris Street between Boland Avenue and Facer Street, in the City of Greater Sudbury. The proposed Draft Plan by ACK Architects is shown in **Appendix A**. This chapter summarizes the conclusions and recommendations from the study.

The proposed development is anticipated to consist of a 16-storey building with 198 units, a 20-storey building with 250 units and a ground-floor restaurant (500 sq.m. of GFA) and a 10-storey retirement home with 100 rooms.

1. The proposed development is expected to generate a total of 202 AM and 206 PM peak hour primary trips and 18 PM peak hour pass-by trips.
2. Background traffic and pedestrian counts were commissioned for the existing intersections of Paris Street / Van Horne Street, Paris Street / McNaughton Street, Paris Street / Facer Street, Facer Street / Bell Park Road and Paris Street / York Street completed on Wednesday, April 20<sup>th</sup> 2022. Background traffic and pedestrian counts at the study area intersections were also obtained from the City.
3. An intersection operation analysis was completed at the study area intersections, using the existing (2022) and background (2027 & 2032) traffic volumes, with the adjacent development traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the proposed development. These improvements are warranted based on the anticipated growth in the City and traffic generated by future developments in the study area without the proposed development. The following improvements are recommended:

### Existing (2022) Traffic Volumes

- **Paris Street / John Street and Paris Street / Ramsey Lake Road**
  - Optimize signal timing plan.

### Background (2027) Traffic Volumes

- **Paris Street / Van Horne Street, Paris Street / McNaughton Street, Paris Street / Boland Avenue & Paris Driveway and Paris Street / York Street**
  - Optimize signal timing plan.

### Background (2032) Traffic Volumes

- **Paris Street / Brady Street**
  - Adjust eastbound pavement markings to accommodate a double left-turn lane.
  - Adjust eastbound signal heads to accommodate a protected eastbound left turn phase.
  - Optimize signal timing plan.
- **Paris Street / Ramsey Lake Road**
  - Widen Ramsey Lake Road to accommodate westbound double right turn lane with a 100 metre storage length and 60 metre taper length
  - Optimize signal timing plan.



4. An estimate of the amount of traffic that would be generated by the Subject Site was prepared and assigned to the study area streets and intersections.
5. An intersection operation analysis was completed under total (2027 & 2032) traffic volumes with the proposed development operational at the study area intersections. The following improvements are recommended prior to build-out of the proposed development:

**Opening Day (2027) Traffic Volumes**

**Paris Street / Boland Avenue & Paris Driveway**

- Shift the Paris Driveway to align with Boland Avenue.
- The westbound configuration of Paris Driveway at the intersection shall include a left turn lane and through-right lane.

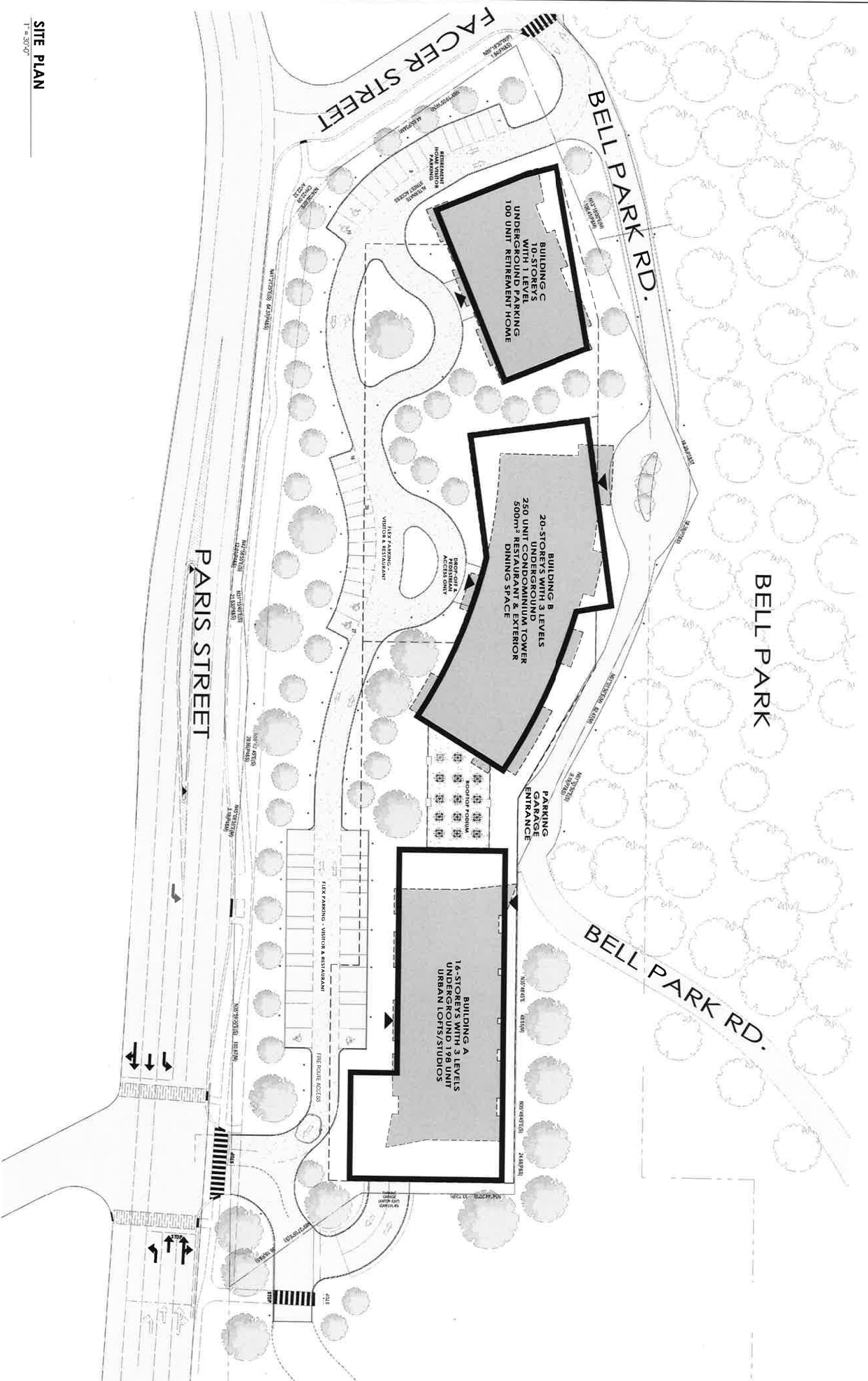
**Facer Street**

- Construct a sidewalk on the south side of the road between Paris Street and Bell Park Road.

**Bell Park Road**

- Reconstruct Bell Park Road south of Facer Street to a 6.0 metre wide paved condominium road.
  - Bell Park Road shall have a posted speed limit of 20 km/h once Bell Park Road is reconstructed.
6. The proposed development will shift the location of the Paris Driveway slightly further north at the intersection to align with Boland Avenue. It is recommended the westbound lane configuration at the Paris Street / Boland Avenue & Paris Driveway intersection include a left turn lane and through-right lane. A single ingress and egress lane at the Paris Driveway will provide the necessary capacity to service the proposed development. The Paris Driveway will provide ingress and egress access to the underground parking and surface parking.
  7. The Bell Park Access will operate as full-movement access driveway. A single ingress and egress lane at the Bell Park Access will provide the necessary capacity to service the proposed development. The Bell Park Ingress will operate efficiently with a single ingress only driveway. A single ingress lane at the Bell Park Ingress will provide the necessary capacity to service the proposed development. Bell Park Access will provide ingress and egress access to the surface parking and the Bell Park Ingress will provide ingress only access to the underground parking.
  8. There are no issues regarding the sight distance available for the proposed Paris Driveway and Bell Park Access.
  9. The proposed parking supply for the proposed development meets the minimum parking requirement specified in the City's Zoning By-law 2010-100Z.
  10. In summary the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

## Appendix A – Site Plan



NO.	DATE:	REVISION:	BY:
1	JUL 28 2018	SO-BEAMT CONCEPTS	MAA
2	AUG 1 2018	SO-BEAMT CONCEPTS	MAA
3	MAY 7 2021	PROPOSED CHAIR LAYOUT	CH
4	DEC 18 2021	REVISED BLD. FLOORPLANS	CH

COMMISSION:

PROPOSED MIXED USE  
DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO



A-C-K  
architects  
STUDIO INC.

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SHEET TITLE

# SITE PLAN

## SITE PLAN

 $\Gamma = 30.0^\circ$ 

<b>Billed by Re-Zoning</b>	
Invoice for Site Plan Agreement	
Issued by Permit	
Inspected / Timed:	
Issued for Certification	
DRAWN BY	JMR
CHECKED BY	MMA
DATE	JULY 2018
SCALE	AS SHOWN
PROJECT No.	2010-270

.SP1



## **Appendix B – Adjacent Development Excerpts**

## Transplan TIS



**RECEIVED**

**JUN 19 2018**

**PLANNING SERVICES**

**Proposed  
Project Manitou  
Residential Development  
City of Greater Sudbury**

**Traffic Impact Study**

**Revised May 22, 2018**

*Prepared by:*

**Tranplan Associates**

Sudbury 705-522-0272

Toronto 416-670-2005

Peterborough 705-874-3638

[www.tranplan.com](http://www.tranplan.com)

*Prepared for:*

**2356268 ONTARIO LIMITED**

*per*

**D.S. Dorland Limited**

**May 2018**





NOTE: Not to scale

# Exhibit 1.1 Key Plan

TRAFFIC, TRANSIT, PARKING, TRANSPORTATION PLANNING

TORONTO SUDBURY PETERBOROUGH

905-670-2005 705-522-0272 705-874-3638

**Table 4.1: PROJECTED TRIP GENERATION BY PROPOSED  
PROJECT MANITOU RESIDENTIAL DEVELOPMENT**

LAND USE		WEEKDAY AM PEAK HOUR				WEEKDAY PM PEAK HOUR			
		Trip Generation Rate (ITE Trip Generation Manual - 8th Edition)	Vehicle Trips			Trip Generation Rate (ITE Trip Generation Manual - 8th Edition)	Vehicle Trips		
			Total	In	Out		Total	In	Out
<u>Senior Adult Units</u>									
High-Rise Apartments (ITE L.U. 222)	476 units	$\ln(T) = 0.99\ln(X) - 1.14$ where T = vehicle trips X = no of dwelling units	143	25% 36	75% 107	$T = 0.32(X) + 12.30$	165	61% 100	39% 64
Senior Adult Housing (ITE L.U.252)	476 units	$T = 0.19(X) - 13.86$ where T = vehicle trips X = no of dwelling units	77	36% 28	64% 49	$T = 0.24(X) - 16.45$ where T = vehicle trips X = no of dwelling units	98	60% 59	40% 39
Average of LU 222 & 252			110	32	78		131	80	52
<u>Rent Geared to Income Units</u>									
Modified Cherry Gardens Survey Trip Rates*	350 units	$T = 0.15 (X)$	53	25% 13	75% 39	$T = 0.20 (X)$	70	60% 42	40% 28
TOTAL UNITS	826 units		162	45	118		201	122	80

Note: Numbers do not add up exactly due to rounding

Note: Numbers do not add up exactly due to rounding.

Cherry Gardens survey trip rates increased by 25% to reflect slightly greater distance from Paris Street and potential higher parking supply.



- The new apartments may have more available parking.

Using the two trip rates as shown in **Table 4.1**, the proposed development is projected to generate approximately 200 vehicle trips during the afternoon peak hour (120 in, 80 out) and 160 vehicle trips during the morning peak hour (45 in, 115 out).

ITE trip rates for the active older people are considered to be conservative (higher volumes than likely) because of the downtown location of the proposed development. The proximity of the site to downtown will likely result in a higher proportion of walking and transit trips, with fewer auto trips than the ITE rates would project.

#### **4.3 Orientation of the Site Traffic**

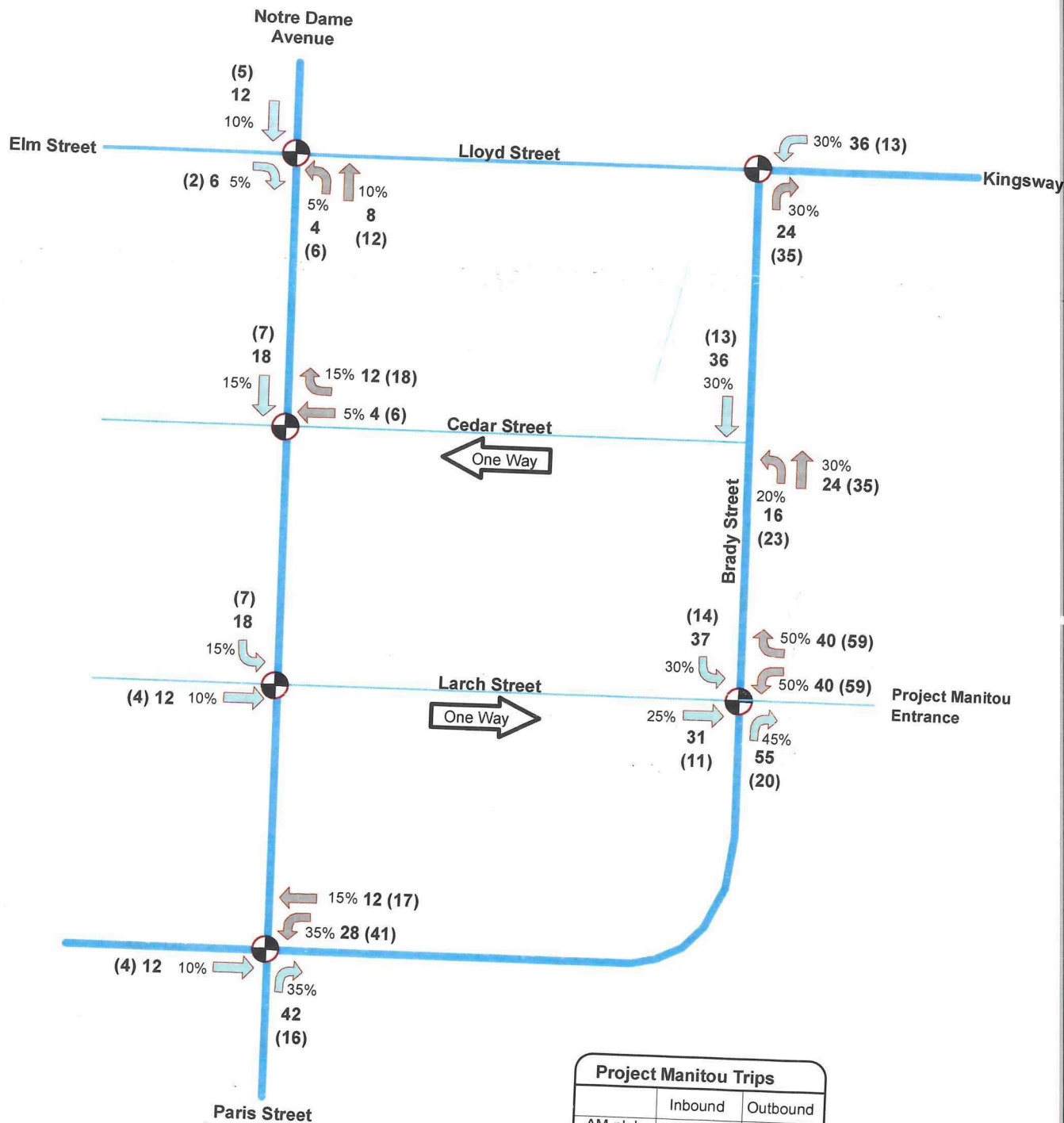
As shown in **Exhibit 4.2** traffic is expected to leave the site:

- split evenly between left turns and right turns onto Brady Street.
- 35% will go south on Paris Street
- 15% will continue west along Brady
- 30% will go out to the Kingsway
- 20% will turn left into Cedar Street with 5% staying downtown, 10% going up Notre Dame and 5% going west on Elm.

Traffic is expected to approach the site

- 30% from the north along Brady Street (from the Kingsway)
- 45% from the south along Brady Street (35% from Paris Street south and 10% from Brady Street west)
- 25% eastbound along Larch Street (10% from Notre Dame, 5% from Elm west and 10% from downtown)





NOTE: Not to scale

## Exhibit 4.2 Site Traffic

Afternoon Peak Hour (Morning Peak Hour in Brackets)

Proposed Project Manitou Apartments - Traffic Impact Study

**tranplan associates**  
 TRAFFIC, TRANSIT, PARKING, TRANSPORTATION PLANNING  
 TORONTO SUDBURY PETERBOROUGH  
 905-670-2005 705-522-0272 705-874-3638  
 www.tranplan.com

## Appendix C – Traffic Count Data



Traffic and Transportation Engineering Services  
1800 Frobisher Street  
PO Box 5000, STN A  
Sudbury, Ontario, Canada P3A 5P3  
705-674-4455 David.Knutson@greatersudbury.ca

Count Name: Brady Street @ Paris Street  
Site Code: 00911103  
Start Date: 08/05/2021  
Page No: 1

## Turning Movement Data

Start Time	Paris Street Southbound						Brady Street Westbound						Paris Street Northbound						Brady Street Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
11:00 AM	36	114	2	0	1	152	0	83	102	0	2	185	116	118	14	0	7	248	16	84	30	0	7	130	715
11:15 AM	36	122	10	1	2	169	5	74	95	0	8	174	118	132	12	0	5	262	10	76	24	0	1	110	715
11:30 AM	33	134	3	0	3	170	2	67	91	0	6	160	124	119	23	0	5	266	18	84	30	0	6	132	728
11:45 AM	45	151	7	0	1	203	3	67	99	0	4	169	124	134	14	0	5	272	13	85	18	0	5	116	760
Hourly Total	150	521	22	1	7	694	10	291	387	0	20	688	482	503	63	0	22	1048	57	329	102	0	19	488	2918
12:00 PM	37	113	8	0	5	158	4	69	94	0	10	167	122	133	23	0	1	278	10	115	41	0	10	166	769
12:15 PM	44	149	7	0	3	200	3	87	111	0	6	201	118	157	19	0	3	294	7	68	25	0	5	100	795
12:30 PM	39	153	8	0	7	200	3	77	93	0	7	173	128	125	26	1	5	280	11	87	36	0	5	134	787
12:45 PM	40	141	6	0	2	187	3	76	108	0	8	187	125	155	26	0	0	306	17	78	30	0	1	125	805
Hourly Total	160	556	29	0	17	745	13	309	406	0	31	728	493	570	94	1	9	1158	45	348	132	0	21	525	3156
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	48	138	7	0	0	193	1	98	92	0	3	191	137	160	17	1	8	315	8	109	38	0	4	155	854
3:15 PM	46	133	4	0	2	183	3	95	136	0	5	234	143	184	21	1	4	349	16	98	28	0	10	142	908
3:30 PM	49	137	2	0	12	188	5	69	117	0	8	191	153	165	24	1	7	343	16	115	32	0	7	163	885
3:45 PM	42	168	5	0	3	215	5	72	108	0	6	185	143	180	27	0	5	350	15	96	37	0	6	148	898
Hourly Total	185	576	18	0	17	779	14	334	453	0	22	801	576	689	89	3	24	1357	55	418	135	0	27	608	3545
4:00 PM	51	155	5	0	2	211	3	93	104	0	5	200	144	209	18	0	2	371	8	116	32	0	3	156	938
4:15 PM	49	153	5	0	5	207	3	79	125	0	10	207	140	213	16	0	2	369	7	115	31	0	6	153	936
4:30 PM	49	171	2	0	2	222	4	75	93	0	12	172	134	233	25	0	2	392	13	92	50	0	3	155	941
4:45 PM	47	165	8	0	0	220	1	114	113	0	6	228	139	170	17	0	0	326	19	113	27	0	13	159	933
Hourly Total	196	644	20	0	9	860	11	361	435	0	33	807	557	825	76	0	6	1458	47	436	140	0	25	623	3748
5:00 PM	56	142	4	0	1	202	1	102	106	0	8	209	122	195	17	2	1	336	13	121	35	0	8	169	916
5:15 PM	38	178	7	0	1	223	3	123	106	0	6	232	149	177	17	2	7	345	11	111	34	0	11	156	956
5:30 PM	41	152	1	0	0	194	5	88	115	0	4	208	124	141	15	1	6	281	9	96	34	0	10	139	822
5:45 PM	40	115	1	0	1	156	6	102	111	0	7	219	105	127	15	0	3	247	13	61	28	0	2	102	724
Hourly Total	175	587	13	0	3	775	15	415	438	0	25	868	500	640	64	5	17	1209	46	389	131	0	31	566	3418
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
6:00 AM	10	27	1	0	1	38	0	37	26	0	1	63	21	27	5	0	0	53	3	15	3	0	2	21	175
6:15 AM	25	50	0	0	0	75	0	44	24	0	0	68	26	44	9	0	0	79	2	36	5	0	1	43	265
6:30 AM	16	83	2	0	1	101	0	52	55	0	1	107	42	64	10	0	1	116	5	47	21	0	0	73	397
6:45 AM	30	119	3	0	0	152	2	54	75	0	4	131	39	60	9	0	0	108	7	56	17	0	2	80	471

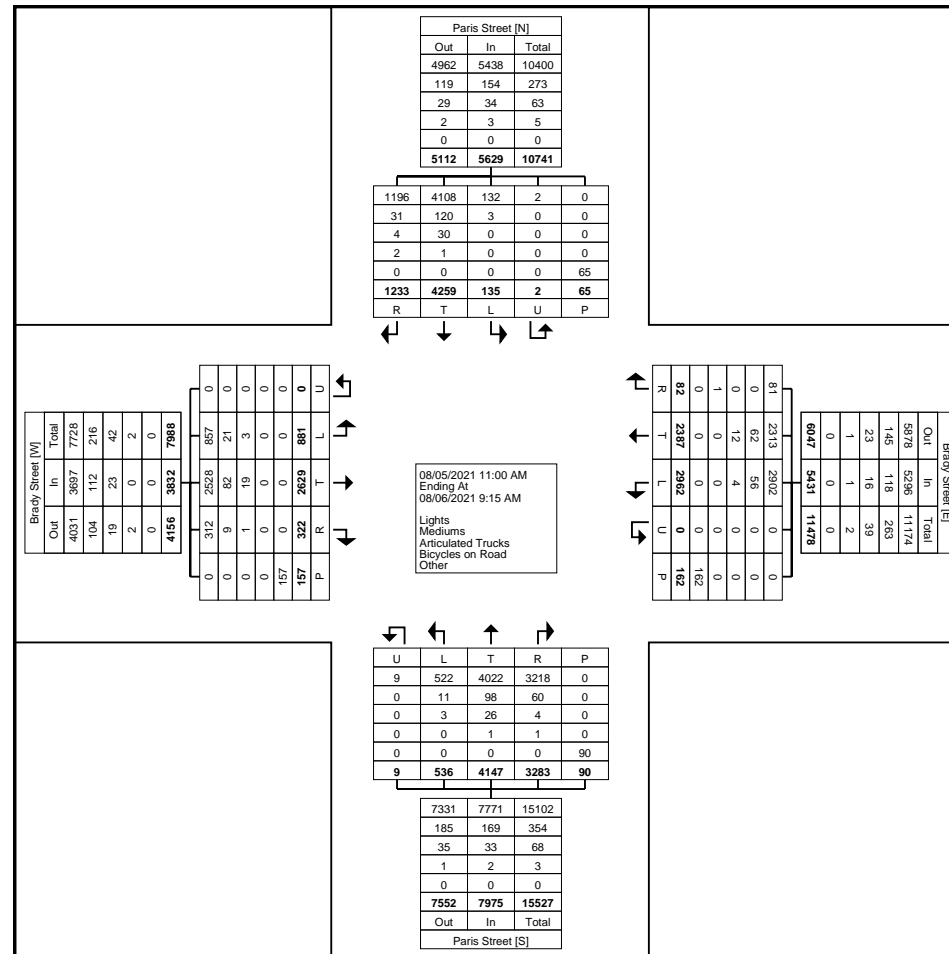


Hourly Total	81	279	6	0	2	366	2	187	180	0	6	369	128	195	33	0	1	356	17	154	46	0	5	217	1308
7:00 AM	30	142	0	0	0	172	2	53	92	0	4	147	43	64	16	0	0	123	2	41	10	0	1	53	495
7:15 AM	22	141	2	0	0	165	0	64	55	0	1	119	47	70	13	0	2	130	2	59	14	0	2	75	489
7:30 AM	24	155	1	0	2	180	4	76	83	0	1	163	83	94	5	0	0	182	7	69	22	0	5	98	623
7:45 AM	47	158	3	0	3	208	1	77	85	0	4	163	73	82	26	0	1	181	10	88	40	0	5	138	690
Hourly Total	123	596	6	0	5	725	7	270	315	0	10	592	246	310	60	0	3	616	21	257	86	0	13	364	2297
8:00 AM	43	114	9	0	2	166	2	56	74	0	3	132	56	104	9	0	0	169	9	59	20	0	4	88	555
8:15 AM	54	146	6	0	0	206	0	53	101	0	2	154	65	110	13	0	3	188	5	76	35	0	5	116	664
8:30 AM	35	112	2	1	2	150	4	54	87	0	5	145	87	101	19	0	2	207	11	70	25	0	2	106	608
8:45 AM	31	128	4	0	1	163	4	55	86	0	5	145	92	100	16	0	3	208	9	92	29	0	5	130	646
Hourly Total	163	500	21	1	5	685	10	218	348	0	15	576	300	415	57	0	8	772	34	297	109	0	16	440	2473
9:00 AM	0	0	0	0	0	0	0	2	0	0	0	2	1	0	0	0	0	1	0	0	0	0	0	0	3
Grand Total	1233	4259	135	2	65	5629	82	2387	2962	0	162	5431	3283	4147	536	9	90	7975	322	2629	881	0	157	3832	22867
Approach %	21.9	75.7	2.4	0.0	-	-	1.5	44.0	54.5	0.0	-	-	41.2	52.0	6.7	0.1	-	-	8.4	68.6	23.0	0.0	-	-	-
Total %	5.4	18.6	0.6	0.0	-	24.6	0.4	10.4	13.0	0.0	-	23.8	14.4	18.1	2.3	0.0	-	34.9	1.4	11.5	3.9	0.0	-	16.8	-
Lights	1196	4108	132	2	-	5438	81	2313	2902	0	-	5296	3218	4022	522	9	-	7771	312	2528	857	0	-	3697	22202
% Lights	97.0	96.5	97.8	100.0	-	96.6	98.8	96.9	98.0	-	-	97.5	98.0	97.0	97.4	100.0	-	97.4	96.9	96.2	97.3	-	-	96.5	97.1
Mediums	31	120	3	0	-	154	0	62	56	0	-	118	60	98	11	0	-	169	9	82	21	0	-	112	553
% Mediums	2.5	2.8	2.2	0.0	-	2.7	0.0	2.6	1.9	-	-	2.2	1.8	2.4	2.1	0.0	-	2.1	2.8	3.1	2.4	-	-	2.9	2.4
Articulated Trucks	4	30	0	0	-	34	0	12	4	0	-	16	4	26	3	0	-	33	1	19	3	0	-	23	106
% Articulated Trucks	0.3	0.7	0.0	0.0	-	0.6	0.0	0.5	0.1	-	-	0.3	0.1	0.6	0.6	0.0	-	0.4	0.3	0.7	0.3	-	-	0.6	0.5
Bicycles on Road	2	1	0	0	-	3	1	0	0	0	-	1	1	1	0	0	-	2	0	0	0	0	-	0	6
% Bicycles on Road	0.2	0.0	0.0	0.0	-	0.1	1.2	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	25	-	-	-	-	-	6	-	-	-	-	-	16	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	15.4	-	-	-	-	-	6.7	-	-	-	-	-	10.2	-	-
Pedestrians	-	-	-	-	65	-	-	-	-	-	137	-	-	-	-	-	84	-	-	-	-	-	141	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	84.6	-	-	-	-	-	93.3	-	-	-	-	-	89.8	-	-



Traffic and Transportation Engineering Services  
1800 Frobisher Street  
PO Box 5000, STN A  
Sudbury, Ontario, Canada P3A 5P3  
705-674-4455 David.Knutson@greatersudbury.ca

Count Name: Brady Street @ Paris Street  
Site Code: 00911103  
Start Date: 08/05/2021  
Page No: 3



Turning Movement Data Plot



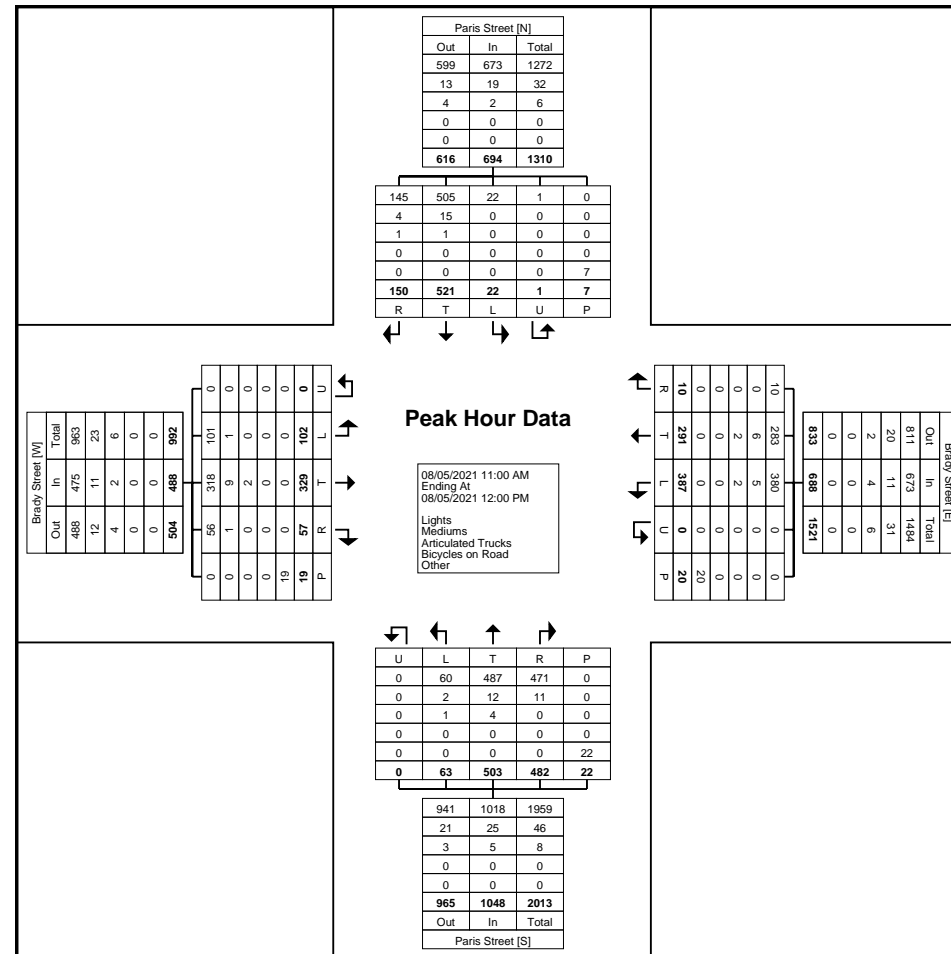
Traffic and Transportation Engineering Services  
1800 Frobisher Street  
PO Box 5000, STN A  
Sudbury, Ontario, Canada P3A 5P3  
705-674-4455 David.Knutson@greatersudbury.ca

Count Name: Brady Street @ Paris Street  
Site Code: 00911103  
Start Date: 08/05/2021  
Page No: 4

### Turning Movement Peak Hour Data (11:00 AM)

Start Time	Paris Street Southbound						Brady Street Westbound						Paris Street Northbound						Brady Street Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
11:00 AM	36	114	2	0	1	152	0	83	102	0	2	185	116	118	14	0	7	248	16	84	30	0	7	130	715
11:15 AM	36	122	10	1	2	169	5	74	95	0	8	174	118	132	12	0	5	262	10	76	24	0	1	110	715
11:30 AM	33	134	3	0	3	170	2	67	91	0	6	160	124	119	23	0	5	266	18	84	30	0	6	132	728
11:45 AM	45	151	7	0	1	203	3	67	99	0	4	169	124	134	14	0	5	272	13	85	18	0	5	116	760
Total	150	521	22	1	7	694	10	291	387	0	20	688	482	503	63	0	22	1048	57	329	102	0	19	488	2918
Approach %	21.6	75.1	3.2	0.1	-	-	1.5	42.3	56.3	0.0	-	-	46.0	48.0	6.0	0.0	-	-	11.7	67.4	20.9	0.0	-	-	-
Total %	5.1	17.9	0.8	0.0	-	23.8	0.3	10.0	13.3	0.0	-	23.6	16.5	17.2	2.2	0.0	-	35.9	2.0	11.3	3.5	0.0	-	16.7	-
PHF	0.833	0.863	0.550	0.250	-	0.855	0.500	0.877	0.949	0.000	-	0.930	0.972	0.938	0.685	0.000	-	0.963	0.792	0.968	0.850	0.000	-	0.924	0.960
Lights	145	505	22	1	-	673	10	283	380	0	-	673	471	487	60	0	-	1018	56	318	101	0	-	475	2839
% Lights	96.7	96.9	100.0	100.0	-	97.0	100.0	97.3	98.2	-	-	97.8	97.7	96.8	95.2	-	-	97.1	98.2	96.7	99.0	-	-	-	97.3
Mediums	4	15	0	0	-	19	0	6	5	0	-	11	11	12	2	0	-	25	1	9	1	0	-	11	66
% Mediums	2.7	2.9	0.0	0.0	-	2.7	0.0	2.1	1.3	-	-	1.6	2.3	2.4	3.2	-	-	2.4	1.8	2.7	1.0	-	-	2.3	2.3
Articulated Trucks	1	1	0	0	-	2	0	2	2	0	-	4	0	4	1	0	-	5	0	2	0	0	-	2	13
% Articulated Trucks	0.7	0.2	0.0	0.0	-	0.3	0.0	0.7	0.5	-	-	0.6	0.0	0.8	1.6	-	-	0.5	0.0	0.6	0.0	-	-	0.4	0.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	7	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	9.1	-	-	-	-	-	36.8	-	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	20	-	-	-	-	-	20	-	-	-	-	-	12	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	90.9	-	-	-	-	-	63.2	-	-





Turning Movement Peak Hour Data Plot (11:00 AM)

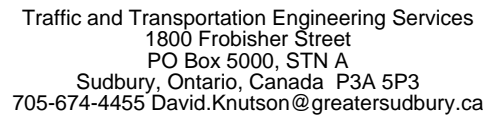


Traffic and Transportation Engineering Services  
1800 Frobisher Street  
PO Box 5000, STN A  
Sudbury, Ontario, Canada P3A 5P3  
705-674-4455 David.Knutson@greatersudbury.ca

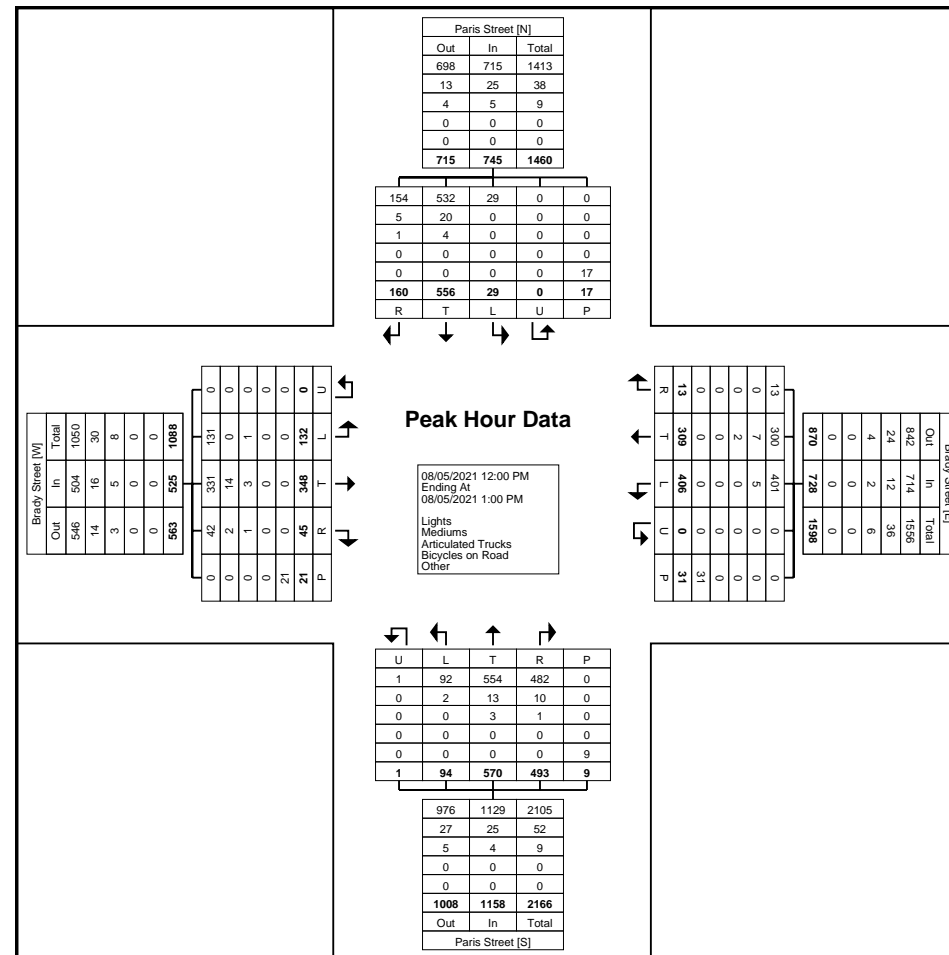
Count Name: Brady Street @ Paris Street  
Site Code: 00911103  
Start Date: 08/05/2021  
Page No: 6

### Turning Movement Peak Hour Data (12:00 PM)

Start Time	Paris Street Southbound						Brady Street Westbound						Paris Street Northbound						Brady Street Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
12:00 PM	37	113	8	0	5	158	4	69	94	0	10	167	122	133	23	0	1	278	10	115	41	0	10	166	769
12:15 PM	44	149	7	0	3	200	3	87	111	0	6	201	118	157	19	0	3	294	7	68	25	0	5	100	795
12:30 PM	39	153	8	0	7	200	3	77	93	0	7	173	128	125	26	1	5	280	11	87	36	0	5	134	787
12:45 PM	40	141	6	0	2	187	3	76	108	0	8	187	125	155	26	0	0	306	17	78	30	0	1	125	805
Total	160	556	29	0	17	745	13	309	406	0	31	728	493	570	94	1	9	1158	45	348	132	0	21	525	3156
Approach %	21.5	74.6	3.9	0.0	-	-	1.8	42.4	55.8	0.0	-	-	42.6	49.2	8.1	0.1	-	-	8.6	66.3	25.1	0.0	-	-	-
Total %	5.1	17.6	0.9	0.0	-	23.6	0.4	9.8	12.9	0.0	-	23.1	15.6	18.1	3.0	0.0	-	36.7	1.4	11.0	4.2	0.0	-	16.6	-
PHF	0.909	0.908	0.906	0.000	-	0.931	0.813	0.888	0.914	0.000	-	0.905	0.963	0.908	0.904	0.250	-	0.946	0.662	0.757	0.805	0.000	-	0.791	0.980
Lights	154	532	29	0	-	715	13	300	401	0	-	714	482	554	92	1	-	1129	42	331	131	0	-	504	3062
% Lights	96.3	95.7	100.0	-	-	96.0	100.0	97.1	98.8	-	-	98.1	97.8	97.2	97.9	100.0	-	97.5	93.3	95.1	99.2	-	-	96.0	97.0
Mediums	5	20	0	0	-	25	0	7	5	0	-	12	10	13	2	0	-	25	2	14	0	0	-	16	78
% Mediums	3.1	3.6	0.0	-	-	3.4	0.0	2.3	1.2	-	-	1.6	2.0	2.3	2.1	0.0	-	2.2	4.4	4.0	0.0	-	-	3.0	2.5
Articulated Trucks	1	4	0	0	-	5	0	2	0	0	-	2	1	3	0	0	-	4	1	3	1	0	-	5	16
% Articulated Trucks	0.6	0.7	0.0	-	-	0.7	0.0	0.6	0.0	-	-	0.3	0.2	0.5	0.0	0.0	-	0.3	2.2	0.9	0.8	-	-	1.0	0.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	6.5	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	17	-	-	-	-	-	29	-	-	-	-	-	9	-	-	-	-	-	21	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	93.5	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Count Name: Brady Street @ Paris Street  
Site Code: 00911103  
Start Date: 08/05/2021  
Page No: 7



### Turning Movement Peak Hour Data Plot (12:00 PM)



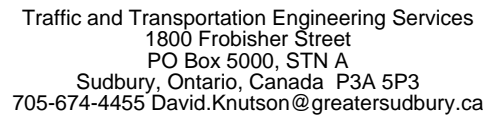


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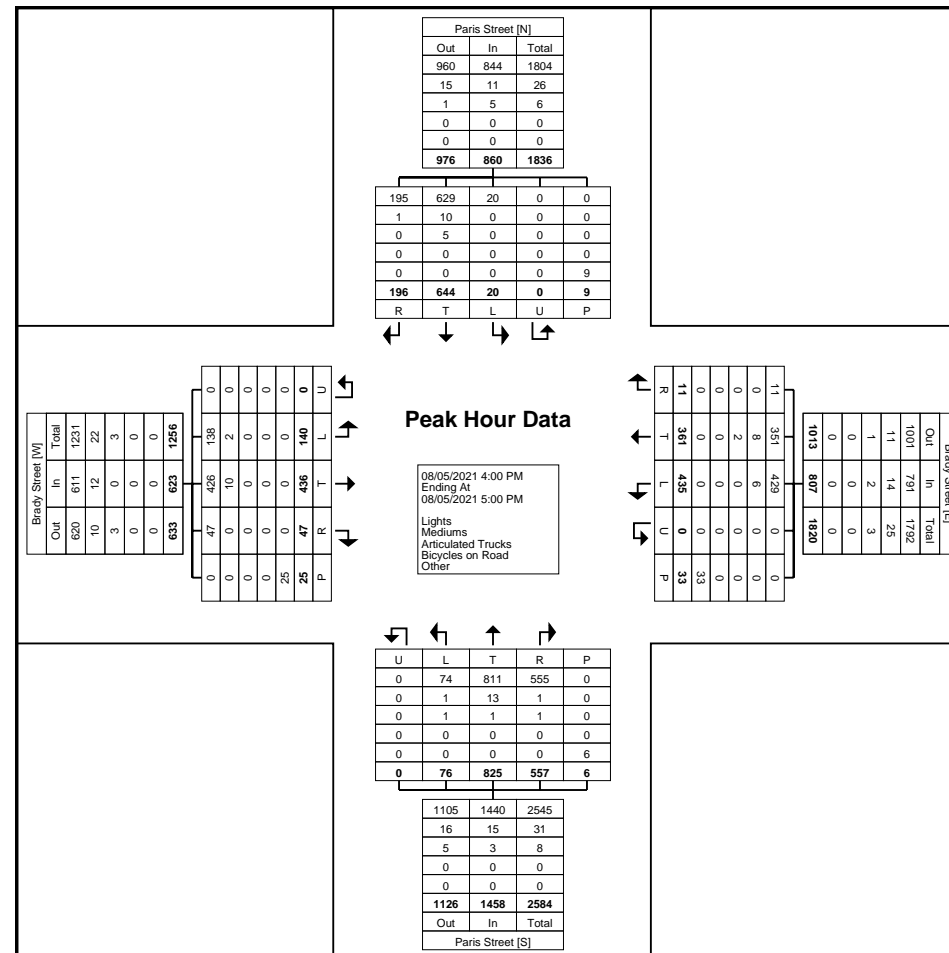
Count Name: Brady Street @ Paris Street  
Site Code: 00911103  
Start Date: 08/05/2021  
Page No: 8

### Turning Movement Peak Hour Data (4:00 PM)

Start Time	Paris Street Southbound						Brady Street Westbound						Paris Street Northbound						Brady Street Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:00 PM	51	155	5	0	2	211	3	93	104	0	5	200	144	209	18	0	2	371	8	116	32	0	3	156	938
4:15 PM	49	153	5	0	5	207	3	79	125	0	10	207	140	213	16	0	2	369	7	115	31	0	6	153	936
4:30 PM	49	171	2	0	2	222	4	75	93	0	12	172	134	233	25	0	2	392	13	92	50	0	3	155	941
4:45 PM	47	165	8	0	0	220	1	114	113	0	6	228	139	170	17	0	0	326	19	113	27	0	13	159	933
Total	196	644	20	0	9	860	11	361	435	0	33	807	557	825	76	0	6	1458	47	436	140	0	25	623	3748
Approach %	22.8	74.9	2.3	0.0	-	-	1.4	44.7	53.9	0.0	-	-	38.2	56.6	5.2	0.0	-	-	7.5	70.0	22.5	0.0	-	-	-
Total %	5.2	17.2	0.5	0.0	-	22.9	0.3	9.6	11.6	0.0	-	21.5	14.9	22.0	2.0	0.0	-	38.9	1.3	11.6	3.7	0.0	-	16.6	-
PHF	0.961	0.942	0.625	0.000	-	0.968	0.688	0.792	0.870	0.000	-	0.885	0.967	0.885	0.760	0.000	-	0.930	0.618	0.940	0.700	0.000	-	0.980	0.996
Lights	195	629	20	0	-	844	11	351	429	0	-	791	555	811	74	0	-	1440	47	426	138	0	-	611	3686
% Lights	99.5	97.7	100.0	-	-	98.1	100.0	97.2	98.6	-	-	98.0	99.6	98.3	97.4	-	-	98.8	100.0	97.7	98.6	-	-	-	98.3
Mediums	1	10	0	0	-	11	0	8	6	0	-	14	1	13	1	0	-	15	0	10	2	0	-	12	52
% Mediums	0.5	1.6	0.0	-	-	1.3	0.0	2.2	1.4	-	-	1.7	0.2	1.6	1.3	-	-	1.0	0.0	2.3	1.4	-	-	1.9	1.4
Articulated Trucks	0	5	0	0	-	5	0	2	0	0	-	2	1	1	1	0	-	3	0	0	0	0	-	0	10
% Articulated Trucks	0.0	0.8	0.0	-	-	0.6	0.0	0.6	0.0	-	-	0.2	0.2	0.1	1.3	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	9	-	-	-	-	-	1	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	27.3	-	-	-	-	-	16.7	-	-	-	-	-	8.0	-	-
Pedestrians	-	-	-	-	9	-	-	-	-	-	24	-	-	-	-	-	5	-	-	-	-	-	23	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	72.7	-	-	-	-	-	83.3	-	-	-	-	-	92.0	-	-



Count Name: Brady Street @ Paris Street  
Site Code: 00911103  
Start Date: 08/05/2021  
Page No: 9



### Turning Movement Peak Hour Data Plot (4:00 PM)



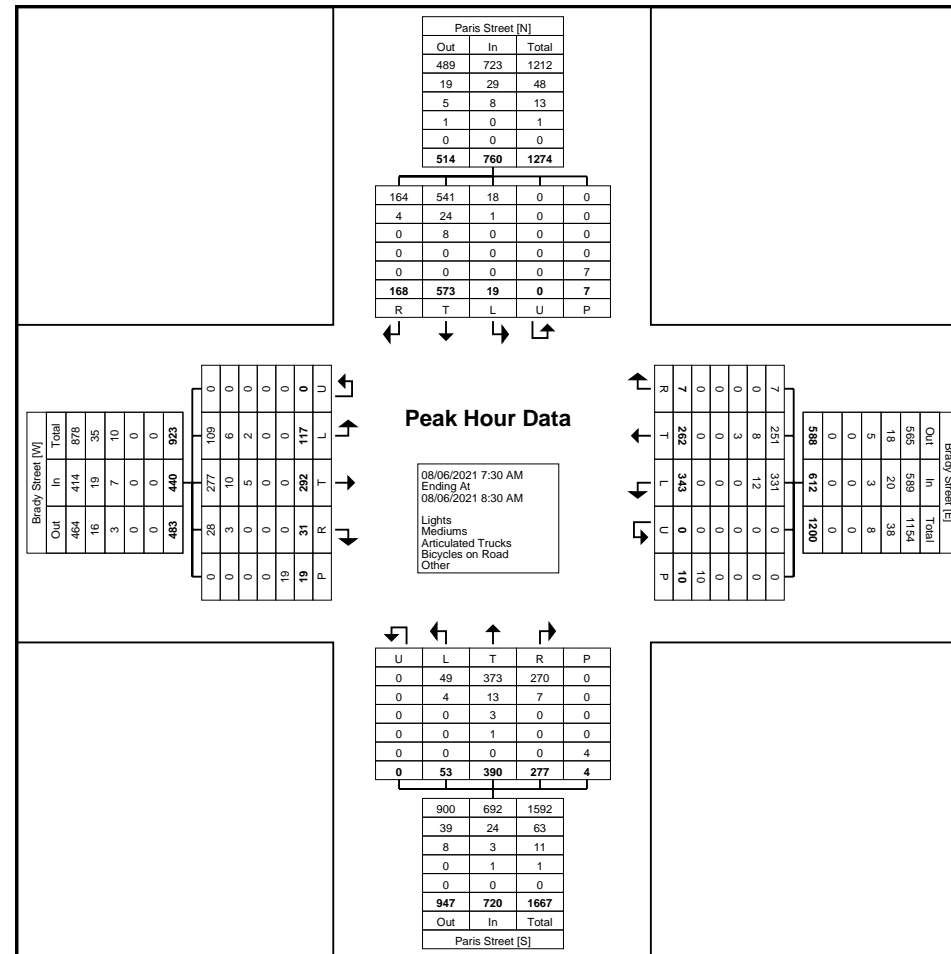
Traffic and Transportation Engineering Services  
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Count Name: Brady Street @ Paris Street  
Site Code: 00911103  
Start Date: 08/05/2021  
Page No: 10

### Turning Movement Peak Hour Data (7:30 AM)

Start Time	Paris Street Southbound						Brady Street Westbound						Paris Street Northbound						Brady Street Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	24	155	1	0	2	180	4	76	83	0	1	163	83	94	5	0	0	182	7	69	22	0	5	98	623
7:45 AM	47	158	3	0	3	208	1	77	85	0	4	163	73	82	26	0	1	181	10	88	40	0	5	138	690
8:00 AM	43	114	9	0	2	166	2	56	74	0	3	132	56	104	9	0	0	169	9	59	20	0	4	88	555
8:15 AM	54	146	6	0	0	206	0	53	101	0	2	154	65	110	13	0	3	188	5	76	35	0	5	116	664
Total	168	573	19	0	7	760	7	262	343	0	10	612	277	390	53	0	4	720	31	292	117	0	19	440	2532
Approach %	22.1	75.4	2.5	0.0	-	-	1.1	42.8	56.0	0.0	-	-	38.5	54.2	7.4	0.0	-	-	7.0	66.4	26.6	0.0	-	-	-
Total %	6.6	22.6	0.8	0.0	-	30.0	0.3	10.3	13.5	0.0	-	24.2	10.9	15.4	2.1	0.0	-	28.4	1.2	11.5	4.6	0.0	-	17.4	-
PHF	0.778	0.907	0.528	0.000	-	0.913	0.438	0.851	0.849	0.000	-	0.939	0.834	0.886	0.510	0.000	-	0.957	0.775	0.830	0.731	0.000	-	0.797	0.917
Lights	164	541	18	0	-	723	7	251	331	0	-	589	270	373	49	0	-	692	28	277	109	0	-	414	2418
% Lights	97.6	94.4	94.7	-	-	95.1	100.0	95.8	96.5	-	-	96.2	97.5	95.6	92.5	-	-	96.1	90.3	94.9	93.2	-	-	94.1	95.5
Mediums	4	24	1	0	-	29	0	8	12	0	-	20	7	13	4	0	-	24	3	10	6	0	-	19	92
% Mediums	2.4	4.2	5.3	-	-	3.8	0.0	3.1	3.5	-	-	3.3	2.5	3.3	7.5	-	-	3.3	9.7	3.4	5.1	-	-	4.3	3.6
Articulated Trucks	0	8	0	0	-	8	0	3	0	0	-	3	0	3	0	0	-	3	0	5	2	0	-	7	21
% Articulated Trucks	0.0	1.4	0.0	-	-	1.1	0.0	1.1	0.0	-	-	0.5	0.0	0.8	0.0	-	-	0.4	0.0	1.7	1.7	-	-	1.6	0.8
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.1	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	10.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	9	-	-	-	-	-	4	-	-	-	-	-	19	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	90.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-





Turning Movement Peak Hour Data Plot (7:30 AM)



Traffic and Transportation Engineering Services  
1800 Frobisher Street  
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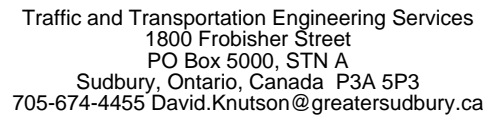
Count Name: Paris Street @ Van Horne Street  
Site Code: 00912103  
Start Date: 08/05/2021  
Page No: 1

## Turning Movement Data

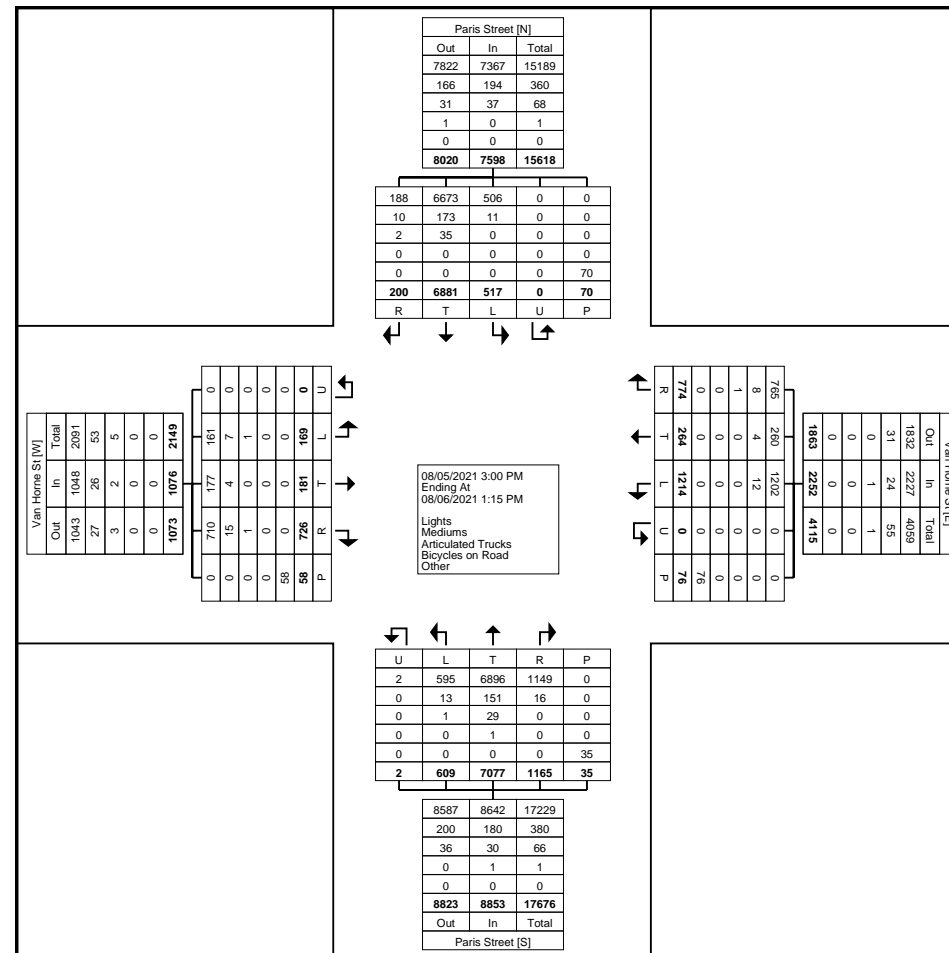
Start Time	Paris Street Southbound						Van Horne St Westbound						Paris Street Northbound						Van Horne St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
3:00 PM	9	241	19	0	1	269	24	12	35	0	5	71	58	321	23	0	0	402	22	5	6	0	1	33	775
3:15 PM	8	247	20	0	0	275	28	7	47	0	2	82	56	310	22	0	1	388	27	10	6	0	4	43	788
3:30 PM	12	278	17	0	4	307	24	13	46	0	3	83	69	333	30	1	1	433	26	9	9	0	4	44	867
3:45 PM	7	216	25	0	6	248	29	9	56	0	1	94	54	318	30	0	1	402	37	6	9	0	3	52	796
Hourly Total	36	982	81	0	11	1099	105	41	184	0	11	330	237	1282	105	1	3	1625	112	30	30	0	12	172	3226
4:00 PM	2	255	22	0	1	279	22	22	51	0	6	95	77	345	32	0	0	454	40	12	13	0	2	65	893
4:15 PM	11	267	23	0	5	301	21	10	41	0	4	72	71	329	27	0	3	427	32	13	8	0	0	53	853
4:30 PM	5	275	32	0	2	312	31	14	38	0	4	83	69	325	15	1	0	410	32	9	9	0	1	50	855
4:45 PM	11	248	31	0	5	290	37	12	50	0	3	99	61	273	23	0	0	357	43	14	10	0	0	67	813
Hourly Total	29	1045	108	0	13	1182	111	58	180	0	17	349	278	1272	97	1	3	1648	147	48	40	0	3	235	3414
5:00 PM	8	236	28	0	6	272	28	13	35	0	5	76	61	327	20	0	1	408	36	11	7	0	3	54	810
5:15 PM	6	269	26	0	5	301	37	11	31	0	4	79	57	269	16	0	2	342	31	3	3	0	6	37	759
5:30 PM	6	218	21	0	4	245	24	7	35	0	2	66	56	249	18	0	6	323	26	6	7	0	2	39	673
5:45 PM	10	210	22	0	4	242	25	9	36	0	2	70	30	207	25	0	4	262	28	7	5	0	1	40	614
Hourly Total	30	933	97	0	19	1060	114	40	137	0	13	291	204	1052	79	0	13	1335	121	27	22	0	12	170	2856
6:00 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
6:00 AM	0	50	4	0	1	54	9	2	9	0	0	20	1	49	2	0	0	52	3	2	2	0	0	7	133
6:15 AM	4	72	6	0	0	82	16	3	12	0	0	31	3	58	3	0	0	64	5	1	2	0	0	8	185
6:30 AM	2	146	10	0	0	158	22	2	30	0	2	54	10	102	4	0	0	116	6	0	0	0	0	6	334
6:45 AM	2	210	5	0	1	217	14	5	32	0	2	51	6	91	13	0	0	110	8	3	1	0	0	12	390
Hourly Total	8	478	25	0	2	511	61	12	83	0	4	156	20	300	22	0	0	342	22	6	5	0	0	33	1042
7:00 AM	7	217	6	0	2	230	17	5	31	0	1	53	8	107	9	0	0	124	10	2	1	0	2	13	420
7:15 AM	9	166	3	0	2	178	21	0	33	0	2	54	12	124	13	0	0	149	12	4	0	0	1	16	397
7:30 AM	7	241	12	0	3	260	29	8	43	0	1	80	19	149	17	0	1	185	12	3	6	0	3	21	546
7:45 AM	4	239	8	0	3	251	32	11	54	0	0	97	26	152	23	0	1	201	13	3	4	0	3	20	569
Hourly Total	27	863	29	0	10	919	99	24	161	0	4	284	65	532	62	0	2	659	47	12	11	0	9	70	1932
8:00 AM	3	206	11	0	5	220	22	8	29	0	5	59	15	156	9	0	0	180	10	3	3	0	3	16	475
8:15 AM	7	208	8	0	0	223	19	4	45	0	3	68	19	171	24	0	0	214	17	4	1	0	2	22	527
8:30 AM	2	192	18	0	0	212	30	11	48	0	2	89	24	171	22	0	0	217	14	6	3	0	1	23	541
8:45 AM	8	186	20	0	1	214	23	4	45	0	4	72	24	206	25	0	1	255	17	6	4	0	0	27	568
Hourly Total	20	792	57	0	6	869	94	27	167	0	14	288	82	704	80	0	1	866	58	19	11	0	6	88	2111
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:00 AM	3	190	11	0	1	204	21	9	34	0	0	64	35	234	23	0	0	292	22	3	8	0	4	33	593
11:15 AM	7	190	10	0	1	207	24	7	39	0	1	70	26	219	16	0	2	261	26	4	6	0	1	36	574
11:30 AM	9	254	17	0	0	280	27	8	23	0	1	58	40	247	13	0	3	300	24	7	5	0	2	36	674
11:45 AM	8	214	13	0	1	235	21	6	39	0	0	66	40	269	22	0	3	331	26	5	7	0	3	38	670
Hourly Total	27	848	51	0	3	926	93	30	135	0	2	258	141	969	74	0	8	1184	98	19	26	0	10	143	2511
12:00 PM	7	235	18	0	1	260	23	6	42	0	2	71	39	270	22	0	2	331	34	3	7	0	2	44	706
12:15 PM	5	204	19	0	0	228	30	8	32	0	5	70	21	216	25	0	0	262	25	7	9	0	2	41	601
12:30 PM	9	240	14	0	3	263	23	10	61	0	1	94	33	266	22	0	2	321	28	3	2	0	1	33	711
12:45 PM	2	259	18	0	2	279	20	8	32	0	3	60	45	213	21	0	1	279	34	7	6	0	1	47	665
Hourly Total	23	938	69	0	6	1030	96	32	167	0	11	295	138	965	90	0	5	1193	121	20	24	0	6	165	2683
1:00 PM	0	2	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	3
Grand Total	200	6881	517	0	70	7598	774	264	1214	0	76	2252	1165	7077	609	2	35	8853	726	181	169	0	58	1076	19779
Approach %	2.6	90.6	6.8	0.0	-	-	34.4	11.7	53.9	0.0	-	-	13.2	79.9	6.9	0.0	-	-	67.5	16.8	15.7	0.0	-	-	-
Total %	1.0	34.8	2.6	0.0	-	38.4	3.9	1.3	6.1	0.0	-	11.4	5.9	35.8	3.1	0.0	-	44.8	3.7	0.9	0.9	0.0	-	5.4	-
Lights	188	6673	506	0	-	7367	765	260	1202	0	-	2227	1149	6896	595	2	-	8642	710	177	161	0	-	1048	19284
% Lights	94.0	97.0	97.9	-	-	97.0	98.8	98.5	99.0	-	-	98.9	98.6	97.4	97.7	100.0	-	97.6	97.8	97.8	95.3	-	-	97.4	97.5
Mediums	10	173	11	0	-	194	8	4	12	0	-	24	16	151	13	0	-	180	15	4	7	0	-	26	424
% Mediums	5.0	2.5	2.1	-	-	2.6	1.0	1.5	1.0	-	-	1.1	1.4	2.1	2.1	0.0	-	2.0	2.1	2.2	4.1	-	-	2.4	2.1
Articulated Trucks	2	35	0	0	-	37	1	0	0	0	-	1	0	29	1	0	-	30	1	0	1	0	-	2	70
% Articulated Trucks	1.0	0.5	0.0	-	-	0.5	0.1	0.0	0.0	-	-	0.0	0.0	0.4	0.2	0.0	-	0.3	0.1	0.0	0.6	-	-	0.2	0.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	6	-	-	-	-	-	15	-	-	-	-	-	0	-	-	-	-	-	6	-	-
% Bicycles on Crosswalk	-	-	-	-	8.6	-	-	-	-	-	19.7	-	-	-	-	-	0.0	-	-	-	-	-	10.3	-	-
Pedestrians	-	-	-	-	64	-	-	-	-	-	61	-	-	-	-	-	35	-	-	-	-	-	52	-	-
% Pedestrians	-	-	-	-	91.4	-	-	-	-	-	80.3	-	-	-	-	-	100.0	-	-	-	-	-	89.7	-	-





Count Name: Paris Street @ Van Horne Street  
Site Code: 00912103  
Start Date: 08/05/2021  
Page No: 3



### Turning Movement Data Plot

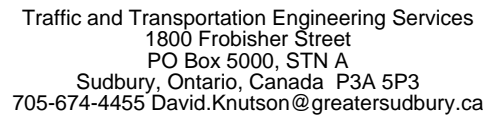


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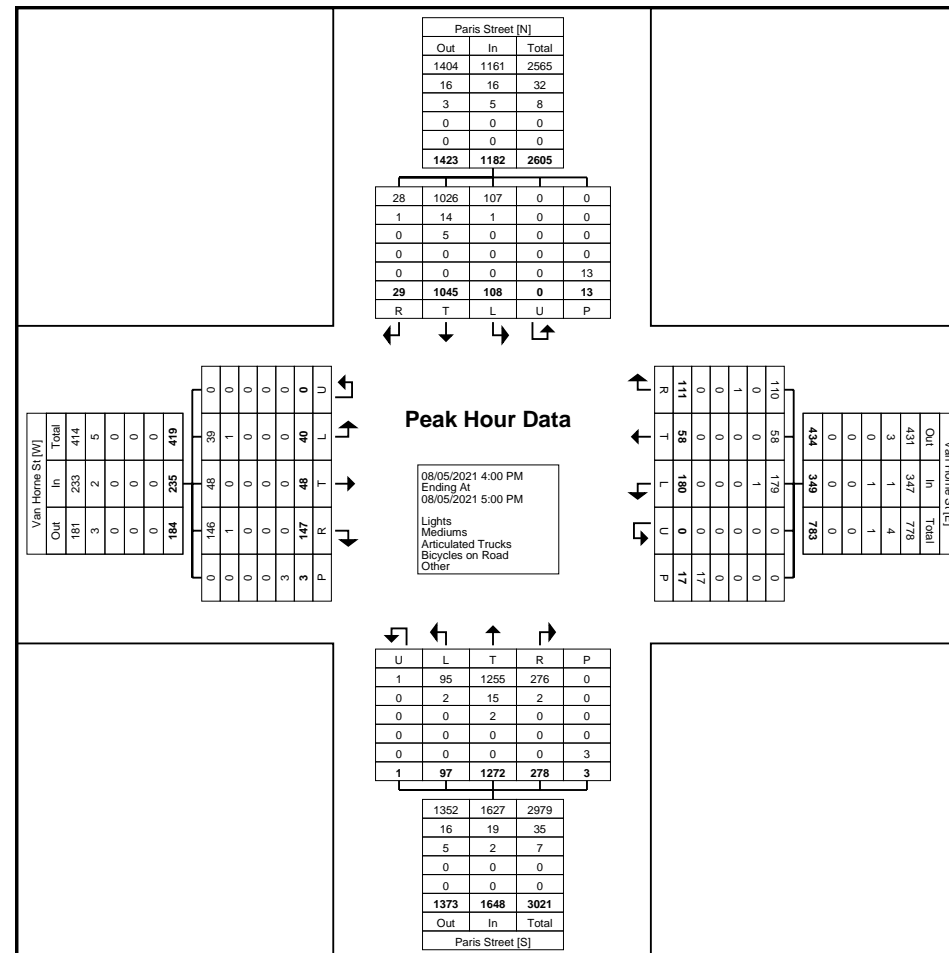
Count Name: Paris Street @ Van Horne Street  
Site Code: 00912103  
Start Date: 08/05/2021  
Page No: 4

### Turning Movement Peak Hour Data (4:00 PM)

Start Time	Paris Street Southbound						Van Horne St Westbound						Paris Street Northbound						Van Horne St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:00 PM	2	255	22	0	1	279	22	22	51	0	6	95	77	345	32	0	0	454	40	12	13	0	2	65	893
4:15 PM	11	267	23	0	5	301	21	10	41	0	4	72	71	329	27	0	3	427	32	13	8	0	0	53	853
4:30 PM	5	275	32	0	2	312	31	14	38	0	4	83	69	325	15	1	0	410	32	9	9	0	1	50	855
4:45 PM	11	248	31	0	5	290	37	12	50	0	3	99	61	273	23	0	0	357	43	14	10	0	0	67	813
Total	29	1045	108	0	13	1182	111	58	180	0	17	349	278	1272	97	1	3	1648	147	48	40	0	3	235	3414
Approach %	2.5	88.4	9.1	0.0	-	-	31.8	16.6	51.6	0.0	-	-	16.9	77.2	5.9	0.1	-	-	62.6	20.4	17.0	0.0	-	-	-
Total %	0.8	30.6	3.2	0.0	-	34.6	3.3	1.7	5.3	0.0	-	10.2	8.1	37.3	2.8	0.0	-	48.3	4.3	1.4	1.2	0.0	-	6.9	-
PHF	0.659	0.950	0.844	0.000	-	0.947	0.750	0.659	0.882	0.000	-	0.881	0.903	0.922	0.758	0.250	-	0.907	0.855	0.857	0.769	0.000	-	0.877	0.956
Lights	28	1026	107	0	-	1161	110	58	179	0	-	347	276	1255	95	1	-	1627	146	48	39	0	-	233	3368
% Lights	96.6	98.2	99.1	-	-	98.2	99.1	100.0	99.4	-	-	99.4	99.3	98.7	97.9	100.0	-	98.7	99.3	100.0	97.5	-	-	99.1	98.7
Mediums	1	14	1	0	-	16	0	0	1	0	-	1	2	15	2	0	-	19	1	0	1	0	-	2	38
% Mediums	3.4	1.3	0.9	-	-	1.4	0.0	0.0	0.6	-	-	0.3	0.7	1.2	2.1	0.0	-	1.2	0.7	0.0	2.5	-	-	0.9	1.1
Articulated Trucks	0	5	0	0	-	5	1	0	0	0	-	1	0	2	0	0	-	2	0	0	0	0	-	0	8
% Articulated Trucks	0.0	0.5	0.0	-	-	0.4	0.9	0.0	0.0	-	-	0.3	0.0	0.2	0.0	0.0	-	0.1	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	6	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	7.7	-	-	-	-	-	35.3	-	-	-	-	-	0.0	-	-	-	-	-	33.3	-	-
Pedestrians	-	-	-	-	12	-	-	-	-	-	11	-	-	-	-	-	3	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	92.3	-	-	-	-	-	64.7	-	-	-	-	-	100.0	-	-	-	-	-	66.7	-	-



Count Name: Paris Street @ Van Horne Street  
Site Code: 00912103  
Start Date: 08/05/2021  
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### Turning Movement Peak Hour Data Plot (4:00 PM)



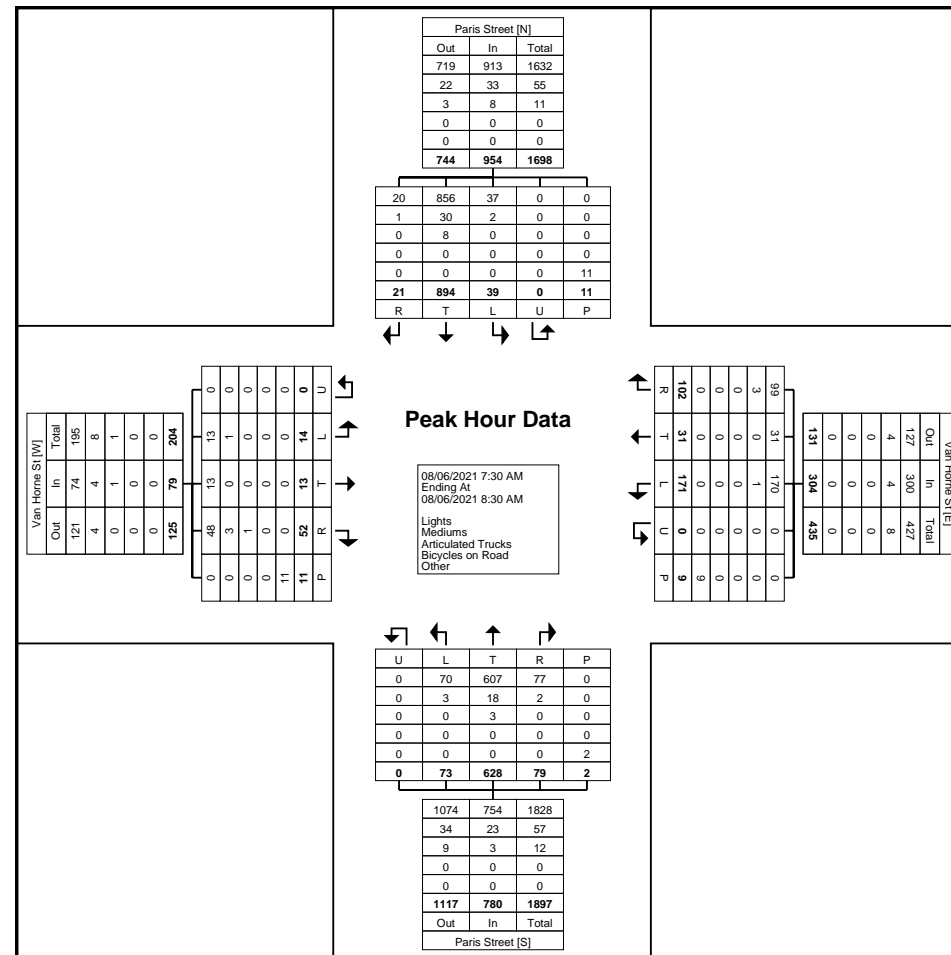


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Count Name: Paris Street @ Van Horne Street  
Site Code: 00912103  
Start Date: 08/05/2021  
Page No: 6

### Turning Movement Peak Hour Data (7:30 AM)

Start Time	Paris Street Southbound						Van Horne St Westbound						Paris Street Northbound						Van Horne St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	7	241	12	0	3	260	29	8	43	0	1	80	19	149	17	0	1	185	12	3	6	0	3	21	546
7:45 AM	4	239	8	0	3	251	32	11	54	0	0	97	26	152	23	0	1	201	13	3	4	0	3	20	569
8:00 AM	3	206	11	0	5	220	22	8	29	0	5	59	15	156	9	0	0	180	10	3	3	0	3	16	475
8:15 AM	7	208	8	0	0	223	19	4	45	0	3	68	19	171	24	0	0	214	17	4	1	0	2	22	527
Total	21	894	39	0	11	954	102	31	171	0	9	304	79	628	73	0	2	780	52	13	14	0	11	79	2117
Approach %	2.2	93.7	4.1	0.0	-	-	33.6	10.2	56.3	0.0	-	-	10.1	80.5	9.4	0.0	-	-	65.8	16.5	17.7	0.0	-	-	-
Total %	1.0	42.2	1.8	0.0	-	45.1	4.8	1.5	8.1	0.0	-	14.4	3.7	29.7	3.4	0.0	-	36.8	2.5	0.6	0.7	0.0	-	3.7	-
PHF	0.750	0.927	0.813	0.000	-	0.917	0.797	0.705	0.792	0.000	-	0.784	0.760	0.918	0.760	0.000	-	0.911	0.765	0.813	0.583	0.000	-	0.898	0.930
Lights	20	856	37	0	-	913	99	31	170	0	-	300	77	607	70	0	-	754	48	13	13	0	-	74	2041
% Lights	95.2	95.7	94.9	-	-	95.7	97.1	100.0	99.4	-	-	98.7	97.5	96.7	95.9	-	-	96.7	92.3	100.0	92.9	-	-	93.7	96.4
Mediums	1	30	2	0	-	33	3	0	1	0	-	4	2	18	3	0	-	23	3	0	1	0	-	4	64
% Mediums	4.8	3.4	5.1	-	-	3.5	2.9	0.0	0.6	-	-	1.3	2.5	2.9	4.1	-	-	2.9	5.8	0.0	7.1	-	-	5.1	3.0
Articulated Trucks	0	8	0	0	-	8	0	0	0	0	-	0	0	3	0	0	-	3	1	0	0	0	-	1	12
% Articulated Trucks	0.0	0.9	0.0	-	-	0.8	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.4	1.9	0.0	0.0	-	-	1.3	0.6
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	22.2	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	11	-	-	-	-	-	7	-	-	-	-	-	2	-	-	-	-	-	11	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	77.8	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (7:30 AM)

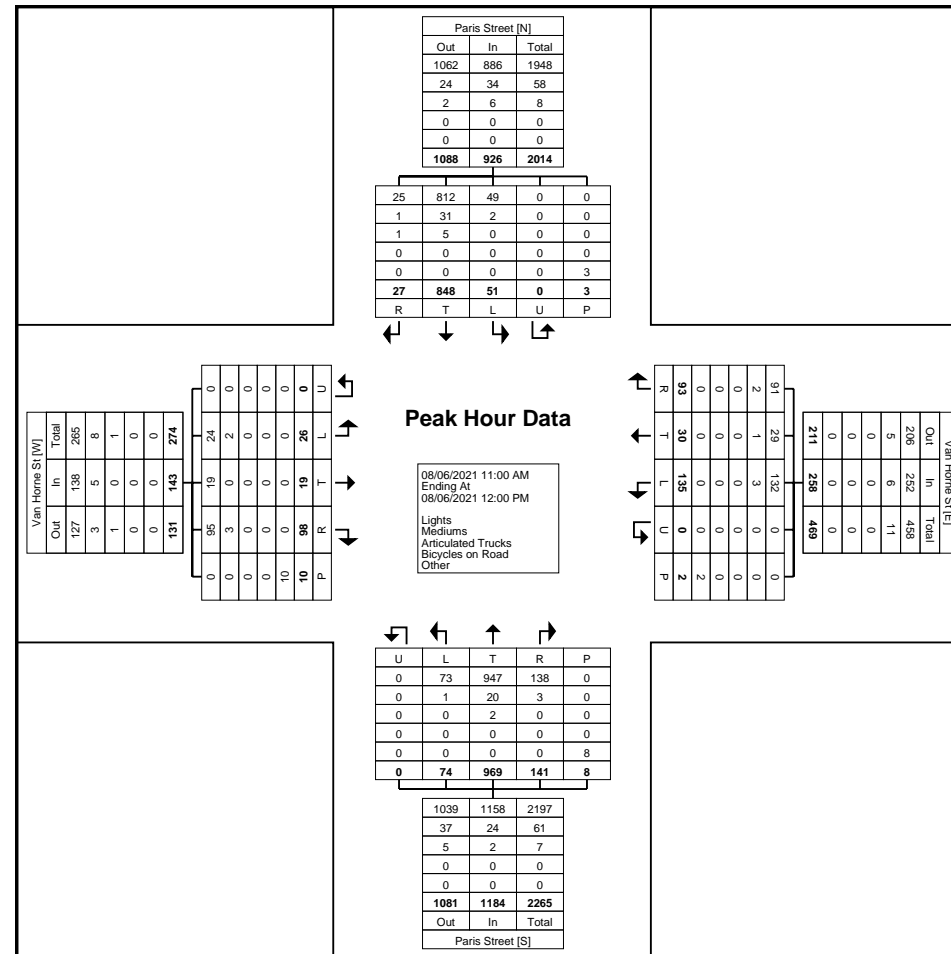


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Count Name: Paris Street @ Van Horne Street  
Site Code: 00912103  
Start Date: 08/05/2021  
Page No: 8

### Turning Movement Peak Hour Data (11:00 AM)

Start Time	Paris Street Southbound						Van Horne St Westbound						Paris Street Northbound						Van Horne St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
11:00 AM	3	190	11	0	1	204	21	9	34	0	0	64	35	234	23	0	0	292	22	3	8	0	4	33	593
11:15 AM	7	190	10	0	1	207	24	7	39	0	1	70	26	219	16	0	2	261	26	4	6	0	1	36	574
11:30 AM	9	254	17	0	0	280	27	8	23	0	1	58	40	247	13	0	3	300	24	7	5	0	2	36	674
11:45 AM	8	214	13	0	1	235	21	6	39	0	0	66	40	269	22	0	3	331	26	5	7	0	3	38	670
Total	27	848	51	0	3	926	93	30	135	0	2	258	141	969	74	0	8	1184	98	19	26	0	10	143	2511
Approach %	2.9	91.6	5.5	0.0	-	-	36.0	11.6	52.3	0.0	-	-	11.9	81.8	6.3	0.0	-	-	68.5	13.3	18.2	0.0	-	-	-
Total %	1.1	33.8	2.0	0.0	-	36.9	3.7	1.2	5.4	0.0	-	10.3	5.6	38.6	2.9	0.0	-	47.2	3.9	0.8	1.0	0.0	-	5.7	-
PHF	0.750	0.835	0.750	0.000	-	0.827	0.861	0.833	0.865	0.000	-	0.921	0.881	0.901	0.804	0.000	-	0.894	0.942	0.679	0.813	0.000	-	0.941	0.931
Lights	25	812	49	0	-	886	91	29	132	0	-	252	138	947	73	0	-	1158	95	19	24	0	-	138	2434
% Lights	92.6	95.8	96.1	-	-	95.7	97.8	96.7	97.8	-	-	97.7	97.9	97.7	98.6	-	-	97.8	96.9	100.0	92.3	-	-	96.5	96.9
Mediums	1	31	2	0	-	34	2	1	3	0	-	6	3	20	1	0	-	24	3	0	2	0	-	5	69
% Mediums	3.7	3.7	3.9	-	-	3.7	2.2	3.3	2.2	-	-	2.3	2.1	2.1	1.4	-	-	2.0	3.1	0.0	7.7	-	-	3.5	2.7
Articulated Trucks	1	5	0	0	-	6	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	8
% Articulated Trucks	3.7	0.6	0.0	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	10.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	8	-	-	-	-	-	9	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	90.0	-	-



Turning Movement Peak Hour Data Plot (11:00 AM)



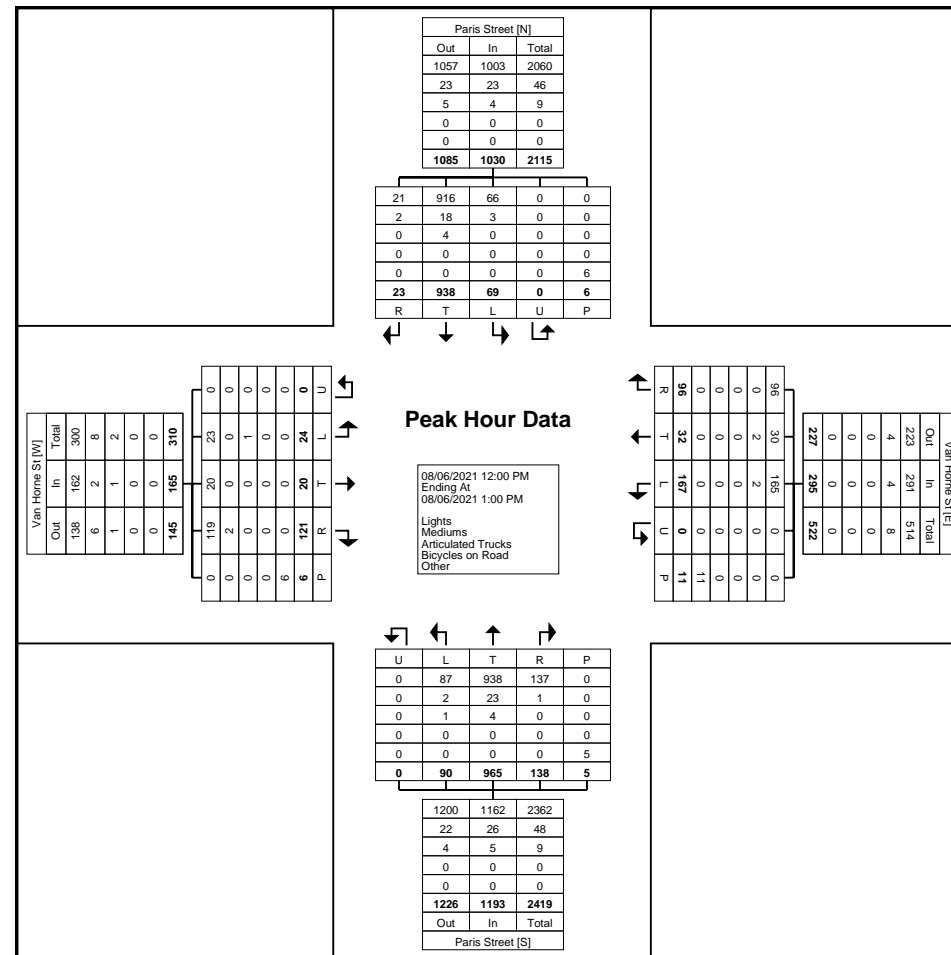


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Count Name: Paris Street @ Van Horne Street  
Site Code: 00912103  
Start Date: 08/05/2021  
Page No: 10

### Turning Movement Peak Hour Data (12:00 PM)

Start Time	Paris Street Southbound						Van Horne St Westbound						Paris Street Northbound						Van Horne St Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
12:00 PM	7	235	18	0	1	260	23	6	42	0	2	71	39	270	22	0	2	331	34	3	7	0	2	44	706
12:15 PM	5	204	19	0	0	228	30	8	32	0	5	70	21	216	25	0	0	262	25	7	9	0	2	41	601
12:30 PM	9	240	14	0	3	263	23	10	61	0	1	94	33	266	22	0	2	321	28	3	2	0	1	33	711
12:45 PM	2	259	18	0	2	279	20	8	32	0	3	60	45	213	21	0	1	279	34	7	6	0	1	47	665
Total	23	938	69	0	6	1030	96	32	167	0	11	295	138	965	90	0	5	1193	121	20	24	0	6	165	2683
Approach %	2.2	91.1	6.7	0.0	-	-	32.5	10.8	56.6	0.0	-	-	11.6	80.9	7.5	0.0	-	-	73.3	12.1	14.5	0.0	-	-	-
Total %	0.9	35.0	2.6	0.0	-	38.4	3.6	1.2	6.2	0.0	-	11.0	5.1	36.0	3.4	0.0	-	44.5	4.5	0.7	0.9	0.0	-	6.1	-
PHF	0.639	0.905	0.908	0.000	-	0.923	0.800	0.800	0.684	0.000	-	0.785	0.767	0.894	0.900	0.000	-	0.901	0.890	0.714	0.667	0.000	-	0.878	0.943
Lights	21	916	66	0	-	1003	96	30	165	0	-	291	137	938	87	0	-	1162	119	20	23	0	-	162	2618
% Lights	91.3	97.7	95.7	-	-	97.4	100.0	93.8	98.8	-	-	98.6	99.3	97.2	96.7	-	-	97.4	98.3	100.0	95.8	-	-	98.2	97.6
Mediums	2	18	3	0	-	23	0	2	2	0	-	4	1	23	2	0	-	26	2	0	0	0	-	2	55
% Mediums	8.7	1.9	4.3	-	-	2.2	0.0	6.3	1.2	-	-	1.4	0.7	2.4	2.2	-	-	2.2	1.7	0.0	0.0	-	-	1.2	2.0
Articulated Trucks	0	4	0	0	-	4	0	0	0	0	-	0	0	4	1	0	-	5	0	0	1	0	-	1	10
% Articulated Trucks	0.0	0.4	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.0	0.4	1.1	-	-	0.4	0.0	0.0	4.2	-	-	0.6	0.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	9.1	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	10	-	-	-	-	-	5	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	90.9	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Turning Movement Peak Hour Data Plot (12:00 PM)


<h2 style="margin: 0;">Morning Peak Diagram</h2>		<b>Specified Period</b> <b>From:</b> 7:00:00 <b>To:</b> 9:00:00	<b>One Hour Peak</b> <b>From:</b> 7:45:00 <b>To:</b> 8:45:00
<b>Municipality:</b> Sudbury <b>Site #:</b> 2206300001 <b>Intersection:</b> Paris St & Van Horne St <b>TFR File #:</b> 1 <b>Count date:</b> 20-Apr-22		<b>Weather conditions:</b>  <b>Person counted:</b> <b>Person prepared:</b> <b>Person checked:</b>	
<b>** Signalized Intersection **</b>		<b>Major Road:</b> Paris St runs N/S	

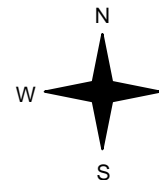
North Leg Total: 2196 North Entering: 1188 North Peds: 4 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">1</td> <td style="text-align: right;">16</td> <td style="text-align: right;">1</td> <td style="text-align: right;">18</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">1</td> <td style="text-align: right;">11</td> <td style="text-align: right;">1</td> <td style="text-align: right;">13</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">36</td> <td style="text-align: right;">1059</td> <td style="text-align: right;">62</td> <td style="text-align: right;">1157</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">38</td> <td style="text-align: right;">1086</td> <td style="text-align: right;">64</td> <td></td> </tr> </table>	Heavys	1	16	1	18	Trucks	1	11	1	13	Cars	36	1059	62	1157	Totals	38	1086	64		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">26</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">20</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">962</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1008</td> </tr> </table>	Heavys	26	Trucks	20	Cars	962	Totals	1008	East Leg Total: 593 East Entering: 406 East Peds: 6 Peds Cross:
Heavys	1	16	1	18																											
Trucks	1	11	1	13																											
Cars	36	1059	62	1157																											
Totals	38	1086	64																												
Heavys	26																														
Trucks	20																														
Cars	962																														
Totals	1008																														

Heavys	Trucks	Cars	Totals
10	3	225	238



Paris St

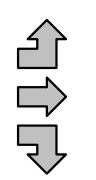


Van Horne St

Cars	Trucks	Heavys	Totals
124	1	0	125
52	0	2	54
226	0	1	227
402	1	3	

Heavys	Trucks	Cars	Totals
1	1	11	13
1	0	22	23
6	2	70	78
8	3	103	



Paris St

Cars	Trucks	Heavys	Totals
182	2	3	187

Peds Cross: West Peds: 6 West Entering: 114 West Leg Total: 352	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1355</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">13</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">23</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1391</td> </tr> </table>	Cars	1355	Trucks	13	Heavys	23	Totals	1391	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">137</td> <td style="text-align: right;">827</td> <td style="text-align: right;">98</td> <td style="text-align: right;">1062</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">2</td> <td style="text-align: right;">18</td> <td style="text-align: right;">1</td> <td style="text-align: right;">21</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">7</td> <td style="text-align: right;">25</td> <td style="text-align: right;">1</td> <td style="text-align: right;">33</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">146</td> <td style="text-align: right;">870</td> <td style="text-align: right;">100</td> <td></td> </tr> </table>	Cars	137	827	98	1062	Trucks	2	18	1	21	Heavys	7	25	1	33	Totals	146	870	100		Peds Cross: South Peds: 4 South Entering: 1116 South Leg Total: 2507
Cars	1355																														
Trucks	13																														
Heavys	23																														
Totals	1391																														
Cars	137	827	98	1062																											
Trucks	2	18	1	21																											
Heavys	7	25	1	33																											
Totals	146	870	100																												

Comments

<h2 style="margin: 0;">Afternoon Peak Diagram</h2>		<b>Specified Period</b> <b>From:</b> 16:00:00 <b>To:</b> 19:00:00	<b>One Hour Peak</b> <b>From:</b> 16:00:00 <b>To:</b> 17:00:00
<b>Municipality:</b> Sudbury <b>Site #:</b> 2206300001 <b>Intersection:</b> Paris St & Van Horne St <b>TFR File #:</b> 1 <b>Count date:</b> 20-Apr-22		<b>Weather conditions:</b>  <b>Person counted:</b> <b>Person prepared:</b> <b>Person checked:</b>	
<b>** Signalized Intersection **</b>		<b>Major Road:</b> Paris St runs N/S	

North Leg Total: 2573 North Entering: 1142 North Peds: 8 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">0</td> <td style="text-align: right;">16</td> <td style="text-align: right;">0</td> <td style="text-align: right;">16</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">1</td> <td style="text-align: right;">6</td> <td style="text-align: right;">0</td> <td style="text-align: right;">7</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">32</td> <td style="text-align: right;">995</td> <td style="text-align: right;">92</td> <td style="text-align: right;">1119</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">33</td> <td style="text-align: right;">1017</td> <td style="text-align: right;">92</td> <td style="text-align: right;">1142</td> </tr> </table>	Heavys	0	16	0	16	Trucks	1	6	0	7	Cars	32	995	92	1119	Totals	33	1017	92	1142	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">16</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">17</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1398</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1431</td> </tr> </table>	Heavys	16	Trucks	17	Cars	1398	Totals	1431	East Leg Total: 762 East Entering: 337 East Peds: 7 Peds Cross:
Heavys	0	16	0	16																											
Trucks	1	6	0	7																											
Cars	32	995	92	1119																											
Totals	33	1017	92	1142																											
Heavys	16																														
Trucks	17																														
Cars	1398																														
Totals	1431																														

Heavys	Trucks	Cars	Totals
2	2	208	212

Paris St

N  
S  
W  
E

Cars	Trucks	Heavys	Totals
112	2	3	117
53	0	0	53
163	1	3	167
328	3	6	337

Heavys	Trucks	Cars	Totals
0	2	33	35
1	0	54	55
1	0	168	169
2	2	255	259

Van Horne St

N  
S  
W  
E

Paris St

Heavys	Trucks	Cars	Totals
0	2	33	35
1	0	54	55
1	0	168	169
2	2	255	259

Van Horne St

N  
S  
W  
E

Paris St

Peds Cross: West Peds: 6 West Entering: 259 West Leg Total: 471	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1326</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">7</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">20</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1353</td> </tr> </table>	Cars	1326	Trucks	7	Heavys	20	Totals	1353	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">123</td> <td style="text-align: right;">1253</td> <td style="text-align: right;">276</td> <td style="text-align: right;">1652</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">1</td> <td style="text-align: right;">13</td> <td style="text-align: right;">1</td> <td style="text-align: right;">15</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">2</td> <td style="text-align: right;">13</td> <td style="text-align: right;">1</td> <td style="text-align: right;">16</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">126</td> <td style="text-align: right;">1279</td> <td style="text-align: right;">278</td> <td style="text-align: right;">1683</td> </tr> </table>	Cars	123	1253	276	1652	Trucks	1	13	1	15	Heavys	2	13	1	16	Totals	126	1279	278	1683	Peds Cross: South Peds: 10 South Entering: 1683 South Leg Total: 3036
Cars	1326																														
Trucks	7																														
Heavys	20																														
Totals	1353																														
Cars	123	1253	276	1652																											
Trucks	1	13	1	15																											
Heavys	2	13	1	16																											
Totals	126	1279	278	1683																											

Comments



## Total Count Diagram

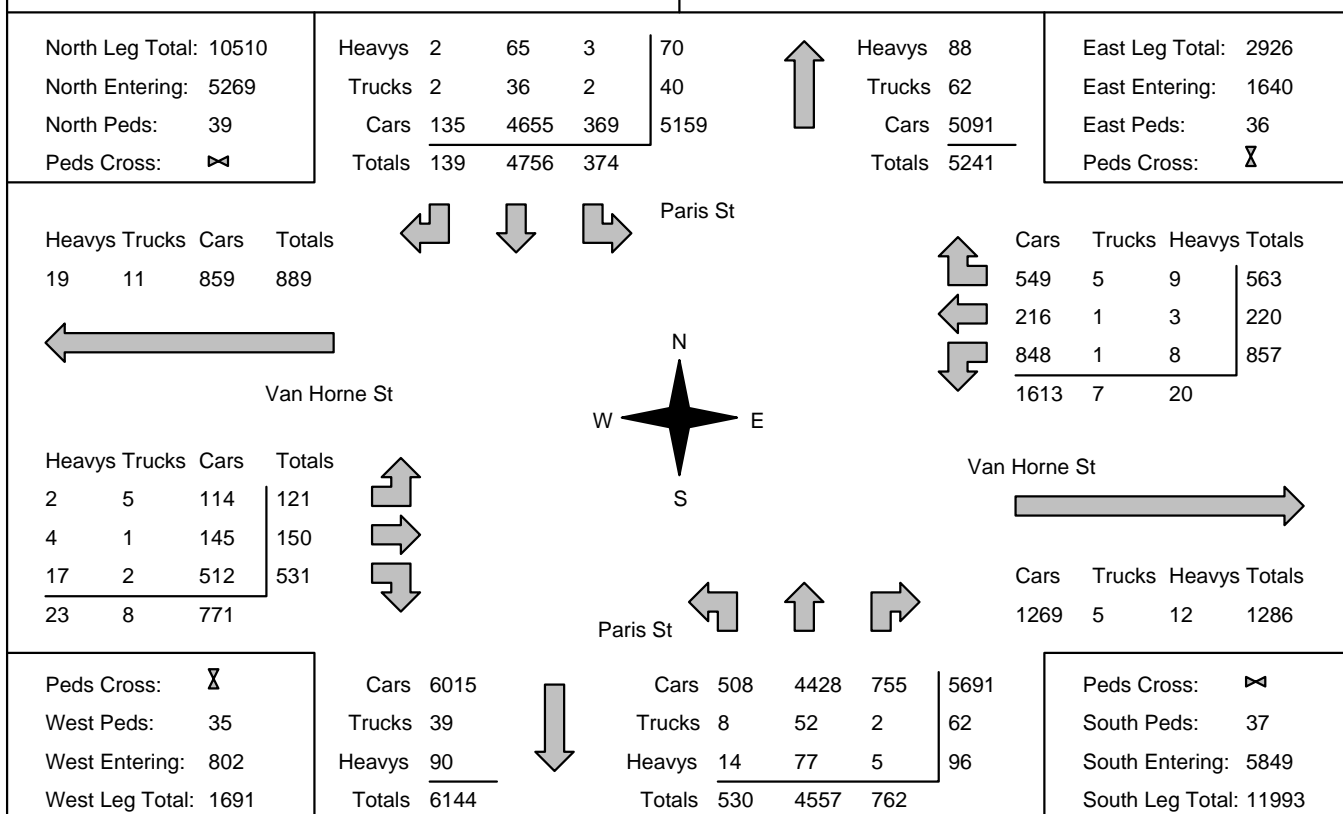
**Municipality:** Sudbury  
**Site #:** 2206300001  
**Intersection:** Paris St & Van Horne St  
**TFR File #:** 1  
**Count date:** 20-Apr-22

**Weather conditions:**

**Person counted:**  
**Person prepared:**  
**Person checked:**

**\*\* Signalized Intersection \*\***

**Major Road:** Paris St runs N/S



**Comments**

# Traffic Count Summary

Intersection: Paris St & Van Horne St

Count Date: 20-Apr-22

Municipality: Sudbury

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	45	959	24	1028	6	1866	8:00:00	80	691	67	838	2
9:00:00	60	1039	34	1133	8	2247	9:00:00	155	853	106	1114	4
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	92	1017	33	1142	8	2825	17:00:00	126	1279	278	1683	10
18:00:00	102	919	27	1048	12	2383	18:00:00	89	1041	205	1335	6
19:00:00	75	822	21	918	5	1797	19:00:00	80	693	106	879	15













Traffic and Transportation Engineering Services  
1800 Frobisher Street  
PO Box 5000, STN A  
Sudbury, Ontario, Canada P3A 5P3  
705-674-4455 David.Knutson@greatersudbury.ca

Count Name: John St. @ Paris St.  
Site Code: 00829103  
Start Date: 07/18/2019  
Page No: 1

## Turning Movement Data

Start Time	Paris St. Southbound						John St. Westbound						Paris St. Northbound						John St. Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
3:00 PM	1	279	19	0	0	299	27	0	14	0	2	41	12	358	0	0	0	370	1	0	0	0	0	1	711
3:15 PM	2	355	12	0	1	369	18	0	17	0	2	35	15	371	0	0	0	386	0	0	1	0	3	1	791
3:30 PM	1	332	11	0	0	344	24	0	16	0	4	40	12	375	0	0	0	387	1	0	1	0	1	2	773
3:45 PM	0	347	28	0	0	375	23	1	12	0	0	36	9	379	0	0	3	388	0	1	1	0	1	2	801
Hourly Total	4	1313	70	0	1	1387	92	1	59	0	8	152	48	1483	0	0	3	1531	2	1	3	0	5	6	3076
4:00 PM	0	391	18	0	3	409	42	0	22	0	0	64	11	437	2	0	1	450	0	0	2	0	2	2	925
4:15 PM	0	385	18	1	0	404	19	0	11	0	0	30	18	461	4	0	2	483	0	1	3	0	5	4	921
4:30 PM	3	374	23	0	0	400	23	0	13	0	0	36	10	449	1	0	1	460	1	1	1	0	4	3	899
4:45 PM	2	344	20	0	0	366	22	0	17	0	2	39	5	429	1	0	0	435	1	1	4	0	3	6	846
Hourly Total	5	1494	79	1	3	1579	106	0	63	0	2	169	44	1776	8	0	4	1828	2	3	10	0	14	15	3591
5:00 PM	1	322	23	0	5	346	19	0	22	0	4	41	20	377	0	0	2	397	0	0	3	0	2	3	787
5:15 PM	3	349	27	0	0	379	22	0	23	0	2	45	14	355	0	0	3	369	0	0	2	0	7	2	795
5:30 PM	1	268	19	0	1	288	17	0	14	0	0	31	15	330	0	0	2	345	0	0	1	0	1	1	665
5:45 PM	0	286	16	1	0	303	18	0	10	0	0	28	11	281	0	0	0	292	0	0	0	0	0	0	623
Hourly Total	5	1225	85	1	6	1316	76	0	69	0	6	145	60	1343	0	0	7	1403	0	0	6	0	10	6	2870
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1
6:30 AM	0	176	3	0	0	179	6	0	4	0	0	10	1	140	0	0	0	141	0	0	1	0	0	1	331
6:45 AM	0	196	7	0	0	203	4	0	6	0	0	10	3	150	0	0	1	153	0	0	0	0	0	0	366
Hourly Total	0	372	10	0	0	382	10	0	10	0	0	20	4	290	0	0	1	294	0	0	1	0	0	1	697
7:00 AM	0	231	6	0	0	237	5	0	4	0	0	9	4	128	0	0	0	132	0	0	1	0	0	1	379
7:15 AM	0	313	11	0	1	324	8	0	10	0	0	18	2	157	1	0	1	160	0	0	0	0	2	0	502
7:30 AM	3	284	11	0	0	298	17	0	2	0	0	19	3	236	1	0	0	240	1	0	1	0	0	2	559
7:45 AM	0	352	11	0	1	363	16	0	10	0	1	26	6	236	0	0	0	242	0	0	1	0	1	1	632
Hourly Total	3	1180	39	0	2	1222	46	0	26	0	1	72	15	757	2	0	1	774	1	0	3	0	3	4	2072
8:00 AM	0	297	13	0	3	310	14	2	13	0	1	29	12	243	0	0	0	255	0	0	0	0	1	0	594
8:15 AM	3	347	11	0	0	361	18	0	7	0	1	25	6	279	2	0	1	287	0	0	2	0	0	2	675
8:30 AM	5	345	9	0	1	359	15	0	4	0	0	19	7	269	1	0	1	277	2	0	6	0	3	8	663
8:45 AM	1	338	13	0	1	352	16	0	16	0	2	32	9	271	1	0	3	281	4	0	0	0	4	4	669
Hourly Total	9	1327	46	0	5	1382	63	2	40	0	4	105	34	1062	4	0	5	1100	6	0	8	0	8	14	2601
9:00 AM	2	238	9	0	1	249	15	0	11	0	2	26	8	234	2	0	2	244	2	0	3	0	1	5	524
9:15 AM	3	242	13	0	0	258	12	0	12	0	2	24	11	218	0	0	2	229	1	0	1	0	1	2	513
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Hourly Total	5	480	22	0	1	507	27	0	23	0	4	50	19	452	2	0	4	473	3	0	4	0	2	7	1037
11:30 AM	0	241	13	0	1	254	16	0	15	0	0	31	6	302	0	0	0	308	3	0	1	0	2	4	597
11:45 AM	0	303	16	0	1	319	19	0	18	0	1	37	7	282	0	0	0	289	2	0	0	0	3	2	647
Hourly Total	0	544	29	0	2	573	35	0	33	0	1	68	13	584	0	0	0	597	5	0	1	0	5	6	1244
12:00 PM	1	355	19	0	0	375	17	0	18	0	0	35	6	305	0	0	0	311	2	0	0	0	2	2	723
12:15 PM	0	285	18	0	0	303	19	0	16	0	2	35	12	302	1	0	0	315	0	0	0	0	2	0	653
12:30 PM	2	286	16	0	2	304	18	0	14	0	1	32	14	310	1	0	0	325	2	1	1	0	0	4	665
12:45 PM	0	299	18	0	0	317	12	0	13	0	0	25	18	298	0	1	3	317	0	0	0	0	1	0	659
Hourly Total	3	1225	71	0	2	1299	66	0	61	0	3	127	50	1215	2	1	3	1268	4	1	1	0	5	6	2700
1:00 PM	0	276	16	0	0	292	24	1	18	0	0	43	11	296	1	0	5	308	1	1	1	0	1	3	646
1:15 PM	1	295	18	0	0	314	25	1	15	0	0	41	12	314	0	0	1	326	0	1	0	0	0	1	682
Grand Total	35	9731	485	2	22	10253	570	5	417	0	29	992	310	9573	19	1	34	9903	24	7	38	0	53	69	21217
Approach %	0.3	94.9	4.7	0.0	-	-	57.5	0.5	42.0	0.0	-	-	3.1	96.7	0.2	0.0	-	-	34.8	10.1	55.1	0.0	-	-	-
Total %	0.2	45.9	2.3	0.0	-	48.3	2.7	0.0	2.0	0.0	-	4.7	1.5	45.1	0.1	0.0	-	46.7	0.1	0.0	0.2	0.0	-	0.3	-
Lights	35	9527	464	2	-	10028	551	5	417	0	-	973	308	9365	19	1	-	9693	23	7	38	0	-	68	20762
% Lights	100.0	97.9	95.7	100.0	-	97.8	96.7	100.0	100.0	-	-	98.1	99.4	97.8	100.0	100.0	-	97.9	95.8	100.0	100.0	-	-	98.6	97.9
Mediums	0	185	18	0	-	203	18	0	0	0	-	18	2	182	0	0	-	184	1	0	0	0	-	1	406
% Mediums	0.0	1.9	3.7	0.0	-	2.0	3.2	0.0	0.0	-	-	1.8	0.6	1.9	0.0	0.0	-	1.9	4.2	0.0	0.0	-	-	1.4	1.9
Articulated Trucks	0	19	2	0	-	21	1	0	0	0	-	1	0	26	0	0	-	26	0	0	0	0	-	0	48
% Articulated Trucks	0.0	0.2	0.4	0.0	-	0.2	0.2	0.0	0.0	-	-	0.1	0.0	0.3	0.0	0.0	-	0.3	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.2	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	9	-	-	-	-	-	3	-	-	-	-	-	12	-	-
% Bicycles on Crosswalk	-	-	-	-	9.1	-	-	-	-	-	31.0	-	-	-	-	-	8.8	-	-	-	-	-	22.6	-	-
Pedestrians	-	-	-	-	20	-	-	-	-	-	20	-	-	-	-	-	31	-	-	-	-	-	41	-	-
% Pedestrians	-	-	-	-	90.9	-	-	-	-	-	69.0	-	-	-	-	-	91.2	-	-	-	-	-	77.4	-	-





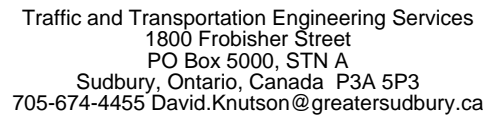


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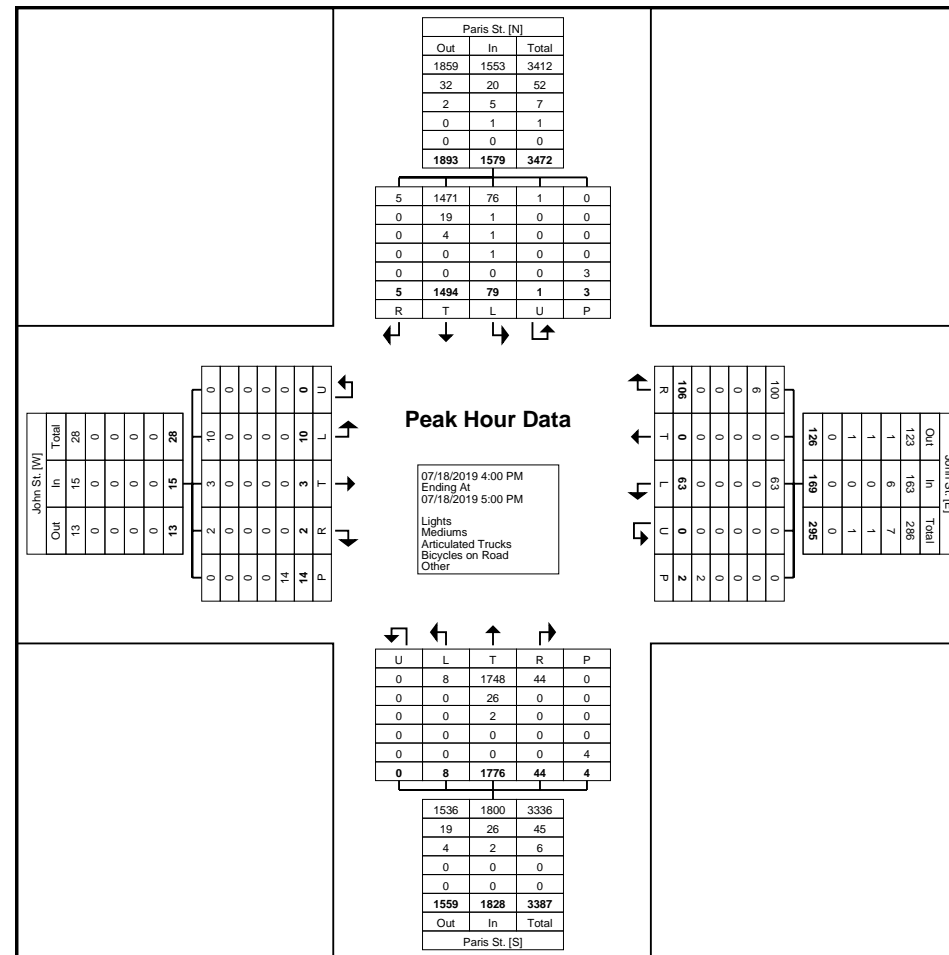
Count Name: John St. @ Paris St.  
Site Code: 00829103  
Start Date: 07/18/2019  
Page No: 4

### Turning Movement Peak Hour Data (4:00 PM)

Start Time	Paris St. Southbound						John St. Westbound						Paris St. Northbound						John St. Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:00 PM	0	391	18	0	3	409	42	0	22	0	0	64	11	437	2	0	1	450	0	0	2	0	2	2	925
4:15 PM	0	385	18	1	0	404	19	0	11	0	0	30	18	461	4	0	2	483	0	1	3	0	5	4	921
4:30 PM	3	374	23	0	0	400	23	0	13	0	0	36	10	449	1	0	1	460	1	1	1	0	4	3	899
4:45 PM	2	344	20	0	0	366	22	0	17	0	2	39	5	429	1	0	0	435	1	1	4	0	3	6	846
Total	5	1494	79	1	3	1579	106	0	63	0	2	169	44	1776	8	0	4	1828	2	3	10	0	14	15	3591
Approach %	0.3	94.6	5.0	0.1	-	-	62.7	0.0	37.3	0.0	-	-	2.4	97.2	0.4	0.0	-	-	13.3	20.0	66.7	0.0	-	-	-
Total %	0.1	41.6	2.2	0.0	-	44.0	3.0	0.0	1.8	0.0	-	4.7	1.2	49.5	0.2	0.0	-	50.9	0.1	0.1	0.3	0.0	-	0.4	-
PHF	0.417	0.955	0.859	0.250	-	0.965	0.631	0.000	0.716	0.000	-	0.660	0.611	0.963	0.500	0.000	-	0.946	0.500	0.750	0.625	0.000	-	0.625	0.971
Lights	5	1471	76	1	-	1553	100	0	63	0	-	163	44	1748	8	0	-	1800	2	3	10	0	-	15	3531
% Lights	100.0	98.5	96.2	100.0	-	98.4	94.3	-	100.0	-	-	96.4	100.0	98.4	100.0	-	-	98.5	100.0	100.0	100.0	-	-	100.0	98.3
Mediums	0	19	1	0	-	20	6	0	0	0	-	6	0	26	0	0	-	26	0	0	0	0	-	0	52
% Mediums	0.0	1.3	1.3	0.0	-	1.3	5.7	-	0.0	-	-	3.6	0.0	1.5	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	1.4
Articulated Trucks	0	4	1	0	-	5	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	7
% Articulated Trucks	0.0	0.3	1.3	0.0	-	0.3	0.0	-	0.0	-	-	0.0	0.0	0.1	0.0	-	-	0.1	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	1.3	0.0	-	0.1	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	14	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Count Name: John St. @ Paris St.  
Site Code: 00829103  
Start Date: 07/18/2019  
Page No: 5



### Turning Movement Peak Hour Data Plot (4:00 PM)



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Count Name: John St. @ Paris St.  
Site Code: 00829103  
Start Date: 07/18/2019  
Page No: 6

### Turning Movement Peak Hour Data (8:00 AM)

Start Time	Paris St. Southbound						John St. Westbound						Paris St. Northbound						John St. Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
8:00 AM	0	297	13	0	3	310	14	2	13	0	1	29	12	243	0	0	0	255	0	0	0	0	1	0	594
8:15 AM	3	347	11	0	0	361	18	0	7	0	1	25	6	279	2	0	1	287	0	0	2	0	0	2	675
8:30 AM	5	345	9	0	1	359	15	0	4	0	0	19	7	269	1	0	1	277	2	0	6	0	3	8	663
8:45 AM	1	338	13	0	1	352	16	0	16	0	2	32	9	271	1	0	3	281	4	0	0	0	4	4	669
Total	9	1327	46	0	5	1382	63	2	40	0	4	105	34	1062	4	0	5	1100	6	0	8	0	8	14	2601
Approach %	0.7	96.0	3.3	0.0	-	-	60.0	1.9	38.1	0.0	-	-	3.1	96.5	0.4	0.0	-	-	42.9	0.0	57.1	0.0	-	-	-
Total %	0.3	51.0	1.8	0.0	-	53.1	2.4	0.1	1.5	0.0	-	4.0	1.3	40.8	0.2	0.0	-	42.3	0.2	0.0	0.3	0.0	-	0.5	-
PHF	0.450	0.956	0.885	0.000	-	0.957	0.875	0.250	0.625	0.000	-	0.820	0.708	0.952	0.500	0.000	-	0.958	0.375	0.000	0.333	0.000	-	0.438	0.963
Lights	9	1297	45	0	-	1351	63	2	40	0	-	105	34	1029	4	0	-	1067	6	0	8	0	-	14	2537
% Lights	100.0	97.7	97.8	-	-	97.8	100.0	100.0	100.0	-	-	100.0	100.0	96.9	100.0	-	-	97.0	100.0	-	100.0	-	-	100.0	97.5
Mediums	0	26	1	0	-	27	0	0	0	0	-	0	0	32	0	0	-	32	0	0	0	0	-	0	59
% Mediums	0.0	2.0	2.2	-	-	2.0	0.0	0.0	0.0	-	-	0.0	0.0	3.0	0.0	-	-	2.9	0.0	-	0.0	-	-	0.0	2.3
Articulated Trucks	0	4	0	0	-	4	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	5
% Articulated Trucks	0.0	0.3	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0	-	-	0.1	0.0	-	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	20.0	-	-	-	-	-	50.0	-	-	-	-	-	0.0	-	-	-	-	-	25.0	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	2	-	-	-	-	-	5	-	-	-	-	-	6	-	-
% Pedestrians	-	-	-	-	80.0	-	-	-	-	-	50.0	-	-	-	-	-	100.0	-	-	-	-	-	75.0	-	-







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Count Name: John St. @ Paris St.  
Site Code: 00829103  
Start Date: 07/18/2019  
Page No: 8

### Turning Movement Peak Hour Data (12:00 PM)

Start Time	Paris St. Southbound						John St. Westbound						Paris St. Northbound						John St. Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
12:00 PM	1	355	19	0	0	375	17	0	18	0	0	35	6	305	0	0	0	311	2	0	0	0	2	2	723
12:15 PM	0	285	18	0	0	303	19	0	16	0	2	35	12	302	1	0	0	315	0	0	0	0	2	0	653
12:30 PM	2	286	16	0	2	304	18	0	14	0	1	32	14	310	1	0	0	325	2	1	1	0	0	4	665
12:45 PM	0	299	18	0	0	317	12	0	13	0	0	25	18	298	0	1	3	317	0	0	0	0	1	0	659
Total	3	1225	71	0	2	1299	66	0	61	0	3	127	50	1215	2	1	3	1268	4	1	1	0	5	6	2700
Approach %	0.2	94.3	5.5	0.0	-	-	52.0	0.0	48.0	0.0	-	-	3.9	95.8	0.2	0.1	-	-	66.7	16.7	16.7	0.0	-	-	-
Total %	0.1	45.4	2.6	0.0	-	48.1	2.4	0.0	2.3	0.0	-	4.7	1.9	45.0	0.1	0.0	-	47.0	0.1	0.0	0.0	0.0	-	0.2	-
PHF	0.375	0.863	0.934	0.000	-	0.866	0.868	0.000	0.847	0.000	-	0.907	0.694	0.980	0.500	0.250	-	0.975	0.500	0.250	0.250	0.000	-	0.375	0.934
Lights	3	1199	66	0	-	1268	65	0	61	0	-	126	49	1183	2	1	-	1235	4	1	1	0	-	6	2635
% Lights	100.0	97.9	93.0	-	-	97.6	98.5	-	100.0	-	-	99.2	98.0	97.4	100.0	100.0	-	97.4	100.0	100.0	100.0	-	-	100.0	97.6
Mediums	0	23	5	0	-	28	1	0	0	0	-	1	1	30	0	0	-	31	0	0	0	0	-	0	60
% Mediums	0.0	1.9	7.0	-	-	2.2	1.5	-	0.0	-	-	0.8	2.0	2.5	0.0	0.0	-	2.4	0.0	0.0	0.0	-	-	0.0	2.2
Articulated Trucks	0	3	0	0	-	3	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	5
% Articulated Trucks	0.0	0.2	0.0	-	-	0.2	0.0	-	0.0	-	-	0.0	0.0	0.2	0.0	0.0	-	0.2	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	33.3	-	-	-	-	-	0.0	-	-	-	-	-	80.0	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	66.7	-	-	-	-	-	100.0	-	-	-	-	-	20.0	-	-





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Count Name: John St. @ Paris St.  
Site Code: 00829103  
Start Date: 07/18/2019  
Page No: 10




<h2 style="margin: 0;">Morning Peak Diagram</h2>		<b>Specified Period</b> <b>From:</b> 7:00:00 <b>To:</b> 9:00:00	<b>One Hour Peak</b> <b>From:</b> 7:45:00 <b>To:</b> 8:45:00
<b>Municipality:</b> Sudbury <b>Site #:</b> 2206300002 <b>Intersection:</b> Paris St & McNaughton St <b>TFR File #:</b> 1 <b>Count date:</b> 20-Apr-22		<b>Weather conditions:</b>  <b>Person counted:</b> <b>Person prepared:</b> <b>Person checked:</b>	
<b>** Non-Signalized Intersection **</b>		<b>Major Road:</b> Paris St runs N/S	

North Leg Total: 2485 North Entering: 1402 North Peds: 0 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">2</td> <td style="text-align: right;">19</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">21</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">0</td> <td style="text-align: right;">12</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">12</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">4</td> <td style="text-align: right;">1365</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">1369</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">6</td> <td style="text-align: right;">1396</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black;"></td> </tr> </table>	Heavys	2	19	0	21	Trucks	0	12	0	12	Cars	4	1365	0	1369	Totals	6	1396	0		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">29</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">15</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1039</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1083</td> </tr> </table>	Heavys	29	Trucks	15	Cars	1039	Totals	1083	East Leg Total: 4 East Entering: 4 East Peds: 1 Peds Cross:
Heavys	2	19	0	21																											
Trucks	0	12	0	12																											
Cars	4	1365	0	1369																											
Totals	6	1396	0																												
Heavys	29																														
Trucks	15																														
Cars	1039																														
Totals	1083																														

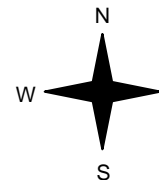
  

Heavys	Trucks	Cars	Totals
2	0	5	7

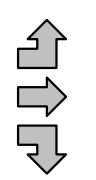


Paris St

Cars	Trucks	Heavys	Totals
1	0	1	2
0	0	0	0
2	0	0	2
3	0	1	



Heavys	Trucks	Cars	Totals
0	0	3	3
0	0	0	0
0	0	8	8
0	0	11	



McNaughton St

Cars	Trucks	Heavys	Totals
0	0	0	0

Peds Cross: West Peds: 2 West Entering: 11 West Leg Total: 18	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1375</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">12</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">19</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1406</td> </tr> </table>	Cars	1375	Trucks	12	Heavys	19	Totals	1406	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1</td> <td style="text-align: right;">1035</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">1036</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">0</td> <td style="text-align: right;">15</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">15</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">0</td> <td style="text-align: right;">28</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">28</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1</td> <td style="text-align: right;">1078</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black;"></td> </tr> </table>	Cars	1	1035	0	1036	Trucks	0	15	0	15	Heavys	0	28	0	28	Totals	1	1078	0		Peds Cross: South Peds: 0 South Entering: 1079 South Leg Total: 2485
Cars	1375																														
Trucks	12																														
Heavys	19																														
Totals	1406																														
Cars	1	1035	0	1036																											
Trucks	0	15	0	15																											
Heavys	0	28	0	28																											
Totals	1	1078	0																												

### Comments

<h2 style="margin: 0;">Afternoon Peak Diagram</h2>		<b>Specified Period</b> <b>From:</b> 16:00:00 <b>To:</b> 19:00:00	<b>One Hour Peak</b> <b>From:</b> 16:00:00 <b>To:</b> 17:00:00
<b>Municipality:</b> Sudbury <b>Site #:</b> 2206300002 <b>Intersection:</b> Paris St & McNaughton St <b>TFR File #:</b> 1 <b>Count date:</b> 20-Apr-22		<b>Weather conditions:</b>  <b>Person counted:</b> <b>Person prepared:</b> <b>Person checked:</b>	
<b>** Non-Signalized Intersection **</b>		<b>Major Road:</b> Paris St runs N/S	

North Leg Total: 2987 North Entering: 1336 North Peds: 0 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">0</td> <td style="text-align: right;">19</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">19</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">0</td> <td style="text-align: right;">8</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">8</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">11</td> <td style="text-align: right;">1297</td> <td style="text-align: right;">1</td> <td style="border-left: 1px solid black; text-align: right;">1309</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">11</td> <td style="text-align: right;">1324</td> <td style="text-align: right;">1</td> <td style="border-left: 1px solid black;"></td> </tr> </table>	Heavys	0	19	0	19	Trucks	0	8	0	8	Cars	11	1297	1	1309	Totals	11	1324	1		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">15</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">9</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1627</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1651</td> </tr> </table>	Heavys	15	Trucks	9	Cars	1627	Totals	1651	East Leg Total: 7 East Entering: 5 East Peds: 2 Peds Cross:
Heavys	0	19	0	19																											
Trucks	0	8	0	8																											
Cars	11	1297	1	1309																											
Totals	11	1324	1																												
Heavys	15																														
Trucks	9																														
Cars	1627																														
Totals	1651																														

Heavys	Trucks	Cars	Totals
0	0	12	12

Paris St

N  
S  
W  
E

Cars	Trucks	Heavys	Totals
2	0	0	2
0	0	0	0
3	0	0	3
5	0	0	

McNaughton St

McNaughton St

Heavys	Trucks	Cars	Totals
0	0	8	8
0	0	0	0
0	0	6	6
0	0	14	

Paris St

Cars	Trucks	Heavys	Totals
2	0	0	2

Peds Cross: West Peds: 3 West Entering: 14 West Leg Total: 26	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1306</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">8</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">19</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1333</td> </tr> </table>	Cars	1306	Trucks	8	Heavys	19	Totals	1333	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1</td> <td style="text-align: right;">1617</td> <td style="text-align: right;">1</td> <td style="border-left: 1px solid black; text-align: right;">1619</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">0</td> <td style="text-align: right;">9</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">9</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">0</td> <td style="text-align: right;">15</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">15</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1</td> <td style="text-align: right;">1641</td> <td style="text-align: right;">1</td> <td style="border-left: 1px solid black;"></td> </tr> </table>	Cars	1	1617	1	1619	Trucks	0	9	0	9	Heavys	0	15	0	15	Totals	1	1641	1		Peds Cross: South Peds: 0 South Entering: 1643 South Leg Total: 2976
Cars	1306																														
Trucks	8																														
Heavys	19																														
Totals	1333																														
Cars	1	1617	1	1619																											
Trucks	0	9	0	9																											
Heavys	0	15	0	15																											
Totals	1	1641	1																												

### Comments

## Total Count Diagram

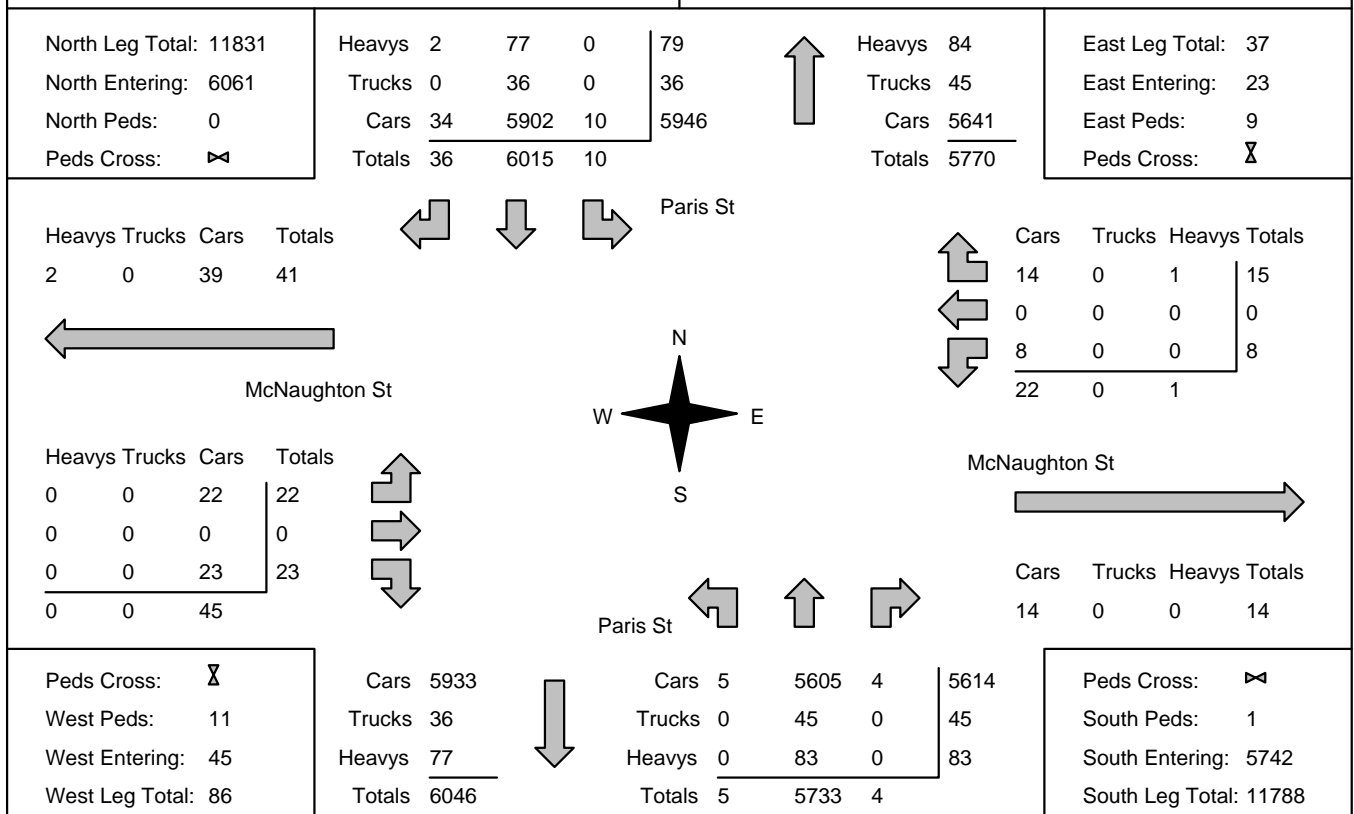
**Municipality:** Sudbury  
**Site #:** 2206300002  
**Intersection:** Paris St & McNaughton St  
**TFR File #:** 1  
**Count date:** 20-Apr-22

**Weather conditions:**

**Person counted:**  
**Person prepared:**  
**Person checked:**

**\*\* Non-Signalized Intersection \*\***

**Major Road:** Paris St runs N/S



**Comments**

# Traffic Count Summary

Intersection: Paris St & McNaughton St						Count Date: 20-Apr-22		Municipality: Sudbury					
North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0	
8:00:00	1	1204	2	1207	0	2016	8:00:00	1	808	0	809	0	
9:00:00	1	1339	5	1345	0	2402	9:00:00	2	1055	0	1057	0	
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0	
17:00:00	1	1324	11	1336	0	2979	17:00:00	1	1641	1	1643	0	
18:00:00	3	1149	8	1160	0	2499	18:00:00	0	1336	3	1339	0	
19:00:00	4	999	10	1013	0	1907	19:00:00	1	893	0	894	1	
Totals:						11803	S Totals:	5	5733	4	5742	1	
East Approach Totals						East/West Total Approaches	West Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0	
8:00:00	3	0	1	4	1	13	8:00:00	3	0	6	9	1	
9:00:00	0	0	2	2	1	9	9:00:00	1	0	6	7	1	
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0	
17:00:00	3	0	2	5	2	19	17:00:00	8	0	6	14	3	
18:00:00	1	0	4	5	3	9	18:00:00	2	0	2	4	3	
19:00:00	1	0	6	7	2	18	19:00:00	8	0	3	11	3	
Totals:						68	W Totals:	22	0	23	45	11	
Calculated Values for Traffic Crossing Major Street													
Hours Ending:	7:00	8:00	9:00	16:00			17:00	18:00	19:00	0:00			
Crossing Values:	0	6	1	0			11	3	10	0			













<h2 style="margin: 0;">Morning Peak Diagram</h2>		<b>Specified Period</b> <b>From:</b> 7:00:00 <b>To:</b> 9:00:00	<b>One Hour Peak</b> <b>From:</b> 7:45:00 <b>To:</b> 8:45:00
<b>Municipality:</b> Sudbury <b>Site #:</b> 2206300003 <b>Intersection:</b> Paris St & Facer St <b>TFR File #:</b> 1 <b>Count date:</b> 20-Apr-22		<b>Weather conditions:</b>  <b>Person counted:</b> <b>Person prepared:</b> <b>Person checked:</b>	
<b>** Non-Signalized Intersection **</b>		<b>Major Road:</b> Paris St runs N/S	

North Leg Total: 2477 North Entering: 1408 North Peds: 1 Peds Cross: ☒	<table style="margin: 0 auto;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">18</td> <td style="text-align: right;">1</td> <td style="border-left: 1px solid black; text-align: right;">19</td> <td rowspan="4" style="font-size: 2em; vertical-align: middle;">↑</td> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">28</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">12</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">12</td> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">15</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1377</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">1377</td> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1026</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1407</td> <td style="text-align: right;">1</td> <td style="border-left: 1px solid black;"></td> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1069</td> </tr> </table> <div style="margin-top: 10px;"> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">   </div> <div>Paris St</div> </div> <div style="text-align: center; margin-top: 20px;"> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div>Paris St</div> <div style="text-align: center;">   </div> </div> </div>	Heavys	18	1	19	↑	Heavys	28	Trucks	12	0	12	Trucks	15	Cars	1377	0	1377	Cars	1026	Totals	1407	1		Totals	1069	<table style="margin: 0 auto;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1379</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">12</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">18</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1409</td> </tr> </table> <div style="text-align: center; margin-top: 10px;"> </div> <table style="margin: 0 auto; margin-top: 10px;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1026</td> <td style="text-align: right;">1</td> <td style="border-left: 1px solid black; text-align: right;">1027</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">15</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">15</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">28</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">28</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1069</td> <td style="text-align: right;">1</td> <td style="border-left: 1px solid black;"></td> </tr> </table>	Cars	1379	Trucks	12	Heavys	18	Totals	1409	Cars	1026	1	1027	Trucks	15	0	15	Heavys	28	0	28	Totals	1069	1	
Heavys	18	1	19	↑	Heavys		28																																												
Trucks	12	0	12		Trucks		15																																												
Cars	1377	0	1377		Cars		1026																																												
Totals	1407	1			Totals	1069																																													
Cars	1379																																																		
Trucks	12																																																		
Heavys	18																																																		
Totals	1409																																																		
Cars	1026	1	1027																																																
Trucks	15	0	15																																																
Heavys	28	0	28																																																
Totals	1069	1																																																	

East Leg Total:	4
East Entering:	2
East Peds:	0
Peds Cross:	☒

Cars	Trucks	Heavys	Totals
0	0	0	0
2	0	0	2
2	0	0	

Facer St

Cars	Trucks	Heavys	Totals
1	0	1	2

Peds Cross:	☒
South Peds:	0
South Entering:	1070
South Leg Total:	2479

### Comments

<h2 style="margin: 0;">Afternoon Peak Diagram</h2>		<b>Specified Period</b> <b>From:</b> 16:00:00 <b>To:</b> 19:00:00	<b>One Hour Peak</b> <b>From:</b> 16:00:00 <b>To:</b> 17:00:00
<b>Municipality:</b> Sudbury <b>Site #:</b> 2206300003 <b>Intersection:</b> Paris St & Facer St <b>TFR File #:</b> 1 <b>Count date:</b> 20-Apr-22		<b>Weather conditions:</b>  <b>Person counted:</b> <b>Person prepared:</b> <b>Person checked:</b>	
<b>** Non-Signalized Intersection **</b>		<b>Major Road:</b> Paris St runs N/S	

North Leg Total: 2963 North Entering: 1328 North Peds: 0 Peds Cross:	<table style="margin: auto;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">19</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">19</td> <td rowspan="4" style="font-size: 2em; vertical-align: middle;">↑</td> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">15</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">8</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">8</td> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">9</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1301</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">1301</td> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1611</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1328</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">1301</td> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1635</td> </tr> </table> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;">   </div> <div>Paris St</div> </div> <div style="text-align: center; margin: 20px 0;"> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div>Paris St</div> <div style="text-align: center;">   </div> </div> <table style="margin: auto; margin-top: 10px;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1302</td> <td style="text-align: right;">8</td> <td style="text-align: right;">19</td> <td style="border-left: 1px solid black; text-align: right;">1329</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">8</td> <td style="text-align: right;">19</td> <td style="border-left: 1px solid black; text-align: right;">1329</td> <td></td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">19</td> <td style="text-align: right;">8</td> <td style="border-left: 1px solid black; text-align: right;">1329</td> <td></td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1329</td> <td style="text-align: right;">8</td> <td style="border-left: 1px solid black; text-align: right;">1329</td> <td></td> </tr> </table>	Heavys	19	0	19	↑	Heavys	15	Trucks	8	0	8	Trucks	9	Cars	1301	0	1301	Cars	1611	Totals	1328	0	1301	Totals	1635	Cars	1302	8	19	1329	Trucks	8	19	1329		Heavys	19	8	1329		Totals	1329	8	1329		<table style="margin: auto;"> <tr> <td style="text-align: right;">East Leg Total:</td> <td style="text-align: right;">7</td> </tr> <tr> <td style="text-align: right;">East Entering:</td> <td style="text-align: right;">2</td> </tr> <tr> <td style="text-align: right;">East Peds:</td> <td style="text-align: right;">1</td> </tr> <tr> <td style="text-align: right;">Peds Cross:</td> <td style="text-align: right;"></td> </tr> </table> <table style="margin: auto; margin-top: 10px;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">Heavys</td> <td style="border-left: 1px solid black; text-align: right;">Totals</td> </tr> <tr> <td style="text-align: right;">1</td> <td style="text-align: right;">0</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">1</td> </tr> <tr> <td style="text-align: right;">1</td> <td style="text-align: right;">0</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">1</td> </tr> <tr> <td style="text-align: right;">2</td> <td style="text-align: right;">0</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">2</td> </tr> </table> <div style="text-align: center; margin-top: 10px;">   </div> <div style="text-align: center; margin-top: 10px;">       Facer St  </div> <table style="margin: auto; margin-top: 10px;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">Heavys</td> <td style="border-left: 1px solid black; text-align: right;">Totals</td> </tr> <tr> <td style="text-align: right;">5</td> <td style="text-align: right;">0</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">5</td> </tr> </table> <table style="margin: auto; margin-top: 10px;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1610</td> <td style="text-align: right;">5</td> <td style="border-left: 1px solid black; text-align: right;">1615</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">9</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">9</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">15</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">15</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1634</td> <td style="text-align: right;">5</td> <td style="border-left: 1px solid black; text-align: right;">1639</td> </tr> </table>	East Leg Total:	7	East Entering:	2	East Peds:	1	Peds Cross:		Cars	Trucks	Heavys	Totals	1	0	0	1	1	0	0	1	2	0	0	2	Cars	Trucks	Heavys	Totals	5	0	0	5	Cars	1610	5	1615	Trucks	9	0	9	Heavys	15	0	15	Totals	1634	5	1639
Heavys	19	0	19	↑	Heavys		15																																																																																								
Trucks	8	0	8		Trucks		9																																																																																								
Cars	1301	0	1301		Cars		1611																																																																																								
Totals	1328	0	1301		Totals	1635																																																																																									
Cars	1302	8	19	1329																																																																																											
Trucks	8	19	1329																																																																																												
Heavys	19	8	1329																																																																																												
Totals	1329	8	1329																																																																																												
East Leg Total:	7																																																																																														
East Entering:	2																																																																																														
East Peds:	1																																																																																														
Peds Cross:																																																																																															
Cars	Trucks	Heavys	Totals																																																																																												
1	0	0	1																																																																																												
1	0	0	1																																																																																												
2	0	0	2																																																																																												
Cars	Trucks	Heavys	Totals																																																																																												
5	0	0	5																																																																																												
Cars	1610	5	1615																																																																																												
Trucks	9	0	9																																																																																												
Heavys	15	0	15																																																																																												
Totals	1634	5	1639																																																																																												

### Comments

## Total Count Diagram


**Municipality:** Sudbury  
**Site #:** 2206300003  
**Intersection:** Paris St & Facer St  
**TFR File #:** 1  
**Count date:** 20-Apr-22

**Weather conditions:**

**Person counted:**  
**Person prepared:**  
**Person checked:**

**\*\* Non-Signalized Intersection \*\***

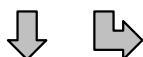
**Major Road:** Paris St runs N/S

North Leg Total: 11753  
 North Entering: 6041  
 North Peds: 1  
 Peds Cross: 

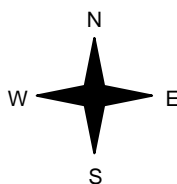
Heavys	75	1	76
Trucks	38	0	38
Cars	5926	1	5927
Totals	6039	2	

Heavys	83
Trucks	47
Cars	5582
Totals	5712

East Leg Total: 31  
 East Entering: 11  
 East Peds: 9  
 Peds Cross: 



Paris St



Cars	Trucks	Heavys	Totals
4	0	0	4
7	0	0	7
11	0	0	

Facer St



Cars	Trucks	Heavys	Totals
19	0	1	20

Cars	5933
Trucks	38
Heavys	75
Totals	6046



Paris St

Cars	5578	18	5596
Trucks	47	0	47
Heavys	83	0	83
Totals	5708	18	

Peds Cross:   
 South Peds: 0  
 South Entering: 5726  
 South Leg Total: 11772

### Comments

# Traffic Count Summary

Intersection: Paris St & Facer St

Count Date: 20-Apr-22

Municipality: Sudbury

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	1215	0	1215	0	2022	8:00:00	0	807	0	807	0
9:00:00	2	1341	0	1343	1	2391	9:00:00	0	1047	1	1048	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	1328	0	1328	0	2967	17:00:00	0	1634	5	1639	0
18:00:00	0	1148	0	1148	0	2484	18:00:00	0	1331	5	1336	0
19:00:00	0	1007	0	1007	0	1903	19:00:00	0	889	7	896	0













<h2 style="margin: 0;">Morning Peak Diagram</h2>	<b>Specified Period</b> <b>From:</b> 7:00:00 <b>To:</b> 9:00:00	<b>One Hour Peak</b> <b>From:</b> 8:00:00 <b>To:</b> 9:00:00																																																
<b>Municipality:</b> Sudbury <b>Site #:</b> 2206300005 <b>Intersection:</b> Facer St & Bell Park Rd <b>TFR File #:</b> 1 <b>Count date:</b> 20-Apr-22	<b>Weather conditions:</b>  <b>Person counted:</b> <b>Person prepared:</b> <b>Person checked:</b>																																																	
<b>** Non-Signalized Intersection **</b>	<b>Major Road:</b> Facer St runs W/E																																																	
East Leg Total: 3 East Entering: 2 East Peds: 2 Peds Cross: 8																																																		
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0	0	1	1																																															
Peds Cross: 8 West Peds: 1 West Entering: 2 West Leg Total: 3	<table style="width: 100%;"> <tr><td>Cars</td><td>2</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Heavys</td><td>0</td></tr> <tr><td><b>Totals</b></td><td><b>2</b></td></tr> </table>	Cars	2	Trucks	0	Heavys	0	<b>Totals</b>	<b>2</b>	<table style="width: 100%;"> <tr><td>Cars</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Heavys</td><td>0</td><td>0</td><td>0</td></tr> <tr><td><b>Totals</b></td><td><b>0</b></td><td><b>0</b></td><td><b>0</b></td></tr> </table>	Cars	0	0	0	Trucks	0	0	0	Heavys	0	0	0	<b>Totals</b>	<b>0</b>	<b>0</b>	<b>0</b>	Peds Cross: 8 South Peds: 2 South Entering: 0 South Leg Total: 2																							
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<h3 style="margin: 0;">Comments</h3>																																																		

<h2>Afternoon Peak Diagram</h2>	<b>Specified Period</b> <b>From:</b> 16:00:00 <b>To:</b> 19:00:00	<b>One Hour Peak</b> <b>From:</b> 16:15:00 <b>To:</b> 17:15:00																																																
<b>Municipality:</b> Sudbury <b>Site #:</b> 2206300005 <b>Intersection:</b> Facer St & Bell Park Rd <b>TFR File #:</b> 1 <b>Count date:</b> 20-Apr-22	<b>Weather conditions:</b>  <b>Person counted:</b> <b>Person prepared:</b> <b>Person checked:</b>																																																	
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<h3>Comments</h3>																																																		

## Total Count Diagram

**Municipality:** Sudbury  
**Site #:** 2206300005  
**Intersection:** Facer St & Bell Park Rd  
**TFR File #:** 1  
**Count date:** 20-Apr-22

**Weather conditions:**

**Person counted:**  
**Person prepared:**  
**Person checked:**

**\*\* Non-Signalized Intersection \*\***

**Major Road:** Facer St runs W/E

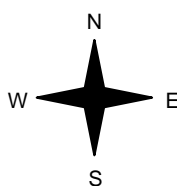
East Leg Total: 22  
 East Entering: 8  
 East Peds: 6  
 Peds Cross: 8

Heavys	Trucks	Cars	Totals
0	0	8	8



Facer St

Heavys	Trucks	Cars	Totals
1	0	13	14
0	0	2	2
1	0	15	



Cars	Trucks	Heavys	Totals
------	--------	--------	--------

7	0	0	7
1	0	0	1
8	0	0	

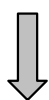
Facer St



Cars	Trucks	Heavys	Totals
13	0	1	14

Peds Cross: 8  
 West Peds: 3  
 West Entering: 16  
 West Leg Total: 24

Cars	3
Trucks	0
Heavys	0
Totals	3



Bell Park Rd

Cars	1	0	1
Trucks	0	0	0
Heavys	0	0	0
Totals	1	0	

Peds Cross: 8  
 South Peds: 5  
 South Entering: 1  
 South Leg Total: 4

### Comments

# Traffic Count Summary

Intersection: Facer St & Bell Park Rd

Count Date: 20-Apr-22

Municipality: Sudbury

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	0	8:00:00	0	0	0	0	0
9:00:00	0	0	0	0	0	0	9:00:00	0	0	0	0	2
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	0	17:00:00	0	0	0	0	0
18:00:00	0	0	0	0	0	0	18:00:00	0	0	0	0	0
19:00:00	0	0	0	0	0	1	19:00:00	1	0	0	1	3













Traffic and Transportation Engineering Services  
1800 Frobisher Street  
PO Box 5000, STN A  
Sudbury, Ontario, Canada P3A 5P3  
705-674-4455 David.Knutson@greatersudbury.ca

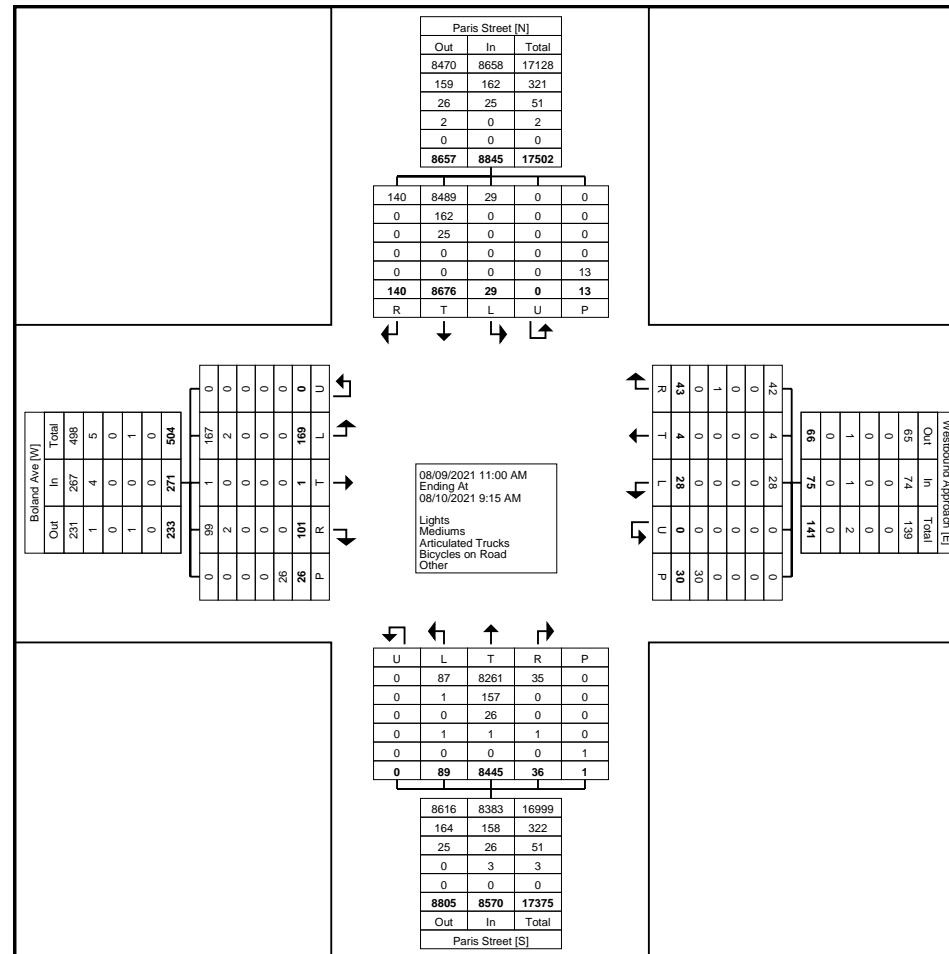
Count Name: Paris Street @ Boland Avenue  
Site Code:  
Start Date: 08/09/2021  
Page No: 1

## Turning Movement Data

Start Time	Paris Street Southbound						Westbound Approach Westbound						Paris Street Northbound						Boland Ave Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
11:00 AM	4	243	3	0	0	250	0	0	4	0	1	4	5	284	1	0	0	290	3	0	5	0	1	8	552
11:15 AM	1	243	2	0	0	246	6	1	1	0	2	8	1	252	2	0	0	255	5	0	5	0	0	10	519
11:30 AM	1	279	0	0	0	280	2	0	6	0	1	8	2	303	2	0	0	307	2	0	7	0	0	9	604
11:45 AM	7	294	0	0	0	301	1	0	1	0	2	2	1	326	4	0	0	331	5	0	9	0	0	14	648
Hourly Total	13	1059	5	0	0	1077	9	1	12	0	6	22	9	1165	9	0	0	1183	15	0	26	0	1	41	2323
12:00 PM	4	277	2	0	1	283	1	0	0	0	0	1	2	286	3	0	0	291	8	0	5	0	3	13	588
12:15 PM	4	283	0	0	0	287	3	0	1	0	3	4	2	263	3	0	0	268	2	0	3	0	0	5	564
12:30 PM	5	319	1	0	1	325	1	0	0	0	1	1	3	338	4	0	0	345	4	0	9	0	2	13	684
12:45 PM	4	300	2	0	2	306	3	0	4	0	0	7	2	275	4	0	0	281	2	0	6	0	1	8	602
Hourly Total	17	1179	5	0	4	1201	8	0	5	0	4	13	9	1162	14	0	0	1185	16	0	23	0	6	39	2438
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	6	306	0	0	0	312	1	0	0	0	1	1	0	375	4	0	1	379	2	0	10	0	0	12	704
3:15 PM	7	330	1	0	1	338	0	0	0	0	5	0	2	337	3	0	0	342	1	0	7	0	1	8	688
3:30 PM	8	308	4	0	0	320	3	0	1	0	1	4	0	365	1	0	0	366	4	0	8	0	0	12	702
3:45 PM	7	304	1	0	0	312	2	0	1	0	0	3	1	391	2	0	0	394	5	0	8	0	0	13	722
Hourly Total	28	1248	6	0	1	1282	6	0	2	0	7	8	3	1468	10	0	1	1481	12	0	33	0	1	45	2816
4:00 PM	5	333	1	0	0	339	2	1	3	0	0	6	2	448	6	0	0	456	2	0	5	0	1	7	808
4:15 PM	9	330	1	0	0	340	3	0	2	0	0	5	1	375	4	0	0	380	5	0	6	0	1	11	736
4:30 PM	6	319	1	0	2	326	3	1	0	0	2	4	3	363	9	0	0	375	2	0	4	0	2	6	711
4:45 PM	9	300	1	0	0	310	1	0	0	0	1	1	1	313	5	0	0	319	6	0	11	0	2	17	647
Hourly Total	29	1282	4	0	2	1315	9	2	5	0	3	16	7	1499	24	0	0	1530	15	0	26	0	6	41	2902
5:00 PM	9	299	2	0	0	310	2	0	0	0	0	2	1	362	7	0	0	370	5	0	6	0	0	11	693
5:15 PM	5	282	1	0	0	288	2	0	0	0	1	2	0	269	2	0	0	271	3	0	2	0	1	5	566
5:30 PM	11	214	1	0	4	226	3	0	0	0	0	3	3	289	4	0	0	296	3	1	6	0	6	10	535
5:45 PM	8	251	0	0	0	259	0	1	0	0	0	1	0	279	4	0	0	283	6	0	5	0	0	11	554
Hourly Total	33	1046	4	0	4	1083	7	1	0	0	1	8	4	1199	17	0	0	1220	17	1	19	0	7	37	2348
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	79	2	0	0	81	0	0	0	0	0	0	2	45	0	0	0	47	1	0	2	0	0	3	131
6:15 AM	0	93	0	0	0	93	0	0	0	0	1	0	0	77	0	0	0	77	1	0	0	0	0	1	171
6:30 AM	0	183	0	0	0	183	0	0	0	0	2	0	0	106	0	0	0	106	0	0	1	0	0	1	290
6:45 AM	0	232	1	0	0	233	2	0	0	0	2	2	0	118	0	0	0	118	3	0	0	0	0	3	356
Hourly Total	0	587	3	0	0	590	2	0	0	0	5	2	2	346	0	0	0	348	5	0	3	0	0	8	948
7:00 AM	1	276	1	0	0	278	0	0	1	0	1	1	0	135	0	0	0	135	0	0	1	0	1	1	415

7:15 AM	2	239	1	0	0	242	0	0	0	0	0	0	1	143	0	0	0	144	0	0	2	0	0	2	388
7:30 AM	2	316	0	0	0	318	0	0	0	0	1	0	0	234	0	0	0	234	0	0	4	0	0	4	556
7:45 AM	0	338	0	0	0	338	0	0	1	0	0	1	1	216	0	0	0	217	2	0	4	0	0	6	562
Hourly Total	5	1169	2	0	0	1176	0	0	2	0	2	2	2	728	0	0	0	730	2	0	11	0	1	13	1921
8:00 AM	3	273	0	0	0	276	0	0	0	0	0	0	0	207	1	0	0	208	3	0	3	0	0	6	490
8:15 AM	3	295	0	0	1	298	2	0	1	0	1	3	0	217	3	0	0	220	3	0	7	0	3	10	531
8:30 AM	3	278	0	0	1	281	0	0	0	0	0	0	0	224	4	0	0	228	5	0	12	0	1	17	526
8:45 AM	6	260	0	0	0	266	0	0	1	0	1	1	0	230	7	0	0	237	8	0	6	0	0	14	518
Hourly Total	15	1106	0	0	2	1121	2	0	2	0	2	4	0	878	15	0	0	893	19	0	28	0	4	47	2065
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	140	8676	29	0	13	8845	43	4	28	0	30	75	36	8445	89	0	1	8570	101	1	169	0	26	271	17761
Approach %	1.6	98.1	0.3	0.0	-	-	57.3	5.3	37.3	0.0	-	-	0.4	98.5	1.0	0.0	-	-	37.3	0.4	62.4	0.0	-	-	-
Total %	0.8	48.8	0.2	0.0	-	49.8	0.2	0.0	0.2	0.0	-	0.4	0.2	47.5	0.5	0.0	-	48.3	0.6	0.0	1.0	0.0	-	1.5	-
Lights	140	8489	29	0	-	8658	42	4	28	0	-	74	35	8261	87	0	-	8383	99	1	167	0	-	267	17382
% Lights	100.0	97.8	100.0	-	-	97.9	97.7	100.0	100.0	-	-	98.7	97.2	97.8	97.8	-	-	97.8	98.0	100.0	98.8	-	-	98.5	97.9
Mediums	0	162	0	0	-	162	0	0	0	0	-	0	0	157	1	0	-	158	2	0	2	0	-	4	324
% Mediums	0.0	1.9	0.0	-	-	1.8	0.0	0.0	0.0	-	-	0.0	0.0	1.9	1.1	-	-	1.8	2.0	0.0	1.2	-	-	1.5	1.8
Articulated Trucks	0	25	0	0	-	25	0	0	0	0	-	0	0	26	0	0	-	26	0	0	0	0	-	0	51
% Articulated Trucks	0.0	0.3	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	0	-	0	1	0	0	0	-	1	1	1	1	0	-	3	0	0	0	0	-	0	4
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	2.3	0.0	0.0	-	-	1.3	2.8	0.0	1.1	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	13	-	-	-	-	-	0	-	-	-	-	-	6	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	43.3	-	-	-	-	-	0.0	-	-	-	-	-	23.1	-	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	17	-	-	-	-	-	1	-	-	-	-	-	20	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	56.7	-	-	-	-	-	100.0	-	-	-	-	-	76.9	-	-





Turning Movement Data Plot

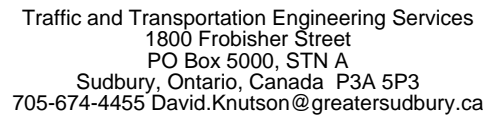


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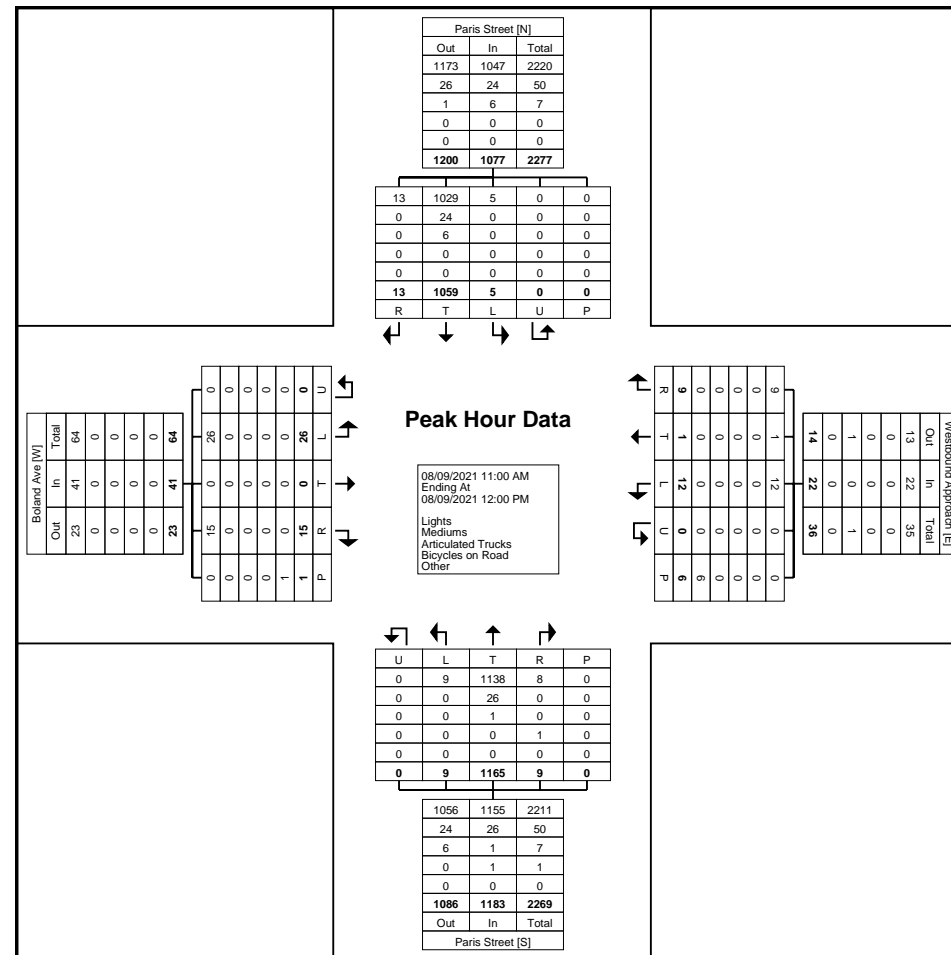
Count Name: Paris Street @ Boland Avenue  
Site Code:  
Start Date: 08/09/2021  
Page No: 4

### Turning Movement Peak Hour Data (11:00 AM)

Start Time	Paris Street Southbound						Westbound Approach Westbound						Paris Street Northbound						Boland Ave Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
11:00 AM	4	243	3	0	0	250	0	0	4	0	1	4	5	284	1	0	0	290	3	0	5	0	1	8	552
11:15 AM	1	243	2	0	0	246	6	1	1	0	2	8	1	252	2	0	0	255	5	0	5	0	0	10	519
11:30 AM	1	279	0	0	0	280	2	0	6	0	1	8	2	303	2	0	0	307	2	0	7	0	0	9	604
11:45 AM	7	294	0	0	0	301	1	0	1	0	2	2	1	326	4	0	0	331	5	0	9	0	0	14	648
Total	13	1059	5	0	0	1077	9	1	12	0	6	22	9	1165	9	0	0	1183	15	0	26	0	1	41	2323
Approach %	1.2	98.3	0.5	0.0	-	-	40.9	4.5	54.5	0.0	-	-	0.8	98.5	0.8	0.0	-	-	36.6	0.0	63.4	0.0	-	-	-
Total %	0.6	45.6	0.2	0.0	-	46.4	0.4	0.0	0.5	0.0	-	0.9	0.4	50.2	0.4	0.0	-	50.9	0.6	0.0	1.1	0.0	-	1.8	-
PHF	0.464	0.901	0.417	0.000	-	0.895	0.375	0.250	0.500	0.000	-	0.688	0.450	0.893	0.563	0.000	-	0.894	0.750	0.000	0.722	0.000	-	0.732	0.896
Lights	13	1029	5	0	-	1047	9	1	12	0	-	22	8	1138	9	0	-	1155	15	0	26	0	-	41	2265
% Lights	100.0	97.2	100.0	-	-	97.2	100.0	100.0	100.0	-	-	100.0	88.9	97.7	100.0	-	-	97.6	100.0	-	100.0	-	-	100.0	97.5
Mediums	0	24	0	0	-	24	0	0	0	0	-	0	0	26	0	0	-	26	0	0	0	0	-	0	50
% Mediums	0.0	2.3	0.0	-	-	2.2	0.0	0.0	0.0	-	-	0.0	0.0	2.2	0.0	-	-	2.2	0.0	-	0.0	-	-	0.0	2.2
Articulated Trucks	0	6	0	0	-	6	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	7
% Articulated Trucks	0.0	0.6	0.0	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0	-	-	0.1	0.0	-	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	11.1	0.0	0.0	-	-	0.1	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	66.7	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	33.3	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-



Count Name: Paris Street @ Boland Avenue  
Site Code:  
Start Date: 08/09/2021  
Page No: 5



### Turning Movement Peak Hour Data Plot (11:00 AM)

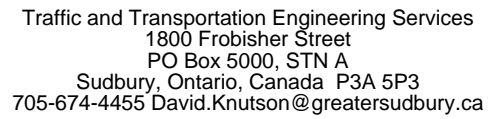


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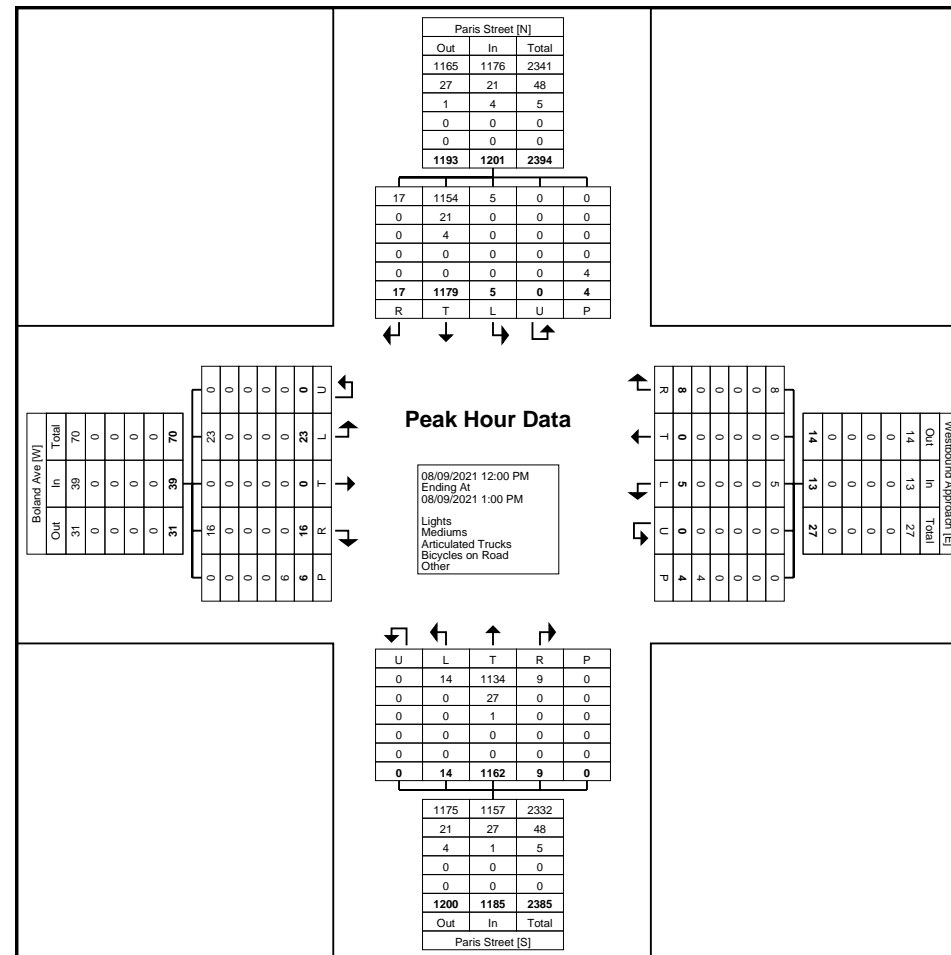
Count Name: Paris Street @ Boland Avenue  
Site Code:  
Start Date: 08/09/2021  
Page No: 6

### Turning Movement Peak Hour Data (12:00 PM)

Start Time	Paris Street Southbound						Westbound Approach Westbound						Paris Street Northbound						Boland Ave Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
12:00 PM	4	277	2	0	1	283	1	0	0	0	0	1	2	286	3	0	0	291	8	0	5	0	3	13	588
12:15 PM	4	283	0	0	0	287	3	0	1	0	3	4	2	263	3	0	0	268	2	0	3	0	0	5	564
12:30 PM	5	319	1	0	1	325	1	0	0	0	1	1	3	338	4	0	0	345	4	0	9	0	2	13	684
12:45 PM	4	300	2	0	2	306	3	0	4	0	0	7	2	275	4	0	0	281	2	0	6	0	1	8	602
Total	17	1179	5	0	4	1201	8	0	5	0	4	13	9	1162	14	0	0	1185	16	0	23	0	6	39	2438
Approach %	1.4	98.2	0.4	0.0	-	-	61.5	0.0	38.5	0.0	-	-	0.8	98.1	1.2	0.0	-	-	41.0	0.0	59.0	0.0	-	-	-
Total %	0.7	48.4	0.2	0.0	-	49.3	0.3	0.0	0.2	0.0	-	0.5	0.4	47.7	0.6	0.0	-	48.6	0.7	0.0	0.9	0.0	-	1.6	-
PHF	0.850	0.924	0.625	0.000	-	0.924	0.667	0.000	0.313	0.000	-	0.464	0.750	0.859	0.875	0.000	-	0.859	0.500	0.000	0.639	0.000	-	0.750	0.891
Lights	17	1154	5	0	-	1176	8	0	5	0	-	13	9	1134	14	0	-	1157	16	0	23	0	-	39	2385
% Lights	100.0	97.9	100.0	-	-	97.9	100.0	-	100.0	-	-	100.0	100.0	97.6	100.0	-	-	97.6	100.0	-	100.0	-	-	100.0	97.8
Mediums	0	21	0	0	-	21	0	0	0	0	-	0	0	27	0	0	-	27	0	0	0	0	-	0	48
% Mediums	0.0	1.8	0.0	-	-	1.7	0.0	-	0.0	-	-	0.0	0.0	2.3	0.0	-	-	2.3	0.0	-	0.0	-	-	0.0	2.0
Articulated Trucks	0	4	0	0	-	4	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	5
% Articulated Trucks	0.0	0.3	0.0	-	-	0.3	0.0	-	0.0	-	-	0.0	0.0	0.1	0.0	-	-	0.1	0.0	-	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	75.0	-	-	-	-	-	-	-	-	-	-	-	16.7	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	25.0	-	-	-	-	-	-	-	-	-	-	-	83.3	-	-



Count Name: Paris Street @ Boland Avenue  
Site Code:  
Start Date: 08/09/2021  
Page No: 7







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Count Name: Paris Street @ Boland Avenue  
Site Code:  
Start Date: 08/09/2021  
Page No: 8

### Turning Movement Peak Hour Data (3:45 PM)

Start Time	Paris Street Southbound						Westbound Approach Westbound						Paris Street Northbound						Boland Ave Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
3:45 PM	7	304	1	0	0	312	2	0	1	0	0	3	1	391	2	0	0	394	5	0	8	0	0	13	722
4:00 PM	5	333	1	0	0	339	2	1	3	0	0	6	2	448	6	0	0	456	2	0	5	0	1	7	808
4:15 PM	9	330	1	0	0	340	3	0	2	0	0	5	1	375	4	0	0	380	5	0	6	0	1	11	736
4:30 PM	6	319	1	0	2	326	3	1	0	0	2	4	3	363	9	0	0	375	2	0	4	0	2	6	711
Total	27	1286	4	0	2	1317	10	2	6	0	2	18	7	1577	21	0	0	1605	14	0	23	0	4	37	2977
Approach %	2.1	97.6	0.3	0.0	-	-	55.6	11.1	33.3	0.0	-	-	0.4	98.3	1.3	0.0	-	-	37.8	0.0	62.2	0.0	-	-	-
Total %	0.9	43.2	0.1	0.0	-	44.2	0.3	0.1	0.2	0.0	-	0.6	0.2	53.0	0.7	0.0	-	53.9	0.5	0.0	0.8	0.0	-	1.2	-
PHF	0.750	0.965	1.000	0.000	-	0.968	0.833	0.500	0.500	0.000	-	0.750	0.583	0.880	0.583	0.000	-	0.880	0.700	0.000	0.719	0.000	-	0.712	0.921
Lights	27	1264	4	0	-	1295	10	2	6	0	-	18	7	1551	21	0	-	1579	12	0	22	0	-	34	2926
% Lights	100.0	98.3	100.0	-	-	98.3	100.0	100.0	100.0	-	-	100.0	100.0	98.4	100.0	-	-	98.4	85.7	-	95.7	-	-	91.9	98.3
Mediums	0	19	0	0	-	19	0	0	0	0	-	0	0	23	0	0	-	23	2	0	1	0	-	3	45
% Mediums	0.0	1.5	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	0.0	1.5	0.0	-	-	1.4	14.3	-	4.3	-	-	8.1	1.5
Articulated Trucks	0	3	0	0	-	3	0	0	0	0	-	0	0	3	0	0	-	3	0	0	0	0	-	0	6
% Articulated Trucks	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	-	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	50.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	50.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-





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Count Name: Paris Street @ Boland Avenue  
Site Code:  
Start Date: 08/09/2021  
Page No: 10

### Turning Movement Peak Hour Data (7:30 AM)

Start Time	Paris Street Southbound						Westbound Approach Westbound						Paris Street Northbound						Boland Ave Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	2	316	0	0	0	318	0	0	0	0	1	0	0	234	0	0	0	234	0	0	4	0	0	4	556
7:45 AM	0	338	0	0	0	338	0	0	1	0	0	1	1	216	0	0	0	217	2	0	4	0	0	6	562
8:00 AM	3	273	0	0	0	276	0	0	0	0	0	0	0	207	1	0	0	208	3	0	3	0	0	6	490
8:15 AM	3	295	0	0	1	298	2	0	1	0	1	3	0	217	3	0	0	220	3	0	7	0	3	10	531
Total	8	1222	0	0	1	1230	2	0	2	0	2	4	1	874	4	0	0	879	8	0	18	0	3	26	2139
Approach %	0.7	99.3	0.0	0.0	-	-	50.0	0.0	50.0	0.0	-	-	0.1	99.4	0.5	0.0	-	-	30.8	0.0	69.2	0.0	-	-	-
Total %	0.4	57.1	0.0	0.0	-	57.5	0.1	0.0	0.1	0.0	-	0.2	0.0	40.9	0.2	0.0	-	41.1	0.4	0.0	0.8	0.0	-	1.2	-
PHF	0.667	0.904	0.000	0.000	-	0.910	0.250	0.000	0.500	0.000	-	0.333	0.250	0.934	0.333	0.000	-	0.939	0.667	0.000	0.643	0.000	-	0.650	0.952
Lights	8	1191	0	0	-	1199	2	0	2	0	-	4	1	844	4	0	-	849	8	0	18	0	-	26	2078
% Lights	100.0	97.5	-	-	-	97.5	100.0	-	100.0	-	-	100.0	100.0	96.6	100.0	-	-	96.6	100.0	-	100.0	-	-	100.0	97.1
Mediums	0	26	0	0	-	26	0	0	0	0	-	0	0	23	0	0	-	23	0	0	0	0	-	0	49
% Mediums	0.0	2.1	-	-	-	2.1	0.0	-	0.0	-	-	0.0	0.0	2.6	0.0	-	-	2.6	0.0	-	0.0	-	-	0.0	2.3
Articulated Trucks	0	5	0	0	-	5	0	0	0	0	-	0	0	7	0	0	-	7	0	0	0	0	-	0	12
% Articulated Trucks	0.0	0.4	-	-	-	0.4	0.0	-	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.8	0.0	-	0.0	-	-	0.0	0.6
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	33.3	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	66.7	-	-





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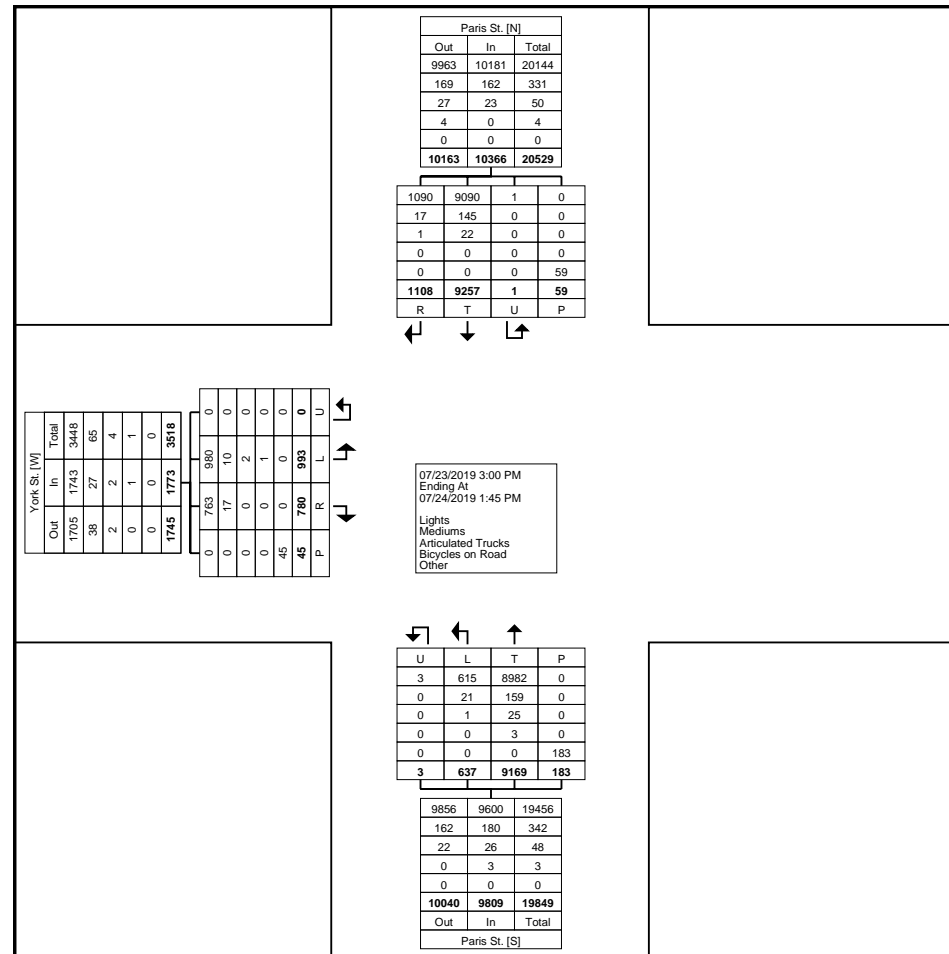
Count Name: Paris @ York St.  
Site Code: 00831103  
Start Date: 07/23/2019  
Page No: 1

## Turning Movement Data

Start Time	Paris St. Southbound					Paris St. Northbound					York St. Eastbound					Int. Total
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
3:00 PM	40	280	0	0	320	378	16	0	6	394	24	50	0	0	74	788
3:15 PM	38	327	0	5	365	325	28	0	6	353	21	23	0	0	44	762
3:30 PM	37	309	0	3	346	392	21	0	8	413	31	38	0	2	69	828
3:45 PM	27	330	0	4	357	352	34	0	5	386	18	35	0	0	53	796
Hourly Total	142	1246	0	12	1388	1447	99	0	25	1546	94	146	0	2	240	3174
4:00 PM	50	332	0	2	382	443	42	0	6	485	21	53	0	2	74	941
4:15 PM	50	327	0	10	377	403	34	0	9	437	22	36	0	0	58	872
4:30 PM	59	355	0	7	414	419	32	0	2	451	28	57	0	1	85	950
4:45 PM	47	331	0	3	378	332	35	0	5	367	17	39	0	1	56	801
Hourly Total	206	1345	0	22	1551	1597	143	0	22	1740	88	185	0	4	273	3564
5:00 PM	41	311	0	0	352	358	24	0	6	382	16	37	0	2	53	787
5:15 PM	31	294	0	1	325	301	27	2	11	330	14	23	0	2	37	692
5:30 PM	33	282	0	1	315	321	21	0	3	342	15	32	0	0	47	704
5:45 PM	21	264	0	0	285	230	13	0	17	243	20	25	0	2	45	573
Hourly Total	126	1151	0	2	1277	1210	85	2	37	1297	65	117	0	6	182	2756
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	20	169	0	1	189	140	8	0	2	148	9	22	0	0	31	368
6:45 AM	26	207	0	0	233	119	15	0	4	134	22	14	0	1	36	403
Hourly Total	46	376	0	1	422	259	23	0	6	282	31	36	0	1	67	771
7:00 AM	26	256	0	0	282	148	14	0	0	162	29	15	0	0	44	488
7:15 AM	33	269	0	1	302	187	10	0	5	197	32	20	0	3	52	551
7:30 AM	47	268	0	0	315	244	11	0	3	255	22	32	0	0	54	624
7:45 AM	59	349	0	0	408	252	14	0	6	266	41	36	0	1	77	751
Hourly Total	165	1142	0	1	1307	831	49	0	14	880	124	103	0	4	227	2414
8:00 AM	40	270	0	0	310	245	10	0	6	255	43	47	0	3	90	655
8:15 AM	32	353	0	0	385	256	18	0	2	274	39	37	0	2	76	735
8:30 AM	22	282	0	1	304	254	17	0	1	271	41	36	0	2	77	652
8:45 AM	33	349	0	1	382	246	16	0	5	262	34	32	0	0	66	710
Hourly Total	127	1254	0	2	1381	1001	61	0	14	1062	157	152	0	7	309	2752
9:00 AM	31	245	0	0	276	229	13	0	4	242	27	24	0	0	51	569
9:15 AM	28	210	0	0	238	236	24	0	3	260	18	25	0	0	43	541
9:30 AM	0	2	0	0	2	1	0	0	0	1	0	0	0	0	0	3
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	59	457	0	0	516	466	37	0	7	503	45	49	0	0	94	1113



11:30 AM	24	294	0	0	318	298	13	0	10	311	30	30	0	6	60	689
11:45 AM	17	282	0	3	299	271	17	0	15	288	26	33	0	3	59	646
Hourly Total	41	576	0	3	617	569	30	0	25	599	56	63	0	9	119	1335
12:00 PM	35	239	1	1	275	293	13	0	4	306	20	18	0	4	38	619
12:15 PM	30	305	0	8	335	310	15	0	6	325	21	23	0	6	44	704
12:30 PM	31	265	0	3	296	296	21	0	1	317	13	23	0	0	36	649
12:45 PM	35	291	0	0	326	319	25	0	7	344	23	31	0	0	54	724
Hourly Total	131	1100	1	12	1232	1218	74	0	18	1292	77	95	0	10	172	2696
1:00 PM	37	302	0	4	339	301	16	0	6	317	31	24	0	2	55	711
1:15 PM	28	307	0	0	335	270	20	1	9	291	12	23	0	0	35	661
1:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Grand Total	1108	9257	1	59	10366	9169	637	3	183	9809	780	993	0	45	1773	21948
Approach %	10.7	89.3	0.0	-	-	93.5	6.5	0.0	-	-	44.0	56.0	0.0	-	-	-
Total %	5.0	42.2	0.0	-	47.2	41.8	2.9	0.0	-	44.7	3.6	4.5	0.0	-	8.1	-
Lights	1090	9090	1	-	10181	8982	615	3	-	9600	763	980	0	-	1743	21524
% Lights	98.4	98.2	100.0	-	98.2	98.0	96.5	100.0	-	97.9	97.8	98.7	-	-	98.3	98.1
Mediums	17	145	0	-	162	159	21	0	-	180	17	10	0	-	27	369
% Mediums	1.5	1.6	0.0	-	1.6	1.7	3.3	0.0	-	1.8	2.2	1.0	-	-	1.5	1.7
Articulated Trucks	1	22	0	-	23	25	1	0	-	26	0	2	0	-	2	51
% Articulated Trucks	0.1	0.2	0.0	-	0.2	0.3	0.2	0.0	-	0.3	0.0	0.2	-	-	0.1	0.2
Bicycles on Road	0	0	0	-	0	3	0	0	-	3	0	1	0	-	1	4
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	-	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	6	-	-	-	-	10	-	-	-	-	-	12	-
% Bicycles on Crosswalk	-	-	-	10.2	-	-	-	-	5.5	-	-	-	-	-	26.7	-
Pedestrians	-	-	-	53	-	-	-	-	173	-	-	-	-	33	-	-
% Pedestrians	-	-	-	89.8	-	-	-	-	94.5	-	-	-	-	73.3	-	-



Turning Movement Data Plot

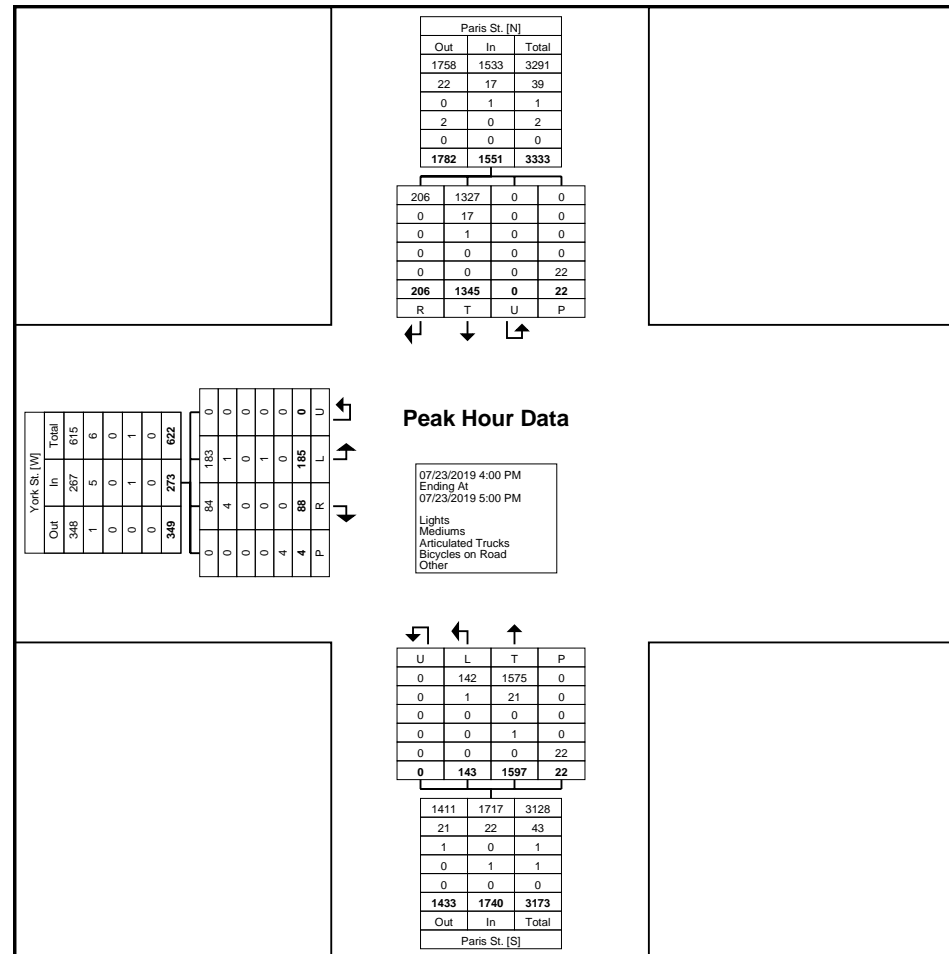


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Count Name: Paris @ York St.  
 Site Code: 00831103  
 Start Date: 07/23/2019  
 Page No: 4

### Turning Movement Peak Hour Data (4:00 PM)

Start Time	Paris St. Southbound					Paris St. Northbound					York St. Eastbound					Int. Total
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
4:00 PM	50	332	0	2	382	443	42	0	6	485	21	53	0	2	74	941
4:15 PM	50	327	0	10	377	403	34	0	9	437	22	36	0	0	58	872
4:30 PM	59	355	0	7	414	419	32	0	2	451	28	57	0	1	85	950
4:45 PM	47	331	0	3	378	332	35	0	5	367	17	39	0	1	56	801
Total	206	1345	0	22	1551	1597	143	0	22	1740	88	185	0	4	273	3564
Approach %	13.3	86.7	0.0	-	-	91.8	8.2	0.0	-	-	32.2	67.8	0.0	-	-	-
Total %	5.8	37.7	0.0	-	43.5	44.8	4.0	0.0	-	48.8	2.5	5.2	0.0	-	7.7	-
PHF	0.873	0.947	0.000	-	0.937	0.901	0.851	0.000	-	0.897	0.786	0.811	0.000	-	0.803	0.938
Lights	206	1327	0	-	1533	1575	142	0	-	1717	84	183	0	-	267	3517
% Lights	100.0	98.7	-	-	98.8	98.6	99.3	-	-	98.7	95.5	98.9	-	-	97.8	98.7
Mediums	0	17	0	-	17	21	1	0	-	22	4	1	0	-	5	44
% Mediums	0.0	1.3	-	-	1.1	1.3	0.7	-	-	1.3	4.5	0.5	-	-	1.8	1.2
Articulated Trucks	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.1	-	-	0.1	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	1	0	0	-	1	0	1	0	-	1	2
% Bicycles on Road	0.0	0.0	-	-	0.0	0.1	0.0	-	-	0.1	0.0	0.5	-	-	0.4	0.1
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	0	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	9.1	-	-	-	-	0.0	-	-	-	-	75.0	-	-
Pedestrians	-	-	-	20	-	-	-	-	22	-	-	-	-	1	-	-
% Pedestrians	-	-	-	90.9	-	-	-	-	100.0	-	-	-	-	25.0	-	-



Turning Movement Peak Hour Data Plot (4:00 PM)



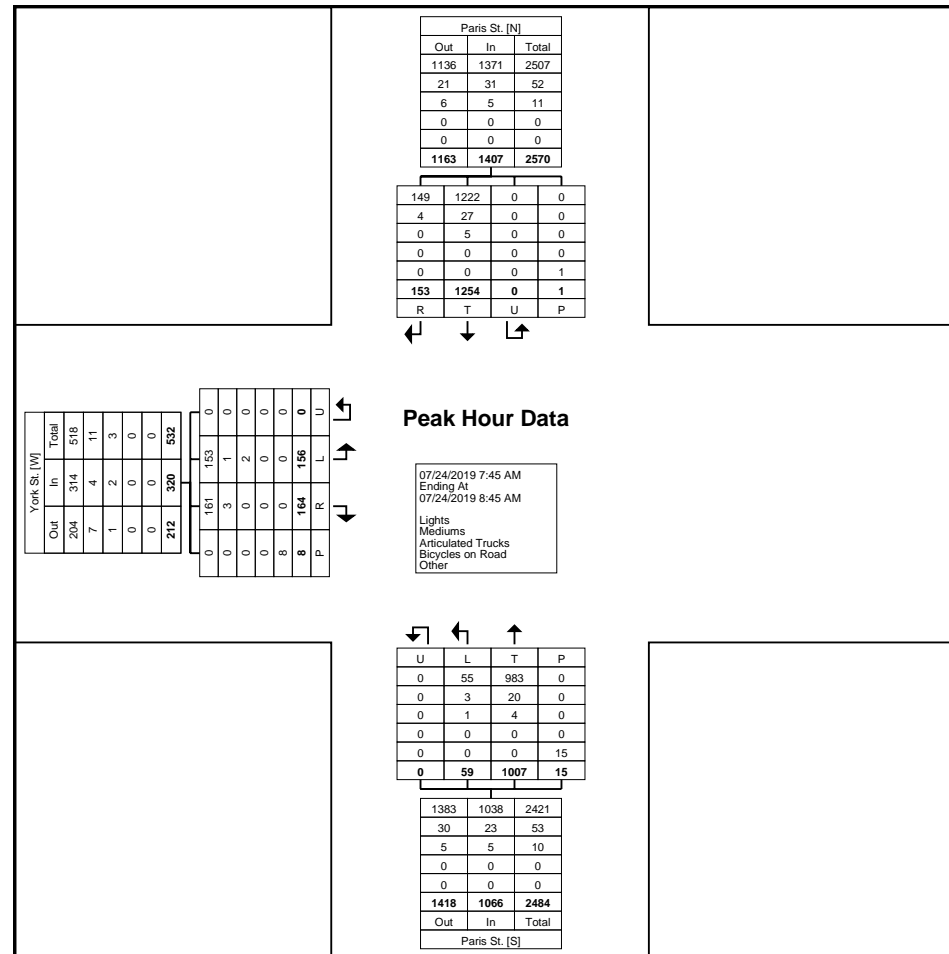
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Count Name: Paris @ York St.  
 Site Code: 00831103  
 Start Date: 07/23/2019  
 Page No: 6

### Turning Movement Peak Hour Data (7:45 AM)

Start Time	Paris St. Southbound					Paris St. Northbound					York St. Eastbound					Int. Total
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
7:45 AM	59	349	0	0	408	252	14	0	6	266	41	36	0	1	77	751
8:00 AM	40	270	0	0	310	245	10	0	6	255	43	47	0	3	90	655
8:15 AM	32	353	0	0	385	256	18	0	2	274	39	37	0	2	76	735
8:30 AM	22	282	0	1	304	254	17	0	1	271	41	36	0	2	77	652
Total	153	1254	0	1	1407	1007	59	0	15	1066	164	156	0	8	320	2793
Approach %	10.9	89.1	0.0	-	-	94.5	5.5	0.0	-	-	51.3	48.8	0.0	-	-	-
Total %	5.5	44.9	0.0	-	50.4	36.1	2.1	0.0	-	38.2	5.9	5.6	0.0	-	11.5	-
PHF	0.648	0.888	0.000	-	0.862	0.983	0.819	0.000	-	0.973	0.953	0.830	0.000	-	0.889	0.930
Lights	149	1222	0	-	1371	983	55	0	-	1038	161	153	0	-	314	2723
% Lights	97.4	97.4	-	-	97.4	97.6	93.2	-	-	97.4	98.2	98.1	-	-	98.1	97.5
Mediums	4	27	0	-	31	20	3	0	-	23	3	1	0	-	4	58
% Mediums	2.6	2.2	-	-	2.2	2.0	5.1	-	-	2.2	1.8	0.6	-	-	1.3	2.1
Articulated Trucks	0	5	0	-	5	4	1	0	-	5	0	2	0	-	2	12
% Articulated Trucks	0.0	0.4	-	-	0.4	0.4	1.7	-	-	0.5	0.0	1.3	-	-	0.6	0.4
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	4	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	26.7	-	-	-	-	37.5	-	-
Pedestrians	-	-	-	1	-	-	-	-	11	-	-	-	-	5	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	73.3	-	-	-	-	62.5	-	-





Turning Movement Peak Hour Data Plot (7:45 AM)

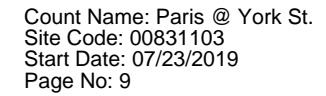


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Count Name: Paris @ York St.  
Site Code: 00831103  
Start Date: 07/23/2019  
Page No: 8

### Turning Movement Peak Hour Data (12:15 PM)

Start Time	Paris St. Southbound					Paris St. Northbound					York St. Eastbound					Int. Total
	Right	Thru	U-Turn	Peds	App. Total	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	
12:15 PM	30	305	0	8	335	310	15	0	6	325	21	23	0	6	44	704
12:30 PM	31	265	0	3	296	296	21	0	1	317	13	23	0	0	36	649
12:45 PM	35	291	0	0	326	319	25	0	7	344	23	31	0	0	54	724
1:00 PM	37	302	0	4	339	301	16	0	6	317	31	24	0	2	55	711
Total	133	1163	0	15	1296	1226	77	0	20	1303	88	101	0	8	189	2788
Approach %	10.3	89.7	0.0	-	-	94.1	5.9	0.0	-	-	46.6	53.4	0.0	-	-	-
Total %	4.8	41.7	0.0	-	46.5	44.0	2.8	0.0	-	46.7	3.2	3.6	0.0	-	6.8	-
PHF	0.899	0.953	0.000	-	0.956	0.961	0.770	0.000	-	0.947	0.710	0.815	0.000	-	0.859	0.963
Lights	129	1143	0	-	1272	1194	76	0	-	1270	87	101	0	-	188	2730
% Lights	97.0	98.3	-	-	98.1	97.4	98.7	-	-	97.5	98.9	100.0	-	-	99.5	97.9
Mediums	4	19	0	-	23	26	1	0	-	27	1	0	0	-	1	51
% Mediums	3.0	1.6	-	-	1.8	2.1	1.3	-	-	2.1	1.1	0.0	-	-	0.5	1.8
Articulated Trucks	0	1	0	-	1	6	0	0	-	6	0	0	0	-	0	7
% Articulated Trucks	0.0	0.1	-	-	0.1	0.5	0.0	-	-	0.5	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	1	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	13.3	-	-	-	-	5.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	13	-	-	-	-	19	-	-	-	-	8	-	-
% Pedestrians	-	-	-	86.7	-	-	-	-	95.0	-	-	-	-	100.0	-	-





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Count Name: Paris @ York St.  
Site Code: 00831103  
Start Date: 07/23/2019  
Page No: 10

<h2 style="margin: 0;">Morning Peak Diagram</h2>		<b>Specified Period</b> <b>From:</b> 7:00:00 <b>To:</b> 9:00:00	<b>One Hour Peak</b> <b>From:</b> 7:45:00 <b>To:</b> 8:45:00
<b>Municipality:</b> Sudbury <b>Site #:</b> 2206300004 <b>Intersection:</b> Paris St & York St <b>TFR File #:</b> 1 <b>Count date:</b> 20-Apr-22		<b>Weather conditions:</b>  <b>Person counted:</b> <b>Person prepared:</b> <b>Person checked:</b>	
<b>** Signalized Intersection **</b>		<b>Major Road:</b> Paris St runs N/S	

North Leg Total: 2448 North Entering: 1411 North Peds: 4 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">3</td> <td style="text-align: right;">15</td> <td style="border-left: 1px solid black; text-align: right;">18</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">0</td> <td style="text-align: right;">11</td> <td style="border-left: 1px solid black; text-align: right;">11</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">160</td> <td style="text-align: right;">1222</td> <td style="border-left: 1px solid black; text-align: right;">1382</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">163</td> <td style="text-align: right;">1248</td> <td style="border-left: 1px solid black;"></td> </tr> </table>	Heavys	3	15	18	Trucks	0	11	11	Cars	160	1222	1382	Totals	163	1248		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">26</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">14</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">997</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1037</td> </tr> </table>	Heavys	26	Trucks	14	Cars	997	Totals	1037	
Heavys	3	15	18																								
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Totals	1037																										

Paris St

York St

Paris St

<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">1</td> <td style="text-align: right;">2</td> <td style="text-align: right;">135</td> <td style="border-left: 1px solid black; text-align: right;">138</td> </tr> <tr> <td style="text-align: right;">2</td> <td style="text-align: right;">3</td> <td style="text-align: right;">109</td> <td style="border-left: 1px solid black; text-align: right;">114</td> <td></td> </tr> <tr> <td style="text-align: right;">3</td> <td style="text-align: right;">5</td> <td style="text-align: right;">244</td> <td style="border-left: 1px solid black;"></td> <td></td> </tr> </table>	Heavys	1	2	135	138	2	3	109	114		3	5	244			<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">1331</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">14</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">17</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">1362</td> </tr> </table>	Cars	1331	Trucks	14	Heavys	17	Totals	1362	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">51</td> <td style="text-align: right;">862</td> <td style="border-left: 1px solid black; text-align: right;">913</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">1</td> <td style="text-align: right;">12</td> <td style="border-left: 1px solid black; text-align: right;">13</td> </tr> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">0</td> <td style="text-align: right;">25</td> <td style="border-left: 1px solid black; text-align: right;">25</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">52</td> <td style="text-align: right;">899</td> <td style="border-left: 1px solid black;"></td> </tr> </table>	Cars	51	862	913	Trucks	1	12	13	Heavys	0	25	25	Totals	52	899		Peds Cross: South Peds: 10 South Entering: 951 South Leg Total: 2313
Heavys	1	2	135	138																																						
2	3	109	114																																							
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Heavys	0	25	25																																							
Totals	52	899																																								

Peds Cross: West Peds: 7 West Entering: 252 West Leg Total: 467	Peds Cross: South Peds: 10 South Entering: 951 South Leg Total: 2313
--	---

### Comments



<h2 style="margin: 0;">Afternoon Peak Diagram</h2>		<b>Specified Period</b> <b>From:</b> 16:00:00 <b>To:</b> 19:00:00	<b>One Hour Peak</b> <b>From:</b> 16:00:00 <b>To:</b> 17:00:00
<b>Municipality:</b> Sudbury <b>Site #:</b> 2206300004 <b>Intersection:</b> Paris St & York St <b>TFR File #:</b> 1 <b>Count date:</b> 20-Apr-22		<b>Weather conditions:</b>  <b>Person counted:</b> <b>Person prepared:</b> <b>Person checked:</b>	
<b>** Signalized Intersection **</b>		<b>Major Road:</b> Paris St runs N/S	

North Leg Total: 2943 North Entering: 1309 North Peds: 6 Peds Cross:	<table style="width: 100%;"> <tr> <td>Heavys</td><td>2</td><td>16</td><td>18</td></tr> <tr> <td>Trucks</td><td>1</td><td>8</td><td>9</td></tr> <tr> <td>Cars</td><td>161</td><td>1121</td><td>1282</td></tr> <tr> <td><b>Totals</b></td><td><b>164</b></td><td><b>1145</b></td><td></td></tr> </table>	Heavys	2	16	18	Trucks	1	8	9	Cars	161	1121	1282	<b>Totals</b>	<b>164</b>	<b>1145</b>		<table style="width: 100%;"> <tr> <td>Heavys</td><td>15</td></tr> <tr> <td>Trucks</td><td>11</td></tr> <tr> <td>Cars</td><td>1608</td></tr> <tr> <td><b>Totals</b></td><td><b>1634</b></td></tr> </table>	Heavys	15	Trucks	11	Cars	1608	<b>Totals</b>	<b>1634</b>	
Heavys	2	16	18																								
Trucks	1	8	9																								
Cars	161	1121	1282																								
<b>Totals</b>	<b>164</b>	<b>1145</b>																									
Heavys	15																										
Trucks	11																										
Cars	1608																										
<b>Totals</b>	<b>1634</b>																										

Heavys	Trucks	Cars	Totals
4	2	280	286

York St

Paris St

Heavys	Trucks	Cars	Totals
1	1	167	169
0	1	89	90
1	2	256	

Peds Cross: West Peds: 4 West Entering: 259 West Leg Total: 545	<table style="width: 100%;"> <tr> <td>Cars</td><td>1210</td></tr> <tr> <td>Trucks</td><td>9</td></tr> <tr> <td>Heavys</td><td>16</td></tr> <tr> <td><b>Totals</b></td><td><b>1235</b></td></tr> </table>	Cars	1210	Trucks	9	Heavys	16	<b>Totals</b>	<b>1235</b>	<table style="width: 100%;"> <tr> <td>Cars</td><td>119</td><td>1441</td></tr> <tr> <td>Trucks</td><td>1</td><td>10</td></tr> <tr> <td>Heavys</td><td>2</td><td>14</td></tr> <tr> <td><b>Totals</b></td><td><b>122</b></td><td><b>1465</b></td></tr> </table>	Cars	119	1441	Trucks	1	10	Heavys	2	14	<b>Totals</b>	<b>122</b>	<b>1465</b>	Peds Cross: South Peds: 15 South Entering: 1587 South Leg Total: 2822
Cars	1210																						
Trucks	9																						
Heavys	16																						
<b>Totals</b>	<b>1235</b>																						
Cars	119	1441																					
Trucks	1	10																					
Heavys	2	14																					
<b>Totals</b>	<b>122</b>	<b>1465</b>																					

Comments

## Total Count Diagram

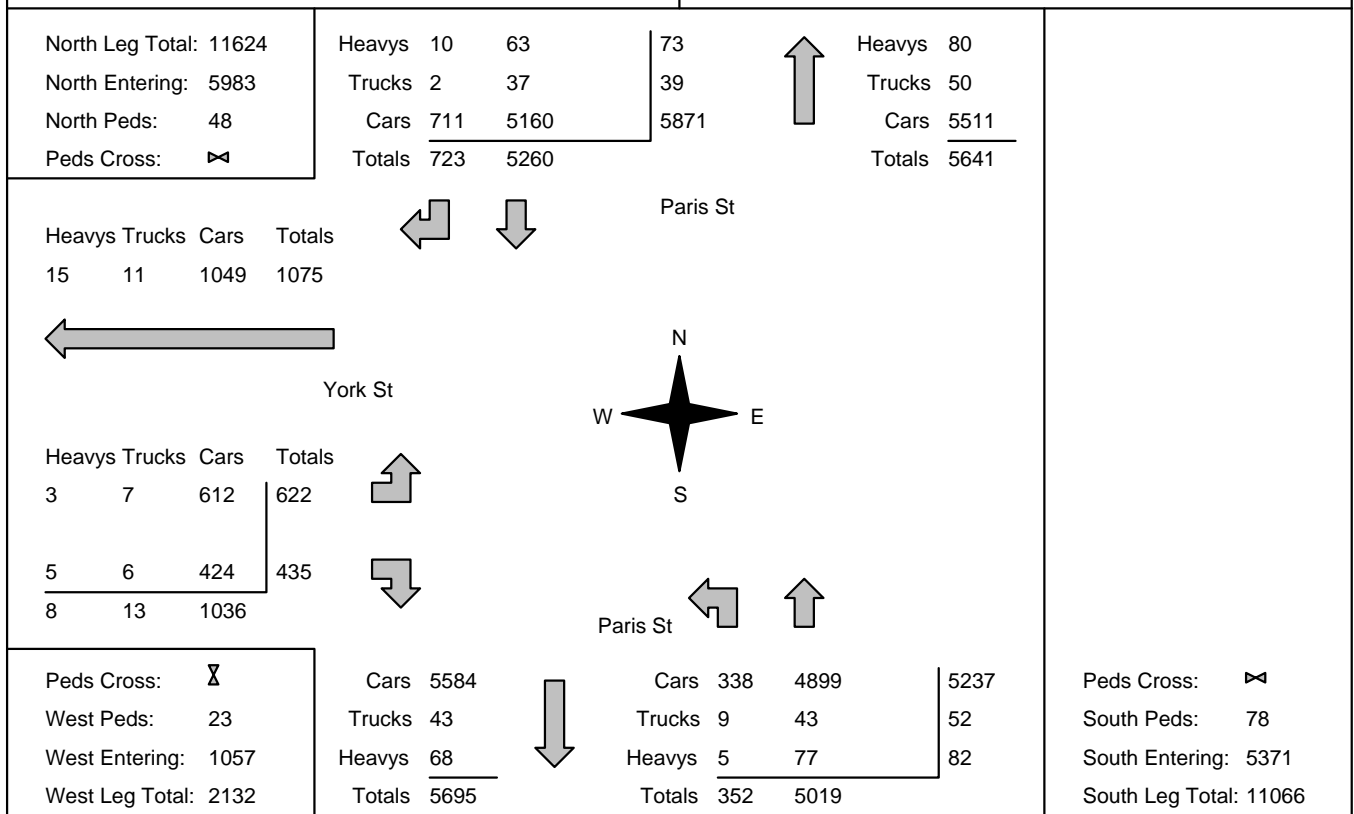
**Municipality:** Sudbury  
**Site #:** 2206300004  
**Intersection:** Paris St & York St  
**TFR File #:** 1  
**Count date:** 20-Apr-22

**Weather conditions:**

**Person counted:**  
**Person prepared:**  
**Person checked:**

**\*\* Signalized Intersection \*\***

**Major Road:** Paris St runs N/S



### Comments

# Traffic Count Summary

Intersection: Paris St & York St

Count Date: 20-Apr-22

Municipality: Sudbury

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	1060	127	1187	3	1933	8:00:00	47	699	0	746	7
9:00:00	0	1188	158	1346	7	2288	9:00:00	47	895	0	942	8
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	1145	164	1309	6	2896	17:00:00	122	1465	0	1587	15
18:00:00	0	988	143	1131	14	2363	18:00:00	70	1162	0	1232	23
19:00:00	0	879	131	1010	18	1874	19:00:00	66	798	0	864	25













Traffic and Transportation Engineering Services  
1800 Frobisher Street  
PO Box 5000, STN A  
Sudbury, Ontario, Canada P3A 5P3  
705-674-4455 David.Knutson@greatersudbury.ca

Count Name: Paris @ Ramsey Lake Rd. (Redo)  
Site Code:  
Start Date: 08/06/2019  
Page No: 1

## Turning Movement Data

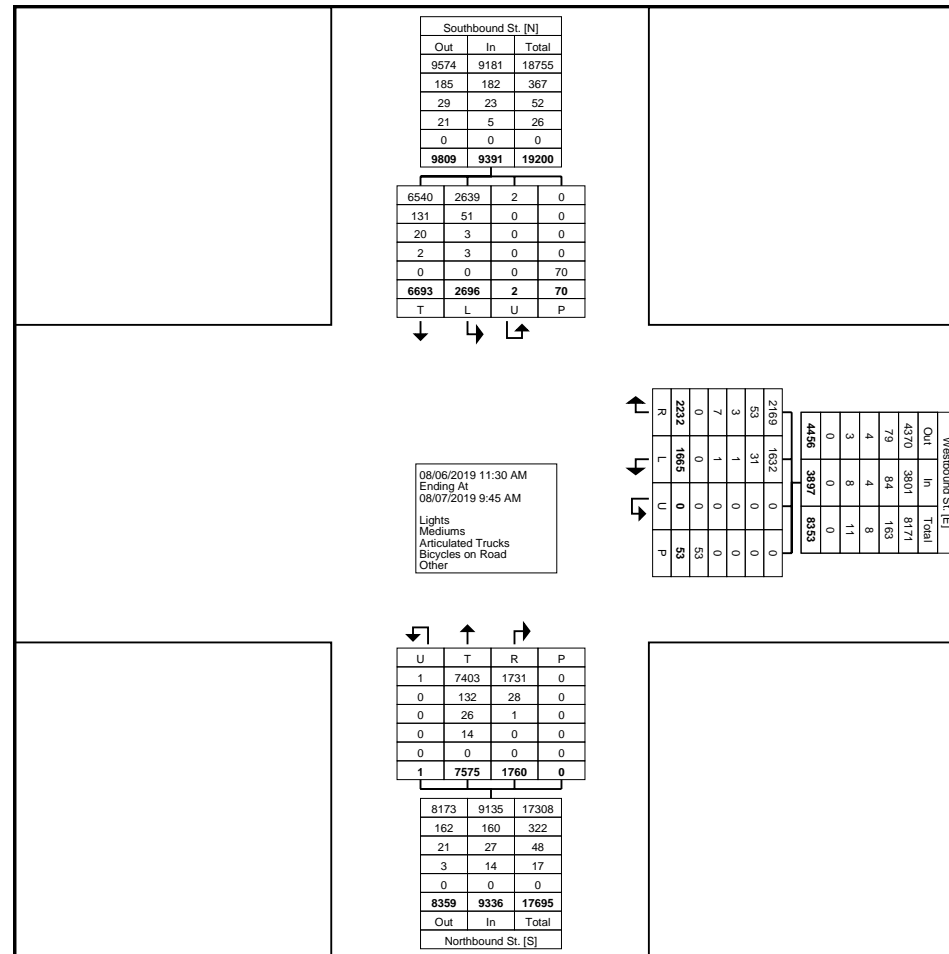
Start Time	Southbound St. Southbound					Westbound St. Westbound					Northbound St. Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
11:30 AM	222	67	0	2	289	69	43	0	0	112	52	257	0	0	309	710
11:45 AM	280	66	0	0	346	57	59	0	2	116	53	260	0	0	313	775
Hourly Total	502	133	0	2	635	126	102	0	2	228	105	517	0	0	622	1485
12:00 PM	252	74	0	1	326	59	62	0	1	121	31	303	1	0	335	782
12:15 PM	232	67	0	5	299	61	59	0	0	120	65	265	0	0	330	749
12:30 PM	227	87	0	3	314	71	34	0	3	105	59	281	0	0	340	759
12:45 PM	267	83	1	0	351	53	41	0	3	94	63	277	0	0	340	785
Hourly Total	978	311	1	9	1290	244	196	0	7	440	218	1126	1	0	1345	3075
1:00 PM	257	87	0	0	344	64	52	0	0	116	64	269	0	0	333	793
1:15 PM	277	69	0	0	346	73	52	0	4	125	44	289	0	0	333	804
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	534	156	0	0	690	137	104	0	4	241	108	558	0	0	666	1597
3:00 PM	22	1	0	1	23	91	74	0	0	165	40	264	0	0	304	492
3:15 PM	0	0	0	0	0	84	56	0	1	140	73	216	0	0	289	429
3:30 PM	302	110	0	3	412	101	66	0	1	167	60	246	0	0	306	885
3:45 PM	272	100	0	2	372	119	84	0	1	203	57	302	0	0	359	934
Hourly Total	596	211	0	6	807	395	280	0	3	675	230	1028	0	0	1258	2740
4:00 PM	293	80	0	6	373	176	147	0	2	323	69	321	0	0	390	1086
4:15 PM	268	69	0	6	337	148	133	0	2	281	58	263	0	0	321	939
4:30 PM	281	65	0	2	346	146	108	0	0	254	49	295	0	0	344	944
4:45 PM	295	74	0	3	369	74	61	0	3	135	41	248	0	0	289	793
Hourly Total	1137	288	0	17	1425	544	449	0	7	993	217	1127	0	0	1344	3762
5:00 PM	262	55	0	1	317	76	56	0	2	132	41	332	0	0	373	822
5:15 PM	219	50	0	1	269	60	53	0	0	113	34	263	0	0	297	679
5:30 PM	213	38	0	3	251	77	51	0	1	128	47	227	0	0	274	653
5:45 PM	197	50	1	0	248	62	50	0	3	112	38	212	0	0	250	610
Hourly Total	891	193	1	5	1085	275	210	0	6	485	160	1034	0	0	1194	2764
6:00 PM	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	3
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	3
6:30 AM	117	68	0	0	185	8	7	0	1	15	18	121	0	0	139	339
6:45 AM	110	92	0	2	202	22	11	0	0	33	41	110	0	0	151	386
Hourly Total	227	160	0	2	387	30	18	0	1	48	59	231	0	0	290	725
7:00 AM	164	127	0	0	291	26	16	0	1	42	31	118	0	0	149	482
7:15 AM	153	123	0	3	276	53	15	0	1	68	48	175	0	0	223	567

7:30 AM	180	108	0	3	288	59	23	0	2	82	56	216	0	0	272	642
7:45 AM	188	152	0	5	340	55	21	0	1	76	78	197	0	0	275	691
Hourly Total	685	510	0	11	1195	193	75	0	5	268	213	706	0	0	919	2382
8:00 AM	174	148	0	3	322	46	22	0	1	68	82	216	0	0	298	688
8:15 AM	202	170	0	3	372	56	40	0	4	96	97	199	0	0	296	764
8:30 AM	206	123	0	5	329	47	47	0	4	94	77	222	0	0	299	722
8:45 AM	228	127	0	2	355	50	51	0	5	101	71	234	0	0	305	761
Hourly Total	810	568	0	13	1378	199	160	0	14	359	327	871	0	0	1198	2935
9:00 AM	181	87	0	1	268	50	29	0	2	79	66	196	0	0	262	609
9:15 AM	152	79	0	4	231	38	40	0	2	78	57	181	0	0	238	547
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	6693	2696	2	70	9391	2232	1665	0	53	3897	1760	7575	1	0	9336	22624
Approach %	71.3	28.7	0.0	-	-	57.3	42.7	0.0	-	-	18.9	81.1	0.0	-	-	-
Total %	29.6	11.9	0.0	-	41.5	9.9	7.4	0.0	-	17.2	7.8	33.5	0.0	-	41.3	-
Lights	6540	2639	2	-	9181	2169	1632	0	-	3801	1731	7403	1	-	9135	22117
% Lights	97.7	97.9	100.0	-	97.8	97.2	98.0	-	-	97.5	98.4	97.7	100.0	-	97.8	97.8
Mediums	131	51	0	-	182	53	31	0	-	84	28	132	0	-	160	426
% Mediums	2.0	1.9	0.0	-	1.9	2.4	1.9	-	-	2.2	1.6	1.7	0.0	-	1.7	1.9
Articulated Trucks	20	3	0	-	23	3	1	0	-	4	1	26	0	-	27	54
% Articulated Trucks	0.3	0.1	0.0	-	0.2	0.1	0.1	-	-	0.1	0.1	0.3	0.0	-	0.3	0.2
Bicycles on Road	2	3	0	-	5	7	1	0	-	8	0	14	0	-	14	27
% Bicycles on Road	0.0	0.1	0.0	-	0.1	0.3	0.1	-	-	0.2	0.0	0.2	0.0	-	0.1	0.1
Bicycles on Crosswalk	-	-	-	21	-	-	-	-	22	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	30.0	-	-	-	-	41.5	-	-	-	-	-	-	-
Pedestrians	-	-	-	49	-	-	-	-	31	-	-	-	-	0	-	-
% Pedestrians	-	-	-	70.0	-	-	-	-	58.5	-	-	-	-	-	-	-



Traffic and Transportation Engineering Services  
1800 Frobisher Street  
PO Box 5000, STN A  
Sudbury, Ontario, Canada P3A 5P3  
705-674-4455 David.Knutson@greatersudbury.ca

Count Name: Paris @ Ramsey Lake Rd. (Redo)  
Site Code:  
Start Date: 08/06/2019  
Page No: 3



Turning Movement Data Plot





Traffic and Transportation Engineering Services  
 1800 Frobisher Street  
 PO Box 5000, STN A  
 Sudbury, Ontario, Canada P3A 5P3  
 705-674-4455 David.Knutson@greatersudbury.ca

Count Name: Paris @ Ramsey Lake Rd. (Redo)  
 Site Code:  
 Start Date: 08/06/2019  
 Page No: 4

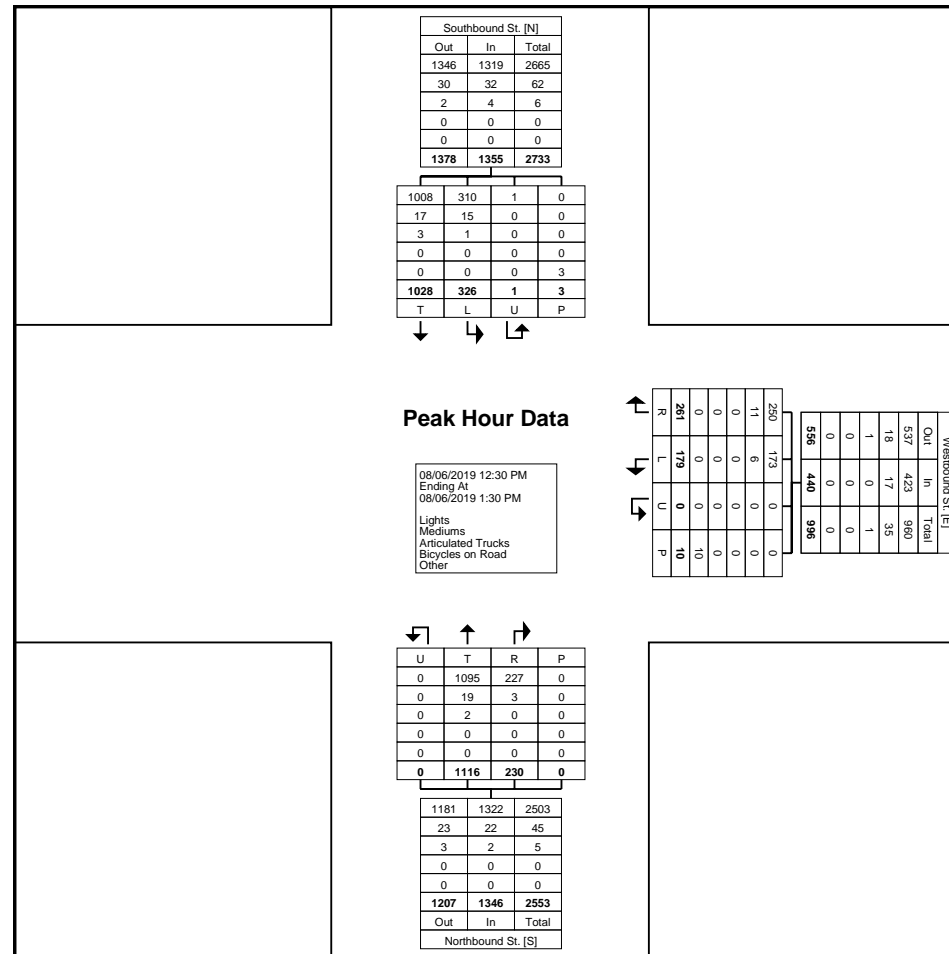
### Turning Movement Peak Hour Data (12:30 PM)

Start Time	Southbound St. Southbound					Westbound St. Westbound					Northbound St. Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
12:30 PM	227	87	0	3	314	71	34	0	3	105	59	281	0	0	340	759
12:45 PM	267	83	1	0	351	53	41	0	3	94	63	277	0	0	340	785
1:00 PM	257	87	0	0	344	64	52	0	0	116	64	269	0	0	333	793
1:15 PM	277	69	0	0	346	73	52	0	4	125	44	289	0	0	333	804
Total	1028	326	1	3	1355	261	179	0	10	440	230	1116	0	0	1346	3141
Approach %	75.9	24.1	0.1	-	-	59.3	40.7	0.0	-	-	17.1	82.9	0.0	-	-	-
Total %	32.7	10.4	0.0	-	43.1	8.3	5.7	0.0	-	14.0	7.3	35.5	0.0	-	42.9	-
PHF	0.928	0.937	0.250	-	0.965	0.894	0.861	0.000	-	0.880	0.898	0.965	0.000	-	0.990	0.977
Lights	1008	310	1	-	1319	250	173	0	-	423	227	1095	0	-	1322	3064
% Lights	98.1	95.1	100.0	-	97.3	95.8	96.6	-	-	96.1	98.7	98.1	-	-	98.2	97.5
Mediums	17	15	0	-	32	11	6	0	-	17	3	19	0	-	22	71
% Mediums	1.7	4.6	0.0	-	2.4	4.2	3.4	-	-	3.9	1.3	1.7	-	-	1.6	2.3
Articulated Trucks	3	1	0	-	4	0	0	0	-	0	0	2	0	-	2	6
% Articulated Trucks	0.3	0.3	0.0	-	0.3	0.0	0.0	-	-	0.0	0.0	0.2	-	-	0.1	0.2
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	6	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	66.7	-	-	-	-	60.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	1	-	-	-	-	4	-	-	-	-	0	-	-
% Pedestrians	-	-	-	33.3	-	-	-	-	40.0	-	-	-	-	-	-	-



Traffic and Transportation Engineering Services  
1800 Frobisher Street  
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Sudbury, Ontario, Canada P3A 5P3  
705-674-4455 David.Knutson@greatersudbury.ca

Count Name: Paris @ Ramsey Lake Rd. (Redo)  
Site Code:  
Start Date: 08/06/2019  
Page No: 5



Turning Movement Peak Hour Data Plot (12:30 PM)



Traffic and Transportation Engineering Services  
1800 Frobisher Street  
PO Box 5000, STN A  
Sudbury, Ontario, Canada P3A 5P3  
705-674-4455 David.Knutson@greatersudbury.ca

Count Name: Paris @ Ramsey Lake Rd. (Redo)  
Site Code:  
Start Date: 08/06/2019  
Page No: 6

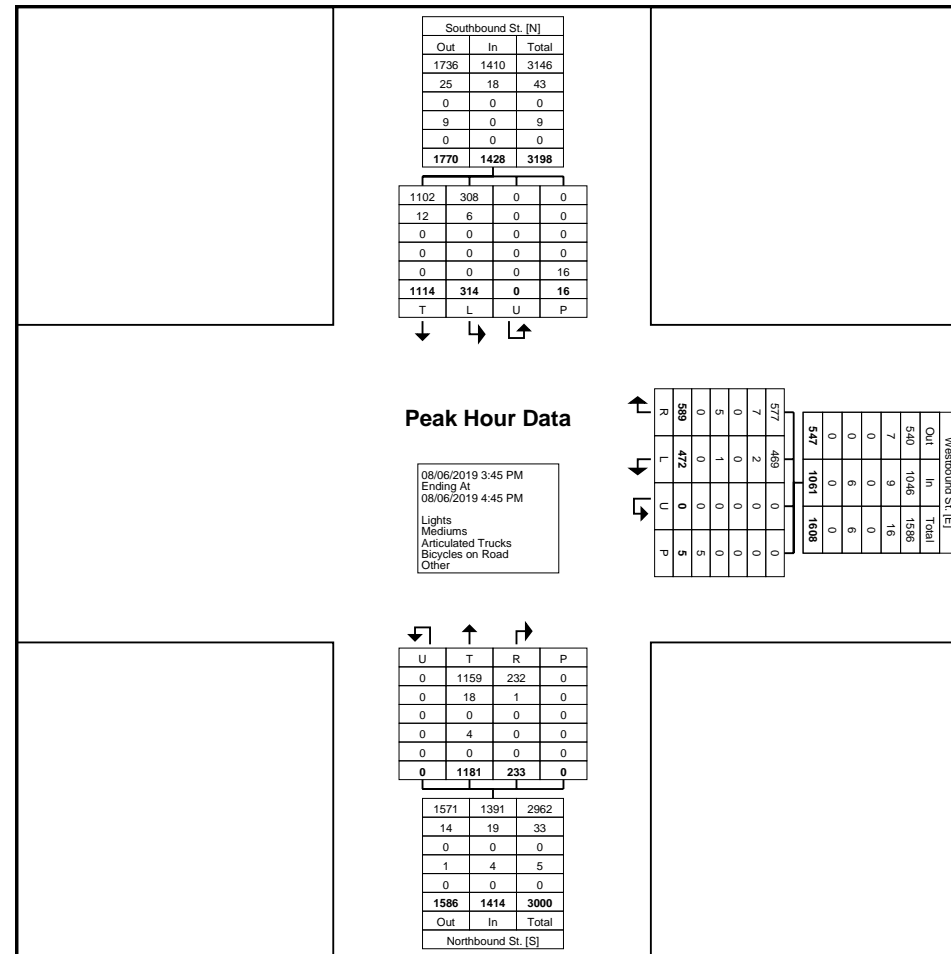
### Turning Movement Peak Hour Data (3:45 PM)

Start Time	Southbound St. Southbound					Westbound St. Westbound					Northbound St. Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
3:45 PM	272	100	0	2	372	119	84	0	1	203	57	302	0	0	359	934
4:00 PM	293	80	0	6	373	176	147	0	2	323	69	321	0	0	390	1086
4:15 PM	268	69	0	6	337	148	133	0	2	281	58	263	0	0	321	939
4:30 PM	281	65	0	2	346	146	108	0	0	254	49	295	0	0	344	944
Total	1114	314	0	16	1428	589	472	0	5	1061	233	1181	0	0	1414	3903
Approach %	78.0	22.0	0.0	-	-	55.5	44.5	0.0	-	-	16.5	83.5	0.0	-	-	-
Total %	28.5	8.0	0.0	-	36.6	15.1	12.1	0.0	-	27.2	6.0	30.3	0.0	-	36.2	-
PHF	0.951	0.785	0.000	-	0.957	0.837	0.803	0.000	-	0.821	0.844	0.920	0.000	-	0.906	0.898
Lights	1102	308	0	-	1410	577	469	0	-	1046	232	1159	0	-	1391	3847
% Lights	98.9	98.1	-	-	98.7	98.0	99.4	-	-	98.6	99.6	98.1	-	-	98.4	98.6
Mediums	12	6	0	-	18	7	2	0	-	9	1	18	0	-	19	46
% Mediums	1.1	1.9	-	-	1.3	1.2	0.4	-	-	0.8	0.4	1.5	-	-	1.3	1.2
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	5	1	0	-	6	0	4	0	-	4	10
% Bicycles on Road	0.0	0.0	-	-	0.0	0.8	0.2	-	-	0.6	0.0	0.3	-	-	0.3	0.3
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	2	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	40.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	16	-	-	-	-	3	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	60.0	-	-	-	-	-	-	-



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Count Name: Paris @ Ramsey Lake Rd. (Redo)  
Site Code:  
Start Date: 08/06/2019  
Page No: 7



Turning Movement Peak Hour Data Plot (3:45 PM)



Traffic and Transportation Engineering Services  
 1800 Frobisher Street  
 PO Box 5000, STN A  
 Sudbury, Ontario, Canada P3A 5P3  
 705-674-4455 David.Knutson@greatersudbury.ca

Count Name: Paris @ Ramsey Lake Rd. (Redo)  
 Site Code:  
 Start Date: 08/06/2019  
 Page No: 8

### Turning Movement Peak Hour Data (8:00 AM)

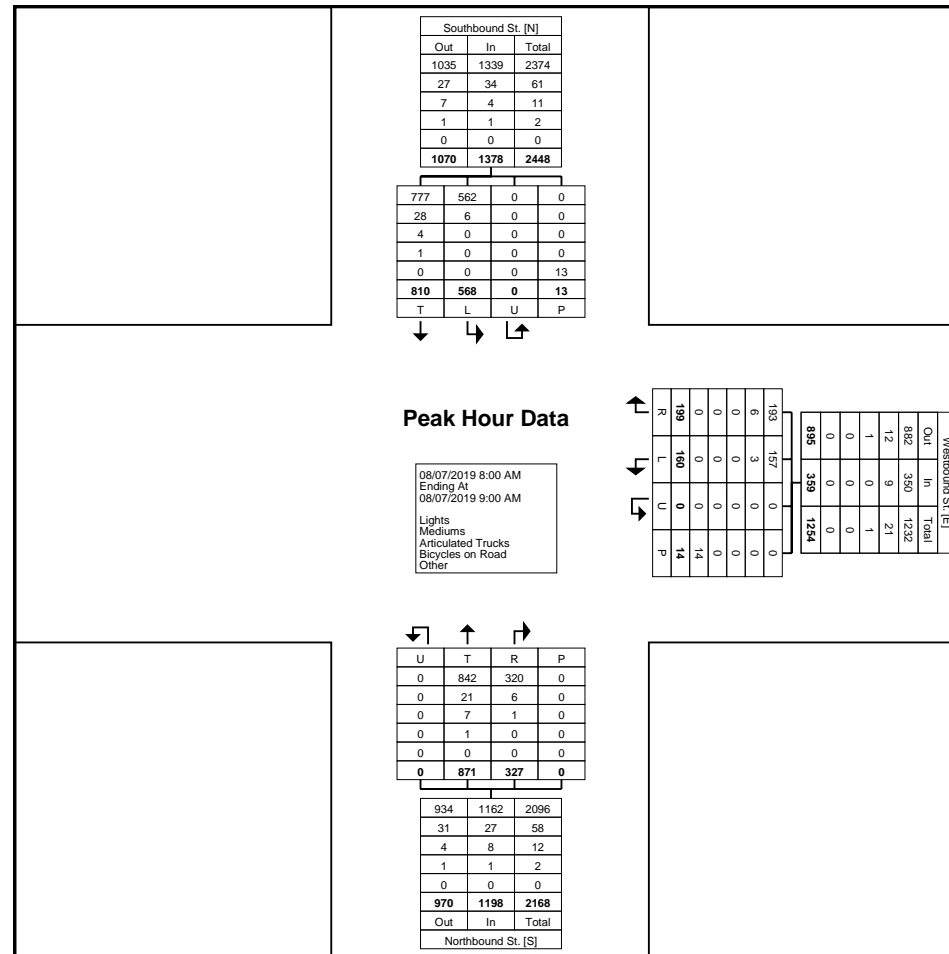
Start Time	Southbound St. Southbound					Westbound St. Westbound					Northbound St. Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
8:00 AM	174	148	0	3	322	46	22	0	1	68	82	216	0	0	298	688
8:15 AM	202	170	0	3	372	56	40	0	4	96	97	199	0	0	296	764
8:30 AM	206	123	0	5	329	47	47	0	4	94	77	222	0	0	299	722
8:45 AM	228	127	0	2	355	50	51	0	5	101	71	234	0	0	305	761
Total	810	568	0	13	1378	199	160	0	14	359	327	871	0	0	1198	2935
Approach %	58.8	41.2	0.0	-	-	55.4	44.6	0.0	-	-	27.3	72.7	0.0	-	-	-
Total %	27.6	19.4	0.0	-	47.0	6.8	5.5	0.0	-	12.2	11.1	29.7	0.0	-	40.8	-
PHF	0.888	0.835	0.000	-	0.926	0.888	0.784	0.000	-	0.889	0.843	0.931	0.000	-	0.982	0.960
Lights	777	562	0	-	1339	193	157	0	-	350	320	842	0	-	1162	2851
% Lights	95.9	98.9	-	-	97.2	97.0	98.1	-	-	97.5	97.9	96.7	-	-	97.0	97.1
Mediums	28	6	0	-	34	6	3	0	-	9	6	21	0	-	27	70
% Mediums	3.5	1.1	-	-	2.5	3.0	1.9	-	-	2.5	1.8	2.4	-	-	2.3	2.4
Articulated Trucks	4	0	0	-	4	0	0	0	-	0	1	7	0	-	8	12
% Articulated Trucks	0.5	0.0	-	-	0.3	0.0	0.0	-	-	0.0	0.3	0.8	-	-	0.7	0.4
Bicycles on Road	1	0	0	-	1	0	0	0	-	0	0	1	0	-	1	2
% Bicycles on Road	0.1	0.0	-	-	0.1	0.0	0.0	-	-	0.0	0.0	0.1	-	-	0.1	0.1
Bicycles on Crosswalk	-	-	-	3	-	-	-	-	7	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	23.1	-	-	-	-	50.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	10	-	-	-	-	7	-	-	-	-	0	-	-
% Pedestrians	-	-	-	76.9	-	-	-	-	50.0	-	-	-	-	-	-	-





Traffic and Transportation Engineering Services  
1800 Frobisher Street  
PO Box 5000, STN A  
Sudbury, Ontario, Canada P3A 5P3  
705-674-4455 David.Knutson@greatersudbury.ca

Count Name: Paris @ Ramsey Lake Rd. (Redo)  
Site Code:  
Start Date: 08/06/2019  
Page No: 9



Turning Movement Peak Hour Data Plot (8:00 AM)



Traffic and Transportation Engineering Services  
1800 Frobisher Street  
PO Box 5000, STN A  
Sudbury, Ontario, Canada P3A 5P3  
705-674-4455 David.Knutson@greatersudbury.ca

Count Name: Paris @ Ramsey Lake Rd. (Redo)  
Site Code:  
Start Date: 08/06/2019  
Page No: 10

# Programmed EPAC Data

4/6/2022  
10:09:17AM

Intersection Name: Paris & Brady

Intersection Alias: Brady

Access Code: 9999 Channel: 7 Address: 0 Revision: 3.32n

Access Data

Port 2 Comm :19200 Baud

Port 3 Comm :4800 Baud

## Phase Data

Vehical Basic Timings							Vehical Density Timings		Time B4	Cars	Time To	
Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red	Added Initial	Max_Initial	Reduction	Before	Reduce	Min_Gap
1	5	2.0	12	14	3.0	2.0	0.0	0	0	0	0	0.0
2	15	5.0	40	45	3.7	2.4	0.0	0	0	0	0	0.0
3	5	2.0	20	28	3.0	2.0	0.0	0	0	0	0	0.0
4	10	3.5	25	25	3.7	2.5	0.0	0	0	0	0	0.0
5	5	2.0	15	17	3.0	2.0	0.0	0	0	0	0	0.0
6	15	5.0	40	45	3.7	2.4	0.0	0	0	0	0	0.0
7	5	2.0	16	20	3.0	2.0	0.0	0	0	0	0	0.0
8	10	3.5	25	25	3.7	2.5	0.0	0	0	0	0	0.0

Pedestrian Timing			Extended Actuated		General Control					Miscellaneous				
Phase	Ped Walk	Flashing Clear	Ped Clear	Rest in Walk	Non-Act Initialize	Veh Recall	Ped Recall	Recall Delay		Non Lock	Dual Entry	Last Car Passage	Conditional Service	No Simultaneous Gap Out
1	0	0	No	0	Inactive	None	None	0		Yes	No	No	No	No
2	7	27	No	0	Yellow	NonActI	Min	None	0	Yes	Yes	No	No	No
3	0	0	No	0	Inactive	None	None	0		Yes	No	No	No	No
4	7	30	No	0	Inactive	NonActII	None	None	0	Yes	Yes	No	No	No
5	0	0	No	0	Inactive	None	None	0		Yes	No	No	No	No
6	7	27	No	0	Yellow	NonActI	Min	None	0	Yes	Yes	No	No	No
7	0	0	No	0	Inactive	None	None	0		Yes	No	No	No	No
8	7	30	No	0	Inactive	NonActII	None	None	0	Yes	Yes	No	No	No

Special Sequence Default Data			Vehical Detector Phase Assignment				
			Assigned Phase	Mode	Switched Phase	Extend	Delay
			Default Data				

Pedestrian Detector Default Data			Special Detector Phase Assignment				
			Assign Phase	Mode	Switched Phase	Extend	Delay
			Default Data				

## Unit Data

General Control				Remote Flash			
Startup Time: 5sec Startup State: Flash Red Revert: 4sec				Test A = Flash			
Auto Ped Clear: No Stop Time Reset: No Alternate Sequence: 0				Flash Flash			
ABC connector Input Modes: 0				Channel Color			
ABC connector Output Modes: 0				Flash Flash			
D connector Input Modes: 0				Entry Exit			
D connector Output Modes: 0				Phase Phase Phase			
				Default Data - No Flash			
				Default Data - No Flash			

Overlaps															
Phase(s)															
A B C D E F G H I J K L M N O P															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring			Phase(s)																
Phase	Ring	Next Phase	Concurrent Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	2		1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
2	1	3		5	5	7	7	2	2	4	4								
3	1	4		6	6	8	8	5	6	7	8								
4	1	1																	
5	2	6																	
6	2	7																	
7	2	8																	
8	2	5																	

Alternate Sequences

Alternate Sequences

Port 1 Data

BIU Port Message  
Addr Status 40

Phase  
Pair(s)

Default Data

No  
Alternate  
Sequences

Channel Assignment											
Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set	
Ph.1 Veh	1	1 - Ph.1 RYG	1	Ph.2 Veh	2	2 - Ph.2 RYG	2	Ph.3 Veh	3	3 - Ph.3 RYG	3
Ph.4 Veh	4	4 - Ph.4 RYG	4	Ph.5 Veh	5	5 - Ph.5 RYG	5	Ph.6 Veh	6	6 - Ph.6 RYG	6
Ph.7 Veh	7	7 - Ph.7 RYG	7	Ph.8 Veh	8	8 - Ph.8 RYG	8	Ph.2 Ped	9	10 - Ph.2 DPW	10
Ph.4 Ped	10	12 - Ph.4 DPW	12	Ph.6 Ped	11	14 - Ph.6 DPW	14	Ph.8 Ped	12	16 - Ph.8 DPW	16
Ph.1 OLP	13	17 - Ph.1 RYG	17	Ph.2 OLP	14	18 - Ph.2 RYG	18	Ph.3 OLP	15	19 - Ph.3 RYG	19
Ph.4 OLP	16	20 - Ph.4 RYG	20	Ph.1 Ped	17	9 - Ph.1 DPW	9	Ph.3 Ped	18	11 - Ph.3 DPW	11
Ph.5 Ped	19	13 - Ph.5 DPW	13	Ph.7 Ped	20	15 - Ph.7 DPW	15				

Coordination Data

General Coordination Data

Operation Mode: 0=Free  
Coordination Mode: 2=Permissive  
Yield  
Maximum Mode: 0=Inhibit  
Correction Mode: 2=Short Way

Offset Mode: 0=Beg Grn  
Force Mode: 1=Cycle  
Max Dwell Time: 15  
Yield Period: 0  
Manual Dial: 1  
Manual Split: 1  
Manual Offset: 1

Dial/Split Cycle

1/1 120  
2/1 130  
3/1 130

## Split Times and Phase Mode:

### Dial 1 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	11	0=Actuated	2	47	1=Coordinate	3	24	0=Actuated	4	38	0=Actuated
5	14	0=Actuated	6	45	1=Coordinate	7	22	0=Actuated	8	39	0=Actuated

### Dial 2 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	10	0=Actuated	2	59	1=Coordinate	3	26	0=Actuated	4	35	0=Actuated
5	17	0=Actuated	6	48	1=Coordinate	7	20	0=Actuated	8	45	0=Actuated

### Dial 3 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	10	0=Actuated	2	62	1=Coordinate	3	22	0=Actuated	4	36	0=Actuated
5	15	0=Actuated	6	57	1=Coordinate	7	22	0=Actuated	8	36	0=Actuated

## Traffic Plan Data

Plan: **1/1/1** Offset Time: 16 Alt. Sequence: 0 Mode: 0=Normal

Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0

Plan: **2/1/1** Offset Time: 17 Alt. Sequence: 0 Mode: 0=Normal

Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0

Plan: **3/1/1** Offset Time: 12 Alt. Sequence: 0 Mode: 0=Normal

Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0

## Local TBC Data

Start of Daylight Saving Month: 3 Week: 2 Cycle Zero ReferenceHours: 24 Min: 0

End of Daylight Saving Month: 11 Week: 1

Source	Equate Days						
Day	1	2	3	4	5	6	7
2	3	4	5	6	0	0	0

## Traffic Data

					PHASE FUNCTION															
Event	Day	Time	D/S/O	flash	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	1	9:0	1/0/1		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	1	20:0	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	2	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	2	6:30	1/0/1		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	2	9:30	1/0/1		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	2	15:0	1/0/1		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	2	16:0	1/0/1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	2	18:0	1/0/1		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	2	21:0	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	7	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	7	8:30	1/0/1		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	7	19:0	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## AUX. Events

				Aux Outputs			Det. Diag.	Det. Rpt.	Det. Mult100	Special Function Outputs									
Event	Program	Day	Hour	Min.	1	2	3	D1	D2	D3	Dimming	1	2	3	4	5	6	7	8
1	1		0	0	<div></div>	<div></div>	<div></div>	<div></div>	<div>X</div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
2	2		0	0	<div></div>	<div></div>	<div></div>	<div></div>	<div>X</div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
3	7		0	0	<div></div>	<div></div>	<div></div>	<div></div>	<div>X</div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>

Default Data - No Special Day(s) or Week(s) Programmed

## Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8
Special Function 1	X							
Special Function 2		X						
Special Function 3			X					
Special Function 4				X				
Special Function 5					X			
Special Function 6						X		
Special Function 7							X	
Special Function 8								X

## Phase Function

Phase Function Map	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

## Dimming Data

Channel Red Yellow Green Alternate

☐ ☐ ☐ ☐

Default Data - No Dimming Programmed

## Preemption Data



General Preemption Data									
Ring Min Grn/Walk Time									
1	5								
2	5								
3	5								
4	5								
Flash > Preempt 1			Preempt 2 = Preempt 3			Preempt 4 = Preempt 5			
Preempt 1 = Preempt 2			Preempt 3 = Preempt 4			Preempt 5 = Preempt 6			

Preempt	Preempt Timers								Select			Track				Dwell	Return		
	Non-Locking	Link to Preempt	Delay	Extend	Duration	MaxCall	Lock-Out		Ped Clear	Yel	Red	Grn	Ped	Yel	Red	Green	Ped Clear	Yel	Red
1	No	0	0	0	0	0	0		8	4.0	2.0	0	0	4.0	2.0	5	0	4.0	2.0
2	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
3	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
4	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
5	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
6	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0

Preempt 1			Preempt 2			Preempt 3			Preempt 4			Preempt 5			Preempt 6		
Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls
1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes
2	No	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes
3	Yes	Yes	3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes
4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes
5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes
6	No	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes
7	Yes	Yes	7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes
8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes

Priority Timers									
Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases	
1	No	0	0	0	0	0	0	0=Do not Skip Phases	
2	No	0	0	0	0	0	0	0=Do not Skip Phases	
3	No	0	0	0	0	0	0	0=Do not Skip Phases	
4	No	0	0	0	0	0	0	0=Do not Skip Phases	
5	No	0	0	0	0	0	0	0=Do not Skip Phases	
6	No	0	0	0	0	0	0	0=Do not Skip Phases	

Priority 1			Priority 2			Priority 3			Priority 4			Priority 5			Priority 6		
Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls

Preempt 1									
Vehical Phases			Pedestrian Phases						Overlaps
Ph. Track	Dwell	Cycle	Ph Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle	
2	Red	Green	Default Data						Default Data
6	Red	Green							

Preempt 2									
Vehical Phases			Pedestrian Phases						Overlaps
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle	
4	Red	Green	Default Data						Default Data
7	Red	Green							

### Preempt 3

Vehical Phases				Pedestrian Phases			Overlaps			
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Ovlp.	Track	Dwell	Cycle
3	Green	Red	No	<b>Default Data</b>			2	Red	Grn	No
4	Red	Green	No				3	Grn	Red	No
8	Green	Green	No				4	Grn	Grn	No

### Preempt 4

Vehical Phases				Pedestrian Phases			Overlaps			
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	<b>Default Data</b>			4	Red	Grn	No
7	Green	Red	No				1	Grn	Red	No
8	Red	Green	No				2	Grn	Grn	No

### Preempt 5

Vehical Phases				Pedestrian Phases			Overlaps			
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	<b>Default Data</b>			4	Red	Grn	No
7	Green	Red	No				1	Grn	Red	No
8	Red	Green	No				2	Grn	Grn	No

### Preempt 6

Vehical Phases				Pedestrian Phases			Overlaps			
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	<b>Default Data</b>			4	Red	Grn	No
7	Green	Red	No				1	Grn	Red	No
8	Red	Green	No				2	Grn	Grn	No

## System/Detectors Data

### Local Critical Alarms

Revert to Backup: 15      1st Phone:  
Local Free: No    Cycle Failure: No    Coord Failure: No    Conflict Flash: No    Remote Flash: No    2nd Phone:  
Local Fash: No    Cycle Fault: No    Coord Fault: No    Preemption: No    Voltage Monitor: No  
Special Status 1: No    Special Status 2: No    Special Status 3: No    Special Status 4: No    Special Status 5: No    Special Status 6: No

### Traffic Responsive

System	Detector	Average	Occupancy	Min	Queue 1	System	Weight	Queue 2	System	Weight
Detector	Channel	Veh/Hr	Time(mins)	Correction/10	Volume %	Detectors	Detectors	Detectors	Detectors	Factor
1	65	900	4	1	98	<b>Default Data</b>		<b>Default Data</b>		
2	66	900	4	1	98					
3	67	900	4	1	98					
4	68	900	4	1	98					
5	69	900	4	1	98					
6	70	900	4	1	98					
7	71	900	4	1	98					

Sample Interval:

Queue: 1    Input Selection: 0=Average    Queue:  
Detector Failed Level : 0    Level    Enter    Leave    Dial / Split / Offset  
Queue: 2    Input Selection: 0=Average    / /  
Detector Failed Level : 0    **Default Data**

### Vehical Detector

Diagnostic Value 0  
Max    No    Erratic  
Detector    Presence    Activity    Count

**Default Data - Diag 0 Values**

### Vehical Detector

Diagnostic Value 1  
Max    No    Erratic  
Detector    Presence    Activity    Count

**Default Data - No Diag 1 Values**

### Special Detector

Diagnostic Value 0  
Max    No    Erratic  
Detector    Presence    Activity    Count

**Default Data - No Diag 0 Val**

Pedestrian Detector  
Diagnostic Value 0  
Max No Erratic  
Detector Presence Activity Count

Default Data - No Diag 0 Values

Speed Trap Data  
Speed Trap:  
Measurement:  
Detector 1 Detector\_2 Distance :

Default Data  
Volume Detector Data

Report Interval  
Volume Controller  
Detector Detector  
Number Channel

Default Data

Pedestrian Detector  
Diagnostic Value 1  
Max No Erratic  
Detector Presence Activity Count

Default Data - No Diag 1 Values

Dial/Split/Offset  
//  
Default Data

Special Detector  
Diagnostic Value 1  
Max No Erratic  
Detector Presence Activity Count

Default Data - No Diag 1 Values

Speed Trap Speed Trap  
Low Treshold High Treshold

# Programmed EPAC Data

4/6/2022  
10:06:18AM

**Intersection Name: Paris & Van Horne**

**Intersection Alias: Van Horne**

Access Code: 9999 Channel: 1 Address: 14 Revision: 3.13b

**Access Data**

Port 2 Comm :19200 Baud

Port 3 Comm :19200 Baud

## Phase Data

Vehical Basic Timings							Vehical Density Timings			Time B4	Cars	Time To	
Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red	Added Initial	Max_Initial	Reduction	Before	Reduce	Min_Gap	
1	5	2.0	15	15	3.0	1.0	0.0	0	0	0	0	0.0	
2	15	3.5	35	35	3.7	2.4	0.0	0	0	0	0	0.0	
4	7	2.5	25	25	3.7	3.0	0.0	0	0	0	0	0.0	
5	5	2.0	6	6	3.0	1.0	0.0	0	0	0	0	0.0	
6	15	3.5	35	35	3.7	2.4	0.0	0	0	0	0	0.0	
8	7	2.5	25	25	3.7	3.0	0.0	0	0	0	0	0.0	

Pedestrian Timing			Extended Actuated			General Control					Miscellaneous				
Phase	Ped Walk	Flashing Clear	Ped Clear	Rest in Walk		Non-Act Initialize	Veh Response	Ped Recall	Recall Delay		Non Lock	Dual Entry	Last Car Passage	Conditional Service	No Simultaneous Gap Out
1	0	0	No	0	No	Inactive	None	None	None	0	Yes	No	No	No	No
2	7	25	No	0	No	Yellow	NonActI	Max	None	0	No	Yes	No	No	No
4	7	35	No	0	No	Inactive	NonActII	None	None	0	Yes	Yes	No	No	No
5	0	0	No	0	No	Inactive	None	None	None	0	Yes	No	No	No	No
6	7	25	No	0	No	Yellow	NonActI	Max	None	0	No	Yes	No	No	No
8	7	35	No	0	No	Inactive	NonActII	None	None	0	Yes	Yes	No	No	No

Special Sequence			Vehical Detector Phase Assignment					
Default Data				Assigned Phase	Mode	Switched Phase	Extend	Delay
			Vehical Detector Channel :3					
				4	Veh	0	0.0	0
			Vehical Detector Channel :6					
				4	Veh	0	0.0	0
			Vehical Detector Channel :7					
				4	Veh	0	0.0	0
			Default Data					

Pedestrian Detector			Special Detector Phase Assignment					
Default Data				Assign Phase	Switched Phase	Extend	Delay	
			:					
			Default Data					

## Unit Data

General Control				Remote Flash			
Startup Time: 5sec Startup State: Flash Red Revert: 4sec				Test A = Flash			
Auto Ped Clear: No Stop Time Reset: No Alternate Sequence: 0				Channel Color Flash Alternat			
ABC connector Input Modes: 0				Flash Entry Exit			
ABC connector Output Modes: 0				Phase Phase Phase			
D connector Input Modes: 0				Default Data - No Flash			
D connector Output Modes: 0				Default Data - No Flash			
	1	Ring 1	Ring 1				
	2	Ring 2	Ring 2				
	3	None	None				
	4	None	None				

Overlaps															
Phase(s)															
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring			Phase(s)																
Phase	Ring	Next Phase	Concurrent Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	2		1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
2	1	3		5	5	7	7	2	2	4	4								
4	1	1		6	6	8	8	5	6	7	8								
5	2	6																	
6	2	7																	
8	2	5																	

Alternate Sequences

Alternate Sequences

Port 1 Data

BIU Port Message  
Addr Status 40

Phase  
Pair(s)

Default Data

No  
Alternate  
Sequences

Channel Assignment											
Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set	
Ph.1 Veh	1	1 - Ph.1 RYG	1	Ph.2 Veh	2	2 - Ph.2 RYG	2	Ph.3 Veh	3	3 - Ph.3 RYG	3
Ph.4 Veh	4	4 - Ph.4 RYG	4	Ph.5 Veh	5	5 - Ph.5 RYG	5	Ph.6 Veh	6	6 - Ph.6 RYG	6
Ph.7 Veh	7	7 - Ph.7 RYG	7	Ph.8 Veh	8	8 - Ph.8 RYG	8	Ph.2 Ped	9	10 - Ph.2 DPW	10
Ph.4 Ped	10	12 - Ph.4 DPW	12	Ph.6 Ped	11	14 - Ph.6 DPW	14	Ph.8 Ped	12	16 - Ph.8 DPW	16
Ph.1 OLP	13	17 - Ph.1 RYG	17	Ph.2 OLP	14	18 - Ph.2 RYG	18	Ph.3 OLP	15	19 - Ph.3 RYG	19
Ph.4 OLP	16	20 - Ph.4 RYG	20	Ph.1 Ped	17	9 - Ph.1 DPW	9	Ph.3 Ped	18	11 - Ph.3 DPW	11
Ph.5 Ped	19	13 - Ph.5 DPW	13	Ph.7 Ped	20	15 - Ph.7 DPW	15				

Coordination Data

General Coordination Data

Operation Mode: 1=Auto  
Coordination Mode: 0=Permissive  
Maximun Mode: 0=Inhibit  
Correction Mode: 3=Short Way Plus

Offset Mode: 0=Beg Grn  
Force Mode: 0=Plan  
Max Dwell Time: 15  
Yield Period: 0  
Manual Dial: 1  
Manual Split: 1  
Manual Offset: 1

Dial/Split Cycle

1/1 120  
2/1 120  
3/1 120

## Split Times and Phase Mode:

### Dial 1 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	11	0=Actuated	2	57	1=Coordinate	4	52	0=Actuated	5	18	0=Actuated
6	50	1=Coordinate	8	52	0=Actuated						

### Dial 2 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	14	0=Actuated	2	55	1=Coordinate	4	51	0=Actuated	5	14	0=Actuated
6	55	1=Coordinate	8	51	0=Actuated						

### Dial 3 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	14	0=Actuated	2	55	1=Coordinate	4	51	0=Actuated	5	14	0=Actuated
6	55	1=Coordinate	8	51	0=Actuated						

## Traffic Plan Data

Plan: 4/1/1 Offset Time: 100 Alt. Sequence: 0 Mode: 0=Normal

Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0

## Local TBC Data

Start of Daylight Saving Month: 3 Week: 2 Cycle Zero Reference Hours: 24 Min: 0

End of Daylight Saving Month: 11 Week: 1

Source	Equate Days						
Day	1	2	3	4	5	6	7
2	3	4	5	6	0	0	0

## Traffic Data

					PHASE FUNCTION															
Event	Day	Time	D/S/O	flash	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>
1	1	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	1	9:0	1/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	1	21:30	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	2	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	2	6:30	1/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	2	21:30	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	7	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	7	8:0	1/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	7	21:30	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## AUX. Events

				Det.			Det.		Det.	Special Function Outputs									
Event	Program	Day	Hour	Min.	Aux	Outputs	Diag.	Rpt.	Mult	100	Dimming	1	2	3	4	5	6	7	8
					1	2	3	D1	D2	D3									
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Default Data - No Special Day(s) or Week(s) Programmed

## Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8
Special Function 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Special Function 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



## Phase Function

Phase Function Map	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

## Dimming Data

Channel Red Yellow Green Alternate

☐ ☐ ☐ ☐

Default Data - No Dimming Programmed

## Preemption Data

### General Preemption Data

Ring Min Grn/Walk Time

1 5  
2 5  
3 5  
4 5

Flash > Preempt 1      Preempt 2 = Preempt 3      Preempt 4 = Preempt 5  
Preempt 1 = Preempt 2      Preempt 3 = Preempt 4      Preempt 5 = Preempt 6

Preempt	Preempt Timers								Select			Track				Dwell Green	Return		
	Non- Locking	Link to Preemnt	Delay	Extend	Duration	MaxCall	Lock-Out	Ped Clear	Yel	Red	Grn	Ped	Yel	Red	Ped Clear		Yel	Red	
1	No	0	0	0	0	0	0	8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0	
2	No	0	0	0	0	0	0	8	4.0	2.0	0	0	4.0	2.0	5	0	4.0	2.0	
3	No	0	0	0	0	0	0	8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0	
4	No	0	0	0	0	0	0	8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0	
5	No	0	0	0	0	0	0	8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0	
6	No	0	0	0	0	0	0	8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0	

Preempt 1			Preempt 2			Preempt 3			Preempt 4			Preempt 5			Preempt 6		
Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls
1	No	Yes	2	Yes	No	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes
2	No	Yes	6	Yes	No	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes
3	No	Yes				3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes
4	Yes	Yes				4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes
5	No	Yes				5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes
6	No	Yes				6	Yes	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes
7	No	Yes				7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes
8	Yes	Yes				8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes

### Priority Timers

Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases
1	No	0	0	0	0	0	0	0=Do not Skip Phases
2	No	0	0	0	0	0	0	0=Do not Skip Phases
3	No	0	0	0	0	0	0	0=Do not Skip Phases
4	No	0	0	0	0	0	0	0=Do not Skip Phases
5	No	0	0	0	0	0	0	0=Do not Skip Phases
6	No	0	0	0	0	0	0	0=Do not Skip Phases

Priority 1			Priority 2			Priority 3			Priority 4			Priority 5			Priority 6		
Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls

### Preempt 1

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
2 Red	Green	No	<b>Default Data</b>			C Red	Green	No
6 Red	Green	No				D Red	Green	No

### Preempt 2

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
4 Red	Green	No	<b>Default Data</b>			<b>Default Data</b>		
8 Red	Green	No						

### Preempt 3

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
3 Green	Red	No	<b>Default Data</b>			2 Red	Grn	No
4 Red	Green	No				3 Grn	Red	No
8 Green	Green	No				4 Grn	Grn	No

## Preempt 4

Vehical Phases				Pedestrian Phases			Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	Default Data			4	Red	Grn	No	
7	Green	Red	No				1	Grn	Red	No	
8	Red	Green	No				2	Grn	Grn	No	

## Preempt 5

Vehical Phases				Pedestrian Phases			Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	Default Data			4	Red	Grn	No	
7	Green	Red	No				1	Grn	Red	No	
8	Red	Green	No				2	Grn	Grn	No	

## Preempt 6

Vehical Phases				Pedestrian Phases			Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	Default Data			4	Red	Grn	No	
7	Green	Red	No				1	Grn	Red	No	
8	Red	Green	No				2	Grn	Grn	No	

## System/Detectors Data

### Local Critical Alarms

Revert to Backup: 15      1st Phone:  
Local Free: No    Cycle Failure: No    Coord Failure: No    Conflict Flash: No    Remote Flash: No    2nd Phone:  
Local Fash: No    Cycle Fault: No    Coord Fault: No    Preemption: No    Voltage Monitor: No  
Special Status 1: No    Special Status 2: No    Special Status 3: No    Special Status 4: No    Special Status 5: No    Special Status 6: No

### Traffic Responsive

System	Detector	Average	Occupancy	Min	Queue 1	System	Weight	Queue 2	System	Weight	
Detector	Channel	Veh/Hr	Time(mins)	Correction/10	Volume %	Detectors	Detectors	Factor	Detectors	Detectors	Factor

### Default Data

Sample Interval:

### Default Data

Queue: 1    Input Selection: 0=Average    Queue:  
Detector Failed Level : 0    Level    Enter    Leave    Dial / Split / Offset  
Queue: 2    Input Selection: 0=Average  
Detector Failed Level : 0    //

### Default Data

### Vehical Detector

Diagnostic Value 0  
Max    No    Erratic  
Detector    Presence    Activity    Count

### Vehical Detector

Diagnostic Value 1  
Max    No    Erratic  
Detector    Presence    Activity    Count

### Special Detector

Diagnostic Value 0  
Max    No    Erratic  
Detector    Presence    Activity    Count

### Default Data - Diag 0 Values

### Default Data - No Diag 1 Values

### Default Data - No Diag 0 Val

### Pedestrian Detector

Diagnostic Value 0  
Max    No    Erratic  
Detector    Presence    Activity    Count

### Pedestrian Detector

Diagnostic Value 1  
Max    No    Erratic  
Detector    Presence    Activity    Count

### Special Detector

Diagnostic Value 1  
Max    No    Erratic  
Detector    Presence    Activity    Count

### Default Data - No Diag 0 Values

### Default Data - No Diag 1 Values

### Default Data - No Diag 1 Values

### Speed Trap Data

Speed Trap:

Measurement:  
Detector 1    Detector\_2    Distance :

Dial/Split/Offset  
//

Speed Trap    Speed Trap  
Low Treshold    High Treshold

### Default Data

### Default Data

Volume Detector Data

Report Interval	
Volume Controller	
Detector	Detector
Number	Channel

Default Data

# Programmed EPAC Data

4/6/2022  
10:10:05AM

Intersection Name: Paris & John

Intersection Alias: John

Access Code: 9999 Channel: 7 Address: 16 Revision: 3.13

Access Data

Port 2 Comm :1200 Baud

Port 3 Comm :1200 Baud

## Phase Data

Vehical Basic Timings							Vehical Density Timings			Time B4	Cars	Time To	
Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red	Added Initial	Max_Initial	Reduction	Before	Reduce	Min_Gap	
1	5	2.5	10	10	3.0	1.0	0.0	0	0	0	0	0.0	
2	20	4.0	45	45	3.7	2.1	0.0	0	0	0	0	0.0	
4	8	3.5	20	20	3.7	2.0	0.0	0	0	0	0	0.0	
6	20	4.0	45	45	3.7	2.1	0.0	0	0	0	0	0.0	
8	8	3.5	20	20	3.7	2.0	0.0	0	0	0	0	0.0	

Pedestrian Timing			Extended Actuated		General Control					Miscellaneous				
Phase	Ped Walk	Flashing Clear	Ped Clear	Rest in Walk	Non-Act Initialize	Veh Response	Ped Recall	Recall Delay	Non Lock	Dual Entry	Last Car Passage	Conditional Service	Simultaneous Gap	No Out
1	0	0	No	0	Inactive	None	None	0	Yes	No	No	No	No	No
2	7	13	No	0	Yellow	NonActI	Min	None	Yes	Yes	No	No	No	No
4	7	22	No	0	Inactive	NonActII	None	0	Yes	Yes	No	No	No	No
6	7	13	No	0	Yellow	NonActI	Min	None	Yes	Yes	No	No	No	No
8	7	22	No	0	Inactive	NonActII	None	0	Yes	Yes	No	No	No	No

Special Sequence		Vehical Detector Phase Assignment					
Default Data		Assigned Phase	Mode	Switched Phase	Extend	Delay	
		Vehical Detector Channel :1	1	Veh	0	0.0	0
		Vehical Detector Channel :2	2	Veh	0	0.0	0
		Vehical Detector Channel :3	4	Veh	0	0.0	0
		Vehical Detector Channel :4	4	Veh	0	0.0	3
		Vehical Detector Channel :5	5	Veh	0	0.0	0
		Vehical Detector Channel :6	6	Veh	0	0.0	0
		Vehical Detector Channel :7	7	Veh	0	0.0	0
		Vehical Detector Channel :8	8	Veh	0	0.0	0

Pedestrian Detector		Special Detector Phase Assignment				
Default Data		Assign Phase	Switched Mode	Switched Phase	Extend	Delay
		:				
		Default Data				

## Unit Data

General Control				Remote Flash			
Startup Time: 5sec Startup State: Flash Red Revert: 4sec				Test A = Flash			
Auto Ped Clear: No Stop Time Reset: No Alternate Sequence: 0				Flash Channel Color Flash Alternat			
ABC connector Input Modes: 0				Flash Entry Exit			
ABC connector Output Modes: 0				Phase Phase Phase			
D connector Input Modes: 0				Default Data - No Flash			
D connector Output Modes: 0				Default Data - No Flash			

Overlaps															
Phase(s)															
1															
2															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring			Phase(s)																
		Next	Concurrent Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Phase	Ring	Phase		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	2		1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
2	1	3		5	5	7	7	2	2	4	4								
4	1	1		6	6	8	8	5	6	7	8								
6	2	7																	
8	2	5																	

Alternate Sequences

Alternate Sequences

Port 1 Data

BIU Port Message  
Addr Status 40

Phase  
Pair(s)

Default Data

No  
Alternate  
Sequences

Channel Assignment											
Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set	
Ph.1 Veh	1	1 - Ph.1 RYG	1	Ph.2 Veh	2	2 - Ph.2 RYG	2	Ph.3 Veh	3	3 - Ph.3 RYG	3
Ph.4 Veh	4	4 - Ph.4 RYG	4	Ph.5 Veh	5	5 - Ph.5 RYG	5	Ph.6 Veh	6	6 - Ph.6 RYG	6
Ph.7 Veh	7	7 - Ph.7 RYG	7	Ph.8 Veh	8	8 - Ph.8 RYG	8	Ph.2 Ped	9	10 - Ph.2 DPW	10
Ph.4 Ped	10	12 - Ph.4 DPW	12	Ph.6 Ped	11	14 - Ph.6 DPW	14	Ph.8 Ped	12	16 - Ph.8 DPW	16
Ph.1 OLP	13	17 - Ph.1 RYG	17	Ph.2 OLP	14	18 - Ph.2 RYG	18	Ph.3 OLP	15	19 - Ph.3 RYG	19
Ph.4 OLP	16	20 - Ph.4 RYG	20	Ph.1 Ped	17	9 - Ph.1 DPW	9	Ph.3 Ped	18	11 - Ph.3 DPW	11
Ph.5 Ped	19	13 - Ph.5 DPW	13	Ph.7 Ped	20	15 - Ph.7 DPW	15				

Coordination Data

Dial/Split Cycle

General Coordination Data

1/1 110

Operation Mode: 1=Auto

Offset Mode: 0=Beg Grn

Manual Dial: 1

2/1 110

Coordination Mode: 0=Permissive

Force Mode: 0=Plan

Manual Split: 1

3/1 110

Maximun Mode: 0=Inhibit

Max Dwell Time: 15

Manual Offset: 1

Correction Mode: 2=Short Way

Yield Period: 0



## Split Times and Phase Mode:

### Dial 1 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	11	0=Actuated	2	62	1=Coordinate	4	37	0=Actuated	6	73	1=Coordinate
8	37	0=Actuated									

### Dial 2 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	13	0=Actuated	2	60	1=Coordinate	4	37	0=Actuated	6	73	1=Coordinate
8	37	0=Actuated									

### Dial 3 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	13	0=Actuated	2	60	1=Coordinate	4	37	0=Actuated	6	73	1=Coordinate
8	37	0=Actuated									

## Traffic Plan Data

Plan: 1/1/1	Offset Time: 55	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 1/2/1	Offset Time: 71	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 1/3/1	Offset Time: 71	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 2/1/1	Offset Time: 43	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 2/2/1	Offset Time: 71	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 3/1/1	Offset Time: 8	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 3/2/1	Offset Time: 71	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0

## Local TBC Data

Start of Daylight Saving Month: 3 Week: 2 Cycle Zero ReferenceHours: 24 Min: 0  
End of Daylight Saving Month: 11 Week: 1

Source	Equate Days						
Day	1	2	3	4	5	6	7
2	3	4	5	6	0	0	0

## Traffic Data

					PHASE FUNCTION															
Event	Day	Time	D/S/O	flash	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	1	8:30	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	1	9:30	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	2	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	2	6:30	1/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	2	9:30	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	2	15:30	3/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	2	18:0	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	2	21:30	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	7	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	7	8:0	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	7	21:0	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## AUX. Events

				Det.				Special Function Outputs											
Event	Program	Day	Hour	Min.	Aux	Outpts	Det.	Det.	Det.	Dimming									
					1	2	3	Diag.	Rpt.		Mult100	1	2	3	4	5	6	7	8
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	D1	D2		D3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Default Data - No Special Day(s) or Week(s) Programmed

## Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8
Special Function 1	X							
Special Function 2		X						
Special Function 3			X					
Special Function 4				X				
Special Function 5					X			
Special Function 6						X		
Special Function 7							X	
Special Function 8								X

## Phase Function

Phase Function Map	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

## Dimming Data

Channel Red Yellow Green Alternate

☐ ☐ ☐ ☐

Default Data - No Dimming Programmed

## Preemption Data

General Preemption Data									
Ring Min Grn/Walk Time									
1	5								
2	5								
3	5								
4	5								
Flash > Preempt 1		Preempt 2 = Preempt 3			Preempt 4 = Preempt 5				
Preempt 1 = Preempt 2		Preempt 3 = Preempt 4			Preempt 5 = Preempt 6				

Preempt	Preempt Timers								Select			Track				Dwell	Return		
	Non-Locking	Link to Preempt	Delay	Extend	Duration	MaxCall	Lock-Out		Ped Clear	Yel	Red	Grn	Ped	Yel	Red	Green	Ped Clear	Yel	Red
1	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
2	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
3	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
4	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
5	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
6	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0

Preempt 1			Preempt 2			Preempt 3			Preempt 4			Preempt 5			Preempt 6		
Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls
4	Yes	No	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes
8	Yes	No	2	No	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes
			3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes
			4	Yes	Yes	4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes
			5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes
			6	No	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes
			7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes
			8	Yes	Yes	8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes

Priority Timers									
Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases	
1	No	0	0	0	0	0	0	0=Do not Skip Phases	
2	No	0	0	0	0	0	0	0=Do not Skip Phases	
3	No	0	0	0	0	0	0	0=Do not Skip Phases	
4	No	0	0	0	0	0	0	0=Do not Skip Phases	
5	No	0	0	0	0	0	0	0=Do not Skip Phases	
6	No	0	0	0	0	0	0	0=Do not Skip Phases	

Priority 1			Priority 2			Priority 3			Priority 4			Priority 5			Priority 6		
Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls	Exit Phase	Exit Phase	Exit Calls

Preempt 1									
Vehical Phases			Pedestrian Phases						Overlaps
Ph. Track	Dwell	Cycle	Ph Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle	
2	Red	Green	Default Data						Default Data
6	Red	Green							

Preempt 2									
Vehical Phases			Pedestrian Phases						Overlaps
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle	
2	Green	Green	Default Data						1 Red Grn No
5	Green	Red							2 Grn Red No
6	Red	Green							3 Grn Grn No

### Preempt 3

Vehical Phases				Pedestrian Phases			Overlaps			
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Ovlp.	Track	Dwell	Cycle
3	Green	Red	No	<b>Default Data</b>			2	Red	Grn	No
4	Red	Green	No				3	Grn	Red	No
8	Green	Green	No				4	Grn	Grn	No

### Preempt 4

Vehical Phases				Pedestrian Phases			Overlaps			
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	<b>Default Data</b>			4	Red	Grn	No
7	Green	Red	No				1	Grn	Red	No
8	Red	Green	No				2	Grn	Grn	No

### Preempt 5

Vehical Phases				Pedestrian Phases			Overlaps			
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	<b>Default Data</b>			4	Red	Grn	No
7	Green	Red	No				1	Grn	Red	No
8	Red	Green	No				2	Grn	Grn	No

### Preempt 6

Vehical Phases				Pedestrian Phases			Overlaps			
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	<b>Default Data</b>			4	Red	Grn	No
7	Green	Red	No				1	Grn	Red	No
8	Red	Green	No				2	Grn	Grn	No

## System/Detectors Data

### Local Critical Alarms

Revert to Backup: 15      1st Phone:  
Local Free: No    Cycle Failure: No    Coord Failure: No    Conflict Flash: No    Remote Flash: No    2nd Phone:  
Local Fash: No    Cycle Fault: No    Coord Fault: No    Preemption: No    Voltage Monitor: No  
Special Status 1: No    Special Status 2: No    Special Status 3: No    Special Status 4: No    Special Status 5: No    Special Status 6: No

### Traffic Responsive

System	Detector	Average	Occupancy	Min	Queue 1	System	Weight	Queue 2	System	Weight
Detector	Channel	Veh/Hr	Time(mins)	Correction/10	Volume %	Detectors	Detectors	Detectors	Detectors	Factor
1	71	100	1	10	0	<b>Default Data</b>		<b>Default Data</b>		
2	72	100	1	10	0					

Sample Interval:

<b>Queue: 1</b>				<b>Queue: 1</b>			
Input Selection: 0=Average				Level   Enter   Leave   Dial / Split / Offset			
Detector Failed Level : 0				1	1	1	2 / 2 / 1
<b>Queue: 2</b>				2	1	1	2 / 2 / 1
Input Selection: 0=Average				<b>Queue: 2</b>			
Detector Failed Level : 0				Level   Enter   Leave   Dial / Split / Offset			
				1	1	1	3 / 2 / 1
				2	1	1	3 / 2 / 1

### Vehical Detector

Diagnostic Value 0			
Detector	Max Presence	No Activity	Erratic Count
1	60	0	0
4	60	0	0

### Vehical Detector

Diagnostic Value 1			
Detector	Max Presence	No Activity	Erratic Count
<b>Default Data - No Diag 1 Values</b>			

### Special Detector

Diagnostic Value 0			
Detector	Max Presence	No Activity	Erratic Count
1	60	0	0
2	60	0	0
<b>Default Data - No Diag 0 Val</b>			

	Diagnostic Value 0		
	Max	No	Erratic
Detector	Presence	Activity	Count
4	60	0	0

# Programmed EPAC Data

4/6/2022  
10:10:51AM

Intersection Name: Paris & Boland

Intersection Alias: Boland

Access Code: 9999 Channel: 7 Address: 17 Revision: 3.13

Access Data

Port 2 Comm :1200 Baud

Port 3 Comm :1200 Baud

## Phase Data

<u>Vehical Basic Timings</u>								<u>Vehical Density Timings</u>			Time B4	Cars	Time To	
Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red	Added Initial	Max_Initial	Reduction	Before	Reduce	Min_Gap		
2	30	5.0	50	50	3.7	2.2	0.0	0	0	0	0	0.0		
4	8	3.5	20	20	3.5	2.5	0.0	0	0	0	0	0.0		
6	30	5.0	50	50	3.7	2.2	0.0	0	0	0	0	0.0		
8	8	3.5	20	20	3.5	2.5	0.0	0	0	0	0	0.0		

Pedestrian Timing			Extended Actuated		General Control					Miscellaneous				
Phase	Ped Walk	Flashing Clear	Ped Clear	Rest in Walk	Non-Act Initialize	Veh Response	Ped Recall	Recall Delay		Non Lock	Dual Entry	Last Car Passage	Conditional Service	No Simultaneous Gap Out
2	7	20	No	0	Yellow	NonActI	Min	None	0	Yes	Yes	No	No	No
4	7	18	No	0	Inactive	NonActII	None	None	0	Yes	Yes	No	No	No
6	7	20	No	0	Yellow	NonActI	Min	None	0	Yes	Yes	No	No	No
8	7	18	No	0	Inactive	NonActII	None	None	0	Yes	Yes	No	No	No

Special Sequence Default Data		Vehical Detector Phase Assignment				
		Assigned Phase	Mode	Switched Phase	Extend	Delay
		Default Data				

Pedestrian Detector Default Data		Special Detector Phase Assignment				
		Assign Phase	Mode	Switched Phase	Extend	Delay
		Default Data				

## Unit Data

General Control				Remote Flash			
Startup Time: 5sec Startup State: Flash Red Revert: 4sec				Test A = Flash			
Auto Ped Clear: No Stop Time Reset: No Alternate Sequence: 0				Channel Color			
ABC connector Input Modes: 0				Flash Entry Flash Exit			
ABC connector Output Modes: 0				Phase Phase Phase			
D connector Input Modes: 0				Default Data - No Flash			
D connector Output Modes: 0				Default Data - No Flash			

Overlaps																
Phase(s)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Ring			Concurrent Phases	Phase(s)															
Phase	Ring	Next Phase		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
2	1	3		1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
4	1	1		5	5	7	7	2	2	4	4								
6	2	7		6	6	8	8	5	6	7	8								
8	2	5																	

## Alternate Sequences

Alternate Sequences

## Port 1 Data

BIU Port Message  
Addr Status 40

Phase  
Pair(s)

## Default Data

No  
Alternate  
Sequences

## Channel Assignment

Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set	
Ph.1 Veh	1	1 - Ph.1 RYG	1	Ph.2 Veh	2	2 - Ph.2 RYG	2	Ph.3 Veh	3	3 - Ph.3 RYG	3
Ph.4 Veh	4	4 - Ph.4 RYG	4	Ph.5 Veh	5	5 - Ph.5 RYG	5	Ph.6 Veh	6	6 - Ph.6 RYG	6
Ph.7 Veh	7	7 - Ph.7 RYG	7	Ph.8 Veh	8	8 - Ph.8 RYG	8	Ph.2 Ped	9	10 - Ph.2 DPW	10
Ph.4 Ped	10	12 - Ph.4 DPW	12	Ph.6 Ped	11	14 - Ph.6 DPW	14	Ph.8 Ped	12	16 - Ph.8 DPW	16
Ph.1 OLP	13	17 - Ph.1 RYG	17	Ph.2 OLP	14	18 - Ph.2 RYG	18	Ph.3 OLP	15	19 - Ph.3 RYG	19
Ph.4 OLP	16	20 - Ph.4 RYG	20	Ph.1 Ped	17	9 - Ph.1 DPW	9	Ph.3 Ped	18	11 - Ph.3 DPW	11
Ph.5 Ped	19	13 - Ph.5 DPW	13	Ph.7 Ped	20	15 - Ph.7 DPW	15				

## Coordination Data

General Coordination Data

Operation Mode: 1=Auto  
Coordination Mode: 0=Permissive  
Maximum Mode: 0=Inhibit  
Correction Mode: 2=Short Way

Offset Mode: 0=Beg Grn  
Force Mode: 0=Plan  
Max Dwell Time: 15  
Yield Period: 0

Manual Dial: 1  
Manual Split: 1  
Manual Offset: 1

Dial/Split Cycle

1/1 110  
2/1 110  
3/1 110

## Split Times and Phase Mode:

Dial 1 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	10	0=Actuated	2	67	1=Coordinate	4	33	0=Actuated	6	77	1=Coordinate
8	33	0=Actuated									

Dial 2 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	10	0=Actuated	2	67	1=Coordinate	4	33	0=Actuated	6	77	1=Coordinate
8	33	0=Actuated									

Dial 3 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	12	0=Actuated	2	65	1=Coordinate	4	33	0=Actuated	6	77	1=Coordinate
8	33	0=Actuated									

## Traffic Plan Data

Plan: 1/1/1 Offset Time: 8 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 1/2/1 Offset Time: 16 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 1/3/1 Offset Time: 16 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 1/4/1 Offset Time: 6 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 2/1/1 Offset Time: 104 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 2/2/1 Offset Time: 12 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 2/3/1 Offset Time: 16 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 2/4/1 Offset Time: 6 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 3/1/1 Offset Time: 63 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 3/2/1 Offset Time: 12 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 4/1/1 Offset Time: 6 Alt. Sequence: 0 Mode: 0=Normal

Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0

## Local TBC Data

Start of Daylight Saving Month: 3 Week: 2 Cycle Zero Reference Hours: 24 Min: 0  
 End of Daylight Saving Month: 11 Week: 1

Source		Equate Days						
Day	1	2	3	4	5	6	7	
2	3	4	5	6	0	0	0	

## Traffic Data

				PHASE FUNCTION																
Event	Day	Time	D/S/O	flash	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	1	8:30	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	1	21:30	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	2	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	2	6:30	1/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	2	9:30	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	2	15:30	3/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	2	18:0	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	2	21:30	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	7	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	7	8:0	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	7	21:30	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## AUX. Events

				Det.			Det.	Det.	Special Function Outputs										
Event	Program	Day	Hour	Min.	Aux	Outpts	Diag.	Rpt.	Mult	100	Dimming	1	2	3	4	5	6	7	8
					1	2	3	D1	D2	D3									
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Default Data - No Special Day(s) or Week(s) Programmed

## Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8
Special Function 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Special Function 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## Phase Function

Phase Function Map	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

## Dimming Data

Channel Red Yellow Green Alternate

☐ ☐ ☐ ☐

Default Data - No Dimming Programmed

## Preemption Data

### General Preemption Data

Ring Min Grn/Walk Time

1 5  
2 5  
3 5  
4 5

Flash > Preempt 1      Preempt 2 = Preempt 3      Preempt 4 = Preempt 5  
Preempt 1 = Preempt 2      Preempt 3 = Preempt 4      Preempt 5 = Preempt 6

Preempt	Preempt Timers								Select			Track				Dwell Green	Return		
	Non-Link to	Delay	Extend	Duration	MaxCall	Lock-Out	Ped	Yel	Red	Grn	Ped	Yel	Red	Ped	Yel		Red		
	Locking Preempt						Clear							Clear				Clear	
1	No	0	0	0	0	0	0	17	4.0	2.0	0	0	4.0	2.0	5	0	4.0	2.0	
2	No	0	0	0	0	0	0	8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0	
3	No	0	0	0	0	0	0	8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0	
4	No	0	0	0	0	0	0	8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0	
5	No	0	0	0	0	0	0	8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0	
6	No	0	0	0	0	0	0	8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0	

Preempt 1			Preempt 2			Preempt 3			Preempt 4			Preempt 5			Preempt 6		
Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls
4	Yes	No	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes
8	Yes	No	2	No	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes
			3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes
			4	Yes	Yes	4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes
			5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes
			6	No	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes
			7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes
			8	Yes	Yes	8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes

### Priority Timers

Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases
1	No	0	0	0	0	0	0	0=Do not Skip Phases
2	No	0	0	0	0	0	0	0=Do not Skip Phases
3	No	0	0	0	0	0	0	0=Do not Skip Phases
4	No	0	0	0	0	0	0	0=Do not Skip Phases
5	No	0	0	0	0	0	0	0=Do not Skip Phases
6	No	0	0	0	0	0	0	0=Do not Skip Phases

Priority 1			Priority 2			Priority 3			Priority 4			Priority 5			Priority 6		
Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls

### Preempt 1

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
2 Red	Green	No	Default Data			Default Data		
6 Red	Green	No						

### Preempt 2

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
2 Green	Green	No	Default Data			1 Red	Grn	No
5 Green	Red	No				2 Grn	Red	No
6 Red	Green	No				3 Grn	Grn	No

### Preempt 3

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
3 Green	Red	No	Default Data			2 Red	Grn	No
4 Red	Green	No				3 Grn	Red	No
8 Green	Green	No				4 Grn	Grn	No

## Preempt 4

Vehical Phases				Pedestrian Phases			Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	Default Data			4	Red	Grn	No	
7	Green	Red	No				1	Grn	Red	No	
8	Red	Green	No				2	Grn	Grn	No	

## Preempt 5

Vehical Phases				Pedestrian Phases			Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	Default Data			4	Red	Grn	No	
7	Green	Red	No				1	Grn	Red	No	
8	Red	Green	No				2	Grn	Grn	No	

## Preempt 6

Vehical Phases				Pedestrian Phases			Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	Default Data			4	Red	Grn	No	
7	Green	Red	No				1	Grn	Red	No	
8	Red	Green	No				2	Grn	Grn	No	

## System/Detectors Data

### Local Critical Alarms

Revert to Backup: 15      1st Phone:  
Local Free: No    Cycle Failure: No    Coord Failure: No    Conflict Flash: No    Remote Flash: No    2nd Phone:  
Local Fash: No    Cycle Fault: No    Coord Fault: No    Premption: No    Voltage Monitor: No  
Special Status 1: No    Special Status 2: No    Special Status 3: No    Special Status 4: No    Special Status 5: No    Special Status 6: No

### Traffic Responsive

System	Detector	Average	Occupancy	Min	Queue 1	System	Weight	Queue 2	System	Weight
Detector	Channel	Veh/Hr	Time(mins)	Correction/10	Volume %	Detectors	Factor	Detectors	Detectors	Factor
1	71	100	1	10	0	<b>Default Data</b>		<b>Default Data</b>		
2	72	100	1	10	0					

Sample Interval:

<b>Queue: 1</b>		Input Selection: 0=Average		<b>Queue: 1</b>	
Detector Failed Level : 0		Level	Enter	Leave	Dial / Split / Offset
<b>Queue: 2</b>		Input Selection: 0=Average		1	1    1    2 / 2 / 1
Detector Failed Level : 0		2	1    1    2 / 2 / 1	<b>Queue: 2</b>	
		Level	Enter	Leave	Dial / Split / Offset
		1	1    1    3 / 2 / 1		
		2	1    1    3 / 2 / 1		

### Vehical Detector

Diagnostic Value 0			
Max	No	Erratic	
Detector	Presence	Activity	Count
1	60	0	0
4	60	0	0

### Vehical Detector

Diagnostic Value 1			
Max	No	Erratic	
Detector	Presence	Activity	Count
<b>Default Data - No Diag 1 Values</b>			

### Special Detector

Diagnostic Value 0			
Max	No	Erratic	
Detector	Presence	Activity	Count
1	60	0	0
2	60	0	0

### Default Data - No Diag 0 Values

### Pedestrian Detector

Diagnostic Value 0			
Max	No	Erratic	
Detector	Presence	Activity	Count
4	60	0	0
<b>Default Data - No Diag 0 Values</b>			

### Pedestrian Detector

Diagnostic Value 1			
Max	No	Erratic	
Detector	Presence	Activity	Count
<b>Default Data - No Diag 1 Values</b>			

### Special Detector

Diagnostic Value 1			
Max	No	Erratic	
Detector	Presence	Activity	Count
<b>Default Data - No Diag 1 Values</b>			

Speed Trap Data

Speed Trap:

Measurement:

Detector 1    Detector\_2    Distance :

Default Data

Volume Detector Data

Report Interval

Volume Controller

Detector    Detector

Number    Channel

Default Data

Dial/Split/Offset    Speed Trap    Speed Trap  
Low Treshold    High Treshold  
//

Default Data



# Programmed EPAC Data

4/6/2022  
10:12:08AM

Intersection Name: Paris & York

Intersection Alias: York

Access Code: 9999 Channel: 7 Address: 18 Revision: 3.13

Access Data

Port 2 Comm :1200 Baud

Port 3 Comm :1200 Baud

## Phase Data

Vehical Basic Timings							Vehical Density Timings		Time B4	Cars	Time To	
Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red	Added Initial	Max_Initial	Reduction	Before	Reduce	Min_Gap
2	30	4.0	45	45	4.2	2.0	0.0	0	0	0	0	0.0
4	8	3.0	20	20	3.3	2.2	0.0	0	0	0	0	0.0
5	5	2.5	12	12	3.0	1.0	0.0	0	0	0	0	0.0
6	30	4.0	45	45	4.2	2.0	0.0	0	0	0	0	0.0

Pedestrian Timing			Extended Actuated		General Control					Miscellaneous				
Phase	Ped Walk	Flashing Clear	Ped Clear	Rest in Walk	Non-Act Initialize	Veh Recall	Ped Recall	Recall Delay	Non Lock	Dual Entry	Last Car Passage	Conditional Service	Simultaneous Gap Out	No
2	7	16	No	0	Yellow	NonActI	Min	None	0	Yes	Yes	No	No	No
4	7	22	No	0	Inactive	NonActII	None	None	0	Yes	No	No	No	No
5	0	0	No	0	Inactive	None	None	None	0	Yes	No	No	No	No
6	7	16	No	0	Yellow	None	Min	None	0	Yes	Yes	No	No	No

Special Sequence		Vehical Detector Phase Assignment									
Default Data		Assigned Phase		Mode		Switched Phase		Extend		Delay	
		Default Data									

Pedestrian Detector						Special Detector Phase Assignment					
Pedestrian Detector Channel :8						Assign Phase		Switched Phase		Extend Delay	
4						Ped		0		0.0	
0						0.0		0			
						Default Data					

## Unit Data

General Control					Remote Flash				
Startup Time: 5sec Startup State: Flash Red Revert: 4sec					Test A = Flash		Channel	Flash Color	Flash Alternat
Auto Ped Clear: No Stop Time Reset: No Alternate Sequence: 0					Flash Entry Phase		Flash Exit Phase	Default Data - No Flash	
ABC connector Input Modes: 0					Input Ring		Output Respons	Default Data - No Flash	
ABC connector Output Modes: 0					Ring 1		Ring 1		
D connector Input Modes: 0					Ring 2		Ring 2		
D connector Output Modes: 0					None		None		
					None		None		

Overlaps																
Overlaps																
Phase(s)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1																
2																
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring			Phase(s)																
Phase	Ring	Next Phase	Concurrent Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
2	1	3		1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
4	1	1		5	5	7	7	2	2	4	4								
5	2	6		6	6	8	8	5	6	7	8								
6	2	7																	

## Alternate Sequences

Alternate Sequences

## Port 1 Data

BIU Port Message  
Addr Status 40

Phase  
Pair(s)

## Default Data

No  
Alternate  
Sequences

## Channel Assignment

Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set	
Ph.1 Veh	1	1 - Ph.1 RYG	1	Ph.2 Veh	2	2 - Ph.2 RYG	2	Ph.3 Veh	3	3 - Ph.3 RYG	3
Ph.4 Veh	4	4 - Ph.4 RYG	4	Ph.5 Veh	5	5 - Ph.5 RYG	5	Ph.6 Veh	6	6 - Ph.6 RYG	6
Ph.7 Veh	7	7 - Ph.7 RYG	7	Ph.8 Veh	8	8 - Ph.8 RYG	8	Ph.2 Ped	9	10 - Ph.2 DPW	10
Ph.4 Ped	10	12 - Ph.4 DPW	12	Ph.6 Ped	11	14 - Ph.6 DPW	14	Ph.8 Ped	12	16 - Ph.8 DPW	16
Ph.1 OLP	13	17 - Ph.1 RYG	17	Ph.2 OLP	14	18 - Ph.2 RYG	18	Ph.3 OLP	15	19 - Ph.3 RYG	19
Ph.4 OLP	16	20 - Ph.4 RYG	20	Ph.1 Ped	17	9 - Ph.1 DPW	9	Ph.3 Ped	18	11 - Ph.3 DPW	11
Ph.5 Ped	19	13 - Ph.5 DPW	13	Ph.7 Ped	20	15 - Ph.7 DPW	15				

## Coordination Data

General Coordination Data

Operation Mode: 1=Auto

Coordination Mode: 0=Permissive

Maximum Mode: 0=Inhibit

Correction Mode: 2=Short Way

Offset Mode: 0=Beg Grn

Force Mode: 0=Plan

Max Dwell Time: 15

Yield Period: 0

Manual Dial: 1

Manual Split: 1

Manual Offset: 1

Dial/Split Cycle

1/1 110

2/1 110

3/1 110

## Split Times and Phase Mode:

Dial 1 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
2	73	1=Coordinate	4	37	0=Actuated	5	15	0=Actuated	6	58	1=Coordinate

Dial 2 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
2	73	1=Coordinate	4	37	0=Actuated	5	15	0=Actuated	6	58	1=Coordinate

Dial 3 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
2	73	1=Coordinate	4	37	0=Actuated	5	15	0=Actuated	6	58	1=Coordinate

### Traffic Plan Data

Plan: 1/1/1 Offset Time: 44 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 1/2/1 Offset Time: 45 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 1/3/1 Offset Time: 45 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 1/4/1 Offset Time: 45 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 2/1/1 Offset Time: 46 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 2/2/1 Offset Time: 38 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 3/1/1 Offset Time: 60 Alt. Sequence: 0 Mode: 0=Normal  
 Plan: 3/2/1 Offset Time: 45 Alt. Sequence: 0 Mode: 0=Normal

Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0  
 Rg 2 Lag Time: 0 Rg 3 Lag Time: 0 Rg 4 Lag Time: 0

### Local TBC Data

Start of Daylight Saving Month: 3 Week: 2 Cycle Zero Reference Hours: 24 Min: 0  
 End of Daylight Saving Month: 11 Week: 1

Source	Equate Days						
Day	1	2	3	4	5	6	7
2	3	4	5	6	0	0	0

### Traffic Data

Event	Day	Time	D/S/O	flash	PHASE FUNCTION															
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	1	9:0	1/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	1	12:0	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	1	21:0	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	2	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	2	6:30	1/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	2	12:0	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	2	16:0	3/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	2	18:0	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	2	21:0	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	7	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	7	8:30	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	7	12:0	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	7	21:30	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### AUX. Events

Event	Program	Day	Hour	Min.	Aux. Outputs			Det. Diag.	Det. Rpt.	Det. Mult100	Special Function Outputs								
					1	2	3	D1	D2	D3	Dimming	1	2	3	4	5	6	7	8
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Default Data - No Special Day(s) or Week(s) Programmed

### Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8
Special Function 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Special Function 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## Phase Function

Phase Function Map	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

## Dimming Data

Channel Red Yellow Green Alternate

☐ ☐ ☐ ☐

Default Data - No Dimming Programmed

## Preemption Data

### General Preemption Data

Ring Min Grn/Walk Time

1 0  
2 0  
3 0  
4 0

Flash > Preempt 1      Preempt 2 = Preempt 3      Preempt 4 = Preempt 5  
Preempt 1 > Preempt 2      Preempt 3 = Preempt 4      Preempt 5 = Preempt 6

Preempt	Preempt Timers								Select			Track				Dwell Green	Return		
	Non-Linking	Link to Preempt	Delay	Extend	Duration	MaxCall	Lock-Out	Ped Clear	Yel	Red	Grn	Ped	Yel	Red	Ped Clear		Yel	Red	
1	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
2	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
3	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
4	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
5	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	
6	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	

Preempt 1			Preempt 2			Preempt 3			Preempt 4			Preempt 5			Preempt 6		
Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls
1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes
2	Yes	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes
3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes
4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes
5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes
6	Yes	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes
7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes
8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes

### Priority Timers

Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases
1	No	0	0	0	0	0	0	0=Do not Skip Phases
2	No	0	0	0	0	0	0	0=Do not Skip Phases
3	No	0	0	0	0	0	0	0=Do not Skip Phases
4	No	0	0	0	0	0	0	0=Do not Skip Phases
5	No	0	0	0	0	0	0	0=Do not Skip Phases
6	No	0	0	0	0	0	0	0=Do not Skip Phases

Priority 1			Priority 2			Priority 3			Priority 4			Priority 5			Priority 6		
Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls	Phase	Exit Phase	Exit Calls

### Preempt 1

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
2 Red	Green	No	<b>Default Data</b>			<b>Default Data</b>		
6 Red	Green	No						

### Preempt 2

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
<b>Default Data</b>			<b>Default Data</b>			<b>Default Data</b>		

### Default Data

### Preempt 3

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
<b>Default Data</b>			<b>Default Data</b>			<b>Default Data</b>		

### Default Data

#### Preempt 4

Vehical Phases  
Ph. Track Dwell Cycle

Pedestrian Phases  
Ph. Track Dwell Cycle

Overlaps  
Ovlp. Track Dwell Cycle

#### Default Data

#### Default Data

#### Default Data

#### Preempt 5

Vehical Phases  
Ph. Track Dwell Cycle

Pedestrian Phases  
Ph. Track Dwell Cycle

Overlaps  
Ovlp. Track Dwell Cycle

#### Default Data

#### Default Data

#### Default Data

#### Preempt 6

Vehical Phases  
Ph. Track Dwell Cycle

Pedestrian Phases  
Ph. Track Dwell Cycle

Overlaps  
Ovlp. Track Dwell Cycle

#### Default Data

#### Default Data

#### Default Data

### System/Detectors Data

#### Local Critical Alarms

Revert to Backup: 15 1st Phone:  
Local Free: No Cycle Failure: No Coord Failure: No Conflict Flash: No Remote Flash: No 2nd Phone:  
Local Fash: No Cycle Fault: No Coord Fault: No Premption: No Voltage Monitor: No  
Special Status 1: No Special Status 2: No Special Status 3: No Special Status 4: No Special Status 5: No Special Status 6: No

#### Traffic Responsive

System Detector	Average	Occupancy	Min	Queue 1	System	Weight	Queue 2	System	Weight
Detector Channel Veh/Hr Time(mins) Correction/10 Volume % Detectors Detectors Factor Detectors Detectors Factor									
1 71 100 1 10 0									
2 72 100 1 10 0									

Sample Interval:

Queue: 1 Input Selection: 0=Average Queue: 1  
Detector Failed Level : 0 Level Enter Leave Dial / Split / Offset  
Queue: 2 Input Selection: 0=Average 1 1 1 2 / 2 / 1  
Detector Failed Level : 0 2 1 1 2 / 2 / 1  
Queue: 2  
Level Enter Leave Dial / Split / Offset  
1 1 1 3 / 2 / 1  
2 1 1 3 / 2 / 1

#### Vehical Detector

Diagnostic Value 0  
Max No Erratic  
Detector Presence Activity Count  
1 60 0 0  
4 60 0 0

#### Vehical Detector

Diagnostic Value 1  
Max No Erratic  
Detector Presence Activity Count

#### Default Data - No Diag 1 Values

#### Special Detector

Diagnostic Value 0  
Max No Erratic  
Detector Presence Activity Count  
1 60 0 0  
2 60 0 0

#### Default Data - No Diag 0 Values

#### Pedestrian Detector

Diagnostic Value 0  
Max No Erratic  
Detector Presence Activity Count  
4 60 0 0

#### Default Data - No Diag 0 Values

#### Pedestrian Detector

Diagnostic Value 1  
Max No Erratic  
Detector Presence Activity Count

#### Default Data - No Diag 1 Values

#### Special Detector

Diagnostic Value 1  
Max No Erratic  
Detector Presence Activity Count

#### Default Data - No Diag 1 Values

#### Speed Trap Data

Speed Trap:

Measurement:  
Detector 1 Detector\_2 Distance :

Dial/Split/Offset  
//

#### Default Data

Speed Trap Speed Trap  
Low Treshold High Treshold

#### Default Data



Volume Detector Data

	Report Interval
Volume Controller	
Detector	Detector
Number	Channel

Default Data

# Programmed EPAC Data

4/6/2022  
10:20:08AM

**Intersection Name: Paris & Ramsey Lake**

**Intersection Alias: Ramsey Lak**

Access Code: 9999 Channel: 7 Address: 19 Revision: 3.13

**Access Data**

Port 2 Comm :1200 Baud

Port 3 Comm :19200 Baud

## Phase Data

<u>Vehical Basic Timings</u>							<u>Vehical Density Timings</u>		Time B4	Cars	Time To	
Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red	Added Initial	Max_Initial	Reduction	Before	Reduce	Min_Gap
1	10	3.0	19	28	3.0	2.0	0.0	0	0	0	0	0.0
2	15	5.0	50	50	4.2	2.0	0.0	0	0	0	0	0.0
4	8	2.5	25	25	3.3	2.5	0.0	0	0	0	0	0.0
6	15	3.0	50	50	4.2	2.0	0.0	0	0	0	0	0.0

<u>Pedestrian Timing</u>			<u>Extended Actuated</u>		<u>General Control</u>					<u>Miscellaneous</u>					
	Ped	Flashing	Ped	Rest		Non-Act	Veh	Ped	Recall		Non	Dual	Last Car	Conditional	No
Phase	Walk	Clear	Walk	Clear	in Walk	Initialize	Response	Recall	Recall	Delay	Lock	Entry	Passage	Service	Simultaneous
1	0	0	No	0	No	Inactive	None	None	None	0	Yes	No	No	No	No
2	7	24	No	0	No	Yellow	NonActI	Min	None	0	Yes	Yes	No	No	No
4	7	27	No	0	No	Inactive	NonActII	None	None	0	Yes	No	No	No	No
6	0	0	No	0	No	Yellow	NonActI	Min	None	0	No	Yes	No	No	No

<u>Special Sequence</u>		<u>Vehical Detector Phase Assignment</u>					
<b>Default Data</b>		Assigned Phase	Mode	Switched Phase	Extend	Delay	
		Vehical Detector Channel :7	4	Veh	0	0.0	0
		<b>Default Data</b>					

<u>Pedestrian Detector</u>		<u>Special Detector Phase Assignment</u>				
<b>Default Data</b>		Assign Phase	Switched Phase	Extend	Delay	
		:				
		<b>Default Data</b>				

## Unit Data

<u>General Control</u>				<u>Remote Flash</u>			
Startup Time: 5sec Startup State: Flash Red Revert: 2sec				Test A = Flash Channel Color Alternat			
Auto Ped Clear: Yes Stop Time Reset: No Alternate Sequence: 0				Flash Entry Flash Exit			
ABC connector Input Modes: 0				Phase Phase Phase			
ABC connector Output Modes: 0				<b>Default Data - No Flash</b>			
D connector Input Modes: 2				<b>Default Data - No Flash</b>			
D connector Output Modes: 0							

<u>Overlaps</u>																
Phase(s)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	0.0	0.0	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring			Concurrent Phases	Phase(s)															
Phase	Ring	Next Phase		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	2		1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
2	1	3		5	5	7	7	2	2	4	4								
4	1	1		6	6	8	8	5	6	7	8								
6	2	7																	

## Alternate Sequences

Alternate Sequences

## Port 1 Data

BIU Port Message  
Addr Status 40

Phase  
Pair(s)

## Default Data

No  
Alternate  
Sequences

## Channel Assignment

Control	Channel	Hardware Pin Set	Control	Channel	Hardware Pin Set	Control	Channel	Hardware Pin Set
Ph.1 Veh	1	1 - Ph.1 RYG 1	Ph.2 Veh	2	2 - Ph.2 RYG 2	Ph.3 Veh	3	3 - Ph.3 RYG 3
Ph.4 Veh	4	4 - Ph.4 RYG 4	Ph.5 Veh	5	5 - Ph.5 RYG 5	Ph.6 Veh	6	6 - Ph.6 RYG 6
Ph.7 Veh	7	7 - Ph.7 RYG 7	Ph.8 Veh	8	8 - Ph.8 RYG 8	Ph.2 Ped	9	10 - Ph.2 DPW 10
Ph.4 Ped	10	12 - Ph.4 DPW 12	Ph.6 Ped	11	14 - Ph.6 DPW 14	Ph.8 Ped	12	16 - Ph.8 DPW 16
Ph.1 OLP	13	17 - Ph.1 RYG 17	Ph.2 OLP	14	18 - Ph.2 RYG 18	Ph.3 OLP	15	19 - Ph.3 RYG 19
Ph.4 OLP	16	20 - Ph.4 RYG 20	Ph.1 Ped	17	9 - Ph.1 DPW 9	Ph.3 Ped	18	11 - Ph.3 DPW 11
Ph.5 Ped	19	13 - Ph.5 DPW 13	Ph.7 Ped	20	15 - Ph.7 DPW 15			

## Coordination Data

General Coordination Data

Operation Mode: 1=Auto  
Coordination Mode: 0=Permissive  
Maximum Mode: 0=Inhibit  
Correction Mode: 2=Short Way

Offset Mode: 0=Beg Grn  
Force Mode: 1=Cycle  
Max Dwell Time: 0  
Yield Period: 0

Manual Dial: 1  
Manual Split: 1  
Manual Offset: 1

Dial/Split Cycle

1/1 110  
2/1 110  
3/1 110

## Split Times and Phase Mode:

Dial 1 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	30	0=Actuated	2	39	1=Coordinate	4	41	0=Actuated	6	69	1=Coordinate

Dial 2 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	28	0=Actuated	2	41	0=Actuated	4	41	0=Actuated	6	69	1=Coordinate

Dial 3 / Split 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	17	0=Actuated	2	45	1=Coordinate	4	48	0=Actuated	6	72	1=Coordinate

## Traffic Plan Data

Plan: 1/1/1 Offset Time: 2	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 1/2/1 Offset Time: 2	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 1/3/1 Offset Time: 2	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 2/1/1 Offset Time: 18	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 2/2/1 Offset Time: 2	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 3/1/1 Offset Time: 102	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
Plan: 3/2/1 Offset Time: 2	Alt. Sequence: 0	Mode: 0=Normal	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0

## Local TBC Data

Start of Daylight Saving Month: 3 Week: 2 Cycle Zero ReferenceHours: 24 Min: 0

End of Daylight Saving Month: 11 Week: 1

Source	Equate Days						
Day	1	2	3	4	5	6	7
2	3	4	5	6	0	0	0

## Traffic Data

Event	Day	Time	D/S/O	flash	PHASE FUNCTION															
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	1	9:0	1/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	1	12:0	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	1	21:30	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	2	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	2	6:30	1/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	2	12:0	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	2	16:0	3/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	2	18:0	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	2	21:0	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	7	0:1	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	7	8:30	2/1/1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	7	21:0	0/0/4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## AUX. Events

Event	Program	Day	Hour	Min.	Aux Outputs			Det. Diag.	Det. Rpt.	Det. Mult100	Dimming	Special Function Outputs							
					1	2	3					1	2	3	4	5	6	7	8
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Default Data - No Special Day(s) or Week(s) Programmed

## Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8
Special Function 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Function 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Special Function 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## Phase Function

Phase Function Map	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

## Dimming Data

Channel Red Yellow Green Alternate

☐ ☐ ☐ ☐

Default Data - No Dimming Programmed

## Preemption Data

### General Preemption Data

Ring Min Grn/Walk Time

1 5  
2 5  
3 5  
4 5

Flash > Preempt 1      Preempt 2 = Preempt 3      Preempt 4 = Preempt 5  
Preempt 1 = Preempt 2      Preempt 3 = Preempt 4      Preempt 5 = Preempt 6

Preempt	Preempt Timers								Select			Track				Dwell	Return		
	Non-Link to	Delay	Extend	Duration	MaxCall	Lock-Out			Ped	Yel	Red	Grn	Ped	Yel	Red	Green	Ped	Yel	Red
	Locking Preempt								Clear										
1	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
2	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
3	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
4	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
5	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0
6	No	0	0	0	0	0	0		8	4.0	2.0	5	0	4.0	2.0	5	0	4.0	2.0

Preempt 1			Preempt 2			Preempt 3			Preempt 4			Preempt 5			Preempt 6		
Exit	Exit		Exit	Exit		Exit	Exit		Exit	Exit		Exit	Exit		Exit	Exit	
Phase	Phase	Calls	Phase	Phase	Calls	Phase	Phase	Calls	Phase	Phase	Calls	Phase	Phase	Calls	Phase	Phase	Calls
1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes
2	No	Yes	2	No	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes
3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes
4	Yes	Yes	4	Yes	Yes	4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes
5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes
6	No	Yes	6	No	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes
7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes
8	Yes	Yes	8	Yes	Yes	8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes

### Priority Timers

Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases
1	No	0	0	0	0	0	0	0=Do not Skip Phases
2	No	0	0	0	0	0	0	0=Do not Skip Phases
3	No	0	0	0	0	0	0	0=Do not Skip Phases
4	No	0	0	0	0	0	0	0=Do not Skip Phases
5	No	0	0	0	0	0	0	0=Do not Skip Phases
6	No	0	0	0	0	0	0	0=Do not Skip Phases

Priority 1			Priority 2			Priority 3			Priority 4			Priority 5			Priority 6		
Exit	Exit		Exit	Exit		Exit	Exit		Exit	Exit		Exit	Exit		Exit	Exit	
Phase	Phase	Calls	Phase	Phase	Calls	Phase	Phase	Calls	Phase	Phase	Calls	Phase	Phase	Calls	Phase	Phase	Calls

### Preempt 1

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
1	Red	Green	<b>Default Data</b>			C	Red	No
6	Red	Green				D	Red	No

### Preempt 2

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
2	Green	Green	<b>Default Data</b>			1	Red	No
5	Green	Red				2	Grn	No
6	Red	Green				3	Grn	No

### Preempt 3

Vehical Phases			Pedestrian Phases			Overlaps		
Ph. Track	Dwell	Cycle	Ph. Track	Dwell	Cycle	Ovlp Track	Dwell	Cycle
3	Green	Red	<b>Default Data</b>			2	Red	No
4	Red	Green				3	Grn	No
8	Green	Green				4	Grn	No



## Preempt 4

Vehical Phases				Pedestrian Phases			Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	Default Data			4	Red	Grn	No	
7	Green	Red	No				1	Grn	Red	No	
8	Red	Green	No				2	Grn	Grn	No	

## Preempt 5

Vehical Phases				Pedestrian Phases			Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	Default Data			4	Red	Grn	No	
7	Green	Red	No				1	Grn	Red	No	
8	Red	Green	No				2	Grn	Grn	No	

## Preempt 6

Vehical Phases				Pedestrian Phases			Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle
4	Green	Green	No	Default Data			4	Red	Grn	No	
7	Green	Red	No				1	Grn	Red	No	
8	Red	Green	No				2	Grn	Grn	No	

## System/Detectors Data

### Local Critical Alarms

Revert to Backup: 20      1st Phone:  
Local Free: No    Cycle Failure: No    Coord Failure: No    Conflict Flash: No    Remote Flash: No    2nd Phone:  
Local Fash: No    Cycle Fault: No    Coord Fault: No    Preemption: No    Voltage Monitor: No  
Special Status 1: No    Special Status 2: No    Special Status 3: No    Special Status 4: No    Special Status 5: No    Special Status 6: No

### Traffic Responsive

System	Detector	Average	Occupancy	Min	Queue 1	System	Weight	Queue 2	System	Weight
Detector	Channel	Veh/Hr	Time(mins)	Correction/10	Volume %	Detectors	Factor	Detectors	Detectors	Factor
1	71	2,000	1	10	0	1	1	1	2	1
2	72	2,000	1	10	0	2	1	2	2	1

Sample Interval:

Queue: 1 Input Selection: 0=Average				Queue: 1			
Detector Failed Level : 0				Level	Enter	Leave	Dial / Split / Offset
Queue: 2 Input Selection: 0=Average				1	1	1	2 / 2 / 1
Detector Failed Level : 0				2	1	1	2 / 2 / 1
				Queue: 2			
				Level	Enter	Leave	Dial / Split / Offset
				1	1	1	3 / 2 / 1
				2	1	1	3 / 2 / 1

### Vehical Detector

Diagnostic Value 0			
Max	No	Erratic	
Detector	Presence	Activity	Count
1	60	0	0
4	60	0	0

### Vehical Detector

Diagnostic Value 1			
Max	No	Erratic	
Detector	Presence	Activity	Count
<b>Default Data - No Diag 1 Values</b>			

### Special Detector

Diagnostic Value 0			
Max	No	Erratic	
Detector	Presence	Activity	Count
1	60	0	0
2	60	0	0

### Default Data - No Diag 0 Values

### Pedestrian Detector

Diagnostic Value 0			
Max	No	Erratic	
Detector	Presence	Activity	Count
4	60	0	0
<b>Default Data - No Diag 0 Values</b>			

### Pedestrian Detector

Diagnostic Value 1			
Max	No	Erratic	
Detector	Presence	Activity	Count
<b>Default Data - No Diag 1 Values</b>			

### Special Detector

Diagnostic Value 1			
Max	No	Erratic	
Detector	Presence	Activity	Count
<b>Default Data - No Diag 1 Values</b>			

Speed Trap Data

Speed Trap:

Measurement:

Detector 1    Detector\_2    Distance :

Dial/Split/Offset    Speed Trap    Speed Trap  
Low Treshold    High Treshold  
//

Default Data

Default Data

Volume Detector Data





















Report Interval  
Volume Controller  
Detector    Detector  
Number    Channel

Default Data

## **Appendix D – Synchro Analysis Output – Existing Traffic Volumes**

700 Paris St  
1: Paris St & Brady St

Queues  
Existing (2022) AM Peak Hour

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	156	390	458	349	71	520	370	25	764	224
Future Volume (vph)	156	390	458	349	71	520	370	25	764	224
Lane Group Flow (vph)	170	469	498	389	77	565	402	27	830	243
Turn Type	pm+pt	NA	Prot	NA	pm+pt	NA	pt+ov	pm+pt	NA	pm+ov
Protected Phases	7	4	3	8	5	2	2 3	1	6	7
Permitted Phases	4				2			6		6
Detector Phase	7	4	3	8	5	2	2 3	1	6	7
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0		5.0	15.0	5.0
Minimum Split (s)	10.0	31.2	10.0	31.2	10.0	40.1		10.0	40.1	10.0
Total Split (s)	21.0	31.2	25.0	35.2	20.0	49.1		17.0	46.1	21.0
Total Split (%)	17.2%	25.5%	20.4%	28.8%	16.4%	40.1%		13.9%	37.7%	17.2%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7		3.0	3.7	3.0
All-Red Time (s)	2.0	2.5	2.0	2.5	2.0	2.4		2.0	2.4	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	6.2	5.0	6.2	5.0	6.1		5.0	6.1	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min		None	Min	None
v/c Ratio	0.40	0.68	0.70	0.40	0.29	0.35	0.39	0.08	0.67	0.37
Control Delay	18.5	38.6	40.2	28.5	20.3	24.2	6.0	17.9	33.8	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	38.6	40.2	28.5	20.3	24.2	6.0	17.9	33.8	13.1
Queue Length 50th (m)	17.2	42.0	43.5	29.8	8.6	25.4	10.6	2.9	51.4	18.9
Queue Length 95th (m)	35.6	65.9	#77.5	52.0	19.2	46.4	41.0	8.7	73.8	38.5
Internal Link Dist (m)		364.5		324.4		160.9			177.4	
Turn Bay Length (m)	57.0		85.0		70.0		6.0	24.0		6.0
Base Capacity (vph)	526	1023	813	1212	372	2590	1084	420	2363	753
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.46	0.61	0.32	0.21	0.22	0.37	0.06	0.35	0.32

Intersection Summary

Cycle Length: 122.3

Actuated Cycle Length: 86.9









Natural Cycle: 95

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.






















Splits and Phases: 1: Paris St & Brady St

			
Ø1	Ø2	Ø3	Ø4
17 s	49.1 s	25 s	31.2 s
			
Ø5	Ø6	Ø7	Ø8
20 s	46.1 s	21 s	35.2 s





















700 Paris St  
1: Paris St & Brady St

HCM Signalized Intersection Capacity Analysis  
Existing (2022) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	390	41	458	349	9	71	520	370	25	764	224
Future Volume (vph)	156	390	41	458	349	9	71	520	370	25	764	224
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.2		5.0	6.2		5.0	6.1	6.1	5.0	6.1	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1684	3368		3367	3460		1670	4988	1568	1717	4893	1555
Flt Permitted	0.52	1.00		0.95	1.00		0.19	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)	925	3368		3367	3460		337	4988	1568	776	4893	1555
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	170	424	45	498	379	10	77	565	402	27	830	243
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	92	0	0	47
Lane Group Flow (vph)	170	463	0	498	388	0	77	565	310	27	830	196
Confl. Peds. (#/hr)	7		4	4		7	19		10	10		19
Heavy Vehicles (%)	7%	5%	10%	4%	4%	0%	8%	4%	3%	5%	6%	2%
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA	pt+ov	pm+pt	NA	pm+ov
Protected Phases	7	4		3	8		5	2	2 3	1	6	7
Permitted Phases	4						2			6		6
Actuated Green, G (s)	29.1	17.7		18.4	24.7		35.6	28.5	53.0	26.4	23.9	35.3
Effective Green, g (s)	29.1	17.7		18.4	24.7		35.6	28.5	53.0	26.4	23.9	35.3
Actuated g/C Ratio	0.33	0.20		0.21	0.28		0.40	0.32	0.59	0.30	0.27	0.39
Clearance Time (s)	5.0	6.2		5.0	6.2		5.0	6.1		5.0	6.1	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	397	666		692	955		240	1590	929	255	1308	613
v/s Ratio Prot	0.05	c0.14		c0.15	0.11		c0.03	0.11	0.20	0.00	c0.17	0.04
v/s Ratio Perm	0.08						0.10			0.03		0.09
v/c Ratio	0.43	0.69		0.72	0.41		0.32	0.36	0.33	0.11	0.63	0.32
Uniform Delay, d1	22.6	33.3		33.1	26.4		17.9	23.4	9.2	22.6	28.9	18.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	3.1		3.6	0.3		0.8	0.1	0.2	0.2	1.0	0.3
Delay (s)	23.4	36.5		36.7	26.7		18.6	23.5	9.5	22.7	29.9	19.0
Level of Service	C	D		D	C		B	C	A	C	C	B
Approach Delay (s)		33.0			32.3			17.8			27.3	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			26.8	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			89.4	Sum of lost time (s)				22.3				
Intersection Capacity Utilization			71.4%	ICU Level of Service				C				
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
2: Paris St & Van Horne St

Queues  
Existing (2022) AM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	13	23	227	54	125	146	870	68	1155
Future Volume (vph)	13	23	227	54	125	146	870	68	1155
Lane Group Flow (vph)	14	111	249	59	137	160	1066	75	1313
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Minimum Split (s)	31.7	31.7	31.7	31.7	31.7	9.0	41.1	9.0	41.1
Total Split (s)	31.7	31.7	31.7	31.7	31.7	10.0	41.1	19.0	50.1
Total Split (%)	34.5%	34.5%	34.5%	34.5%	34.5%	10.9%	44.8%	20.7%	54.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.05	0.15	0.80	0.13	0.28	0.62	0.40	0.21	0.48
Control Delay	24.1	8.9	49.6	25.2	6.2	20.5	12.9	7.9	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.1	8.9	49.6	25.2	6.2	20.5	12.9	7.9	13.8
Queue Length 50th (m)	1.9	1.7	40.2	7.9	0.0	9.6	38.1	4.2	49.4
Queue Length 95th (m)	6.5	8.0	67.7	17.4	13.2	#26.6	58.0	10.7	70.6
Internal Link Dist (m)		187.2		465.5			478.0		160.9
Turn Bay Length (m)	21.0		132.0		62.0	34.0		48.0	
Base Capacity (vph)	378	986	413	583	596	258	2690	507	2708
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.11	0.60	0.10	0.23	0.62	0.40	0.15	0.48

Intersection Summary

Cycle Length: 91.8

Actuated Cycle Length: 85.5

Natural Cycle: 85

Control Type: Semi Act-Uncoord

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























Queue shown is maximum after two cycles.

Splits and Phases: 2: Paris St & Van Horne St

		
Ø1	Ø2	Ø4
19 s	41.1 s	31.7 s
		
Ø5	Ø6	Ø8
10 s	50.1 s	31.7 s















700 Paris St  
2: Paris St & Van Horne St

HCM Signalized Intersection Capacity Analysis  
Existing (2022) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	23	78	227	54	125	146	870	100	68	1155	40
Future Volume (vph)	13	23	78	227	54	125	146	870	100	68	1155	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	2904		1801	1827	1576	1703	4869		1752	5050	
Flt Permitted	0.72	1.00		0.68	1.00	1.00	0.15	1.00		0.22	1.00	
Satd. Flow (perm)	1184	2904		1293	1827	1576	277	4869		411	5050	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	14	25	86	249	59	137	160	956	110	75	1269	44
RTOR Reduction (vph)	0	65	0	0	0	104	0	12	0	0	4	0
Lane Group Flow (vph)	14	46	0	249	59	33	160	1054	0	75	1309	0
Confl. Peds. (#/hr)	4		4	4		4	6		6	6		6
Heavy Vehicles (%)	15%	4%	10%	0%	4%	1%	6%	5%	2%	3%	2%	5%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	20.6	20.6		20.6	20.6	20.6	52.5	47.0		52.4	46.7	
Effective Green, g (s)	20.6	20.6		20.6	20.6	20.6	52.5	47.0		52.4	46.7	
Actuated g/C Ratio	0.24	0.24		0.24	0.24	0.24	0.61	0.54		0.61	0.54	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	282	693		308	436	376	259	2651		338	2732	
v/s Ratio Prot		0.02			0.03		c0.04	0.22		0.01	0.26	
v/s Ratio Perm	0.01			c0.19		0.02	c0.34			0.12		
v/c Ratio	0.05	0.07		0.81	0.14	0.09	0.62	0.40		0.22	0.48	
Uniform Delay, d1	25.3	25.4		31.0	25.8	25.5	8.4	11.4		7.2	12.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.0		14.4	0.1	0.1	4.3	0.4		0.3	0.6	
Delay (s)	25.4	25.4		45.4	26.0	25.6	12.8	11.9		7.5	12.9	
Level of Service	C	C		D	C	C	B	B		A	B	
Approach Delay (s)		25.4			36.7			12.0			12.6	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.2	HCM 2000 Level of Service				B				
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			86.3	Sum of lost time (s)				13.5				
Intersection Capacity Utilization			67.2%	ICU Level of Service				C				
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
3: Paris St & John St

Queues  
Existing (2022) AM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	8	0	40	2	4	1111	46	1388
Future Volume (vph)	8	0	40	2	4	1111	46	1388
Lane Group Flow (vph)	0	14	0	110	4	1192	48	1455
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	20.0	20.0	5.0	20.0
Minimum Split (s)	25.7	25.7	25.7	25.7	34.8	34.8	9.0	34.8
Total Split (s)	25.7	25.7	25.7	25.7	50.8	50.8	14.0	64.8
Total Split (%)	28.4%	28.4%	28.4%	28.4%	56.1%	56.1%	15.5%	71.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.1	2.1	1.0	2.1
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.7		5.7	5.8	5.8	4.0	5.8
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.04		0.35	0.02	0.57	0.13	0.59
Control Delay		0.2		15.9	8.8	11.3	4.0	6.9
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		0.2		15.9	8.8	11.3	4.0	6.9
Queue Length 50th (m)		0.0		4.1	0.2	49.2	1.3	39.2
Queue Length 95th (m)		0.0		19.1	1.6	81.1	4.4	68.9
Internal Link Dist (m)		561.8		431.0		175.2		478.0
Turn Bay Length (m)					33.0		23.0	
Base Capacity (vph)		628		622	283	2933	492	3395
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.02		0.18	0.01	0.41	0.10	0.43

Intersection Summary

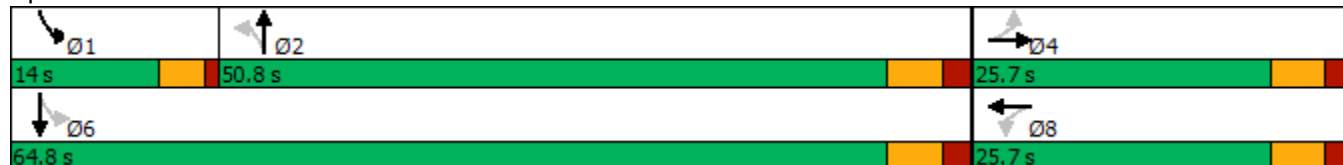
Cycle Length: 90.5

Actuated Cycle Length: 53.9

Natural Cycle: 70

Control Type: Semi Act-Uncoord



















Splits and Phases: 3: Paris St & John St





















700 Paris St  
3: Paris St & John St

HCM Signalized Intersection Capacity Analysis  
Existing (2022) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	0	6	40	2	63	4	1111	34	46	1388	9
Future Volume (vph)	8	0	6	40	2	63	4	1111	34	46	1388	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1727			1696		1802	3490		1769	3536	
Flt Permitted		0.84			0.87		0.18	1.00		0.15	1.00	
Satd. Flow (perm)		1492			1502		337	3490		288	3536	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	8	0	6	42	2	66	4	1157	35	48	1446	9
RTOR Reduction (vph)	0	12	0	0	58	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	2	0	0	52	0	4	1190	0	48	1455	0
Confl. Peds. (#/hr)	5		5	5		5	8		4	4		8
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.1			7.1		30.9	30.9		38.2	38.2	
Effective Green, g (s)		7.1			7.1		30.9	30.9		38.2	38.2	
Actuated g/C Ratio		0.12			0.12		0.54	0.54		0.67	0.67	
Clearance Time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		186			187		183	1898		279	2378	
v/s Ratio Prot								0.34		0.01	c0.41	
v/s Ratio Perm		0.00			c0.03		0.01			0.11		
v/c Ratio		0.01			0.28		0.02	0.63		0.17	0.61	
Uniform Delay, d1		21.8			22.5		6.0	9.0		4.6	5.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.8		0.0	0.7		0.3	0.5	
Delay (s)		21.8			23.3		6.0	9.6		4.9	5.6	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		21.8			23.3			9.6			5.6	
Approach LOS		C			C			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		8.1					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		56.8					Sum of lost time (s)		15.5			
Intersection Capacity Utilization		57.9%					ICU Level of Service		B			
Analysis Period (min)		15										
c Critical Lane Group												












700 Paris St  
4: Paris St & McNaughton St

HCM Unsignalized Intersection Capacity Analysis  
Existing (2022) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	9	2	0	2	1	1264	0	0	1456	7
Future Volume (Veh/h)	3	0	9	2	0	2	1	1264	0	0	1456	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	0	10	2	0	2	1	1404	0	0	1618	8
Pedestrians		2			1							
Lane Width (m)		3.6			3.6							
Walking Speed (m/s)		1.2			1.2							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)								347			199	
pX, platoon unblocked	0.79	0.79	0.74	0.79	0.79	0.89	0.74			0.89		
vC, conflicting volume	2330	3031	815	2226	3035	703	1628			1405		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1555	2437	54	1424	2442	429	1150			1215		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	95	100	99	97	100	100	100			100		
cM capacity (veh/h)	62	25	746	76	25	410	455			519		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	13	4	703	702	809	817						
Volume Left	3	2	1	0	0	0						
Volume Right	10	2	0	0	0	8						
cSH	209	129	455	1700	519	1700						
Volume to Capacity	0.06	0.03	0.00	0.41	0.00	0.48						
Queue Length 95th (m)	1.6	0.8	0.1	0.0	0.0	0.0						
Control Delay (s)	23.4	33.9	0.1	0.0	0.0	0.0						
Lane LOS	C	D	A									
Approach Delay (s)	23.4	33.9	0.0		0.0							
Approach LOS	C	D										
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			50.5%		ICU Level of Service		A					
Analysis Period (min)			15									

700 Paris St  
5: Paris St & Facer St

HCM Unsignalized Intersection Capacity Analysis  
Existing (2022) AM Peak Hour














						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	2	0	1253	1	1	1467
Future Volume (Veh/h)	2	0	1253	1	1	1467
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	0	1392	1	1	1630
Pedestrians						1
Lane Width (m)						3.6
Walking Speed (m/s)						1.2
Percent Blockage						0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			226			321
pX, platoon unblocked	0.82	0.85			0.85	
vC, conflicting volume	2210	698			1393	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1231	298			1114	
tC, single (s)	6.8	6.9			6.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			3.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	141	599			229	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	2	928	465	544	1087	
Volume Left	2	0	0	1	0	
Volume Right	0	0	1	0	0	
cSH	141	1700	1700	229	1700	
Volume to Capacity	0.01	0.55	0.27	0.00	0.64	
Queue Length 95th (m)	0.3	0.0	0.0	0.1	0.0	
Control Delay (s)	30.9	0.0	0.0	0.2	0.0	
Lane LOS	D			A		
Approach Delay (s)	30.9	0.0		0.1		
Approach LOS	D					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			51.6%		ICU Level of Service	A
Analysis Period (min)			15			

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↶	↶	
Traffic Volume (veh/h)	1	1	1	1	0	0
Future Volume (Veh/h)	1	1	1	1	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.50	0.50
Hourly flow rate (vph)	2	2	2	2	0	0
Pedestrians	1			2	2	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			6		12	7
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			6		12	7
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1625		1009	1078
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	4	4	0			
Volume Left	0	2	0			
Volume Right	2	0	0			
cSH	1700	1625	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	3.6	0.0			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.6	0.0			
Approach LOS		A				
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			14.6%	ICU Level of Service	A	
Analysis Period (min)			15			



700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

Queues  
Existing (2022) AM Peak Hour

							
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	24	0	2	0	5	1208	1476
Future Volume (vph)	24	0	2	0	5	1208	1476
Lane Group Flow (vph)	0	37	2	2	5	1273	1566
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		4		8		2	6
Permitted Phases	4		8		2		
Detector Phase	4	4	8	8	2	2	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	30.0	30.0	30.0
Minimum Split (s)	26.0	26.0	26.0	26.0	35.9	35.9	35.9
Total Split (s)	26.0	26.0	26.0	26.0	55.9	55.9	55.9
Total Split (%)	31.7%	31.7%	31.7%	31.7%	68.3%	68.3%	68.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.7	3.7	3.7
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	5.9	5.9	5.9
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	Min	Min	Min
v/c Ratio		0.12	0.01	0.01	0.02	0.42	0.52
Control Delay		9.5	21.0	0.0	3.6	3.4	4.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		9.5	21.0	0.0	3.6	3.4	4.2
Queue Length 50th (m)		0.0	0.2	0.0	0.0	0.0	0.0
Queue Length 95th (m)		6.9	1.9	0.0	1.1	45.5	64.7
Internal Link Dist (m)		198.2		192.5		314.0	201.8
Turn Bay Length (m)					40.0		
Base Capacity (vph)		711	719	653	244	3316	3313
Starvation Cap Reductn		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0
Reduced v/c Ratio		0.05	0.00	0.00	0.02	0.38	0.47

Intersection Summary

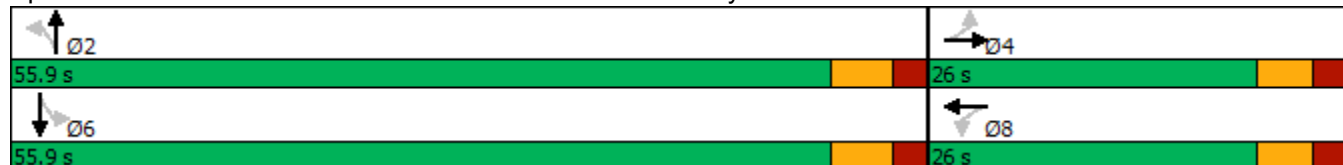
Cycle Length: 81.9

Actuated Cycle Length: 53.1

Natural Cycle: 65




















Control Type: Semi Act-Uncoord

Splits and Phases: 7: Paris St & Boland Ave/Paris Driveway















700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

HCM Signalized Intersection Capacity Analysis  
Existing (2022) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	0	11	2	0	2	5	1208	1	0	1476	11
Future Volume (vph)	24	0	11	2	0	2	5	1208	1	0	1476	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		5.9	5.9			5.9	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95			0.95	
Frt		0.96		1.00	0.85		1.00	1.00			1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1757		1805	1615		1805	3505			3502	
Flt Permitted		1.00		1.00	1.00		0.14	1.00			1.00	
Satd. Flow (perm)		1817		1900	1615		259	3505			3502	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	0	12	2	0	2	5	1272	1	0	1554	12
RTOR Reduction (vph)	0	35	0	0	2	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	2	0	2	0	0	5	1273	0	0	1565	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		3.0		3.0	3.0		41.8	41.8			41.8	
Effective Green, g (s)		3.0		3.0	3.0		41.8	41.8			41.8	
Actuated g/C Ratio		0.05		0.05	0.05		0.74	0.74			0.74	
Clearance Time (s)		6.0		6.0	6.0		5.9	5.9			5.9	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		96		100	85		190	2583			2581	
v/s Ratio Prot					0.00			0.36			c0.45	
v/s Ratio Perm		c0.00		0.00			0.02					
v/c Ratio		0.02		0.02	0.00		0.03	0.49			0.61	
Uniform Delay, d1		25.5		25.5	25.4		2.0	3.1			3.5	
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.1		0.1	0.0		0.1	0.1			0.4	
Delay (s)		25.5		25.5	25.4		2.1	3.2			3.9	
Level of Service		C		C	C		A	A			A	
Approach Delay (s)		25.5			25.5			3.2			3.9	
Approach LOS		C			C			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		3.9					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		56.7					Sum of lost time (s)		11.9			
Intersection Capacity Utilization		59.7%					ICU Level of Service		B			
Analysis Period (min)		15										
c Critical Lane Group												

700 Paris St  
8: Paris St & York St

Queues  
Existing (2022) AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	160	132	60	1054	1301	188
Future Volume (vph)	160	132	60	1054	1301	188
Lane Group Flow (vph)	178	147	67	1171	1446	209
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	30.0	30.0	30.0
Minimum Split (s)	25.5	25.5	9.0	36.2	36.2	36.2
Total Split (s)	25.5	25.5	16.0	67.2	51.2	51.2
Total Split (%)	27.5%	27.5%	17.3%	72.5%	55.2%	55.2%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	2.2	2.2	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
v/c Ratio	0.56	0.37	0.24	0.52	0.77	0.23
Control Delay	36.9	8.7	6.2	7.7	18.5	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	8.7	6.2	7.7	18.5	2.6
Queue Length 50th (m)	24.5	0.0	2.6	39.3	87.0	0.2
Queue Length 95th (m)	48.7	15.2	7.5	66.1	140.5	10.9
Internal Link Dist (m)	376.5			775.4	314.0	
Turn Bay Length (m)	21.0		123.0			72.0
Base Capacity (vph)	508	539	394	2883	2287	1060
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.27	0.17	0.41	0.63	0.20

Intersection Summary

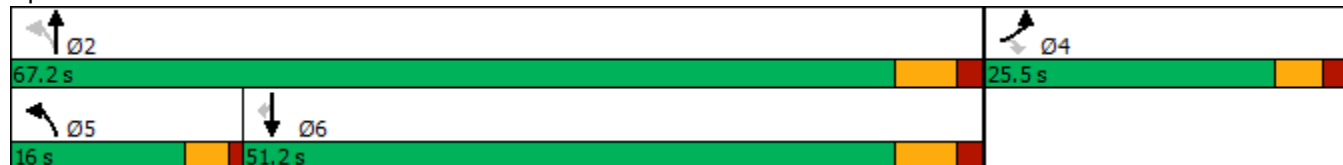
Cycle Length: 92.7













Actuated Cycle Length: 72.8

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Splits and Phases: 8: Paris St & York St















						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	160	132	60	1054	1301	188
Future Volume (vph)	160	132	60	1054	1301	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1517	1770	3471	3539	1532
Flt Permitted	0.95	1.00	0.09	1.00	1.00	1.00
Satd. Flow (perm)	1770	1517	175	3471	3539	1532
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	178	147	67	1171	1446	209
RTOR Reduction (vph)	0	121	0	0	0	98
Lane Group Flow (vph)	178	26	67	1171	1446	111
Confl. Peds. (#/hr)	1	15	8			8
Heavy Vehicles (%)	2%	4%	2%	4%	2%	2%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	13.1	13.1	48.4	48.4	38.5	38.5
Effective Green, g (s)	13.1	13.1	48.4	48.4	38.5	38.5
Actuated g/C Ratio	0.18	0.18	0.66	0.66	0.53	0.53
Clearance Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	316	271	244	2295	1861	805
v/s Ratio Prot	c0.10		0.02	c0.34	c0.41	
v/s Ratio Perm		0.02	0.16			0.07
v/c Ratio	0.56	0.10	0.27	0.51	0.78	0.14
Uniform Delay, d1	27.4	25.1	8.8	6.3	13.9	8.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	0.2	0.6	0.2	2.1	0.1
Delay (s)	29.7	25.3	9.4	6.5	16.0	8.9
Level of Service	C	C	A	A	B	A
Approach Delay (s)	27.7			6.7	15.1	
Approach LOS	C			A	B	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			13.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.71			
Actuated Cycle Length (s)			73.2		Sum of lost time (s)	15.7
Intersection Capacity Utilization			68.1%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						



700 Paris St  
9: Ramsey Lake Rd & Paris St

Queues  
Existing (2022) AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	167	208	911	342	594	847
Future Volume (vph)	167	208	911	342	594	847
Lane Group Flow (vph)	174	217	949	356	619	882
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	30.8		56.2	56.2	24.0	80.2
Total Split (%)	27.7%		50.6%	50.6%	21.6%	72.3%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.35	0.28	0.73	0.50	0.70	0.37
Control Delay	32.3	11.0	24.2	8.7	32.4	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	11.0	24.2	8.7	32.4	5.4
Queue Length 50th (m)	11.9	12.7	60.7	11.4	41.0	22.0
Queue Length 95th (m)	24.2	34.0	91.8	34.7	#86.9	40.6
Internal Link Dist (m)	679.1		533.6			775.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	1160	765	2369	1118	890	3288
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.28	0.40	0.32	0.70	0.27

Intersection Summary

Cycle Length: 111

Actuated Cycle Length: 75.2

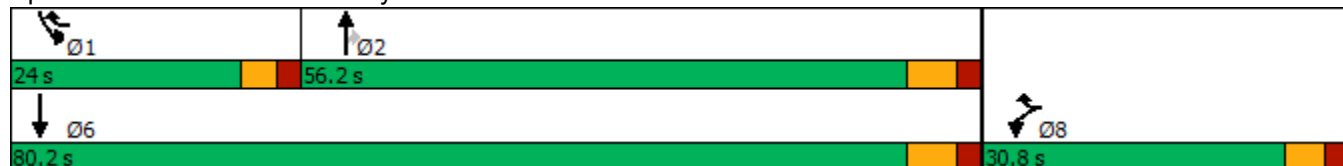
Natural Cycle: 90

Control Type: Semi Act-Uncoord

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


Queue shown is maximum after two cycles.

Splits and Phases: 9: Ramsey Lake Rd & Paris St























700 Paris St  
9: Ramsey Lake Rd & Paris St

HCM Signalized Intersection Capacity Analysis  
Existing (2022) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕	↔	↔↔	↕↕
Traffic Volume (vph)	167	208	911	342	594	847
Future Volume (vph)	167	208	911	342	594	847
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1568	3505	1549	3467	3471
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1568	3505	1549	3467	3471
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	174	217	949	356	619	882
RTOR Reduction (vph)	0	31	0	149	0	0
Lane Group Flow (vph)	174	186	949	207	619	882
Confl. Peds. (#/hr)		13		14	14	
Heavy Vehicles (%)	2%	3%	3%	2%	1%	4%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	10.8	35.9	27.9	27.9	19.3	52.2
Effective Green, g (s)	10.8	35.9	27.9	27.9	19.3	52.2
Actuated g/C Ratio	0.14	0.48	0.37	0.37	0.26	0.70
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	494	750	1303	576	892	2415
v/s Ratio Prot	c0.05	0.12	c0.27		c0.18	0.25
v/s Ratio Perm				0.13		
v/c Ratio	0.35	0.25	0.73	0.36	0.69	0.37
Uniform Delay, d1	28.9	11.6	20.3	17.1	25.2	4.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2	2.1	0.4	2.4	0.1
Delay (s)	29.4	11.7	22.4	17.5	27.5	4.7
Level of Service	C	B	C	B	C	A
Approach Delay (s)	19.6		21.0			14.1
Approach LOS	B		C			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			17.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			75.0		Sum of lost time (s)	17.0
Intersection Capacity Utilization			70.8%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

700 Paris St  
1: Paris St & Brady St

Queues  
Existing (2022) PM Peak Hour

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	168	523	521	433	91	989	668	24	772	235
Future Volume (vph)	168	523	521	433	91	989	668	24	772	235
Lane Group Flow (vph)	168	579	521	446	91	989	668	24	772	235
Turn Type	pm+pt	NA	Prot	NA	pm+pt	NA	pt+ov	pm+pt	NA	pm+ov
Protected Phases	7	4	3	8	5	2	2 3	1	6	7
Permitted Phases	4				2			6		6
Detector Phase	7	4	3	8	5	2	2 3	1	6	7
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0		5.0	15.0	5.0
Minimum Split (s)	10.0	31.2	10.0	31.2	10.0	40.1		10.0	40.1	10.0
Total Split (s)	25.0	31.2	33.0	39.2	22.0	54.1		19.0	51.1	25.0
Total Split (%)	18.2%	22.7%	24.0%	28.6%	16.0%	39.4%		13.8%	37.2%	18.2%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7		3.0	3.7	3.0
All-Red Time (s)	2.0	2.5	2.0	2.5	2.0	2.4		2.0	2.4	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	6.2	5.0	6.2	5.0	6.1		5.0	6.1	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min		None	Min	None
v/c Ratio	0.44	0.76	0.70	0.42	0.31	0.58	0.63	0.11	0.53	0.32
Control Delay	23.2	48.2	45.9	33.1	22.5	31.0	12.5	20.2	33.4	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0
Total Delay	23.2	48.2	45.9	33.1	22.5	31.0	13.0	20.2	33.4	11.0
Queue Length 50th (m)	21.6	65.1	58.0	42.0	12.5	71.1	69.8	3.2	54.7	17.3
Queue Length 95th (m)	43.8	#108.5	88.1	71.5	24.0	91.5	110.5	8.6	73.5	33.6
Internal Link Dist (m)		364.5		324.4		160.9			177.4	
Turn Bay Length (m)	57.0		85.0		70.0		6.0	24.0		6.0
Base Capacity (vph)	506	901	984	1214	401	2474	1150	352	2319	843
Starvation Cap Reductn	0	0	0	0	0	0	179	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.64	0.53	0.37	0.23	0.40	0.69	0.07	0.33	0.28

Intersection Summary

Cycle Length: 137.3

Actuated Cycle Length: 104.7









Natural Cycle: 95

Control Type: Semi Act-Uncoord

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























Queue shown is maximum after two cycles.

Splits and Phases: 1: Paris St & Brady St

 Ø1	 Ø2	 Ø3	 Ø4
19 s	54.1 s	33 s	31.2 s
 Ø5	 Ø6	 Ø7	 Ø8
22 s	51.1 s	25 s	39.2 s

700 Paris St  
1: Paris St & Brady St

HCM Signalized Intersection Capacity Analysis  
Existing (2022) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	523	56	521	433	13	91	989	668	24	772	235
Future Volume (vph)	168	523	56	521	433	13	91	989	668	24	772	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.2		5.0	6.2		5.0	6.1	6.1	5.0	6.1	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1580	3538		3467	3491		1750	5085	1615	1785	5085	1575
Flt Permitted	0.49	1.00		0.95	1.00		0.23	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	822	3538		3467	3491		429	5085	1615	389	5085	1575
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	168	523	56	521	433	13	91	989	668	24	772	235
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	82	0	0	61
Lane Group Flow (vph)	168	573	0	521	445	0	91	989	586	24	772	174
Confl. Peds. (#/hr)	9		6	6		9	25		33	33		25
Heavy Vehicles (%)	14%	0%	4%	1%	3%	0%	3%	2%	0%	1%	2%	0%
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA	pt+ov	pm+pt	NA	pm+ov
Protected Phases	7	4		3	8		5	2	2 3	1	6	7
Permitted Phases	4						2			6		6
Actuated Green, G (s)	35.6	22.5		22.5	31.9		42.6	35.2	63.8	35.0	31.4	44.5
Effective Green, g (s)	35.6	22.5		22.5	31.9		42.6	35.2	63.8	35.0	31.4	44.5
Actuated g/C Ratio	0.34	0.21		0.21	0.30		0.40	0.33	0.60	0.33	0.30	0.42
Clearance Time (s)	5.0	6.2		5.0	6.2		5.0	6.1		5.0	6.1	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	369	750		735	1049		264	1687	971	175	1504	660
v/s Ratio Prot	0.06	c0.16		c0.15	0.13		c0.02	0.19	c0.36	0.00	0.15	0.03
v/s Ratio Perm	0.10						0.11			0.04		0.08
v/c Ratio	0.46	0.76		0.71	0.42		0.34	0.59	0.60	0.14	0.51	0.26
Uniform Delay, d1	26.2	39.3		38.8	29.7		20.8	29.4	13.2	24.5	31.0	20.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	4.7		3.1	0.3		0.8	0.5	1.1	0.4	0.3	0.2
Delay (s)	27.1	44.0		41.9	30.0		21.6	29.9	14.3	24.8	31.3	20.3
Level of Service	C	D		D	C		C	C	B	C	C	C
Approach Delay (s)		40.2			36.4			23.5			28.6	
Approach LOS		D			D			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		30.2					HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio		0.70										
Actuated Cycle Length (s)		106.1					Sum of lost time (s)		22.3			
Intersection Capacity Utilization		81.8%					ICU Level of Service		D			
Analysis Period (min)		15										
c Critical Lane Group												



700 Paris St  
2: Paris St & Van Horne St

Queues  
Existing (2022) PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	41	65	197	63	138	149	1511	109	1201
Future Volume (vph)	41	65	197	63	138	149	1511	109	1201
Lane Group Flow (vph)	42	270	201	64	141	152	1877	111	1266
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Minimum Split (s)	31.7	31.7	31.7	31.7	31.7	9.0	41.1	9.0	41.1
Total Split (s)	31.7	31.7	31.7	31.7	31.7	10.0	41.1	19.0	50.1
Total Split (%)	34.5%	34.5%	34.5%	34.5%	34.5%	10.9%	44.8%	20.7%	54.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.14	0.31	0.82	0.14	0.30	0.54	0.69	0.45	0.47
Control Delay	25.6	11.4	56.0	25.2	6.3	15.8	17.7	14.3	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	11.4	56.0	25.2	6.3	15.8	17.7	14.3	13.6
Queue Length 50th (m)	5.7	7.7	32.6	8.6	0.0	9.1	85.2	6.3	47.1
Queue Length 95th (m)	13.8	17.3	#60.3	18.3	13.4	#20.5	127.0	18.8	67.5
Internal Link Dist (m)		187.2		465.5			478.0		160.9
Turn Bay Length (m)	21.0		132.0		62.0	34.0		48.0	
Base Capacity (vph)	406	1110	329	607	582	280	2707	396	2714
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.24	0.61	0.11	0.24	0.54	0.69	0.28	0.47

Intersection Summary

Cycle Length: 91.8

Actuated Cycle Length: 85.4

Natural Cycle: 85

Control Type: Semi Act-Uncoord

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























Queue shown is maximum after two cycles.

Splits and Phases: 2: Paris St & Van Horne St

Ø1	Ø2	Ø4
19 s	41.1 s	31.7 s
Ø5	Ø6	Ø8
10 s	50.1 s	31.7 s















700 Paris St  
2: Paris St & Van Horne St

HCM Signalized Intersection Capacity Analysis  
Existing (2022) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	65	200	197	63	138	149	1511	328	109	1201	39
Future Volume (vph)	41	65	200	197	63	138	149	1511	328	109	1201	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1690	3129		1767	1900	1522	1769	4935		1805	5056	
Flt Permitted	0.72	1.00		0.55	1.00	1.00	0.17	1.00		0.09	1.00	
Satd. Flow (perm)	1273	3129		1029	1900	1522	313	4935		162	5056	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	42	66	204	201	64	141	152	1542	335	111	1226	40
RTOR Reduction (vph)	0	123	0	0	0	108	0	29	0	0	3	0
Lane Group Flow (vph)	42	147	0	201	64	33	152	1848	0	111	1263	0
Confl. Peds. (#/hr)	13		3	3		13	3		17	17		3
Heavy Vehicles (%)	6%	2%	1%	2%	0%	4%	2%	2%	1%	0%	2%	3%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	20.5	20.5		20.5	20.5	20.5	51.9	46.4		53.2	46.8	
Effective Green, g (s)	20.5	20.5		20.5	20.5	20.5	51.9	46.4		53.2	46.8	
Actuated g/C Ratio	0.24	0.24		0.24	0.24	0.24	0.60	0.54		0.62	0.54	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	302	743		244	451	361	281	2653		221	2741	
v/s Ratio Prot		0.05			0.03		0.03	c0.37		c0.04	0.25	
v/s Ratio Perm	0.03			c0.20		0.02	0.29			0.27		
v/c Ratio	0.14	0.20		0.82	0.14	0.09	0.54	0.70		0.50	0.46	
Uniform Delay, d1	25.9	26.3		31.2	26.0	25.7	8.2	14.7		10.7	12.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		19.7	0.1	0.1	2.1	1.5		1.8	0.6	
Delay (s)	26.2	26.5		50.9	26.1	25.8	10.4	16.3		12.5	12.6	
Level of Service	C	C		D	C	C	B	B		B	B	
Approach Delay (s)		26.4			38.2			15.8			12.6	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.8	HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			86.3	Sum of lost time (s)			13.5					
Intersection Capacity Utilization			79.4%	ICU Level of Service			D					
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
3: Paris St & John St

Queues  
Existing (2022) PM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	3	63	0	8	1857	80	1513
Future Volume (vph)	10	3	63	0	8	1857	80	1513
Lane Group Flow (vph)	0	15	0	174	8	1959	82	1565
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	20.0	20.0	5.0	20.0
Minimum Split (s)	25.7	25.7	25.7	25.7	34.8	34.8	9.0	34.8
Total Split (s)	25.7	25.7	25.7	25.7	50.8	50.8	14.0	64.8
Total Split (%)	28.4%	28.4%	28.4%	28.4%	56.1%	56.1%	15.5%	71.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.1	2.1	1.0	2.1
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.7		5.7	5.8	5.8	4.0	5.8
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.07		0.62	0.05	0.93	0.34	0.62
Control Delay		27.1		26.9	10.1	25.8	8.5	7.8
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		27.1		26.9	10.1	25.8	8.5	7.8
Queue Length 50th (m)		1.8		12.7	0.5	135.3	2.7	51.8
Queue Length 95th (m)		6.9		32.8	3.0	#244.8	10.3	96.8
Internal Link Dist (m)		561.8		431.0		175.2		478.0
Turn Bay Length (m)					33.0		23.0	
Base Capacity (vph)		372		435	169	2114	310	2688
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.04		0.40	0.05	0.93	0.26	0.58

Intersection Summary

Cycle Length: 90.5

Actuated Cycle Length: 78

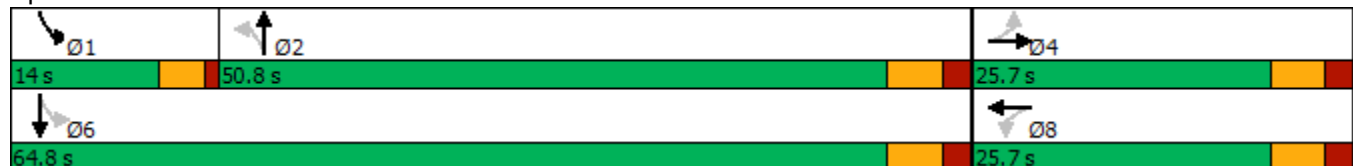
Natural Cycle: 90

Control Type: Semi Act-Uncoord

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



















Queue shown is maximum after two cycles.

Splits and Phases: 3: Paris St & John St



700 Paris St  
3: Paris St & John St

















HCM Signalized Intersection Capacity Analysis  
Existing (2022) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	3	2	63	0	106	8	1857	44	80	1513	5
Future Volume (vph)	10	3	2	63	0	106	8	1857	44	80	1513	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1800			1629		1800	3527		1736	3537	
Flt Permitted		0.77			0.87		0.15	1.00		0.08	1.00	
Satd. Flow (perm)		1441			1445		281	3527		144	3537	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	3	2	65	0	109	8	1914	45	82	1560	5
RTOR Reduction (vph)	0	2	0	0	74	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	13	0	0	100	0	8	1957	0	82	1565	0
Confl. Peds. (#/hr)	3		4	4		3	14		2	2		14
Heavy Vehicles (%)	0%	0%	0%	0%	0%	6%	0%	2%	0%	4%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.2			11.2		46.7	46.7		56.1	56.1	
Effective Green, g (s)		11.2			11.2		46.7	46.7		56.1	56.1	
Actuated g/C Ratio		0.14			0.14		0.59	0.59		0.71	0.71	
Clearance Time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		204			205		166	2090		211	2518	
v/s Ratio Prot							c0.56			0.03	c0.44	
v/s Ratio Perm		0.01			c0.07		0.03			0.25		
v/c Ratio		0.07			0.49		0.05	0.94		0.39	0.62	
Uniform Delay, d1		29.3			31.2		6.7	14.7		15.5	5.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			1.8		0.1	8.7		1.2	0.5	
Delay (s)		29.4			33.0		6.9	23.4		16.7	6.3	
Level of Service		C			C		A	C		B	A	
Approach Delay (s)		29.4			33.0			23.3			6.9	
Approach LOS		C			C			C			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		16.6					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.84										
Actuated Cycle Length (s)		78.8					Sum of lost time (s)			15.5		
Intersection Capacity Utilization		84.8%					ICU Level of Service			E		
Analysis Period (min)		15										
c Critical Lane Group												












700 Paris St  
4: Paris St & McNaughton St










HCM Unsignalized Intersection Capacity Analysis  
Existing (2022) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	7	3	0	2	1	1881	1	1	1640	13
Future Volume (Veh/h)	9	0	7	3	0	2	1	1881	1	1	1640	13
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	9	0	7	3	0	2	1	1959	1	1	1708	14
Pedestrians	3			2								
Lane Width (m)	3.6			3.6								
Walking Speed (m/s)	1.2			1.2								
Percent Blockage	0			0								
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)							347			199		
pX, platoon unblocked	0.60	0.60	0.74	0.60	0.60	0.47	0.74				0.47	
vC, conflicting volume	2704	3684	864	2826	3690	982	1725				1962	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	532	2171	105	737	2182	0	1272				778	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	96	100	99	98	100	100	100				100	
cM capacity (veh/h)	257	28	689	182	28	509	407				395	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	16	5	980	980	855	868						
Volume Left	9	3	1	0	1	0						
Volume Right	7	2	0	1	0	14						
cSH	354	245	407	1700	395	1700						
Volume to Capacity	0.05	0.02	0.00	0.58	0.00	0.51						
Queue Length 95th (m)	1.1	0.5	0.1	0.0	0.1	0.0						
Control Delay (s)	15.7	20.0	0.1	0.0	0.1	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	15.7	20.0	0.0		0.0							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			62.7%	ICU Level of Service				B				
Analysis Period (min)			15									

700 Paris St  
5: Paris St & Facer St
















HCM Unsignalized Intersection Capacity Analysis  
Existing (2022) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	1	1873	6	0	1645
Future Volume (Veh/h)	1	1	1873	6	0	1645
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	1	1972	6	0	1732
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			225			321
pX, platoon unblocked	0.64	0.51			0.51	
vC, conflicting volume	2842	990			1979	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	869	0			987	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	189	553			359	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	2	1315	663	577	1155	
Volume Left	1	0	0	0	0	
Volume Right	1	0	6	0	0	
cSH	282	1700	1700	359	1700	
Volume to Capacity	0.01	0.77	0.39	0.00	0.68	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	17.9	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	17.9	0.0		0.0		
Approach LOS	C					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			62.0%		ICU Level of Service	B
Analysis Period (min)			15			

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	7	0	0	2	0	0
Future Volume (Veh/h)	7	0	0	2	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	10	0	0	3	0	0
Pedestrians	1			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			10		14	12
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			10		14	12
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1009	1073
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	10	3	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1623	1700			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization	14.0%			ICU Level of Service	A	
Analysis Period (min)	15					

700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

Queues  
Existing (2022) PM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	23	0	6	2	21	1848	4	1589
Future Volume (vph)	23	0	6	2	21	1848	4	1589
Lane Group Flow (vph)	0	40	7	13	23	2017	4	1756
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	30.0	30.0	30.0	30.0
Minimum Split (s)	26.0	26.0	26.0	26.0	35.9	35.9	35.9	35.9
Total Split (s)	26.0	26.0	26.0	26.0	55.9	55.9	55.9	55.9
Total Split (%)	31.7%	31.7%	31.7%	31.7%	68.3%	68.3%	68.3%	68.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.7	3.7	3.7	3.7
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	5.9	5.9	5.9	5.9
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.19	0.03	0.06	0.14	0.69	0.03	0.60
Control Delay		13.4	28.3	17.8	5.6	6.4	3.8	5.1
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		13.4	28.3	17.8	5.6	6.4	3.8	5.1
Queue Length 50th (m)		0.1	0.9	0.3	0.8	76.5	0.1	56.6
Queue Length 95th (m)		8.5	4.3	5.0	3.5	106.7	0.9	77.7
Internal Link Dist (m)		192.5		282.1		313.9		201.2
Turn Bay Length (m)					40.0		100.0	
Base Capacity (vph)		462	574	540	161	2918	125	2915
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.09	0.01	0.02	0.14	0.69	0.03	0.60

Intersection Summary

Cycle Length: 81.9

Actuated Cycle Length: 63.2

Natural Cycle: 80

Control Type: Semi Act-Uncoord




















Splits and Phases: 7: Paris St & Boland Ave/Paris Driveway

 Ø2	 Ø4
55.9 s	26 s
 Ø6	 Ø8
55.9 s	26 s















700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

HCM Signalized Intersection Capacity Analysis  
Existing (2022) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	0	14	6	2	10	21	1848	7	4	1589	27
Future Volume (vph)	23	0	14	6	2	10	21	1848	7	4	1589	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.95		1.00	0.87		1.00	1.00		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1622		1805	1640		1804	3537		1805	3530	
Flt Permitted		0.80		0.93	1.00		0.10	1.00		0.08	1.00	
Satd. Flow (perm)		1342		1767	1640		196	3537		153	3530	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	0	15	7	2	11	23	2009	8	4	1727	29
RTOR Reduction (vph)	0	36	0	0	10	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	4	0	7	3	0	23	2017	0	4	1755	0
Confl. Peds. (#/hr)	2					2	4		2	2		4
Heavy Vehicles (%)	4%	0%	14%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		4.3		4.3	4.3		49.7	49.7		49.7	49.7	
Effective Green, g (s)		4.3		4.3	4.3		49.7	49.7		49.7	49.7	
Actuated g/C Ratio		0.07		0.07	0.07		0.75	0.75		0.75	0.75	
Clearance Time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		87		115	107		147	2667		115	2662	
v/s Ratio Prot					0.00			c0.57			0.50	
v/s Ratio Perm		0.00		c0.00			0.12			0.03		
v/c Ratio		0.04		0.06	0.03		0.16	0.76		0.03	0.66	
Uniform Delay, d1		28.9		28.9	28.8		2.3	4.6		2.0	4.0	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2		0.2	0.1		0.5	1.3		0.1	0.6	
Delay (s)		29.1		29.1	28.9		2.8	5.9		2.2	4.6	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		29.1			29.0			5.9			4.6	
Approach LOS		C			C			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		5.6					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.70										
Actuated Cycle Length (s)		65.9					Sum of lost time (s)		11.9			
Intersection Capacity Utilization		70.0%					ICU Level of Service		C			
Analysis Period (min)		15										
c Critical Lane Group												

700 Paris St  
8: Paris St & York St

Queues  
Existing (2022) PM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	196	104	141	1680	1419	190
Future Volume (vph)	196	104	141	1680	1419	190
Lane Group Flow (vph)	206	109	148	1768	1494	200
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	30.0	30.0	30.0
Minimum Split (s)	25.5	25.5	9.0	36.2	36.2	36.2
Total Split (s)	25.5	25.5	16.0	67.2	51.2	51.2
Total Split (%)	27.5%	27.5%	17.3%	72.5%	55.2%	55.2%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	2.2	2.2	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
v/c Ratio	0.64	0.29	0.49	0.75	0.84	0.23
Control Delay	41.2	8.8	14.4	11.6	23.5	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.2	8.8	14.4	11.6	23.5	3.0
Queue Length 50th (m)	31.8	0.0	6.6	84.4	101.4	0.6
Queue Length 95th (m)	57.4	13.3	25.0	135.0	159.8	12.0
Internal Link Dist (m)	376.5			774.4	313.9	
Turn Bay Length (m)	21.0		123.0			72.0
Base Capacity (vph)	461	483	366	2787	2058	975
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.23	0.40	0.63	0.73	0.21

Intersection Summary

Cycle Length: 92.7













Actuated Cycle Length: 79.2













Natural Cycle: 75

Control Type: Semi Act-Uncoord

Splits and Phases: 8: Paris St & York St



						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	196	104	141	1680	1419	190
Future Volume (vph)	196	104	141	1680	1419	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1561	1770	3539	3539	1541
Flt Permitted	0.95	1.00	0.09	1.00	1.00	1.00
Satd. Flow (perm)	1787	1561	170	3539	3539	1541
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	206	109	148	1768	1494	200
RTOR Reduction (vph)	0	89	0	0	0	95
Lane Group Flow (vph)	206	20	148	1768	1494	105
Confl. Peds. (#/hr)	6	15	4			4
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	14.3	14.3	53.0	53.0	39.8	39.8
Effective Green, g (s)	14.3	14.3	53.0	53.0	39.8	39.8
Actuated g/C Ratio	0.18	0.18	0.67	0.67	0.50	0.50
Clearance Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	323	282	300	2374	1782	776
v/s Ratio Prot	c0.12		0.06	c0.50	c0.42	
v/s Ratio Perm		0.01	0.27			0.07
v/c Ratio	0.64	0.07	0.49	0.74	0.84	0.13
Uniform Delay, d1	30.0	26.8	12.0	8.6	16.8	10.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.1	0.1	1.3	1.3	3.6	0.1
Delay (s)	34.0	26.9	13.2	9.9	20.5	10.5
Level of Service	C	C	B	A	C	B
Approach Delay (s)	31.6			10.1	19.3	
Approach LOS	C			B	B	
Intersection Summary						
HCM 2000 Control Delay			15.8	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.80			
Actuated Cycle Length (s)			79.0	Sum of lost time (s)		15.7
Intersection Capacity Utilization			76.2%	ICU Level of Service		D
Analysis Period (min)			15			
c Critical Lane Group						

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	494	616	1235	244	328	1165
Future Volume (vph)	494	616	1235	244	328	1165
Lane Group Flow (vph)	549	684	1372	271	364	1294
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	30.8		56.2	56.2	33.0	89.2
Total Split (%)	25.7%		46.8%	46.8%	27.5%	74.3%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.72	0.90	0.93	0.37	0.50	0.54
Control Delay	48.9	43.7	44.7	15.4	42.1	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	43.7	44.7	15.4	42.1	10.4
Queue Length 50th (m)	66.4	147.4	167.9	26.1	40.1	74.1
Queue Length 95th (m)	86.8	#227.3	#216.5	48.1	55.2	89.8
Internal Link Dist (m)	679.1		533.6			774.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	764	815	1561	760	848	2591
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.84	0.88	0.36	0.43	0.50

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 114.5

Natural Cycle: 90

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.













Splits and Phases: 9: Ramsey Lake Rd & Paris St





700 Paris St  
9: Ramsey Lake Rd & Paris St















HCM Signalized Intersection Capacity Analysis  
Existing (2022) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	494	616	1235	244	328	1165
Future Volume (vph)	494	616	1235	244	328	1165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	1583	3539	1587	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	1583	3539	1587	3433	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	549	684	1372	271	364	1294
RTOR Reduction (vph)	0	6	0	64	0	0
Lane Group Flow (vph)	549	678	1372	207	364	1294
Confl. Peds. (#/hr)		16		5	5	
Heavy Vehicles (%)	1%	2%	2%	0%	2%	2%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	25.3	55.5	47.7	47.7	24.4	77.1
Effective Green, g (s)	25.3	55.5	47.7	47.7	24.4	77.1
Actuated g/C Ratio	0.22	0.49	0.42	0.42	0.21	0.67
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	766	767	1475	661	732	2385
v/s Ratio Prot	0.16	c0.43	c0.39		0.11	0.37
v/s Ratio Perm				0.13		
v/c Ratio	0.72	0.88	0.93	0.31	0.50	0.54
Uniform Delay, d1	41.2	26.6	31.8	22.4	39.6	9.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	11.8	10.8	0.3	0.5	0.3
Delay (s)	44.4	38.4	42.5	22.6	40.1	9.8
Level of Service	D	D	D	C	D	A
Approach Delay (s)	41.1		39.2			16.5
Approach LOS	D		D			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			31.4		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.96			
Actuated Cycle Length (s)			114.4		Sum of lost time (s)	17.0
Intersection Capacity Utilization			83.9%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

700 Paris St  
3: Paris St & John St

Queues

Existing (2022) PM Peak Hour w/ Improvements

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	3	63	0	8	1857	80	1513
Future Volume (vph)	10	3	63	0	8	1857	80	1513
Lane Group Flow (vph)	0	15	0	174	8	1959	82	1565
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	20.0	20.0	5.0	20.0
Minimum Split (s)	25.7	25.7	25.7	25.7	34.8	34.8	9.0	34.8
Total Split (s)	25.7	25.7	25.7	25.7	85.3	85.3	9.0	94.3
Total Split (%)	21.4%	21.4%	21.4%	21.4%	71.1%	71.1%	7.5%	78.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.1	2.1	1.0	2.1
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.7		5.7	5.8	5.8	4.0	5.8
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.07		0.65	0.05	0.87	0.45	0.62
Control Delay		38.1		40.0	7.8	18.8	15.3	7.8
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		38.1		40.0	7.8	18.8	15.3	7.8
Queue Length 50th (m)		2.2		20.5	0.5	144.0	3.3	62.4
Queue Length 95th (m)		9.3		50.7	2.6	214.6	15.0	101.0
Internal Link Dist (m)		561.8		431.0		175.2		478.0
Turn Bay Length (m)					33.0		23.0	
Base Capacity (vph)		359		393	224	2961	183	3151
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.04		0.44	0.04	0.66	0.45	0.50

Intersection Summary


Cycle Length: 120

Actuated Cycle Length: 91.6

Natural Cycle: 90



















Control Type: Semi Act-Uncoord

Splits and Phases: 3: Paris St & John St

		
9 s	85.3 s	25.7 s
		
94.3 s	25.7 s	

700 Paris St  
3: Paris St & John St













HCM Signalized Intersection Capacity Analysis  
Existing (2022) PM Peak Hour w/ Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	3	2	63	0	106	8	1857	44	80	1513	5
Future Volume (vph)	10	3	2	63	0	106	8	1857	44	80	1513	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1799			1628		1800	3527		1736	3537	
Flt Permitted		0.80			0.87		0.14	1.00		0.06	1.00	
Satd. Flow (perm)		1488			1444		266	3527		117	3537	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	3	2	65	0	109	8	1914	45	82	1560	5
RTOR Reduction (vph)	0	2	0	0	53	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	13	0	0	121	0	8	1958	0	82	1565	0
Confl. Peds. (#/hr)	3		4	4		3	14		2	2		14
Heavy Vehicles (%)	0%	0%	0%	0%	0%	6%	0%	2%	0%	4%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.8			13.8		58.6	58.6		66.3	66.3	
Effective Green, g (s)		13.8			13.8		58.6	58.6		66.3	66.3	
Actuated g/C Ratio		0.15			0.15		0.64	0.64		0.72	0.72	
Clearance Time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		224			217		170	2256		150	2560	
v/s Ratio Prot							c0.56			0.02	c0.44	
v/s Ratio Perm		0.01			c0.08		0.03			0.37		
v/c Ratio		0.06			0.56		0.05	0.87		0.55	0.61	
Uniform Delay, d1		33.3			36.1		6.1	13.4		16.4	6.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			3.1		0.1	3.8		4.0	0.4	
Delay (s)		33.4			39.2		6.2	17.2		20.4	6.7	
Level of Service		C			D		A	B		C	A	
Approach Delay (s)		33.4			39.2			17.1			7.4	
Approach LOS		C			D			B			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		14.0					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.81										
Actuated Cycle Length (s)		91.6					Sum of lost time (s)			15.5		
Intersection Capacity Utilization		84.8%					ICU Level of Service			E		
Analysis Period (min)		15										
c Critical Lane Group												

700 Paris St  
9: Ramsey Lake Rd & Paris St

Queues

Existing (2022) PM Peak Hour w/ Improvements

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	494	616	1235	244	328	1165
Future Volume (vph)	494	616	1235	244	328	1165
Lane Group Flow (vph)	549	684	1372	271	364	1294
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	36.0		62.0	62.0	22.0	84.0
Total Split (%)	30.0%		51.7%	51.7%	18.3%	70.0%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.60	0.93	0.89	0.36	0.71	0.58
Control Delay	41.0	50.9	37.4	12.6	56.0	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	50.9	37.4	12.6	56.0	13.4
Queue Length 50th (m)	61.0	154.9	152.6	22.0	44.2	86.5
Queue Length 95th (m)	81.7	#245.0	184.6	41.9	62.3	104.8
Internal Link Dist (m)	679.1		533.6			774.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	916	734	1729	835	511	2410
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.93	0.79	0.32	0.71	0.54

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 114.6

Natural Cycle: 90

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.













Splits and Phases: 9: Ramsey Lake Rd & Paris St





700 Paris St  
9: Ramsey Lake Rd & Paris St





















HCM Signalized Intersection Capacity Analysis  
Existing (2022) PM Peak Hour w/ Improvements

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	494	616	1235	244	328	1165
Future Volume (vph)	494	616	1235	244	328	1165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	1583	3539	1587	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	1583	3539	1587	3433	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	549	684	1372	271	364	1294
RTOR Reduction (vph)	0	10	0	66	0	0
Lane Group Flow (vph)	549	674	1372	205	364	1294
Confl. Peds. (#/hr)		16		5	5	
Heavy Vehicles (%)	1%	2%	2%	0%	2%	2%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	30.3	53.2	50.2	50.2	17.1	72.3
Effective Green, g (s)	30.3	53.2	50.2	50.2	17.1	72.3
Actuated g/C Ratio	0.26	0.46	0.44	0.44	0.15	0.63
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	916	734	1550	695	512	2232
v/s Ratio Prot	0.16	c0.43	c0.39		0.11	0.37
v/s Ratio Perm				0.13		
v/c Ratio	0.60	0.92	0.89	0.29	0.71	0.58
Uniform Delay, d1	36.8	28.7	29.6	20.8	46.4	12.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	16.3	6.4	0.2	4.6	0.4
Delay (s)	37.9	45.0	36.0	21.0	51.0	12.7
Level of Service	D	D	D	C	D	B
Approach Delay (s)	41.8		33.5			21.1
Approach LOS	D		C			C
<b>Intersection Summary</b>						
HCM 2000 Control Delay			31.2		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.96			
Actuated Cycle Length (s)			114.6		Sum of lost time (s)	17.0
Intersection Capacity Utilization			83.9%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

## **Appendix E – Synchro Analysis Output – Background Traffic Volumes**

700 Paris St  
1: Paris St & Brady St

Queues  
Background (2027) AM Peak Hour

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	168	424	534	393	76	560	415	27	823	241
Future Volume (vph)	168	424	534	393	76	560	415	27	823	241
Lane Group Flow (vph)	183	509	580	438	83	609	451	29	895	262
Turn Type	pm+pt	NA	Prot	NA	pm+pt	NA	pt+ov	pm+pt	NA	pm+ov
Protected Phases	7	4	3	8	5	2	2 3	1	6	7
Permitted Phases	4				2			6		6
Detector Phase	7	4	3	8	5	2	2 3	1	6	7
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0		5.0	15.0	5.0
Minimum Split (s)	10.0	31.2	10.0	31.2	10.0	40.1		10.0	40.1	10.0
Total Split (s)	26.1	31.2	34.0	39.1	20.0	44.0		17.0	41.0	26.1
Total Split (%)	20.7%	24.7%	26.9%	31.0%	15.8%	34.9%		13.5%	32.5%	20.7%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7		3.0	3.7	3.0
All-Red Time (s)	2.0	2.5	2.0	2.5	2.0	2.4		2.0	2.4	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	6.2	5.0	6.2	5.0	6.1		5.0	6.1	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min		None	Min	None
v/c Ratio	0.45	0.73	0.73	0.41	0.34	0.40	0.44	0.09	0.71	0.38
Control Delay	20.9	45.5	43.1	29.8	24.5	29.5	6.9	21.2	38.5	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	20.9	45.5	43.1	29.8	24.5	29.5	7.1	21.2	38.5	13.0
Queue Length 50th (m)	20.6	51.8	57.8	37.2	10.7	38.3	21.8	3.6	63.1	18.9
Queue Length 95th (m)	41.2	83.8	91.7	63.3	23.2	56.0	48.5	10.3	90.2	41.1
Internal Link Dist (m)		364.5		324.4		160.9			177.4	
Turn Bay Length (m)	57.0		85.0		70.0		6.0	24.0		6.0
Base Capacity (vph)	571	921	1060	1295	335	2059	1121	393	1855	831
Starvation Cap Reductn	0	0	0	0	0	0	154	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.55	0.55	0.34	0.25	0.30	0.47	0.07	0.48	0.32

Intersection Summary









Cycle Length: 126.2

Actuated Cycle Length: 98.5

Natural Cycle: 95






















Control Type: Semi Act-Uncoord

Splits and Phases: 1: Paris St & Brady St

			
Ø1	Ø2	Ø3	Ø4
17 s	44 s	34 s	31.2 s
			
Ø5	Ø6	Ø7	Ø8
20 s	41 s	26.1 s	39.1 s

700 Paris St  
1: Paris St & Brady St



















HCM Signalized Intersection Capacity Analysis  
Background (2027) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	424	44	534	393	10	76	560	415	27	823	241
Future Volume (vph)	168	424	44	534	393	10	76	560	415	27	823	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.2		5.0	6.2		5.0	6.1	6.1	5.0	6.1	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1684	3369		3367	3460		1671	4988	1568	1717	4893	1553
Flt Permitted	0.50	1.00		0.95	1.00		0.16	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	883	3369		3367	3460		288	4988	1568	742	4893	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	461	48	580	427	11	83	609	451	29	895	262
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	95	0	0	69
Lane Group Flow (vph)	183	503	0	580	437	0	83	609	356	29	895	193
Confl. Peds. (#/hr)	7		4	4		7	19		10	10		19
Heavy Vehicles (%)	7%	5%	10%	4%	4%	0%	8%	4%	3%	5%	6%	2%
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA	pt+ov	pm+pt	NA	pm+ov
Protected Phases	7	4		3	8		5	2	2 3	1	6	7
Permitted Phases	4						2			6		6
Actuated Green, G (s)	32.8	20.2		23.2	30.8		37.8	30.2	59.5	30.2	26.4	39.0
Effective Green, g (s)	32.8	20.2		23.2	30.8		37.8	30.2	59.5	30.2	26.4	39.0
Actuated g/C Ratio	0.33	0.20		0.23	0.31		0.38	0.30	0.60	0.30	0.26	0.39
Clearance Time (s)	5.0	6.2		5.0	6.2		5.0	6.1		5.0	6.1	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	391	682		783	1068		214	1510	935	261	1295	607
v/s Ratio Prot	0.06	c0.15		c0.17	0.13		c0.03	0.12	0.23	0.00	c0.18	0.04
v/s Ratio Perm	0.09						0.12			0.03		0.08
v/c Ratio	0.47	0.74		0.74	0.41		0.39	0.40	0.38	0.11	0.69	0.32
Uniform Delay, d1	25.2	37.3		35.5	27.2		21.4	27.6	10.5	24.6	33.0	21.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	4.2		3.8	0.3		1.2	0.2	0.3	0.2	1.6	0.3
Delay (s)	26.1	41.4		39.3	27.5		22.6	27.8	10.8	24.8	34.6	21.4
Level of Service	C	D		D	C		C	C	B	C	C	C
Approach Delay (s)		37.4			34.2			20.7			31.4	
Approach LOS		D			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.1	HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			99.7	Sum of lost time (s)					22.3			
Intersection Capacity Utilization			75.1%	ICU Level of Service					D			
Analysis Period (min)			15									
c Critical Lane Group												



700 Paris St  
2: Paris St & Van Horne St

Queues  
Background (2027) AM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	15	25	245	58	138	157	949	76	1278
Future Volume (vph)	15	25	245	58	138	157	949	76	1278
Lane Group Flow (vph)	16	119	269	64	152	173	1162	84	1456
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Minimum Split (s)	31.7	31.7	31.7	31.7	31.7	9.0	41.1	9.0	41.1
Total Split (s)	37.0	37.0	37.0	37.0	37.0	19.0	41.1	19.0	41.1
Total Split (%)	38.1%	38.1%	38.1%	38.1%	38.1%	19.6%	42.3%	19.6%	42.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.05	0.14	0.79	0.13	0.29	0.60	0.46	0.26	0.64
Control Delay	22.5	8.1	45.4	23.4	5.6	22.8	15.2	10.1	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	8.1	45.4	23.4	5.6	22.8	15.2	10.1	21.0
Queue Length 50th (m)	1.9	1.7	40.6	7.9	0.0	11.9	44.1	4.9	65.0
Queue Length 95th (m)	6.8	8.0	73.0	18.2	13.3	37.6	73.2	13.5	108.6
Internal Link Dist (m)		187.2		465.5			478.0		160.9
Turn Bay Length (m)	21.0		133.0		62.0	34.0		48.0	
Base Capacity (vph)	468	1209	509	725	717	377	2521	489	2262
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.10	0.53	0.09	0.21	0.46	0.46	0.17	0.64

Intersection Summary

Cycle Length: 97.1

Actuated Cycle Length: 82.9

Natural Cycle: 85























Control Type: Semi Act-Uncoord

Splits and Phases: 2: Paris St & Van Horne St

 Ø1	 Ø2	 Ø4
19 s	41.1 s	37 s
 Ø5	 Ø6	 Ø8
19 s	41.1 s	37 s















700 Paris St  
2: Paris St & Van Horne St

HCM Signalized Intersection Capacity Analysis  
Background (2027) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	25	84	245	58	138	157	949	108	76	1278	47
Future Volume (vph)	15	25	84	245	58	138	157	949	108	76	1278	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	2905		1801	1827	1576	1703	4870		1752	5048	
Flt Permitted	0.72	1.00		0.68	1.00	1.00	0.09	1.00		0.21	1.00	
Satd. Flow (perm)	1179	2905		1283	1827	1576	169	4870		388	5048	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	27	92	269	64	152	173	1043	119	84	1404	52
RTOR Reduction (vph)	0	68	0	0	0	112	0	11	0	0	3	0
Lane Group Flow (vph)	16	51	0	269	64	40	173	1151	0	84	1453	0
Confl. Peds. (#/hr)	4		4	4		4	6		6	6		6
Heavy Vehicles (%)	15%	4%	10%	0%	4%	1%	6%	5%	2%	3%	2%	5%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	22.1	22.1		22.1	22.1	22.1	52.6	42.7		43.9	38.0	
Effective Green, g (s)	22.1	22.1		22.1	22.1	22.1	52.6	42.7		43.9	38.0	
Actuated g/C Ratio	0.26	0.26		0.26	0.26	0.26	0.63	0.51		0.52	0.45	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	311	767		338	482	416	291	2484		299	2291	
v/s Ratio Prot		0.02			0.04		c0.07	0.24		0.02	c0.29	
v/s Ratio Perm	0.01			c0.21		0.03	0.30			0.13		
v/c Ratio	0.05	0.07		0.80	0.13	0.10	0.59	0.46		0.28	0.63	
Uniform Delay, d1	23.0	23.1		28.7	23.5	23.3	11.9	13.1		10.0	17.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.0		12.2	0.1	0.1	3.2	0.6		0.5	1.4	
Delay (s)	23.0	23.1		40.9	23.6	23.4	15.1	13.8		10.5	18.9	
Level of Service	C	C		D	C	C	B	B		B	B	
Approach Delay (s)		23.1			33.1			14.0			18.4	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.9	HCM 2000 Level of Service				B				
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			83.7	Sum of lost time (s)				13.5				
Intersection Capacity Utilization			68.7%	ICU Level of Service				C				
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
3: Paris St & John St

Queues  
Background (2027) AM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	8	0	40	2	4	1209	46	1529
Future Volume (vph)	8	0	40	2	4	1209	46	1529
Lane Group Flow (vph)	0	14	0	110	4	1294	48	1602
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	20.0	20.0	5.0	20.0
Minimum Split (s)	25.7	25.7	25.7	25.7	34.8	34.8	9.0	34.8
Total Split (s)	25.7	25.7	25.7	25.7	50.8	50.8	14.0	64.8
Total Split (%)	28.4%	28.4%	28.4%	28.4%	56.1%	56.1%	15.5%	71.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.1	2.1	1.0	2.1
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.7		5.7	5.8	5.8	4.0	5.8
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.04		0.36	0.02	0.60	0.14	0.63
Control Delay		0.2		16.9	8.5	11.4	4.0	7.3
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		0.2		16.9	8.5	11.4	4.0	7.3
Queue Length 50th (m)		0.0		4.3	0.2	56.1	1.3	46.3
Queue Length 95th (m)		0.0		19.8	1.7	91.0	4.3	80.5
Internal Link Dist (m)		561.8		431.0		175.2		478.0
Turn Bay Length (m)					33.0		23.0	
Base Capacity (vph)		610		601	218	2854	463	3321
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.02		0.18	0.02	0.45	0.10	0.48

Intersection Summary

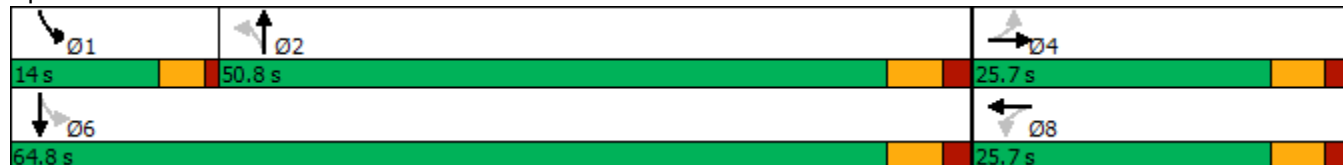
Cycle Length: 90.5

Actuated Cycle Length: 56.5

Natural Cycle: 70



















Control Type: Semi Act-Uncoord

Splits and Phases: 3: Paris St & John St



700 Paris St  
3: Paris St & John St

















HCM Signalized Intersection Capacity Analysis  
Background (2027) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	0	6	40	2	63	4	1209	34	46	1529	9
Future Volume (vph)	8	0	6	40	2	63	4	1209	34	46	1529	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1727			1696		1803	3491		1770	3536	
Flt Permitted		0.84			0.87		0.14	1.00		0.13	1.00	
Satd. Flow (perm)		1498			1501		267	3491		250	3536	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	8	0	6	42	2	66	4	1259	35	48	1593	9
RTOR Reduction (vph)	0	12	0	0	58	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	2	0	0	52	0	4	1292	0	48	1602	0
Confl. Peds. (#/hr)	5		5	5		5	8		4	4		8
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.1			7.1		33.5	33.5		40.8	40.8	
Effective Green, g (s)		7.1			7.1		33.5	33.5		40.8	40.8	
Actuated g/C Ratio		0.12			0.12		0.56	0.56		0.69	0.69	
Clearance Time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		179			179		150	1968		256	2428	
v/s Ratio Prot								0.37		0.01	c0.45	
v/s Ratio Perm		0.00			c0.03		0.01			0.12		
v/c Ratio		0.01			0.29		0.03	0.66		0.19	0.66	
Uniform Delay, d1		23.1			23.9		5.7	9.0		4.9	5.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.9		0.1	0.8		0.4	0.7	
Delay (s)		23.1			24.8		5.8	9.8		5.2	6.0	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		23.1			24.8			9.8			6.0	
Approach LOS		C			C			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		8.3					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		59.4					Sum of lost time (s)		15.5			
Intersection Capacity Utilization		61.8%					ICU Level of Service		B			
Analysis Period (min)		15										
c Critical Lane Group												












700 Paris St  
4: Paris St & McNaughton St

HCM Unsignalized Intersection Capacity Analysis  
Background (2027) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	9	2	0	2	1	1374	0	0	1603	7
Future Volume (Veh/h)	3	0	9	2	0	2	1	1374	0	0	1603	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	0	10	2	0	2	1	1527	0	0	1781	8
Pedestrians		2			1							
Lane Width (m)		3.6			3.6							
Walking Speed (m/s)		1.2			1.2							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)								347			199	
pX, platoon unblocked	0.78	0.78	0.69	0.78	0.78	0.84	0.69			0.84		
vC, conflicting volume	2554	3317	896	2430	3321	764	1791			1528		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1471	2454	0	1312	2459	324	1257			1238		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	96	100	99	98	100	100	100			100		
cM capacity (veh/h)	69	24	755	90	24	459	388			475		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	13	4	764	764	890	898						
Volume Left	3	2	1	0	0	0						
Volume Right	10	2	0	0	0	8						
cSH	230	151	388	1700	475	1700						
Volume to Capacity	0.06	0.03	0.00	0.45	0.00	0.53						
Queue Length 95th (m)	1.4	0.7	0.1	0.0	0.0	0.0						
Control Delay (s)	21.6	29.5	0.1	0.0	0.0	0.0						
Lane LOS	C	D	A									
Approach Delay (s)	21.6	29.5	0.0		0.0							
Approach LOS	C	D										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			54.5%				ICU Level of Service			A		
Analysis Period (min)			15									

700 Paris St  
5: Paris St & Facer St














HCM Unsignalized Intersection Capacity Analysis  
Background (2027) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	0	1362	1	1	1614
Future Volume (Veh/h)	2	0	1362	1	1	1614
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	0	1513	1	1	1793
Pedestrians						1
Lane Width (m)						3.6
Walking Speed (m/s)						1.2
Percent Blockage						0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			226			321
pX, platoon unblocked	0.78	0.81			0.81	
vC, conflicting volume	2412	758			1514	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1169	244			1173	
tC, single (s)	6.8	6.9			6.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			3.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	147	620			202	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	2	1009	505	599	1195	
Volume Left	2	0	0	1	0	
Volume Right	0	0	1	0	0	
cSH	147	1700	1700	202	1700	
Volume to Capacity	0.01	0.59	0.30	0.00	0.70	
Queue Length 95th (m)	0.3	0.0	0.0	0.1	0.0	
Control Delay (s)	29.9	0.0	0.0	0.2	0.0	
Lane LOS	D			A		
Approach Delay (s)	29.9	0.0		0.1		
Approach LOS	D					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			55.6%		ICU Level of Service	B
Analysis Period (min)			15			

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↶	↶	
Traffic Volume (veh/h)	1	1	1	1	0	0
Future Volume (Veh/h)	1	1	1	1	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.50	0.50
Hourly flow rate (vph)	2	2	2	2	0	0
Pedestrians	1			2	2	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			6		12	7
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			6		12	7
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1625		1009	1078
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	4	4	0			
Volume Left	0	2	0			
Volume Right	2	0	0			
cSH	1700	1625	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	3.6	0.0			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.6	0.0			
Approach LOS		A				
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			14.6%	ICU Level of Service	A	
Analysis Period (min)			15			

700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

Queues  
Background (2027) AM Peak Hour

							
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	26	0	2	0	5	1313	1624
Future Volume (vph)	26	0	2	0	5	1313	1624
Lane Group Flow (vph)	0	40	2	2	5	1383	1722
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		4		8		2	6
Permitted Phases	4		8		2		
Detector Phase	4	4	8	8	2	2	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	30.0	30.0	30.0
Minimum Split (s)	26.0	26.0	26.0	26.0	35.9	35.9	35.9
Total Split (s)	26.0	26.0	26.0	26.0	55.9	55.9	55.9
Total Split (%)	31.7%	31.7%	31.7%	31.7%	68.3%	68.3%	68.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.7	3.7	3.7
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	5.9	5.9	5.9
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	Min	Min	Min
v/c Ratio		0.17	0.01	0.01	0.03	0.48	0.60
Control Delay		12.1	25.5	0.0	3.8	4.4	5.5
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		12.1	25.5	0.0	3.8	4.4	5.5
Queue Length 50th (m)		0.1	0.3	0.0	0.2	37.1	55.0
Queue Length 95th (m)		8.2	2.1	0.0	1.0	50.5	75.5
Internal Link Dist (m)		198.2		192.5		314.0	201.8
Turn Bay Length (m)					40.0		
Base Capacity (vph)		522	591	587	172	3004	3001
Starvation Cap Reductn		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0
Reduced v/c Ratio		0.08	0.00	0.00	0.03	0.46	0.57

Intersection Summary





Cycle Length: 81.9

Actuated Cycle Length: 59.3

Natural Cycle: 70

Control Type: Semi Act-Uncoord




















Splits and Phases: 7: Paris St & Boland Ave/Paris Driveway

 Ø2	 Ø4
55.9 s	26 s
 Ø6	 Ø8
55.9 s	26 s















700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

HCM Signalized Intersection Capacity Analysis  
Background (2027) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	0	12	2	0	2	5	1313	1	0	1624	12
Future Volume (vph)	26	0	12	2	0	2	5	1313	1	0	1624	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		5.9	5.9			5.9	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95			0.95	
Frt		0.96		1.00	0.85		1.00	1.00			1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1757		1805	1615		1805	3505			3502	
Flt Permitted		0.80		0.91	1.00		0.11	1.00			1.00	
Satd. Flow (perm)		1447		1727	1615		201	3505			3502	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	27	0	13	2	0	2	5	1382	1	0	1709	13
RTOR Reduction (vph)	0	36	0	0	2	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	4	0	2	0	0	5	1383	0	0	1721	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		4.4		4.4	4.4		45.6	45.6			45.6	
Effective Green, g (s)		4.4		4.4	4.4		45.6	45.6			45.6	
Actuated g/C Ratio		0.07		0.07	0.07		0.74	0.74			0.74	
Clearance Time (s)		6.0		6.0	6.0		5.9	5.9			5.9	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		102		122	114		148	2582			2579	
v/s Ratio Prot					0.00			0.39			c0.49	
v/s Ratio Perm		c0.00		0.00			0.02					
v/c Ratio		0.04		0.02	0.00		0.03	0.54			0.67	
Uniform Delay, d1		26.8		26.7	26.7		2.2	3.5			4.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.1		0.1	0.0		0.1	0.2			0.7	
Delay (s)		26.9		26.8	26.7		2.3	3.8			4.9	
Level of Service		C		C	C		A	A			A	
Approach Delay (s)		26.9			26.8			3.8			4.9	
Approach LOS		C			C			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		4.7					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		61.9					Sum of lost time (s)		11.9			
Intersection Capacity Utilization		64.0%					ICU Level of Service		C			
Analysis Period (min)		15										
c Critical Lane Group												

700 Paris St  
8: Paris St & York St

Queues  
Background (2027) AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	174	142	65	1145	1432	207
Future Volume (vph)	174	142	65	1145	1432	207
Lane Group Flow (vph)	193	158	72	1272	1591	230
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	30.0	30.0	30.0
Minimum Split (s)	25.5	25.5	9.0	36.2	36.2	36.2
Total Split (s)	25.5	25.5	9.0	79.0	70.0	70.0
Total Split (%)	24.4%	24.4%	8.6%	75.6%	67.0%	67.0%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	2.2	2.2	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
v/c Ratio	0.62	0.44	0.34	0.55	0.78	0.23
Control Delay	42.6	17.4	8.4	8.0	16.5	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	17.4	8.4	8.0	16.5	1.8
Queue Length 50th (m)	28.5	6.8	3.0	46.4	97.4	0.0
Queue Length 95th (m)	61.5	28.2	7.9	75.2	145.0	9.0
Internal Link Dist (m)	376.5			775.4	314.0	
Turn Bay Length (m)	21.0		123.0			72.0
Base Capacity (vph)	477	486	212	3058	2847	1270
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.33	0.34	0.42	0.56	0.18

Intersection Summary

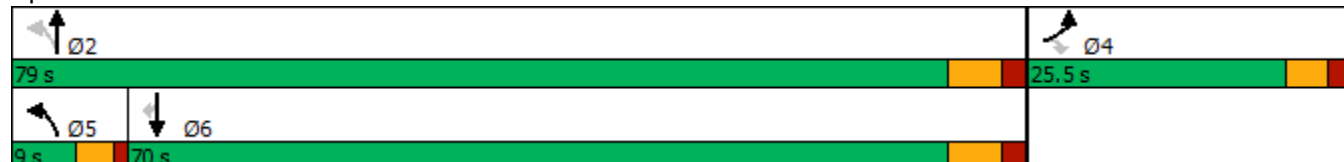
Cycle Length: 104.5













Actuated Cycle Length: 79.1

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Splits and Phases: 8: Paris St & York St



						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	174	142	65	1145	1432	207
Future Volume (vph)	174	142	65	1145	1432	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1516	1770	3471	3539	1530
Flt Permitted	0.95	1.00	0.08	1.00	1.00	1.00
Satd. Flow (perm)	1770	1516	150	3471	3539	1530
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	193	158	72	1272	1591	230
RTOR Reduction (vph)	0	89	0	0	0	97
Lane Group Flow (vph)	193	69	72	1272	1591	133
Confl. Peds. (#/hr)	1	15	8			8
Heavy Vehicles (%)	2%	4%	2%	4%	2%	2%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	14.0	14.0	53.5	53.5	45.8	45.8
Effective Green, g (s)	14.0	14.0	53.5	53.5	45.8	45.8
Actuated g/C Ratio	0.18	0.18	0.68	0.68	0.58	0.58
Clearance Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	312	267	177	2344	2046	884
v/s Ratio Prot	c0.11		0.02	c0.37	c0.45	
v/s Ratio Perm		0.05	0.26			0.09
v/c Ratio	0.62	0.26	0.41	0.54	0.78	0.15
Uniform Delay, d1	30.1	28.1	10.2	6.6	12.8	7.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.6	0.5	1.5	0.3	1.9	0.1
Delay (s)	33.8	28.6	11.7	6.8	14.7	7.8
Level of Service	C	C	B	A	B	A
Approach Delay (s)	31.5			7.1	13.8	
Approach LOS	C			A	B	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			13.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.74			
Actuated Cycle Length (s)			79.2		Sum of lost time (s)	15.7
Intersection Capacity Utilization			72.2%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

700 Paris St  
9: Ramsey Lake Rd & Paris St

Queues  
Background (2027) AM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	180	226	989	368	655	927
Future Volume (vph)	180	226	989	368	655	927
Lane Group Flow (vph)	188	235	1030	383	682	966
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	30.8		56.2	56.2	33.0	89.2
Total Split (%)	25.7%		46.8%	46.8%	27.5%	74.3%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.37	0.31	0.75	0.53	0.75	0.39
Control Delay	38.9	14.8	27.8	12.6	38.0	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.9	14.8	27.8	12.6	38.0	5.7
Queue Length 50th (m)	16.0	20.7	82.3	22.0	56.5	29.0
Queue Length 95th (m)	31.4	47.5	126.7	55.9	102.3	52.7
Internal Link Dist (m)	679.1		533.6			775.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	1010	851	2064	990	1143	3104
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.28	0.50	0.39	0.60	0.31

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 88.9

Natural Cycle: 90

Control Type: Semi Act-Uncoord












Splits and Phases: 9: Ramsey Lake Rd & Paris St

























700 Paris St  
9: Ramsey Lake Rd & Paris St

HCM Signalized Intersection Capacity Analysis  
Background (2027) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	180	226	989	368	655	927
Future Volume (vph)	180	226	989	368	655	927
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1568	3505	1546	3467	3471
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1568	3505	1546	3467	3471
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	188	235	1030	383	682	966
RTOR Reduction (vph)	0	18	0	123	0	0
Lane Group Flow (vph)	188	217	1030	260	682	966
Confl. Peds. (#/hr)		13		14	14	
Heavy Vehicles (%)	2%	3%	3%	2%	1%	4%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	13.1	42.1	35.1	35.1	23.2	63.3
Effective Green, g (s)	13.1	42.1	35.1	35.1	23.2	63.3
Actuated g/C Ratio	0.15	0.48	0.40	0.40	0.26	0.72
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	508	746	1391	613	909	2485
v/s Ratio Prot	c0.05	0.14	c0.29		c0.20	0.28
v/s Ratio Perm				0.17		
v/c Ratio	0.37	0.29	0.74	0.42	0.75	0.39
Uniform Delay, d1	33.9	14.1	22.8	19.3	29.9	4.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2	2.2	0.5	3.5	0.1
Delay (s)	34.4	14.3	24.9	19.8	33.5	5.0
Level of Service	C	B	C	B	C	A
Approach Delay (s)	23.2		23.5			16.8
Approach LOS	C		C			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			20.3		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			88.4		Sum of lost time (s)	17.0
Intersection Capacity Utilization			74.5%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

700 Paris St  
1: Paris St & Brady St

Queues  
Background (2027) PM Peak Hour

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	181	575	589	478	98	1065	762	26	832	253
Future Volume (vph)	181	575	589	478	98	1065	762	26	832	253
Lane Group Flow (vph)	181	635	589	492	98	1065	762	26	832	253
Turn Type	pm+pt	NA	Prot	NA	pm+pt	NA	pt+ov	Perm	NA	pm+ov
Protected Phases	7	4	3	8	5	2	2 3		6	7
Permitted Phases	4				2			6		6
Detector Phase	7	4	3	8	5	2	2 3	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0		15.0	15.0	5.0
Minimum Split (s)	10.0	31.2	10.0	31.2	10.0	40.1		40.1	40.1	10.0
Total Split (s)	35.1	40.3	34.0	39.2	22.0	63.0		41.0	41.0	35.1
Total Split (%)	25.6%	29.4%	24.8%	28.6%	16.0%	45.9%		29.9%	29.9%	25.6%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7		3.7	3.7	3.0
All-Red Time (s)	2.0	2.5	2.0	2.5	2.0	2.4		2.4	2.4	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	6.2	5.0	6.2	5.0	6.1		6.1	6.1	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min		Min	Min	None
v/c Ratio	0.48	0.77	0.77	0.43	0.39	0.54	0.71	0.21	0.64	0.39
Control Delay	23.0	49.4	51.3	32.5	27.7	28.3	16.4	41.3	40.6	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0
Total Delay	23.0	49.4	51.3	32.5	27.7	28.3	18.6	41.3	40.6	17.4
Queue Length 50th (m)	23.4	76.6	69.0	47.7	15.1	72.7	99.5	5.0	66.0	28.1
Queue Length 95th (m)	43.9	109.2	105.4	75.5	29.3	95.7	170.2	14.7	90.5	51.4
Internal Link Dist (m)		364.5		324.4		160.9			177.4	
Turn Bay Length (m)	57.0		85.0		70.0		6.0	24.0		6.0
Base Capacity (vph)	605	1106	917	1225	350	2638	1145	158	1685	890
Starvation Cap Reductn	0	0	0	0	0	0	243	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.57	0.64	0.40	0.28	0.40	0.84	0.16	0.49	0.28

Intersection Summary

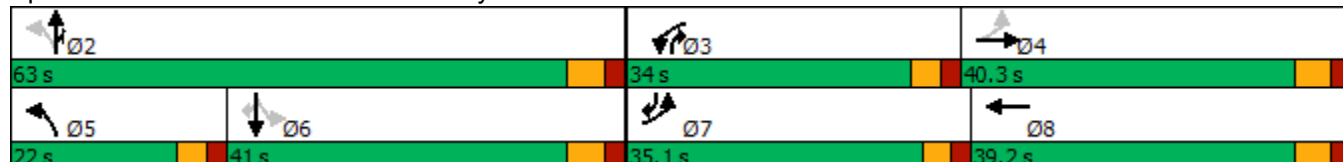
Cycle Length: 137.3

Actuated Cycle Length: 114.4

Natural Cycle: 95























Control Type: Semi Act-Uncoord

Splits and Phases: 1: Paris St & Brady St





















700 Paris St  
1: Paris St & Brady St

HCM Signalized Intersection Capacity Analysis  
Background (2027) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	575	60	589	478	14	98	1065	762	26	832	253
Future Volume (vph)	181	575	60	589	478	14	98	1065	762	26	832	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.2		5.0	6.2		5.0	6.1	6.1	6.1	6.1	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1580	3540		3467	3491		1751	5085	1615	1774	5085	1575
Flt Permitted	0.47	1.00		0.95	1.00		0.18	1.00	1.00	0.26	1.00	1.00
Satd. Flow (perm)	786	3540		3467	3491		323	5085	1615	479	5085	1575
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	181	575	60	589	478	14	98	1065	762	26	832	253
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	15	0	0	45
Lane Group Flow (vph)	181	629	0	589	491	0	98	1065	747	26	832	208
Confl. Peds. (#/hr)	9		6	6		9	25		33	33		25
Heavy Vehicles (%)	14%	0%	4%	1%	3%	0%	3%	2%	0%	1%	2%	0%
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA	pt+ov	Perm	NA	pm+ov
Protected Phases	7	4		3	8		5	2	2 3		6	7
Permitted Phases	4						2			6		6
Actuated Green, G (s)	40.1	26.3		25.4	37.9		44.6	44.6	76.1	29.6	29.6	43.4
Effective Green, g (s)	40.1	26.3		25.4	37.9		44.6	44.6	76.1	29.6	29.6	43.4
Actuated g/C Ratio	0.35	0.23		0.22	0.33		0.39	0.39	0.67	0.26	0.26	0.38
Clearance Time (s)	5.0	6.2		5.0	6.2		5.0	6.1		6.1	6.1	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	373	819		775	1164		252	1996	1081	124	1324	601
v/s Ratio Prot	0.06	c0.18		c0.17	0.14		0.03	0.21	c0.46		0.16	0.04
v/s Ratio Perm	0.11						0.12			0.05		0.09
v/c Ratio	0.49	0.77		0.76	0.42		0.39	0.53	0.69	0.21	0.63	0.35
Uniform Delay, d1	26.9	40.8		41.2	29.3		23.5	26.5	11.5	32.9	37.1	25.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	4.4		4.4	0.2		1.0	0.3	1.9	0.8	0.9	0.3
Delay (s)	27.8	45.2		45.7	29.6		24.5	26.8	13.4	33.7	38.1	25.3
Level of Service	C	D		D	C		C	C	B	C	D	C
Approach Delay (s)		41.3			38.3			21.4			35.1	
Approach LOS		D			D			C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		31.5					HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio		0.80										
Actuated Cycle Length (s)		113.6					Sum of lost time (s)		22.3			
Intersection Capacity Utilization		98.2%					ICU Level of Service		F			
Analysis Period (min)		15										
c Critical Lane Group												

700 Paris St  
2: Paris St & Van Horne St

Queues  
Background (2027) PM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	48	70	212	68	154	161	1661	121	1315
Future Volume (vph)	48	70	212	68	154	161	1661	121	1315
Lane Group Flow (vph)	49	290	216	69	157	164	2055	123	1387
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Minimum Split (s)	31.7	31.7	31.7	31.7	31.7	9.0	41.1	9.0	41.1
Total Split (s)	45.0	45.0	45.0	45.0	45.0	12.0	55.0	9.0	52.0
Total Split (%)	41.3%	41.3%	41.3%	41.3%	41.3%	11.0%	50.5%	8.3%	47.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.15	0.32	0.82	0.14	0.33	0.62	0.76	0.69	0.54
Control Delay	25.9	16.0	57.0	25.4	10.8	21.2	20.2	35.4	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	16.0	57.0	25.4	10.8	21.2	20.2	35.4	17.7
Queue Length 50th (m)	7.1	13.3	38.4	10.0	6.7	11.1	101.3	7.9	61.1
Queue Length 95th (m)	15.8	23.3	65.8	19.9	21.2	#40.2	166.8	#42.4	100.4
Internal Link Dist (m)		187.2		465.5			478.0		160.9
Turn Bay Length (m)	21.0		133.0		62.0	34.0		48.0	
Base Capacity (vph)	549	1426	429	825	722	266	2699	178	2579
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.20	0.50	0.08	0.22	0.62	0.76	0.69	0.54

Intersection Summary

Cycle Length: 109

Actuated Cycle Length: 94







Natural Cycle: 85

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.























Splits and Phases: 2: Paris St & Van Horne St

		
9 s	55 s	45 s
		
12 s	52 s	45 s

















700 Paris St  
2: Paris St & Van Horne St

HCM Signalized Intersection Capacity Analysis  
Background (2027) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	70	215	212	68	154	161	1661	353	121	1315	44
Future Volume (vph)	48	70	215	212	68	154	161	1661	353	121	1315	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1689	3128		1767	1900	1521	1770	4937		1805	5055	
Flt Permitted	0.71	1.00		0.53	1.00	1.00	0.12	1.00		0.08	1.00	
Satd. Flow (perm)	1266	3128		987	1900	1521	230	4937		159	5055	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	49	71	219	216	69	157	164	1695	360	123	1342	45
RTOR Reduction (vph)	0	87	0	0	0	81	0	26	0	0	3	0
Lane Group Flow (vph)	49	203	0	216	69	76	164	2029	0	123	1384	0
Confl. Peds. (#/hr)	13		3	3		13	3		17	17		3
Heavy Vehicles (%)	6%	2%	1%	2%	0%	4%	2%	2%	1%	0%	2%	3%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	24.9	24.9		24.9	24.9	24.9	58.4	50.9		52.9	47.9	
Effective Green, g (s)	24.9	24.9		24.9	24.9	24.9	58.4	50.9		52.9	47.9	
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.27	0.62	0.54		0.56	0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	336	830		262	504	403	266	2679		177	2581	
v/s Ratio Prot		0.06			0.04		c0.05	c0.41		0.04	0.27	
v/s Ratio Perm	0.04			c0.22		0.05	0.33			0.35		
v/c Ratio	0.15	0.24		0.82	0.14	0.19	0.62	0.76		0.69	0.54	
Uniform Delay, d1	26.3	27.1		32.4	26.3	26.6	10.2	16.7		14.4	15.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		18.6	0.1	0.2	4.2	2.1		11.2	0.8	
Delay (s)	26.5	27.2		51.0	26.4	26.9	14.4	18.7		25.6	16.3	
Level of Service	C	C		D	C	C	B	B		C	B	
Approach Delay (s)		27.1			38.6			18.4			17.0	
Approach LOS		C			D			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			20.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			93.8				Sum of lost time (s)			13.5		
Intersection Capacity Utilization			84.9%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
3: Paris St & John St

Queues  
Background (2027) PM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	3	63	0	8	2034	80	1651
Future Volume (vph)	10	3	63	0	8	2034	80	1651
Lane Group Flow (vph)	0	15	0	174	8	2142	82	1707
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	20.0	20.0	5.0	20.0
Minimum Split (s)	25.7	25.7	25.7	25.7	34.8	34.8	9.0	34.8
Total Split (s)	25.7	25.7	25.7	25.7	85.3	85.3	9.0	94.3
Total Split (%)	21.4%	21.4%	21.4%	21.4%	71.1%	71.1%	7.5%	78.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.1	2.1	1.0	2.1
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.7		5.7	5.8	5.8	4.0	5.8
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.07		0.68	0.06	0.91	0.50	0.66
Control Delay		39.6		44.0	7.9	21.5	20.8	8.1
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		39.6		44.0	7.9	21.5	20.8	8.1
Queue Length 50th (m)		2.7		25.0	0.6	184.5	3.5	77.3
Queue Length 95th (m)		9.3		50.7	2.7	267.4	#19.7	118.4
Internal Link Dist (m)		561.8		431.0		175.2		478.0
Turn Bay Length (m)					33.0		23.0	
Base Capacity (vph)		311		359	169	2748	164	2988
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.05		0.48	0.05	0.78	0.50	0.57

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 100.3

Natural Cycle: 100

Control Type: Semi Act-Uncoord

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



















Queue shown is maximum after two cycles.

Splits and Phases: 3: Paris St & John St

			
9 s	85.3 s		25.7 s
			
94.3 s			25.7 s
















700 Paris St  
3: Paris St & John St

HCM Signalized Intersection Capacity Analysis  
Background (2027) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	3	2	63	0	106	8	2034	44	80	1651	5
Future Volume (vph)	10	3	2	63	0	106	8	2034	44	80	1651	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1799			1628		1801	3528		1736	3537	
Flt Permitted		0.77			0.87		0.12	1.00		0.06	1.00	
Satd. Flow (perm)		1437			1444		218	3528		103	3537	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	3	2	65	0	109	8	2097	45	82	1702	5
RTOR Reduction (vph)	0	2	0	0	53	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	13	0	0	121	0	8	2141	0	82	1707	0
Confl. Peds. (#/hr)	3		4	4		3	14		2	2		14
Heavy Vehicles (%)	0%	0%	0%	0%	0%	6%	0%	2%	0%	4%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.1			14.1		67.2	67.2		74.8	74.8	
Effective Green, g (s)		14.1			14.1		67.2	67.2		74.8	74.8	
Actuated g/C Ratio		0.14			0.14		0.67	0.67		0.75	0.75	
Clearance Time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		201			202		145	2361		135	2635	
v/s Ratio Prot							c0.61			0.02	c0.48	
v/s Ratio Perm		0.01			c0.08		0.04			0.43		
v/c Ratio		0.07			0.60		0.06	0.91		0.61	0.65	
Uniform Delay, d1		37.4			40.5		5.7	14.0		21.4	6.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			4.7		0.2	5.5		7.5	0.6	
Delay (s)		37.6			45.2		5.9	19.5		28.9	6.9	
Level of Service		D			D		A	B		C	A	
Approach Delay (s)		37.6			45.2			19.4			7.9	
Approach LOS		D			D			B			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		15.6					HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio		0.86										
Actuated Cycle Length (s)		100.4					Sum of lost time (s)		15.5			
Intersection Capacity Utilization		87.8%					ICU Level of Service		E			
Analysis Period (min)		15										
c Critical Lane Group												

700 Paris St  
4: Paris St & McNaughton St










HCM Unsignalized Intersection Capacity Analysis  
Background (2027) PM Peak Hour











												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	7	3	0	2	1	2059	1	1	1788	13
Future Volume (Veh/h)	9	0	7	3	0	2	1	2059	1	1	1788	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	9	0	7	3	0	2	1	2145	1	1	1862	14
Pedestrians		3			2							
Lane Width (m)		3.6			3.6							
Walking Speed (m/s)		1.2			1.2							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)								347			199	
pX, platoon unblocked	0.43	0.43	0.72	0.43	0.43	0.29	0.72			0.29		
vC, conflicting volume	2950	4024	941	3090	4030	1075	1879			2148		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	2464	147	269	2480	0	1447			27		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	99	100	99	100			100		
cM capacity (veh/h)	431	13	633	278	13	312	342			458		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	16	5	1074	1074	932	945						
Volume Left	9	3	1	0	1	0						
Volume Right	7	2	0	1	0	14						
cSH	501	291	342	1700	458	1700						
Volume to Capacity	0.03	0.02	0.00	0.63	0.00	0.56						
Queue Length 95th (m)	0.8	0.4	0.1	0.0	0.1	0.0						
Control Delay (s)	12.4	17.6	0.1	0.0	0.1	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	12.4	17.6	0.1		0.0							
Approach LOS	B	C										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			67.6%		ICU Level of Service					C		
Analysis Period (min)			15									



700 Paris St  
5: Paris St & Facer St
















HCM Unsignalized Intersection Capacity Analysis  
Background (2027) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	1	2051	6	0	1793
Future Volume (Veh/h)	1	1	2051	6	0	1793
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	1	2159	6	0	1887
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			225			321
pX, platoon unblocked	0.41	0.26			0.26	
vC, conflicting volume	3106	1084			2166	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	24	0			0	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	405	284			427	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	2	1439	726	629	1258	
Volume Left	1	0	0	0	0	
Volume Right	1	0	6	0	0	
cSH	334	1700	1700	427	1700	
Volume to Capacity	0.01	0.85	0.43	0.00	0.74	
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	
Control Delay (s)	15.8	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	15.8	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			66.9%		ICU Level of Service	C
Analysis Period (min)			15			

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	7	0	0	2	0	0
Future Volume (Veh/h)	7	0	0	2	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	10	0	0	3	0	0
Pedestrians	1			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			10		14	12
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			10		14	12
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1009	1073
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	10	3	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1623	1700			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			14.0%	ICU Level of Service	A	
Analysis Period (min)			15			

700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

Queues  
Background (2027) PM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	25	0	6	2	23	2024	4	1733
Future Volume (vph)	25	0	6	2	23	2024	4	1733
Lane Group Flow (vph)	0	43	7	13	25	2208	4	1916
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	30.0	30.0	30.0	30.0
Minimum Split (s)	26.0	26.0	26.0	26.0	35.9	35.9	35.9	35.9
Total Split (s)	26.0	26.0	26.0	26.0	94.0	94.0	94.0	94.0
Total Split (%)	21.7%	21.7%	21.7%	21.7%	78.3%	78.3%	78.3%	78.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.7	3.7	3.7	3.7
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	5.9	5.9	5.9	5.9
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.23	0.03	0.06	0.18	0.73	0.04	0.63
Control Delay		26.4	40.3	24.3	6.1	6.4	3.2	4.9
Queue Delay		0.0	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay		26.4	40.3	24.3	6.1	6.9	3.2	4.9
Queue Length 50th (m)		2.4	1.0	0.3	0.9	95.9	0.1	68.1
Queue Length 95th (m)		15.1	6.1	6.6	3.9	140.2	0.9	98.2
Internal Link Dist (m)		192.5		282.1		313.9		201.2
Turn Bay Length (m)					40.0		100.0	
Base Capacity (vph)		410	504	486	156	3396	120	3389
Starvation Cap Reductn		0	0	0	0	657	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.10	0.01	0.03	0.16	0.81	0.03	0.57

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 74.8

Natural Cycle: 90




















Control Type: Semi Act-Uncoord

Splits and Phases: 7: Paris St & Boland Ave/Paris Driveway















700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

HCM Signalized Intersection Capacity Analysis  
Background (2027) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	15	6	2	10	23	2024	7	4	1733	29
Future Volume (vph)	25	0	15	6	2	10	23	2024	7	4	1733	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.95		1.00	0.87		1.00	1.00		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1622		1805	1639		1804	3537		1805	3530	
Flt Permitted		0.80		0.91	1.00		0.09	1.00		0.07	1.00	
Satd. Flow (perm)		1341		1727	1639		163	3537		125	3530	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	0	16	7	2	11	25	2200	8	4	1884	32
RTOR Reduction (vph)	0	25	0	0	10	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	18	0	7	3	0	25	2208	0	4	1915	0
Confl. Peds. (#/hr)	2					2	4		2	2		4
Heavy Vehicles (%)	4%	0%	14%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		4.4		4.4	4.4		60.9	60.9		60.9	60.9	
Effective Green, g (s)		4.4		4.4	4.4		60.9	60.9		60.9	60.9	
Actuated g/C Ratio		0.06		0.06	0.06		0.79	0.79		0.79	0.79	
Clearance Time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		76		98	93		128	2790		98	2784	
v/s Ratio Prot					0.00			c0.62			0.54	
v/s Ratio Perm		c0.01		0.00			0.15			0.03		
v/c Ratio		0.24		0.07	0.03		0.20	0.79		0.04	0.69	
Uniform Delay, d1		34.8		34.5	34.4		2.0	4.6		1.8	3.8	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.7		0.3	0.1		0.7	1.6		0.2	0.7	
Delay (s)		36.5		34.8	34.5		2.8	6.2		1.9	4.5	
Level of Service		D		C	C		A	A		A	A	
Approach Delay (s)		36.5			34.6			6.1			4.5	
Approach LOS		D			C			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			5.8				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			77.2				Sum of lost time (s)			11.9		
Intersection Capacity Utilization			75.1%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												



						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	214	112	152	1840	1547	208
Future Volume (vph)	214	112	152	1840	1547	208
Lane Group Flow (vph)	225	118	160	1937	1628	219
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	30.0	30.0	30.0
Minimum Split (s)	25.5	25.5	9.0	36.2	36.2	36.2
Total Split (s)	25.5	25.5	12.0	94.5	82.5	82.5
Total Split (%)	21.3%	21.3%	10.0%	78.8%	68.8%	68.8%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	2.2	2.2	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
v/c Ratio	0.71	0.32	0.67	0.79	0.82	0.23
Control Delay	51.8	10.1	30.8	12.7	20.6	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.8	10.1	30.8	12.7	20.6	2.1
Queue Length 50th (m)	40.4	0.0	12.0	116.3	124.2	0.6
Queue Length 95th (m)	#85.3	16.3	#47.2	156.6	161.2	9.8
Internal Link Dist (m)	376.5			774.4	313.9	
Turn Bay Length (m)	21.0		123.0			72.0
Base Capacity (vph)	401	439	242	3228	2932	1308
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.27	0.66	0.60	0.56	0.17

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 92.3

Natural Cycle: 80








Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.












Splits and Phases: 8: Paris St & York St

 Ø2	 Ø4
94.5 s	25.5 s
 Ø5	 Ø6
12 s	82.5 s

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	214	112	152	1840	1547	208
Future Volume (vph)	214	112	152	1840	1547	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.97	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1557	1770	3539	3539	1539
Flt Permitted	0.95	1.00	0.07	1.00	1.00	1.00
Satd. Flow (perm)	1787	1557	134	3539	3539	1539
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	225	118	160	1937	1628	219
RTOR Reduction (vph)	0	97	0	0	0	92
Lane Group Flow (vph)	225	21	160	1937	1628	127
Confl. Peds. (#/hr)	6	15	4			4
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	16.3	16.3	63.8	63.8	51.7	51.7
Effective Green, g (s)	16.3	16.3	63.8	63.8	51.7	51.7
Actuated g/C Ratio	0.18	0.18	0.69	0.69	0.56	0.56
Clearance Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	317	276	237	2459	1993	866
v/s Ratio Prot	c0.13		0.06	c0.55	0.46	
v/s Ratio Perm		0.01	0.41			0.08
v/c Ratio	0.71	0.08	0.68	0.79	0.82	0.15
Uniform Delay, d1	35.5	31.5	19.3	9.4	16.2	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.1	0.1	7.4	1.7	2.7	0.1
Delay (s)	42.6	31.6	26.6	11.2	18.9	9.6
Level of Service	D	C	C	B	B	A
Approach Delay (s)	38.8			12.4	17.8	
Approach LOS	D			B	B	
<b>Intersection Summary</b>						
HCM 2000 Control Delay			16.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.81			
Actuated Cycle Length (s)			91.8		Sum of lost time (s)	15.7
Intersection Capacity Utilization			81.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

700 Paris St  
9: Ramsey Lake Rd & Paris St

Queues  
Background (2027) PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	532	677	1347	263	358	1268
Future Volume (vph)	532	677	1347	263	358	1268
Lane Group Flow (vph)	591	752	1497	292	398	1409
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	36.0		62.0	62.0	22.0	84.0
Total Split (%)	30.0%		51.7%	51.7%	18.3%	70.0%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.67	1.06	0.93	0.37	0.81	0.62
Control Delay	44.1	84.9	41.4	13.4	62.9	14.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.1	84.9	41.4	13.4	62.9	14.0
Queue Length 50th (m)	68.4	~206.9	176.7	25.9	50.0	99.1
Queue Length 95th (m)	88.6	#284.0	#216.9	47.1	#73.6	119.9
Internal Link Dist (m)	679.1		533.6			774.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	887	707	1673	812	494	2333
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	1.06	0.89	0.36	0.81	0.60

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 118.1

Natural Cycle: 100

Control Type: Semi Act-Uncoord

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 9: Ramsey Lake Rd & Paris St















JD Engineering

Synchro 11 Report  
02-07-2023

700 Paris St  
9: Ramsey Lake Rd & Paris St





















HCM Signalized Intersection Capacity Analysis  
Background (2027) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	532	677	1347	263	358	1268
Future Volume (vph)	532	677	1347	263	358	1268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	1583	3539	1587	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	1583	3539	1587	3433	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	591	752	1497	292	398	1409
RTOR Reduction (vph)	0	7	0	64	0	0
Lane Group Flow (vph)	591	745	1497	228	398	1409
Confl. Peds. (#/hr)		16		5	5	
Heavy Vehicles (%)	1%	2%	2%	0%	2%	2%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	30.2	53.0	53.9	53.9	17.0	75.9
Effective Green, g (s)	30.2	53.0	53.9	53.9	17.0	75.9
Actuated g/C Ratio	0.26	0.45	0.46	0.46	0.14	0.64
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	886	710	1615	724	494	2274
v/s Ratio Prot	0.17	c0.47	c0.42		0.12	0.40
v/s Ratio Perm				0.14		
v/c Ratio	0.67	1.05	0.93	0.32	0.81	0.62
Uniform Delay, d1	39.4	32.5	30.2	20.4	49.0	12.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	47.4	9.6	0.3	9.3	0.5
Delay (s)	41.4	79.9	39.8	20.6	58.2	13.0
Level of Service	D	E	D	C	E	B
Approach Delay (s)	62.9		36.7			23.0
Approach LOS	E		D			C
<b>Intersection Summary</b>						
HCM 2000 Control Delay			38.8		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.04			
Actuated Cycle Length (s)			118.1		Sum of lost time (s)	17.0
Intersection Capacity Utilization			90.7%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						



700 Paris St  
1: Paris St & Brady St

Queues  
Background (2032) AM Peak Hour

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	181	457	573	422	82	603	445	29	887	260
Future Volume (vph)	181	457	573	422	82	603	445	29	887	260
Lane Group Flow (vph)	197	549	623	470	89	655	484	32	964	283
Turn Type	pm+pt	NA	Prot	NA	pm+pt	NA	pt+ov	pm+pt	NA	pm+ov
Protected Phases	7	4	3	8	5	2	2 3	1	6	7
Permitted Phases	4				2			6		6
Detector Phase	7	4	3	8	5	2	2 3	1	6	7
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0		5.0	15.0	5.0
Minimum Split (s)	10.0	31.2	10.0	31.2	10.0	40.1		10.0	40.1	10.0
Total Split (s)	26.1	31.2	34.0	39.1	20.0	44.0		17.0	41.0	26.1
Total Split (%)	20.7%	24.7%	26.9%	31.0%	15.8%	34.9%		13.5%	32.5%	20.7%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7		3.0	3.7	3.0
All-Red Time (s)	2.0	2.5	2.0	2.5	2.0	2.4		2.0	2.4	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	6.2	5.0	6.2	5.0	6.1		5.0	6.1	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min		None	Min	None
v/c Ratio	0.49	0.77	0.77	0.42	0.39	0.42	0.47	0.11	0.74	0.41
Control Delay	22.3	48.9	46.7	31.4	26.1	30.5	7.7	21.7	40.5	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Total Delay	22.3	48.9	46.7	31.4	26.1	30.5	8.0	21.7	40.5	13.8
Queue Length 50th (m)	24.5	62.3	69.4	43.6	12.8	45.4	29.3	4.4	75.6	24.7
Queue Length 95th (m)	45.3	92.1	100.7	70.0	24.4	60.5	56.5	11.0	98.3	45.7
Internal Link Dist (m)		364.5		324.4		160.9			177.4	
Turn Bay Length (m)	57.0		85.0		70.0		6.0	24.0		6.0
Base Capacity (vph)	543	845	973	1211	308	1903	1095	370	1702	816
Starvation Cap Reductn	0	0	0	0	0	0	189	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.65	0.64	0.39	0.29	0.34	0.53	0.09	0.57	0.35

Intersection Summary









Cycle Length: 126.2

Actuated Cycle Length: 104.9

Natural Cycle: 105























Control Type: Semi Act-Uncoord

Splits and Phases: 1: Paris St & Brady St

			
Ø1	Ø2	Ø3	Ø4
17 s	44 s	34 s	31.2 s
			
Ø5	Ø6	Ø7	Ø8
20 s	41 s	26.1 s	39.1 s



















700 Paris St  
1: Paris St & Brady St

HCM Signalized Intersection Capacity Analysis  
Background (2032) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	457	48	573	422	10	82	603	445	29	887	260
Future Volume (vph)	181	457	48	573	422	10	82	603	445	29	887	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.2		5.0	6.2		5.0	6.1	6.1	5.0	6.1	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1684	3369		3367	3461		1671	4988	1568	1717	4893	1551
Flt Permitted	0.48	1.00		0.95	1.00		0.14	1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)	856	3369		3367	3461		245	4988	1568	681	4893	1551
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	197	497	52	623	459	11	89	655	484	32	964	283
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	93	0	0	69
Lane Group Flow (vph)	197	543	0	623	469	0	89	655	391	32	964	214
Confl. Peds. (#/hr)	7		4	4		7	19		10	10		19
Heavy Vehicles (%)	7%	5%	10%	4%	4%	0%	8%	4%	3%	5%	6%	2%
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA	pt+ov	pm+pt	NA	pm+ov
Protected Phases	7	4		3	8		5	2	2 3	1	6	7
Permitted Phases	4						2			6		6
Actuated Green, G (s)	35.4	22.0		25.1	33.7		41.2	33.1	64.3	33.0	29.0	42.4
Effective Green, g (s)	35.4	22.0		25.1	33.7		41.2	33.1	64.3	33.0	29.0	42.4
Actuated g/C Ratio	0.33	0.21		0.24	0.32		0.39	0.31	0.60	0.31	0.27	0.40
Clearance Time (s)	5.0	6.2		5.0	6.2		5.0	6.1		5.0	6.1	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	388	695		793	1095		203	1550	946	249	1332	617
v/s Ratio Prot	0.06	c0.16		c0.19	0.14		c0.03	0.13	0.25	0.00	c0.20	0.04
v/s Ratio Perm	0.10						0.14			0.03		0.09
v/c Ratio	0.51	0.78		0.79	0.43		0.44	0.42	0.41	0.13	0.72	0.35
Uniform Delay, d1	26.9	40.0		38.2	28.8		22.8	29.1	11.1	25.9	35.1	22.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	5.7		5.1	0.3		1.5	0.2	0.3	0.2	2.0	0.3
Delay (s)	27.9	45.7		43.3	29.0		24.3	29.3	11.4	26.1	37.1	22.7
Level of Service	C	D		D	C		C	C	B	C	D	C
Approach Delay (s)		41.0			37.2			21.9			33.6	
Approach LOS		D			D			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			32.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			106.5				Sum of lost time (s)			22.3		
Intersection Capacity Utilization			78.1%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
2: Paris St & Van Horne St

Queues  
Background (2032) AM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	16	27	263	63	148	169	1022	82	1374
Future Volume (vph)	16	27	263	63	148	169	1022	82	1374
Lane Group Flow (vph)	18	130	289	69	163	186	1250	90	1565
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Minimum Split (s)	31.7	31.7	31.7	31.7	31.7	9.0	41.1	9.0	41.1
Total Split (s)	37.0	37.0	37.0	37.0	37.0	19.0	41.1	19.0	41.1
Total Split (%)	38.1%	38.1%	38.1%	38.1%	38.1%	19.6%	42.3%	19.6%	42.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.06	0.15	0.82	0.14	0.29	0.63	0.50	0.30	0.71
Control Delay	22.6	8.0	48.2	23.4	5.4	25.4	16.5	11.2	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.6	8.0	48.2	23.4	5.4	25.4	16.5	11.2	23.3
Queue Length 50th (m)	2.2	1.9	45.2	8.7	0.0	14.9	51.6	5.6	77.2
Queue Length 95th (m)	7.4	8.5	79.7	19.3	13.8	41.3	80.7	14.4	119.8
Internal Link Dist (m)		187.2		465.5			478.0		160.9
Turn Bay Length (m)	21.0		133.0		62.0	34.0		48.0	
Base Capacity (vph)	454	1188	492	708	710	368	2481	457	2208
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.11	0.59	0.10	0.23	0.51	0.50	0.20	0.71

Intersection Summary





Cycle Length: 97.1

Actuated Cycle Length: 84.9

Natural Cycle: 85























Control Type: Semi Act-Uncoord

Splits and Phases: 2: Paris St & Van Horne St

 Ø1	 Ø2	 Ø4
19 s	41.1 s	37 s
 Ø5	 Ø6	 Ø8
19 s	41.1 s	37 s

700 Paris St  
2: Paris St & Van Horne St















HCM Signalized Intersection Capacity Analysis  
Background (2032) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	27	91	263	63	148	169	1022	116	82	1374	50
Future Volume (vph)	16	27	91	263	63	148	169	1022	116	82	1374	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	2908		1801	1827	1576	1703	4871		1752	5048	
Flt Permitted	0.71	1.00		0.67	1.00	1.00	0.09	1.00		0.18	1.00	
Satd. Flow (perm)	1174	2908		1270	1827	1576	168	4871		338	5048	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	18	30	100	289	69	163	186	1123	127	90	1510	55
RTOR Reduction (vph)	0	72	0	0	0	118	0	11	0	0	3	0
Lane Group Flow (vph)	18	58	0	289	69	45	186	1239	0	90	1562	0
Confl. Peds. (#/hr)	4		4	4		4	6		6	6		6
Heavy Vehicles (%)	15%	4%	10%	0%	4%	1%	6%	5%	2%	3%	2%	5%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	23.6	23.6		23.6	23.6	23.6	53.2	43.1		44.2	38.1	
Effective Green, g (s)	23.6	23.6		23.6	23.6	23.6	53.2	43.1		44.2	38.1	
Actuated g/C Ratio	0.28	0.28		0.28	0.28	0.28	0.62	0.50		0.52	0.44	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	322	799		349	502	433	293	2446		274	2241	
v/s Ratio Prot		0.02			0.04		c0.08	0.25		0.02	c0.31	
v/s Ratio Perm	0.02			c0.23		0.03	0.31			0.15		
v/c Ratio	0.06	0.07		0.83	0.14	0.10	0.63	0.51		0.33	0.70	
Uniform Delay, d1	22.9	23.0		29.2	23.4	23.2	14.7	14.2		10.8	19.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.0		14.8	0.1	0.1	4.5	0.8		0.7	1.8	
Delay (s)	23.0	23.0		44.0	23.6	23.3	19.2	15.0		11.5	21.0	
Level of Service	C	C		D	C	C	B	B		B	C	
Approach Delay (s)		23.0			34.8			15.5			20.5	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			20.7	HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			85.8	Sum of lost time (s)			13.5					
Intersection Capacity Utilization			71.2%	ICU Level of Service			C					
Analysis Period (min)			15									
c Critical Lane Group												



700 Paris St  
3: Paris St & John St

Queues  
Background (2032) AM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	8	0	40	2	4	1301	46	1645
Future Volume (vph)	8	0	40	2	4	1301	46	1645
Lane Group Flow (vph)	0	14	0	110	4	1390	48	1723
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	20.0	20.0	5.0	20.0
Minimum Split (s)	25.7	25.7	25.7	25.7	34.8	34.8	9.0	34.8
Total Split (s)	25.7	25.7	25.7	25.7	50.8	50.8	14.0	64.8
Total Split (%)	28.4%	28.4%	28.4%	28.4%	56.1%	56.1%	15.5%	71.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.1	2.1	1.0	2.1
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.7		5.7	5.8	5.8	4.0	5.8
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.05		0.38	0.03	0.62	0.15	0.67
Control Delay		0.3		18.0	8.2	11.4	4.0	7.6
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		0.3		18.0	8.2	11.4	4.0	7.6
Queue Length 50th (m)		0.0		4.7	0.2	63.0	1.3	53.1
Queue Length 95th (m)		0.0		20.6	1.6	101.7	4.4	92.8
Internal Link Dist (m)		561.8		431.0		175.2		478.0
Turn Bay Length (m)					33.0		23.0	
Base Capacity (vph)		586		578	172	2735	437	3245
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.02		0.19	0.02	0.51	0.11	0.53

Intersection Summary

Cycle Length: 90.5

Actuated Cycle Length: 59.3

Natural Cycle: 70



















Control Type: Semi Act-Uncoord

Splits and Phases: 3: Paris St & John St



















700 Paris St  
3: Paris St & John St

HCM Signalized Intersection Capacity Analysis  
Background (2032) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	0	6	40	2	63	4	1301	34	46	1645	9
Future Volume (vph)	8	0	6	40	2	63	4	1301	34	46	1645	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1726			1696		1803	3492		1770	3536	
Flt Permitted		0.84			0.87		0.12	1.00		0.12	1.00	
Satd. Flow (perm)		1496			1501		220	3492		218	3536	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	8	0	6	42	2	66	4	1355	35	48	1714	9
RTOR Reduction (vph)	0	12	0	0	58	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	2	0	0	52	0	4	1388	0	48	1723	0
Confl. Peds. (#/hr)	5		5	5		5	8		4	4		8
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.1			7.1		36.3	36.3		43.6	43.6	
Effective Green, g (s)		7.1			7.1		36.3	36.3		43.6	43.6	
Actuated g/C Ratio		0.11			0.11		0.58	0.58		0.70	0.70	
Clearance Time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		170			171		128	2037		235	2478	
v/s Ratio Prot								0.40		0.01	c0.49	
v/s Ratio Perm		0.00			c0.03		0.02			0.13		
v/c Ratio		0.01			0.30		0.03	0.68		0.20	0.70	
Uniform Delay, d1		24.4			25.3		5.5	9.0		5.2	5.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			1.0		0.1	1.0		0.4	0.9	
Delay (s)		24.5			26.3		5.6	9.9		5.6	6.3	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		24.5			26.3			9.9			6.3	
Approach LOS		C			C			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		8.6					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.69										
Actuated Cycle Length (s)		62.2					Sum of lost time (s)		15.5			
Intersection Capacity Utilization		65.0%					ICU Level of Service		C			
Analysis Period (min)		15										
c Critical Lane Group												










700 Paris St  
4: Paris St & McNaughton St

HCM Unsignalized Intersection Capacity Analysis  
Background (2032) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	9	2	0	2	1	1479	0	0	1724	7
Future Volume (Veh/h)	3	0	9	2	0	2	1	1479	0	0	1724	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	0	10	2	0	2	1	1643	0	0	1916	8
Pedestrians		2			1							
Lane Width (m)		3.6			3.6							
Walking Speed (m/s)		1.2			1.2							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)								347			199	
pX, platoon unblocked	0.75	0.75	0.65	0.75	0.75	0.80	0.65			0.80		
vC, conflicting volume	2748	3568	964	2614	3572	822	1926			1644		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1465	2559	0	1287	2564	279	1348			1306		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	96	100	99	98	100	100	100			100		
cM capacity (veh/h)	68	20	708	91	20	474	336			429		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	13	4	822	822	958	966						
Volume Left	3	2	1	0	0	0						
Volume Right	10	2	0	0	0	8						
cSH	222	152	336	1700	429	1700						
Volume to Capacity	0.06	0.03	0.00	0.48	0.00	0.57						
Queue Length 95th (m)	1.5	0.6	0.1	0.0	0.0	0.0						
Control Delay (s)	22.2	29.2	0.1	0.0	0.0	0.0						
Lane LOS	C	D	A									
Approach Delay (s)	22.2	29.2	0.1		0.0							
Approach LOS	C	D										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			57.9%		ICU Level of Service		B					
Analysis Period (min)			15									

700 Paris St  
5: Paris St & Facer St

HCM Unsignalized Intersection Capacity Analysis  
Background (2032) AM Peak Hour














						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	0	1466	1	1	1737
Future Volume (Veh/h)	2	0	1466	1	1	1737
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	0	1629	1	1	1930
Pedestrians						1
Lane Width (m)						3.6
Walking Speed (m/s)						1.2
Percent Blockage						0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			226			321
pX, platoon unblocked	0.74	0.79			0.79	
vC, conflicting volume	2596	816			1630	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1157	231			1263	
tC, single (s)	6.8	6.9			6.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			3.2	
p0 queue free %	99	100			99	
cM capacity (veh/h)	141	613			174	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	2	1086	544	644	1287	
Volume Left	2	0	0	1	0	
Volume Right	0	0	1	0	0	
cSH	141	1700	1700	174	1700	
Volume to Capacity	0.01	0.64	0.32	0.01	0.76	
Queue Length 95th (m)	0.3	0.0	0.0	0.1	0.0	
Control Delay (s)	31.0	0.0	0.0	0.3	0.0	
Lane LOS	D			A		
Approach Delay (s)	31.0	0.0		0.1		
Approach LOS	D					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			59.0%		ICU Level of Service	B
Analysis Period (min)			15			



	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	1	1	1	1	0	0
Future Volume (Veh/h)	1	1	1	1	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.50	0.50
Hourly flow rate (vph)	2	2	2	2	0	0
Pedestrians	1			2	2	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			6		12	7
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			6		12	7
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1625		1009	1078
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	4	4	0			
Volume Left	0	2	0			
Volume Right	2	0	0			
cSH	1700	1625	1700			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	3.6	0.0			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.6	0.0			
Approach LOS		A				
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			14.6%	ICU Level of Service	A	
Analysis Period (min)			15			

700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

Queues  
Background (2032) AM Peak Hour

							
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations							
Traffic Volume (vph)	28	0	2	0	6	1414	1747
Future Volume (vph)	28	0	2	0	6	1414	1747
Lane Group Flow (vph)	0	43	2	2	6	1489	1853
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		4		8		2	6
Permitted Phases	4		8		2		
Detector Phase	4	4	8	8	2	2	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	30.0	30.0	30.0
Minimum Split (s)	26.0	26.0	26.0	26.0	35.9	35.9	35.9
Total Split (s)	26.0	26.0	26.0	26.0	55.9	55.9	55.9
Total Split (%)	31.7%	31.7%	31.7%	31.7%	68.3%	68.3%	68.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.7	3.7	3.7
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	5.9	5.9	5.9
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	Min	Min	Min
v/c Ratio		0.19	0.01	0.01	0.04	0.51	0.64
Control Delay		13.8	27.0	0.0	4.0	4.4	5.8
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		13.8	27.0	0.0	4.0	4.4	5.8
Queue Length 50th (m)		0.6	0.3	0.0	0.2	42.0	64.0
Queue Length 95th (m)		9.0	2.1	0.0	1.3	57.8	89.2
Internal Link Dist (m)		198.2		192.5		314.0	201.8
Turn Bay Length (m)					40.0		
Base Capacity (vph)		502	581	559	139	2927	2924
Starvation Cap Reductn		0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0
Reduced v/c Ratio		0.09	0.00	0.00	0.04	0.51	0.63

Intersection Summary

Cycle Length: 81.9

Actuated Cycle Length: 62.4

Natural Cycle: 75




















Control Type: Semi Act-Uncoord













Splits and Phases: 7: Paris St & Boland Ave/Paris Driveway



700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

HCM Signalized Intersection Capacity Analysis  
Background (2032) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	0	13	2	0	2	6	1414	1	0	1747	13
Future Volume (vph)	28	0	13	2	0	2	6	1414	1	0	1747	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		5.9	5.9			5.9	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95			0.95	
Frt		0.96		1.00	0.85		1.00	1.00			1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1757		1805	1615		1805	3505			3502	
Flt Permitted		0.80		0.93	1.00		0.09	1.00			1.00	
Satd. Flow (perm)		1448		1767	1615		167	3505			3502	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	29	0	14	2	0	2	6	1488	1	0	1839	14
RTOR Reduction (vph)	0	36	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	7	0	2	0	0	6	1489	0	0	1853	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		4.3		4.3	4.3		48.8	48.8			48.8	
Effective Green, g (s)		4.3		4.3	4.3		48.8	48.8			48.8	
Actuated g/C Ratio		0.07		0.07	0.07		0.75	0.75			0.75	
Clearance Time (s)		6.0		6.0	6.0		5.9	5.9			5.9	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		95		116	106		125	2631			2629	
v/s Ratio Prot					0.00			0.42			c0.53	
v/s Ratio Perm		c0.00		0.00			0.04					
v/c Ratio		0.07		0.02	0.00		0.05	0.57			0.70	
Uniform Delay, d1		28.5		28.4	28.3		2.1	3.5			4.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.3		0.1	0.0		0.2	0.3			0.9	
Delay (s)		28.8		28.4	28.3		2.3	3.8			5.2	
Level of Service		C		C	C		A	A			A	
Approach Delay (s)		28.8			28.4			3.8			5.2	
Approach LOS		C			C			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		4.9					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		65.0					Sum of lost time (s)		11.9			
Intersection Capacity Utilization		67.6%					ICU Level of Service		C			
Analysis Period (min)		15										
c Critical Lane Group												

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	188	153	70	1233	1540	222
Future Volume (vph)	188	153	70	1233	1540	222
Lane Group Flow (vph)	209	170	78	1370	1711	247
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	30.0	30.0	30.0
Minimum Split (s)	25.5	25.5	9.0	36.2	36.2	36.2
Total Split (s)	25.5	25.5	9.0	79.0	70.0	70.0
Total Split (%)	24.4%	24.4%	8.6%	75.6%	67.0%	67.0%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	2.2	2.2	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
v/c Ratio	0.66	0.48	0.39	0.59	0.82	0.25
Control Delay	46.4	21.1	10.6	8.6	18.1	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.4	21.1	10.6	8.6	18.1	1.9
Queue Length 50th (m)	35.2	10.8	3.5	57.3	118.7	0.3
Queue Length 95th (m)	66.6	33.3	9.9	84.6	166.4	9.8
Internal Link Dist (m)	376.5			775.4	314.0	
Turn Bay Length (m)	21.0		123.0			72.0
Base Capacity (vph)	449	458	200	2897	2676	1211
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.37	0.39	0.47	0.64	0.20

#### Intersection Summary

Cycle Length: 104.5

Actuated Cycle Length: 84.7













Natural Cycle: 80

Control Type: Semi Act-Uncoord

Splits and Phases: 8: Paris St & York St

















						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	188	153	70	1233	1540	222
Future Volume (vph)	188	153	70	1233	1540	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1514	1770	3471	3539	1529
Flt Permitted	0.95	1.00	0.07	1.00	1.00	1.00
Satd. Flow (perm)	1770	1514	137	3471	3539	1529
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	209	170	78	1370	1711	247
RTOR Reduction (vph)	0	83	0	0	0	99
Lane Group Flow (vph)	209	87	78	1370	1711	148
Confl. Peds. (#/hr)	1	15	8			8
Heavy Vehicles (%)	2%	4%	2%	4%	2%	2%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	15.2	15.2	57.9	57.9	50.2	50.2
Effective Green, g (s)	15.2	15.2	57.9	57.9	50.2	50.2
Actuated g/C Ratio	0.18	0.18	0.68	0.68	0.59	0.59
Clearance Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	317	271	164	2369	2095	905
v/s Ratio Prot	c0.12		0.02	c0.39	c0.48	
v/s Ratio Perm		0.06	0.30			0.10
v/c Ratio	0.66	0.32	0.48	0.58	0.82	0.16
Uniform Delay, d1	32.4	30.3	12.5	7.1	13.7	7.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.9	0.7	2.2	0.3	2.6	0.1
Delay (s)	37.3	31.0	14.7	7.4	16.2	7.9
Level of Service	D	C	B	A	B	A
Approach Delay (s)	34.5			7.8	15.2	
Approach LOS	C			A	B	
Intersection Summary						
HCM 2000 Control Delay			14.3	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.78			
Actuated Cycle Length (s)			84.8	Sum of lost time (s)		15.7
Intersection Capacity Utilization			75.6%	ICU Level of Service		D
Analysis Period (min)			15			
c Critical Lane Group						

700 Paris St  
9: Ramsey Lake Rd & Paris St

Queues  
Background (2032) AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	194	243	1065	397	704	998
Future Volume (vph)	194	243	1065	397	704	998
Lane Group Flow (vph)	202	253	1109	414	733	1040
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	30.8		56.2	56.2	33.0	89.2
Total Split (%)	25.7%		46.8%	46.8%	27.5%	74.3%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.39	0.34	0.79	0.56	0.80	0.42
Control Delay	40.9	16.7	30.5	14.3	42.4	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	16.7	30.5	14.3	42.4	6.2
Queue Length 50th (m)	19.2	26.8	101.2	30.2	68.9	35.3
Queue Length 95th (m)	33.2	53.0	144.4	66.5	#122.5	62.1
Internal Link Dist (m)	679.1		533.6			775.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	920	796	1879	920	1040	2959
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.32	0.59	0.45	0.70	0.35

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 96.5

Natural Cycle: 90

Control Type: Semi Act-Uncoord

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













Queue shown is maximum after two cycles.

Splits and Phases: 9: Ramsey Lake Rd & Paris St























700 Paris St  
9: Ramsey Lake Rd & Paris St

HCM Signalized Intersection Capacity Analysis  
Background (2032) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	194	243	1065	397	704	998
Future Volume (vph)	194	243	1065	397	704	998
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1568	3505	1544	3467	3471
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1568	3505	1544	3467	3471
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	202	253	1109	414	733	1040
RTOR Reduction (vph)	0	14	0	122	0	0
Lane Group Flow (vph)	202	239	1109	292	733	1040
Confl. Peds. (#/hr)		13		14	14	
Heavy Vehicles (%)	2%	3%	3%	2%	1%	4%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	14.6	46.0	38.8	38.8	25.6	69.4
Effective Green, g (s)	14.6	46.0	38.8	38.8	25.6	69.4
Actuated g/C Ratio	0.15	0.48	0.40	0.40	0.27	0.72
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	522	751	1416	624	924	2509
v/s Ratio Prot	0.06	c0.15	c0.32		c0.21	0.30
v/s Ratio Perm				0.19		
v/c Ratio	0.39	0.32	0.78	0.47	0.79	0.41
Uniform Delay, d1	36.7	15.4	24.9	21.0	32.7	5.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2	2.9	0.6	4.7	0.1
Delay (s)	37.1	15.6	27.8	21.6	37.5	5.4
Level of Service	D	B	C	C	D	A
Approach Delay (s)	25.2		26.1			18.6
Approach LOS	C		C			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			22.5		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.71			
Actuated Cycle Length (s)			96.0		Sum of lost time (s)	17.0
Intersection Capacity Utilization			78.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

700 Paris St  
1: Paris St & Brady St

Queues  
Background (2032) PM Peak Hour

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	195	619	633	515	106	1148	817	28	896	273
Future Volume (vph)	195	619	633	515	106	1148	817	28	896	273
Lane Group Flow (vph)	195	684	633	530	106	1148	817	28	896	273
Turn Type	pm+pt	NA	Prot	NA	pm+pt	NA	pt+ov	Perm	NA	pm+ov
Protected Phases	7	4	3	8	5	2	2 3		6	7
Permitted Phases	4				2			6		6
Detector Phase	7	4	3	8	5	2	2 3	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0		15.0	15.0	5.0
Minimum Split (s)	10.0	31.2	10.0	31.2	10.0	40.1		40.1	40.1	10.0
Total Split (s)	35.1	40.3	34.0	39.2	22.0	63.0		41.0	41.0	35.1
Total Split (%)	25.6%	29.4%	24.8%	28.6%	16.0%	45.9%		29.9%	29.9%	25.6%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7		3.7	3.7	3.0
All-Red Time (s)	2.0	2.5	2.0	2.5	2.0	2.4		2.4	2.4	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	6.2	5.0	6.2	5.0	6.1		6.1	6.1	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min		Min	Min	None
v/c Ratio	0.52	0.82	0.83	0.45	0.44	0.56	0.76	0.24	0.65	0.41
Control Delay	25.0	53.8	57.8	34.8	29.6	29.9	19.4	43.6	42.3	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0
Total Delay	25.0	53.8	57.8	34.8	29.6	29.9	25.9	43.6	42.3	18.4
Queue Length 50th (m)	30.7	95.2	88.5	60.5	17.7	86.6	132.1	5.8	77.2	34.0
Queue Length 95th (m)	47.3	118.9	#120.6	82.8	31.5	104.7	199.6	16.2	98.7	56.1
Internal Link Dist (m)		364.5		324.4		160.9			177.4	
Turn Bay Length (m)	57.0		85.0		70.0		6.0	24.0		6.0
Base Capacity (vph)	577	1021	845	1195	326	2434	1118	134	1600	878
Starvation Cap Reductn	0	0	0	0	0	0	251	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.67	0.75	0.44	0.33	0.47	0.94	0.21	0.56	0.31

Intersection Summary

Cycle Length: 137.3

Actuated Cycle Length: 122.4









Natural Cycle: 105

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.























Splits and Phases: 1: Paris St & Brady St

			
63 s		34 s	40.3 s
			
22 s	41 s	35.1 s	39.2 s





















700 Paris St  
1: Paris St & Brady St

HCM Signalized Intersection Capacity Analysis  
Background (2032) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	619	65	633	515	15	106	1148	817	28	896	273
Future Volume (vph)	195	619	65	633	515	15	106	1148	817	28	896	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.2		5.0	6.2		5.0	6.1	6.1	6.1	6.1	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1580	3539		3467	3491		1751	5085	1615	1774	5085	1572
Flt Permitted	0.46	1.00		0.95	1.00		0.16	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)	757	3539		3467	3491		290	5085	1615	430	5085	1572
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	195	619	65	633	515	15	106	1148	817	28	896	273
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	11	0	0	45
Lane Group Flow (vph)	195	678	0	633	529	0	106	1148	806	28	896	228
Confl. Peds. (#/hr)	9		6	6		9	25		33	33		25
Heavy Vehicles (%)	14%	0%	4%	1%	3%	0%	3%	2%	0%	1%	2%	0%
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA	pt+ov	Perm	NA	pm+ov
Protected Phases	7	4		3	8		5	2	2 3		6	7
Permitted Phases	4						2			6		6
Actuated Green, G (s)	43.6	28.8		26.9	40.9		48.9	48.9	81.9	33.4	33.4	48.2
Effective Green, g (s)	43.6	28.8		26.9	40.9		48.9	48.9	81.9	33.4	33.4	48.2
Actuated g/C Ratio	0.36	0.24		0.22	0.34		0.40	0.40	0.67	0.27	0.27	0.40
Clearance Time (s)	5.0	6.2		5.0	6.2		5.0	6.1		6.1	6.1	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	370	836		765	1171		242	2039	1085	117	1393	621
v/s Ratio Prot	0.06	c0.19		c0.18	0.15		0.04	0.23	c0.50		0.18	0.04
v/s Ratio Perm	0.12						0.14			0.07		0.10
v/c Ratio	0.53	0.81		0.83	0.45		0.44	0.56	0.74	0.24	0.64	0.37
Uniform Delay, d1	28.7	44.0		45.3	31.7		25.0	28.2	13.1	34.4	39.0	26.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	6.0		7.3	0.3		1.3	0.4	2.8	1.1	1.0	0.4
Delay (s)	30.0	50.0		52.6	32.0		26.3	28.6	15.9	35.4	40.0	26.4
Level of Service	C	D		D	C		C	C	B	D	D	C
Approach Delay (s)		45.6			43.2			23.5			36.8	
Approach LOS		D			D			C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		34.5					HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio		0.85										
Actuated Cycle Length (s)		121.9					Sum of lost time (s)		22.3			
Intersection Capacity Utilization		102.7%					ICU Level of Service		G			
Analysis Period (min)		15										
c Critical Lane Group												

700 Paris St  
2: Paris St & Van Horne St

Queues  
Background (2032) PM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	52	75	229	73	165	173	1787	130	1415
Future Volume (vph)	52	75	229	73	165	173	1787	130	1415
Lane Group Flow (vph)	53	314	234	74	168	177	2212	133	1492
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Minimum Split (s)	31.7	31.7	31.7	31.7	31.7	9.0	41.1	9.0	41.1
Total Split (s)	31.7	31.7	31.7	31.7	31.7	12.0	55.0	9.0	52.0
Total Split (%)	33.1%	33.1%	33.1%	33.1%	33.1%	12.5%	57.5%	9.4%	54.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.16	0.34	0.92	0.14	0.34	0.73	0.82	0.75	0.58
Control Delay	27.2	17.3	74.5	26.6	12.3	31.0	20.9	40.9	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.2	17.3	74.5	26.6	12.3	31.0	20.9	40.9	17.6
Queue Length 50th (m)	7.7	14.9	43.2	10.7	8.1	13.2	123.0	9.5	72.3
Queue Length 95th (m)	17.2	26.4	#87.7	21.8	24.7	#44.1	145.9	#39.1	87.2
Internal Link Dist (m)		187.2		465.5			478.0		160.9
Turn Bay Length (m)	21.0		133.0		62.0	34.0		48.0	
Base Capacity (vph)	365	994	273	551	520	245	2693	178	2565
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.32	0.86	0.13	0.32	0.72	0.82	0.75	0.58

Intersection Summary

Cycle Length: 95.7

Actuated Cycle Length: 93.9

Natural Cycle: 85

Control Type: Semi Act-Uncoord

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























Queue shown is maximum after two cycles.

Splits and Phases: 2: Paris St & Van Horne St

		
9 s	55 s	31.7 s
		
12 s	52 s	31.7 s















700 Paris St  
2: Paris St & Van Horne St

HCM Signalized Intersection Capacity Analysis  
Background (2032) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	75	232	229	73	165	173	1787	381	130	1415	47
Future Volume (vph)	52	75	232	229	73	165	173	1787	381	130	1415	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1689	3129		1767	1900	1521	1770	4936		1805	5055	
Flt Permitted	0.71	1.00		0.51	1.00	1.00	0.10	1.00		0.08	1.00	
Satd. Flow (perm)	1261	3129		943	1900	1521	192	4936		160	5055	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	53	77	237	234	74	168	177	1823	389	133	1444	48
RTOR Reduction (vph)	0	89	0	0	0	82	0	34	0	0	3	0
Lane Group Flow (vph)	53	225	0	234	74	86	177	2178	0	133	1489	0
Confl. Peds. (#/hr)	13		3	3		13	3		17	17		3
Heavy Vehicles (%)	6%	2%	1%	2%	0%	4%	2%	2%	1%	0%	2%	3%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	25.3	25.3		25.3	25.3	25.3	58.1	50.6		52.6	47.6	
Effective Green, g (s)	25.3	25.3		25.3	25.3	25.3	58.1	50.6		52.6	47.6	
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.27	0.62	0.54		0.56	0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	339	843		254	511	409	244	2659		177	2562	
v/s Ratio Prot		0.07			0.04		c0.06	c0.44		0.04	0.29	
v/s Ratio Perm	0.04			c0.25		0.06	0.39			0.38		
v/c Ratio	0.16	0.27		0.92	0.14	0.21	0.73	0.82		0.75	0.58	
Uniform Delay, d1	26.2	27.0		33.3	26.1	26.6	12.0	17.9		16.1	16.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		35.9	0.1	0.3	10.2	3.0		16.4	1.0	
Delay (s)	26.4	27.2		69.2	26.2	26.8	22.2	20.8		32.5	17.1	
Level of Service	C	C		E	C	C	C	C		C	B	
Approach Delay (s)		27.1			47.6			20.9			18.4	
Approach LOS		C			D			C			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			23.2				HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			93.9				Sum of lost time (s)		13.5			
Intersection Capacity Utilization			90.0%				ICU Level of Service		E			
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
3: Paris St & John St

Queues  
Background (2032) PM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	3	63	0	8	2188	80	1777
Future Volume (vph)	10	3	63	0	8	2188	80	1777
Lane Group Flow (vph)	0	15	0	174	8	2301	82	1837
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	20.0	20.0	5.0	20.0
Minimum Split (s)	25.7	25.7	25.7	25.7	34.8	34.8	9.0	34.8
Total Split (s)	25.7	25.7	25.7	25.7	85.3	85.3	9.0	94.3
Total Split (%)	21.4%	21.4%	21.4%	21.4%	71.1%	71.1%	7.5%	78.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.1	2.1	1.0	2.1
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.7		5.7	5.8	5.8	4.0	5.8
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.08		0.72	0.06	0.93	0.55	0.68
Control Delay		40.1		47.5	8.2	24.4	27.1	8.4
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		40.1		47.5	8.2	24.4	27.1	8.4
Queue Length 50th (m)		2.8		25.7	0.6	224.2	3.5	89.4
Queue Length 95th (m)		9.3		50.7	2.8	#350.8	#23.9	137.4
Internal Link Dist (m)		561.8		431.0		175.2		478.0
Turn Bay Length (m)					33.0		23.0	
Base Capacity (vph)		264		325	136	2643	149	2870
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.06		0.54	0.06	0.87	0.55	0.64

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 108

Natural Cycle: 110

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.



















Splits and Phases: 3: Paris St & John St

			
9 s	85.3 s		25.7 s
			
94.3 s			25.7 s



















700 Paris St  
3: Paris St & John St

HCM Signalized Intersection Capacity Analysis  
Background (2032) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	3	2	63	0	106	8	2188	44	80	1777	5
Future Volume (vph)	10	3	2	63	0	106	8	2188	44	80	1777	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1799			1627		1802	3528		1736	3537	
Flt Permitted		0.74			0.87		0.10	1.00		0.05	1.00	
Satd. Flow (perm)		1377			1443		183	3528		92	3537	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	3	2	65	0	109	8	2256	45	82	1832	5
RTOR Reduction (vph)	0	2	0	0	54	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	13	0	0	120	0	8	2300	0	82	1837	0
Confl. Peds. (#/hr)	3		4	4		3	14		2	2		14
Heavy Vehicles (%)	0%	0%	0%	0%	0%	6%	0%	2%	0%	4%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.1			14.1		75.3	75.3		83.0	83.0	
Effective Green, g (s)		14.1			14.1		75.3	75.3		83.0	83.0	
Actuated g/C Ratio		0.13			0.13		0.69	0.69		0.76	0.76	
Clearance Time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		178			187		126	2446		126	2703	
v/s Ratio Prot							c0.65			0.02	c0.52	
v/s Ratio Perm		0.01			c0.08		0.04			0.47		
v/c Ratio		0.07			0.64		0.06	0.94		0.65	0.68	
Uniform Delay, d1		41.5			44.9		5.3	14.7		27.0	6.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			7.3		0.2	8.1		11.4	0.7	
Delay (s)		41.7			52.2		5.6	22.7		38.4	7.0	
Level of Service		D			D		A	C		D	A	
Approach Delay (s)		41.7			52.2			22.7			8.3	
Approach LOS		D			D			C			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		17.7					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.90										
Actuated Cycle Length (s)		108.6					Sum of lost time (s)			15.5		
Intersection Capacity Utilization		87.8%					ICU Level of Service			E		
Analysis Period (min)		15										
c Critical Lane Group												












700 Paris St  
4: Paris St & McNaughton St











HCM Unsignalized Intersection Capacity Analysis  
Background (2032) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	7	3	0	2	1	2216	1	1	1924	13
Future Volume (Veh/h)	9	0	7	3	0	2	1	2216	1	1	1924	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	9	0	7	3	0	2	1	2308	1	1	2004	14
Pedestrians		3			2							
Lane Width (m)		3.6			3.6							
Walking Speed (m/s)		1.2			1.2							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)								347			199	
pX, platoon unblocked	0.41	0.41	0.69	0.41	0.41	0.26	0.69			0.26		
vC, conflicting volume	3174	4329	1012	3324	4336	1156	2021			2311		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	39	2827	114	400	2843	0	1579			336		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	99	100	99	100			100		
cM capacity (veh/h)	393	7	635	219	7	282	290			319		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	16	5	1155	1155	1003	1016						
Volume Left	9	3	1	0	1	0						
Volume Right	7	2	0	1	0	14						
cSH	472	240	290	1700	319	1700						
Volume to Capacity	0.03	0.02	0.00	0.68	0.00	0.60						
Queue Length 95th (m)	0.8	0.5	0.1	0.0	0.1	0.0						
Control Delay (s)	12.9	20.3	0.2	0.0	0.1	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	12.9	20.3	0.1		0.1							
Approach LOS	B	C										
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			72.0%		ICU Level of Service					C		
Analysis Period (min)			15									

700 Paris St  
5: Paris St & Facer St

HCM Unsignalized Intersection Capacity Analysis  
Background (2032) PM Peak Hour
















						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	1	1	2207	6	0	1930
Future Volume (Veh/h)	1	1	2207	6	0	1930
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	1	2323	6	0	2032
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			225			321
pX, platoon unblocked	0.41	0.24			0.24	
vC, conflicting volume	3343	1166			2330	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	135	0			194	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	345	260			332	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	2	1549	780	677	1355	
Volume Left	1	0	0	0	0	
Volume Right	1	0	6	0	0	
cSH	297	1700	1700	332	1700	
Volume to Capacity	0.01	0.91	0.46	0.00	0.80	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	17.2	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	17.2	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			71.2%		ICU Level of Service	C
Analysis Period (min)			15			

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	7	0	0	2	0	0
Future Volume (Veh/h)	7	0	0	2	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	10	0	0	3	0	0
Pedestrians	1			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			10		14	12
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			10		14	12
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		1009	1073
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	10	3	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1623	1700			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			14.0%	ICU Level of Service	A	
Analysis Period (min)			15			



700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

Queues  
Background (2032) PM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	27	0	6	2	24	2178	4	1865
Future Volume (vph)	27	0	6	2	24	2178	4	1865
Lane Group Flow (vph)	0	46	7	13	26	2375	4	2061
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	30.0	30.0	30.0	30.0
Minimum Split (s)	26.0	26.0	26.0	26.0	35.9	35.9	35.9	35.9
Total Split (s)	26.0	26.0	26.0	26.0	94.0	94.0	94.0	94.0
Total Split (%)	21.7%	21.7%	21.7%	21.7%	78.3%	78.3%	78.3%	78.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.7	3.7	3.7	3.7
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	5.9	5.9	5.9	5.9
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.29	0.05	0.07	0.24	0.81	0.05	0.70
Control Delay		30.0	44.8	25.9	8.9	8.8	3.5	6.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		30.0	44.8	25.9	8.9	8.8	3.5	6.2
Queue Length 50th (m)		3.4	1.2	0.3	1.0	117.6	0.1	80.5
Queue Length 95th (m)		16.1	6.2	6.6	5.2	179.8	1.0	120.1
Internal Link Dist (m)		192.5		282.1		313.9		201.2
Turn Bay Length (m)					40.0		100.0	
Base Capacity (vph)		340	330	400	117	3223	94	3219
Starvation Cap Reductn		0	0	0	0	21	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.14	0.02	0.03	0.22	0.74	0.04	0.64

Intersection Summary

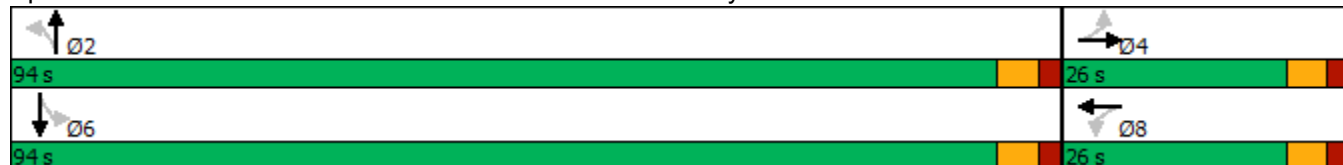
Cycle Length: 120

Actuated Cycle Length: 90.1

Natural Cycle: 90




















Control Type: Semi Act-Uncoord













Splits and Phases: 7: Paris St & Boland Ave/Paris Driveway



700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

HCM Signalized Intersection Capacity Analysis  
Background (2032) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	0	16	6	2	10	24	2178	7	4	1865	31
Future Volume (vph)	27	0	16	6	2	10	24	2178	7	4	1865	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.95		1.00	0.87		1.00	1.00		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1623		1805	1639		1805	3537		1805	3530	
Flt Permitted		0.80		0.73	1.00		0.07	1.00		0.05	1.00	
Satd. Flow (perm)		1341		1381	1639		130	3537		104	3530	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	0	17	7	2	11	26	2367	8	4	2027	34
RTOR Reduction (vph)	0	24	0	0	10	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	22	0	7	3	0	26	2375	0	4	2060	0
Confl. Peds. (#/hr)	2					2	4		2	2		4
Heavy Vehicles (%)	4%	0%	14%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.4		6.4	6.4		73.0	73.0		73.0	73.0	
Effective Green, g (s)		6.4		6.4	6.4		73.0	73.0		73.0	73.0	
Actuated g/C Ratio		0.07		0.07	0.07		0.80	0.80		0.80	0.80	
Clearance Time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		94		96	114		103	2828		83	2822	
v/s Ratio Prot					0.00			c0.67			0.58	
v/s Ratio Perm		c0.02		0.01			0.20			0.04		
v/c Ratio		0.23		0.07	0.02		0.25	0.84		0.05	0.73	
Uniform Delay, d1		40.1		39.7	39.5		2.3	5.6		1.9	4.4	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.3		0.3	0.1		1.3	2.4		0.2	1.0	
Delay (s)		41.4		40.0	39.6		3.6	7.9		2.1	5.4	
Level of Service		D		D	D		A	A		A	A	
Approach Delay (s)		41.4			39.8			7.9			5.4	
Approach LOS		D			D			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		7.2					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.79										
Actuated Cycle Length (s)		91.3					Sum of lost time (s)		11.9			
Intersection Capacity Utilization		79.5%					ICU Level of Service		D			
Analysis Period (min)		15										
c Critical Lane Group												

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	230	121	164	1980	1665	224
Future Volume (vph)	230	121	164	1980	1665	224
Lane Group Flow (vph)	242	127	173	2084	1753	236
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	30.0	30.0	30.0
Minimum Split (s)	25.5	25.5	9.0	36.2	36.2	36.2
Total Split (s)	25.5	25.5	12.0	94.5	82.5	82.5
Total Split (%)	21.3%	21.3%	10.0%	78.8%	68.8%	68.8%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	2.2	2.2	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
v/c Ratio	0.77	0.34	0.78	0.84	0.85	0.24
Control Delay	59.3	10.3	45.9	14.4	22.0	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	10.3	45.9	14.4	22.0	2.4
Queue Length 50th (m)	48.2	0.0	18.8	152.6	153.2	2.1
Queue Length 95th (m)#	100.6	17.4	#62.9	185.0	184.4	11.5
Internal Link Dist (m)	376.5			774.4	313.9	
Turn Bay Length (m)	21.0		123.0			72.0
Base Capacity (vph)	365	418	221	3074	2752	1241
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.30	0.78	0.68	0.64	0.19

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 100.4

Natural Cycle: 90













Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.

Splits and Phases: 8: Paris St & York St










						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	230	121	164	1980	1665	224
Future Volume (vph)	230	121	164	1980	1665	224
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.97	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1556	1770	3539	3539	1538
Flt Permitted	0.95	1.00	0.06	1.00	1.00	1.00
Satd. Flow (perm)	1787	1556	119	3539	3539	1538
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	127	173	2084	1753	236
RTOR Reduction (vph)	0	105	0	0	0	88
Lane Group Flow (vph)	242	22	173	2084	1753	148
Confl. Peds. (#/hr)	6	15	4			4
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	17.6	17.6	70.7	70.7	58.5	58.5
Effective Green, g (s)	17.6	17.6	70.7	70.7	58.5	58.5
Actuated g/C Ratio	0.18	0.18	0.71	0.71	0.58	0.58
Clearance Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	314	273	219	2502	2070	899
v/s Ratio Prot	c0.14		0.06	c0.59	0.50	
v/s Ratio Perm		0.01	0.49			0.10
v/c Ratio	0.77	0.08	0.79	0.83	0.85	0.17
Uniform Delay, d1	39.3	34.4	26.3	10.4	17.1	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.1	0.1	17.1	2.5	3.4	0.1
Delay (s)	50.4	34.6	43.3	13.0	20.5	9.6
Level of Service	D	C	D	B	C	A
Approach Delay (s)	44.9			15.3	19.2	
Approach LOS	D			B	B	
Intersection Summary						
HCM 2000 Control Delay			19.3	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.86			
Actuated Cycle Length (s)			100.0	Sum of lost time (s)		15.7
Intersection Capacity Utilization			85.4%	ICU Level of Service		E
Analysis Period (min)			15			
c Critical Lane Group						



700 Paris St  
9: Ramsey Lake Rd & Paris St

Queues  
Background (2032) PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	573	728	1450	283	386	1365
Future Volume (vph)	573	728	1450	283	386	1365
Lane Group Flow (vph)	637	809	1611	314	429	1517
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	36.0		62.0	62.0	22.0	84.0
Total Split (%)	30.0%		51.7%	51.7%	18.3%	70.0%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.73	1.17	0.98	0.39	0.88	0.66
Control Delay	46.9	122.4	49.7	14.3	71.0	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.9	122.4	49.7	14.3	71.0	14.8
Queue Length 50th (m)	75.0	~238.0	201.3	29.8	54.5	112.4
Queue Length 95th (m)	96.2	#316.7	#258.7	52.7	#82.6	135.5
Internal Link Dist (m)	679.1		533.6			774.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	872	693	1645	800	486	2294
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.73	1.17	0.98	0.39	0.88	0.66

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Natural Cycle: 120

Control Type: Semi Act-Uncoord

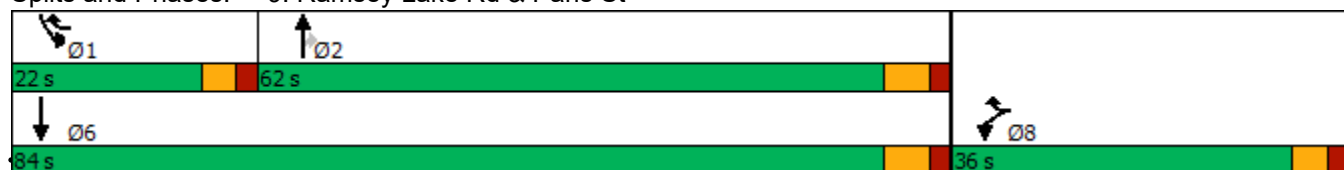
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 9: Ramsey Lake Rd & Paris St















JD Engineering

Synchro 11 Report  
02-07-2023





























700 Paris St  
9: Ramsey Lake Rd & Paris St

HCM Signalized Intersection Capacity Analysis  
Background (2032) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	573	728	1450	283	386	1365
Future Volume (vph)	573	728	1450	283	386	1365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	1583	3539	1586	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	1583	3539	1586	3433	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	637	809	1611	314	429	1517
RTOR Reduction (vph)	0	5	0	63	0	0
Lane Group Flow (vph)	637	804	1611	251	429	1517
Confl. Peds. (#/hr)		16		5	5	
Heavy Vehicles (%)	1%	2%	2%	0%	2%	2%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	30.2	53.0	55.8	55.8	17.0	77.8
Effective Green, g (s)	30.2	53.0	55.8	55.8	17.0	77.8
Actuated g/C Ratio	0.25	0.44	0.46	0.46	0.14	0.65
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	872	699	1645	737	486	2294
v/s Ratio Prot	0.18	c0.51	c0.46		0.12	0.43
v/s Ratio Perm				0.16		
v/c Ratio	0.73	1.15	0.98	0.34	0.88	0.66
Uniform Delay, d1	41.2	33.5	31.5	20.4	50.5	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	83.5	17.3	0.3	17.0	0.7
Delay (s)	44.3	117.0	48.8	20.7	67.6	13.7
Level of Service	D	F	D	C	E	B
Approach Delay (s)	85.0		44.2			25.6
Approach LOS	F		D			C
<b>Intersection Summary</b>						
HCM 2000 Control Delay			48.5		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.12			
Actuated Cycle Length (s)			120.0		Sum of lost time (s)	17.0
Intersection Capacity Utilization			96.7%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

700 Paris St  
1: Paris St & Brady St

Queues  
Background (2032) AM Peak Hour

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 	 	 		  			  	
Traffic Volume (vph)	181	457	573	422	82	603	445	29	887	260
Future Volume (vph)	181	457	573	422	82	603	445	29	887	260
Lane Group Flow (vph)	197	549	623	470	89	655	484	32	964	283
Turn Type	Prot	NA	Prot	NA	pm+pt	NA	pt+ov	pm+pt	NA	pt+ov
Protected Phases	7	4	3	8	5	2	2 3	1	6	6 7
Permitted Phases					2			6		
Detector Phase	7	4	3	8	5	2	2 3	1	6	6 7
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0		5.0	15.0	
Minimum Split (s)	10.0	31.2	10.0	31.2	10.0	40.1		10.0	40.1	
Total Split (s)	26.1	31.2	34.0	39.1	20.0	44.0		17.0	41.0	
Total Split (%)	20.7%	24.7%	26.9%	31.0%	15.8%	34.9%		13.5%	32.5%	
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7		3.0	3.7	
All-Red Time (s)	2.0	2.5	2.0	2.5	2.0	2.4		2.0	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.2	5.0	6.2	5.0	6.1		5.0	6.1	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None	Min		None	Min	
v/c Ratio	0.52	0.78	0.78	0.41	0.38	0.41	0.46	0.11	0.73	0.38
Control Delay	52.7	49.7	47.4	30.6	25.8	30.3	7.7	21.5	40.0	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Total Delay	52.7	49.7	47.4	30.6	25.8	30.3	8.0	21.5	40.0	14.3
Queue Length 50th (m)	22.9	63.3	70.6	43.6	12.9	45.6	29.4	4.5	76.0	25.8
Queue Length 95th (m)	37.1	92.1	100.7	67.9	24.4	60.5	56.5	11.0	98.3	48.6
Internal Link Dist (m)		364.5		324.4		160.9			177.4	
Turn Bay Length (m)	57.0		85.0		70.0		6.0	24.0		6.0
Base Capacity (vph)	682	838	965	1230	308	1900	1105	371	1688	875
Starvation Cap Reductn	0	0	0	0	0	0	195	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.66	0.65	0.38	0.29	0.34	0.53	0.09	0.57	0.32

Intersection Summary









Cycle Length: 126.2

Actuated Cycle Length: 106

Natural Cycle: 105























Control Type: Semi Act-Uncoord

Splits and Phases: 1: Paris St & Brady St













 Ø1	 Ø2	 Ø3	 Ø4
17 s	44 s	34 s	31.2 s
 Ø5	 Ø6	 Ø7	 Ø8
20 s	41 s	26.1 s	39.1 s

700 Paris St  
1: Paris St & Brady St

HCM Signalized Intersection Capacity Analysis  
Background (2032) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	457	48	573	422	10	82	603	445	29	887	260
Future Volume (vph)	181	457	48	573	422	10	82	603	445	29	887	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.2		5.0	6.2		5.0	6.1	6.1	5.0	6.1	6.1
Lane Util. Factor	0.97	0.95		0.97	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3273	3369		3367	3461		1671	4988	1568	1717	4893	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.14	1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)	3273	3369		3367	3461		250	4988	1568	681	4893	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	197	497	52	623	459	11	89	655	484	32	964	283
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	92	0	0	63
Lane Group Flow (vph)	197	543	0	623	469	0	89	655	392	32	964	220
Confl. Peds. (#/hr)	7		4	4		7	19		10	10		19
Heavy Vehicles (%)	7%	5%	10%	4%	4%	0%	8%	4%	3%	5%	6%	2%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	pt+ov	pm+pt	NA	pt+ov
Protected Phases	7	4		3	8		5	2	2 3	1	6	6 7
Permitted Phases							2			6		
Actuated Green, G (s)	12.2	22.1		25.2	35.1		42.0	33.9	65.2	33.8	29.8	48.1
Effective Green, g (s)	12.2	22.1		25.2	35.1		42.0	33.9	65.2	33.8	29.8	48.1
Actuated g/C Ratio	0.11	0.21		0.23	0.33		0.39	0.32	0.61	0.31	0.28	0.45
Clearance Time (s)	5.0	6.2		5.0	6.2		5.0	6.1		5.0	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	371	692		789	1130		204	1572	951	252	1356	708
v/s Ratio Prot	0.06	c0.16		c0.19	0.14		c0.03	0.13	0.25	0.00	c0.20	0.14
v/s Ratio Perm							0.14			0.04		
v/c Ratio	0.53	0.78		0.79	0.41		0.44	0.42	0.41	0.13	0.71	0.31
Uniform Delay, d1	45.0	40.4		38.7	28.2		22.7	29.0	11.1	25.7	35.0	19.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	5.8		5.3	0.2		1.5	0.2	0.3	0.2	1.8	0.3
Delay (s)	46.4	46.3		43.9	28.4		24.2	29.2	11.4	26.0	36.8	19.3
Level of Service	D	D		D	C		C	C	B	C	D	B
Approach Delay (s)		46.3			37.3			21.8			32.6	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.1	HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			107.5	Sum of lost time (s)					22.3			
Intersection Capacity Utilization			78.1%	ICU Level of Service					D			
Analysis Period (min)			15									
c Critical Lane Group												



						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	194	243	1065	397	704	998
Future Volume (vph)	194	243	1065	397	704	998
Lane Group Flow (vph)	202	253	1109	414	733	1040
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	30.8		56.2	56.2	33.0	89.2
Total Split (%)	25.7%		46.8%	46.8%	27.5%	74.3%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.48	0.20	0.77	0.55	0.77	0.40
Control Delay	43.8	13.4	27.7	13.0	37.9	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	13.4	27.7	13.0	37.9	4.8
Queue Length 50th (m)	18.8	12.2	95.4	28.2	63.8	30.0
Queue Length 95th (m)	33.7	25.2	127.4	58.9	#104.8	45.3
Internal Link Dist (m)	679.1		533.6			775.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	962	1383	1964	952	1088	3090
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.18	0.56	0.43	0.67	0.34

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 91.5

Natural Cycle: 90

Control Type: Semi Act-Uncoord

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













Queue shown is maximum after two cycles.

#### Splits and Phases: 9: Ramsey Lake Rd & Paris St























700 Paris St  
9: Ramsey Lake Rd & Paris St

HCM Signalized Intersection Capacity Analysis  
Background (2032) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	194	243	1065	397	704	998
Future Volume (vph)	194	243	1065	397	704	998
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	0.88	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	2760	3505	1545	3467	3471
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	2760	3505	1545	3467	3471
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	202	253	1109	414	733	1040
RTOR Reduction (vph)	0	26	0	120	0	0
Lane Group Flow (vph)	202	227	1109	294	733	1040
Confl. Peds. (#/hr)		13		14	14	
Heavy Vehicles (%)	2%	3%	3%	2%	1%	4%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	11.2	42.3	37.7	37.7	25.3	68.0
Effective Green, g (s)	11.2	42.3	37.7	37.7	25.3	68.0
Actuated g/C Ratio	0.12	0.46	0.41	0.41	0.28	0.75
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	421	1280	1448	638	961	2588
v/s Ratio Prot	c0.06	0.08	c0.32		c0.21	0.30
v/s Ratio Perm				0.19		
v/c Ratio	0.48	0.18	0.77	0.46	0.76	0.40
Uniform Delay, d1	37.3	14.3	23.0	19.4	30.2	4.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1	2.5	0.5	3.6	0.1
Delay (s)	38.1	14.4	25.4	19.9	33.8	4.3
Level of Service	D	B	C	B	C	A
Approach Delay (s)	24.9		23.9			16.5
Approach LOS	C		C			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			20.5		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			91.2		Sum of lost time (s)	17.0
Intersection Capacity Utilization			78.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

700 Paris St  
1: Paris St & Brady St

Queues  
Background (2032) PM Peak Hour

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	195	619	633	515	106	1148	817	28	896	273
Future Volume (vph)	195	619	633	515	106	1148	817	28	896	273
Lane Group Flow (vph)	195	684	633	530	106	1148	817	28	896	273
Turn Type	Prot	NA	Prot	NA	pm+pt	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	7	4	3	8	5	2	2 3		6	6 7
Permitted Phases					2			6		
Detector Phase	7	4	3	8	5	2	2 3	6	6	6 7
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0		15.0	15.0	
Minimum Split (s)	10.0	31.2	10.0	31.2	10.0	40.1		40.1	40.1	
Total Split (s)	35.1	40.3	34.0	39.2	22.0	63.0		41.0	41.0	
Total Split (%)	25.6%	29.4%	24.8%	28.6%	16.0%	45.9%		29.9%	29.9%	
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7		3.7	3.7	
All-Red Time (s)	2.0	2.5	2.0	2.5	2.0	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.2	5.0	6.2	5.0	6.1		6.1	6.1	
Lead/Lag	Lead	Lag	Lead	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes			Yes	Yes	
Recall Mode	None	None	None	None	None	Min		Min	Min	
v/c Ratio	0.58	0.82	0.83	0.44	0.44	0.56	0.76	0.24	0.65	0.37
Control Delay	61.4	53.8	57.8	33.6	29.6	29.9	19.4	43.6	42.3	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0
Total Delay	61.4	53.8	57.8	33.6	29.6	29.9	25.9	43.6	42.3	18.7
Queue Length 50th (m)	27.3	95.2	88.5	59.7	17.7	86.6	132.1	5.8	77.2	34.4
Queue Length 95th (m)	40.2	118.9	#120.6	80.6	31.5	104.7	199.6	16.2	98.7	58.3
Internal Link Dist (m)		364.5		324.4		160.9			177.4	
Turn Bay Length (m)	57.0		85.0		70.0		6.0	24.0		6.0
Base Capacity (vph)	777	1021	845	1226	326	2434	1118	134	1600	946
Starvation Cap Reductn	0	0	0	0	0	0	251	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.67	0.75	0.43	0.33	0.47	0.94	0.21	0.56	0.29

Intersection Summary

Cycle Length: 137.3

Actuated Cycle Length: 122.4











Natural Cycle: 105

Control Type: Semi Act-Uncoord

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























Queue shown is maximum after two cycles.

Splits and Phases: 1: Paris St & Brady St

				
63 s		34 s		40.3 s
				
22 s	41 s	35.1 s		39.2 s

700 Paris St  
1: Paris St & Brady St













HCM Signalized Intersection Capacity Analysis  
Background (2032) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	619	65	633	515	15	106	1148	817	28	896	273
Future Volume (vph)	195	619	65	633	515	15	106	1148	817	28	896	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.2		5.0	6.2		5.0	6.1	6.1	6.1	6.1	6.1
Lane Util. Factor	0.97	0.95		0.97	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3072	3539		3467	3491		1751	5085	1615	1774	5085	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.16	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)	3072	3539		3467	3491		290	5085	1615	430	5085	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	195	619	65	633	515	15	106	1148	817	28	896	273
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	11	0	0	44
Lane Group Flow (vph)	195	678	0	633	529	0	106	1148	806	28	896	229
Confl. Peds. (#/hr)	9		6	6		9	25		33	33		25
Heavy Vehicles (%)	14%	0%	4%	1%	3%	0%	3%	2%	0%	1%	2%	0%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	7	4		3	8		5	2	2 3		6	6 7
Permitted Phases							2			6		
Actuated Green, G (s)	13.5	28.8		26.9	42.2		48.9	48.9	81.9	33.4	33.4	53.0
Effective Green, g (s)	13.5	28.8		26.9	42.2		48.9	48.9	81.9	33.4	33.4	53.0
Actuated g/C Ratio	0.11	0.24		0.22	0.35		0.40	0.40	0.67	0.27	0.27	0.43
Clearance Time (s)	5.0	6.2		5.0	6.2		5.0	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	340	836		765	1208		242	2039	1085	117	1393	702
v/s Ratio Prot	0.06	c0.19		c0.18	0.15		0.04	0.23	c0.50		0.18	0.14
v/s Ratio Perm							0.14			0.07		
v/c Ratio	0.57	0.81		0.83	0.44		0.44	0.56	0.74	0.24	0.64	0.33
Uniform Delay, d1	51.5	44.0		45.3	30.7		25.0	28.2	13.1	34.4	39.0	22.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	6.0		7.3	0.3		1.3	0.4	2.8	1.1	1.0	0.3
Delay (s)	53.8	50.0		52.6	31.0		26.3	28.6	15.9	35.4	40.0	23.0
Level of Service	D	D		D	C		C	C	B	D	D	C
Approach Delay (s)		50.8			42.8			23.5			36.0	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			35.0	HCM 2000 Level of Service			D					
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			121.9	Sum of lost time (s)			22.3					
Intersection Capacity Utilization			102.7%	ICU Level of Service			G					
Analysis Period (min)			15									
c Critical Lane Group												



700 Paris St  
9: Ramsey Lake Rd & Paris St

Queues  
Background (2032) PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	573	728	1450	283	386	1365
Future Volume (vph)	573	728	1450	283	386	1365
Lane Group Flow (vph)	637	809	1611	314	429	1517
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	32.0		64.5	64.5	23.5	88.0
Total Split (%)	26.7%		53.8%	53.8%	19.6%	73.3%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.84	0.69	0.94	0.38	0.82	0.63
Control Delay	55.5	31.5	41.2	12.8	62.1	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	31.5	41.2	12.8	62.1	12.1
Queue Length 50th (m)	78.5	90.1	192.6	27.6	53.6	100.0
Queue Length 95th (m)	#106.2	116.1	#248.7	49.5	#76.9	120.6
Internal Link Dist (m)	679.1		533.6			774.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	778	1168	1770	854	545	2483
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.69	0.91	0.37	0.79	0.61

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 116.9

Natural Cycle: 100

Control Type: Semi Act-Uncoord

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








Queue shown is maximum after two cycles.

Splits and Phases: 9: Ramsey Lake Rd & Paris St



700 Paris St  
9: Ramsey Lake Rd & Paris St





















HCM Signalized Intersection Capacity Analysis  
Background (2032) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	573	728	1450	283	386	1365
Future Volume (vph)	573	728	1450	283	386	1365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	0.88	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	2787	3539	1587	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	2787	3539	1587	3433	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	637	809	1611	314	429	1517
RTOR Reduction (vph)	0	12	0	63	0	0
Lane Group Flow (vph)	637	797	1611	251	429	1517
Confl. Peds. (#/hr)		16		5	5	
Heavy Vehicles (%)	1%	2%	2%	0%	2%	2%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	25.6	49.3	56.4	56.4	17.9	79.3
Effective Green, g (s)	25.6	49.3	56.4	56.4	17.9	79.3
Actuated g/C Ratio	0.22	0.42	0.48	0.48	0.15	0.68
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	759	1175	1707	765	525	2400
v/s Ratio Prot	c0.18	0.29	c0.46		c0.12	0.43
v/s Ratio Perm				0.16		
v/c Ratio	0.84	0.68	0.94	0.33	0.82	0.63
Uniform Delay, d1	43.7	27.4	28.7	18.6	47.9	10.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.1	1.6	11.1	0.3	9.6	0.5
Delay (s)	51.8	29.0	39.9	18.9	57.5	11.1
Level of Service	D	C	D	B	E	B
Approach Delay (s)	39.0		36.4			21.4
Approach LOS	D		D			C
<b>Intersection Summary</b>						
HCM 2000 Control Delay			31.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.89			
Actuated Cycle Length (s)			116.9		Sum of lost time (s)	17.0
Intersection Capacity Utilization			86.6%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

## **Appendix F – Synchro Analysis Output – Total Traffic Volumes**

700 Paris St  
1: Paris St & Brady St

Queues  
Total (2027) AM Peak Hour

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	168	424	547	393	93	578	435	27	840	241
Future Volume (vph)	168	424	547	393	93	578	435	27	840	241
Lane Group Flow (vph)	183	519	595	438	101	628	473	29	913	262
Turn Type	pm+pt	NA	Prot	NA	pm+pt	NA	pt+ov	pm+pt	NA	pm+ov
Protected Phases	7	4	3	8	5	2	2 3	1	6	7
Permitted Phases	4				2			6		6
Detector Phase	7	4	3	8	5	2	2 3	1	6	7
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0		5.0	15.0	5.0
Minimum Split (s)	10.0	31.2	10.0	31.2	10.0	40.1		10.0	40.1	10.0
Total Split (s)	26.1	31.2	34.0	39.1	20.0	44.0		17.0	41.0	26.1
Total Split (%)	20.7%	24.7%	26.9%	31.0%	15.8%	34.9%		13.5%	32.5%	20.7%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7		3.0	3.7	3.0
All-Red Time (s)	2.0	2.5	2.0	2.5	2.0	2.4		2.0	2.4	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	6.2	5.0	6.2	5.0	6.1		5.0	6.1	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min		None	Min	None
v/c Ratio	0.47	0.77	0.77	0.41	0.40	0.37	0.45	0.10	0.74	0.40
Control Delay	22.3	48.9	46.8	31.3	25.4	29.0	7.1	21.2	41.1	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	22.3	48.9	46.8	31.3	25.4	29.0	7.4	21.2	41.1	13.3
Queue Length 50th (m)	21.5	55.1	62.2	38.4	13.6	40.8	25.1	3.8	67.4	20.0
Queue Length 95th (m)	42.8	87.4	96.5	65.0	27.2	57.7	52.5	10.1	93.5	42.0
Internal Link Dist (m)		364.5		324.4		160.9			177.4	
Turn Bay Length (m)	57.0		85.0		70.0		6.0	24.0		6.0
Base Capacity (vph)	535	834	962	1188	318	1888	1110	393	1683	791
Starvation Cap Reductn	0	0	0	0	0	0	173	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.62	0.62	0.37	0.32	0.33	0.50	0.07	0.54	0.33

Intersection Summary









Cycle Length: 126.2

Actuated Cycle Length: 104.5

Natural Cycle: 95

Control Type: Semi Act-Uncoord























Splits and Phases: 1: Paris St & Brady St

 Ø1	 Ø2	 Ø3	 Ø4
17 s	44 s	34 s	31.2 s
 Ø5	 Ø6	 Ø7	 Ø8
20 s	41 s	26.1 s	39.1 s





















700 Paris St  
1: Paris St & Brady St

HCM Signalized Intersection Capacity Analysis  
Total (2027) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	424	53	547	393	10	93	578	435	27	840	241
Future Volume (vph)	168	424	53	547	393	10	93	578	435	27	840	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.2		5.0	6.2		5.0	6.1	6.1	5.0	6.1	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1684	3357		3367	3460		1671	4988	1568	1717	4893	1551
Flt Permitted	0.50	1.00		0.95	1.00		0.15	1.00	1.00	0.40	1.00	1.00
Satd. Flow (perm)	882	3357		3367	3460		269	4988	1568	727	4893	1551
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	461	58	595	427	11	101	628	473	29	913	262
RTOR Reduction (vph)	0	8	0	0	1	0	0	0	92	0	0	70
Lane Group Flow (vph)	183	511	0	595	437	0	101	628	381	29	913	192
Confl. Peds. (#/hr)	7		4	4		7	19		10	10		19
Heavy Vehicles (%)	7%	5%	10%	4%	4%	0%	8%	4%	3%	5%	6%	2%
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA	pt+ov	pm+pt	NA	pm+ov
Protected Phases	7	4		3	8		5	2	2 3	1	6	7
Permitted Phases	4						2			6		6
Actuated Green, G (s)	33.5	20.8		23.9	32.0		44.4	35.4	65.4	32.8	28.8	41.5
Effective Green, g (s)	33.5	20.8		23.9	32.0		44.4	35.4	65.4	32.8	28.8	41.5
Actuated g/C Ratio	0.31	0.20		0.22	0.30		0.42	0.33	0.61	0.31	0.27	0.39
Clearance Time (s)	5.0	6.2		5.0	6.2		5.0	6.1		5.0	6.1	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	373	656		756	1040		251	1659	963	261	1324	604
v/s Ratio Prot	0.06	c0.15		c0.18	0.13		c0.04	0.13	0.24	0.00	c0.19	0.04
v/s Ratio Perm	0.10						0.13			0.03		0.09
v/c Ratio	0.49	0.78		0.79	0.42		0.40	0.38	0.40	0.11	0.69	0.32
Uniform Delay, d1	28.0	40.6		38.9	29.8		20.8	27.1	10.4	25.9	34.8	22.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	5.8		5.4	0.3		1.1	0.1	0.3	0.2	1.5	0.3
Delay (s)	29.0	46.4		44.3	30.0		21.9	27.2	10.7	26.1	36.3	22.9
Level of Service	C	D		D	C		C	C	B	C	D	C
Approach Delay (s)		41.9			38.2			20.3			33.1	
Approach LOS		D			D			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		32.2					HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio		0.70										
Actuated Cycle Length (s)		106.4					Sum of lost time (s)		22.3			
Intersection Capacity Utilization		76.9%					ICU Level of Service		D			
Analysis Period (min)		15										
c Critical Lane Group												

700 Paris St  
2: Paris St & Van Horne St

Queues  
Total (2027) AM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	15	25	251	58	138	163	1004	76	1317
Future Volume (vph)	15	25	251	58	138	163	1004	76	1317
Lane Group Flow (vph)	16	122	276	64	152	179	1227	84	1499
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Minimum Split (s)	31.7	31.7	31.7	31.7	31.7	9.0	41.1	9.0	41.1
Total Split (s)	37.0	37.0	37.0	37.0	37.0	19.0	41.1	19.0	41.1
Total Split (%)	38.1%	38.1%	38.1%	38.1%	38.1%	19.6%	42.3%	19.6%	42.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.05	0.14	0.80	0.13	0.28	0.62	0.49	0.27	0.67
Control Delay	22.5	8.0	46.4	23.3	5.6	23.9	15.8	10.6	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	8.0	46.4	23.3	5.6	23.9	15.8	10.6	21.8
Queue Length 50th (m)	2.0	1.7	42.2	7.9	0.0	13.2	48.3	5.0	69.5
Queue Length 95th (m)	6.8	8.2	75.2	18.2	13.3	39.2	78.5	13.5	113.1
Internal Link Dist (m)		187.2		465.5			478.0		160.9
Turn Bay Length (m)	21.0		133.0		62.0	34.0		48.0	
Base Capacity (vph)	463	1199	503	719	712	374	2509	470	2242
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.10	0.55	0.09	0.21	0.48	0.49	0.18	0.67

Intersection Summary

Cycle Length: 97.1

Actuated Cycle Length: 83.7

Natural Cycle: 85






















Control Type: Semi Act-Uncoord

Splits and Phases: 2: Paris St & Van Horne St

 Ø1	 Ø2	 Ø4
19 s	41.1 s	37 s
 Ø5	 Ø6	 Ø8
19 s	41.1 s	37 s















700 Paris St  
2: Paris St & Van Horne St

HCM Signalized Intersection Capacity Analysis  
Total (2027) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	25	86	251	58	138	163	1004	113	76	1317	47
Future Volume (vph)	15	25	86	251	58	138	163	1004	113	76	1317	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	2901		1801	1827	1576	1703	4871		1752	5049	
Flt Permitted	0.72	1.00		0.67	1.00	1.00	0.09	1.00		0.19	1.00	
Satd. Flow (perm)	1179	2901		1279	1827	1576	169	4871		353	5049	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	27	95	276	64	152	179	1103	124	84	1447	52
RTOR Reduction (vph)	0	70	0	0	0	111	0	11	0	0	3	0
Lane Group Flow (vph)	16	52	0	276	64	41	179	1216	0	84	1496	0
Confl. Peds. (#/hr)	4		4	4		4	6		6	6		6
Heavy Vehicles (%)	15%	4%	10%	0%	4%	1%	6%	5%	2%	3%	2%	5%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	22.6	22.6		22.6	22.6	22.6	52.8	42.9		43.9	38.0	
Effective Green, g (s)	22.6	22.6		22.6	22.6	22.6	52.8	42.9		43.9	38.0	
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.27	0.63	0.51		0.52	0.45	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	315	776		342	489	422	292	2475		281	2273	
v/s Ratio Prot		0.02			0.04		c0.07	0.25		0.02	c0.30	
v/s Ratio Perm	0.01			c0.22		0.03	0.31			0.13		
v/c Ratio	0.05	0.07		0.81	0.13	0.10	0.61	0.49		0.30	0.66	
Uniform Delay, d1	22.9	23.0		28.9	23.4	23.2	13.1	13.6		10.4	18.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.0		13.0	0.1	0.1	3.8	0.7		0.6	1.5	
Delay (s)	23.0	23.1		41.9	23.6	23.3	16.9	14.3		11.0	19.6	
Level of Service	C	C		D	C	C	B	B		B	B	
Approach Delay (s)		23.1			33.8			14.6			19.2	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.5	HCM 2000 Level of Service				B				
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			84.4	Sum of lost time (s)				13.5				
Intersection Capacity Utilization			69.3%	ICU Level of Service				C				
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
3: Paris St & John St

Queues  
Total (2027) AM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	8	0	40	2	4	1275	46	1576
Future Volume (vph)	8	0	40	2	4	1275	46	1576
Lane Group Flow (vph)	0	14	0	110	4	1363	48	1651
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	20.0	20.0	5.0	20.0
Minimum Split (s)	25.7	25.7	25.7	25.7	34.8	34.8	9.0	34.8
Total Split (s)	25.7	25.7	25.7	25.7	50.8	50.8	14.0	64.8
Total Split (%)	28.4%	28.4%	28.4%	28.4%	56.1%	56.1%	15.5%	71.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.1	2.1	1.0	2.1
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.7		5.7	5.8	5.8	4.0	5.8
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.05		0.37	0.03	0.61	0.15	0.64
Control Delay		0.3		17.8	8.2	11.3	4.0	7.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		0.3		17.8	8.2	11.3	4.0	7.2
Queue Length 50th (m)		0.0		4.6	0.2	61.0	1.3	48.9
Queue Length 95th (m)		0.0		20.6	1.6	98.2	4.3	85.2
Internal Link Dist (m)		561.8		431.0		175.2		478.0
Turn Bay Length (m)					33.0		23.0	
Base Capacity (vph)		592		583	197	2766	444	3261
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.02		0.19	0.02	0.49	0.11	0.51

Intersection Summary

Cycle Length: 90.5

Actuated Cycle Length: 58.7

Natural Cycle: 70

Control Type: Semi Act-Uncoord



















Splits and Phases: 3: Paris St & John St





















700 Paris St  
3: Paris St & John St

HCM Signalized Intersection Capacity Analysis  
Total (2027) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	0	6	40	2	63	4	1275	34	46	1576	9
Future Volume (vph)	8	0	6	40	2	63	4	1275	34	46	1576	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1726			1696		1803	3492		1770	3536	
Flt Permitted		0.84			0.87		0.13	1.00		0.12	1.00	
Satd. Flow (perm)		1497			1501		248	3492		227	3536	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	8	0	6	42	2	66	4	1328	35	48	1642	9
RTOR Reduction (vph)	0	12	0	0	58	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	2	0	0	52	0	4	1361	0	48	1651	0
Confl. Peds. (#/hr)	5		5	5		5	8		4	4		8
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.1			7.1		35.7	35.7		43.0	43.0	
Effective Green, g (s)		7.1			7.1		35.7	35.7		43.0	43.0	
Actuated g/C Ratio		0.12			0.12		0.58	0.58		0.70	0.70	
Clearance Time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		172			173		143	2023		241	2468	
v/s Ratio Prot								0.39		0.01	c0.47	
v/s Ratio Perm		0.00			c0.03		0.02			0.13		
v/c Ratio		0.01			0.30		0.03	0.67		0.20	0.67	
Uniform Delay, d1		24.1			25.0		5.5	8.9		5.1	5.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			1.0		0.1	0.9		0.4	0.7	
Delay (s)		24.2			25.9		5.6	9.8		5.5	6.0	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		24.2			25.9			9.8			6.0	
Approach LOS		C			C			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		8.4					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		61.6					Sum of lost time (s)		15.5			
Intersection Capacity Utilization		63.1%					ICU Level of Service		B			
Analysis Period (min)		15										
c Critical Lane Group												












700 Paris St  
4: Paris St & McNaughton St










HCM Unsignalized Intersection Capacity Analysis  
Total (2027) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	9	2	0	2	1	1440	0	0	1650	7
Future Volume (Veh/h)	3	0	9	2	0	2	1	1440	0	0	1650	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	0	10	2	0	2	1	1600	0	0	1833	8
Pedestrians		2			1							
Lane Width (m)		3.6			3.6							
Walking Speed (m/s)		1.2			1.2							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)								347			199	
pX, platoon unblocked	0.79	0.79	0.68	0.79	0.79	0.78	0.68			0.78		
vC, conflicting volume	2643	3442	922	2530	3446	801	1843			1601		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1295	2302	0	1152	2307	176	1305			1203		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	97	100	99	98	100	100	100			100		
cM capacity (veh/h)	96	31	744	121	31	549	366			457		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	13	4	801	800	916	924						
Volume Left	3	2	1	0	0	0						
Volume Right	10	2	0	0	0	8						
cSH	290	198	366	1700	457	1700						
Volume to Capacity	0.04	0.02	0.00	0.47	0.00	0.54						
Queue Length 95th (m)	1.1	0.5	0.1	0.0	0.0	0.0						
Control Delay (s)	18.0	23.5	0.1	0.0	0.0	0.0						
Lane LOS	C	C	A									
Approach Delay (s)	18.0	23.5	0.0		0.0							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			55.8%				ICU Level of Service			B		
Analysis Period (min)			15									

700 Paris St  
5: Paris St & Facer St
















HCM Unsignalized Intersection Capacity Analysis  
Total (2027) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	2	20	1408	1	16	1646
Future Volume (Veh/h)	2	20	1408	1	16	1646
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	22	1564	1	18	1829
Pedestrians						1
Lane Width (m)						3.6
Walking Speed (m/s)						1.2
Percent Blockage						0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			226			321
pX, platoon unblocked	0.79	0.76			0.76	
vC, conflicting volume	2515	784			1565	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1038	99			1122	
tC, single (s)	6.8	6.9			6.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			3.2	
p0 queue free %	99	97			91	
cM capacity (veh/h)	165	720			203	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	24	1043	522	628	1219	
Volume Left	2	0	0	18	0	
Volume Right	22	0	1	0	0	
cSH	563	1700	1700	203	1700	
Volume to Capacity	0.04	0.61	0.31	0.09	0.72	
Queue Length 95th (m)	1.1	0.0	0.0	2.3	0.0	
Control Delay (s)	11.7	0.0	0.0	4.0	0.0	
Lane LOS	B			A		
Approach Delay (s)	11.7	0.0		1.4		
Approach LOS	B					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			67.1%		ICU Level of Service	C
Analysis Period (min)			15			

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1	16	1	1	20	0
Future Volume (Veh/h)	1	16	1	1	20	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.50	0.50
Hourly flow rate (vph)	2	32	2	2	40	0
Pedestrians	1			2	2	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			36		27	22
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			36		27	22
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	100
cM capacity (veh/h)			1585		990	1057
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	34	4	40			
Volume Left	0	2	40			
Volume Right	32	0	0			
cSH	1700	1585	990			
Volume to Capacity	0.02	0.00	0.04			
Queue Length 95th (m)	0.0	0.0	1.0			
Control Delay (s)	0.0	3.6	8.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.6	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			4.7			
Intersection Capacity Utilization			14.6%	ICU Level of Service		A
Analysis Period (min)			15			

700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

Queues  
Total (2027) AM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	26	0	60	0	5	1313	32	1624
Future Volume (vph)	26	0	60	0	5	1313	32	1624
Lane Group Flow (vph)	0	40	63	51	5	1416	34	1722
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	30.0	30.0	30.0	30.0
Minimum Split (s)	26.0	26.0	26.0	26.0	35.9	35.9	35.9	35.9
Total Split (s)	26.0	26.0	26.0	26.0	55.9	55.9	55.9	55.9
Total Split (%)	31.7%	31.7%	31.7%	31.7%	68.3%	68.3%	68.3%	68.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.7	3.7	3.7	3.7
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	5.9	5.9	5.9	5.9
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.16	0.29	0.17	0.04	0.57	0.16	0.69
Control Delay		11.5	28.0	10.0	4.8	6.8	6.7	8.5
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		11.5	28.0	10.0	4.8	6.8	6.7	8.5
Queue Length 50th (m)		0.1	5.9	0.0	0.2	39.3	1.2	56.2
Queue Length 95th (m)		8.2	19.2	8.8	1.3	66.6	5.3	95.8
Internal Link Dist (m)		198.2		192.5		314.0		201.8
Turn Bay Length (m)					40.0		100.0	
Base Capacity (vph)		510	484	597	164	3047	253	3055
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.08	0.13	0.09	0.03	0.46	0.13	0.56

Intersection Summary

Cycle Length: 81.9

Actuated Cycle Length: 58.6

Natural Cycle: 70

Control Type: Semi Act-Uncoord




















Splits and Phases: 7: Paris St & Boland Ave/Paris Driveway

 Ø2	 Ø4
55.9 s	26 s
 Ø6	 Ø8
55.9 s	26 s















700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

HCM Signalized Intersection Capacity Analysis  
Total (2027) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	0	12	60	0	48	5	1313	32	32	1624	12
Future Volume (vph)	26	0	12	60	0	48	5	1313	32	32	1624	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.96		1.00	0.85		1.00	1.00		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1757		1805	1615		1805	3495		1805	3502	
Flt Permitted		0.77		0.73	1.00		0.10	1.00		0.15	1.00	
Satd. Flow (perm)		1392		1389	1615		188	3495		290	3502	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	27	0	13	63	0	51	5	1382	34	34	1709	13
RTOR Reduction (vph)	0	34	0	0	45	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	6	0	63	6	0	5	1414	0	34	1721	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.4		7.4	7.4		40.4	40.4		40.4	40.4	
Effective Green, g (s)		7.4		7.4	7.4		40.4	40.4		40.4	40.4	
Actuated g/C Ratio		0.12		0.12	0.12		0.68	0.68		0.68	0.68	
Clearance Time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		172		172	200		127	2365		196	2369	
v/s Ratio Prot					0.00			0.40			c0.49	
v/s Ratio Perm		0.00		c0.05			0.03			0.12		
v/c Ratio		0.03		0.37	0.03		0.04	0.60		0.17	0.73	
Uniform Delay, d1		23.0		24.0	23.0		3.2	5.2		3.5	6.1	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		1.3	0.1		0.1	0.4		0.4	1.1	
Delay (s)		23.1		25.3	23.1		3.3	5.7		4.0	7.3	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		23.1			24.3			5.6			7.2	
Approach LOS		C			C			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		7.3					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		59.7					Sum of lost time (s)		11.9			
Intersection Capacity Utilization		64.0%					ICU Level of Service		C			
Analysis Period (min)		15										
c Critical Lane Group												

700 Paris St  
8: Paris St & York St

Queues  
Total (2027) AM Peak Hour

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	179	142	65	1171	1484	213
Future Volume (vph)	179	142	65	1171	1484	213
Lane Group Flow (vph)	199	158	72	1301	1649	237
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	30.0	30.0	30.0
Minimum Split (s)	25.5	25.5	9.0	36.2	36.2	36.2
Total Split (s)	25.5	25.5	9.0	79.0	70.0	70.0
Total Split (%)	24.4%	24.4%	8.6%	75.6%	67.0%	67.0%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	2.2	2.2	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
v/c Ratio	0.63	0.45	0.35	0.56	0.80	0.24
Control Delay	44.2	18.4	8.7	8.1	17.2	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.2	18.4	8.7	8.1	17.2	1.8
Queue Length 50th (m)	31.3	7.8	3.1	50.1	106.9	0.0
Queue Length 95th (m)	63.5	29.1	7.9	78.0	155.2	9.2
Internal Link Dist (m)	376.5			775.4	314.0	
Turn Bay Length (m)	21.0		123.0			72.0
Base Capacity (vph)	464	473	206	2995	2769	1243
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.33	0.35	0.43	0.60	0.19

Intersection Summary

Cycle Length: 104.5













Actuated Cycle Length: 81.5

Natural Cycle: 80

Control Type: Semi Act-Uncoord













Splits and Phases: 8: Paris St & York St



						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	179	142	65	1171	1484	213
Future Volume (vph)	179	142	65	1171	1484	213
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1515	1770	3471	3539	1530
Flt Permitted	0.95	1.00	0.08	1.00	1.00	1.00
Satd. Flow (perm)	1770	1515	144	3471	3539	1530
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	199	158	72	1301	1649	237
RTOR Reduction (vph)	0	86	0	0	0	98
Lane Group Flow (vph)	199	72	72	1301	1649	139
Confl. Peds. (#/hr)	1	15	8			8
Heavy Vehicles (%)	2%	4%	2%	4%	2%	2%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	14.5	14.5	55.5	55.5	47.8	47.8
Effective Green, g (s)	14.5	14.5	55.5	55.5	47.8	47.8
Actuated g/C Ratio	0.18	0.18	0.68	0.68	0.59	0.59
Clearance Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	314	268	171	2357	2070	895
v/s Ratio Prot	c0.11		0.02	c0.37	c0.47	
v/s Ratio Perm		0.05	0.27			0.09
v/c Ratio	0.63	0.27	0.42	0.55	0.80	0.15
Uniform Delay, d1	31.1	29.0	11.1	6.7	13.2	7.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.1	0.5	1.7	0.3	2.2	0.1
Delay (s)	35.3	29.6	12.8	7.0	15.4	7.8
Level of Service	D	C	B	A	B	A
Approach Delay (s)	32.8			7.3	14.4	
Approach LOS	C			A	B	
Intersection Summary						
HCM 2000 Control Delay			13.5	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.76			
Actuated Cycle Length (s)			81.7	Sum of lost time (s)		15.7
Intersection Capacity Utilization			73.8%	ICU Level of Service		D
Analysis Period (min)			15			
c Critical Lane Group						

700 Paris St  
9: Ramsey Lake Rd & Paris St

Queues  
Total (2027) AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	180	232	1009	368	680	954
Future Volume (vph)	180	232	1009	368	680	954
Lane Group Flow (vph)	188	242	1051	383	708	994
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	30.8		56.2	56.2	33.0	89.2
Total Split (%)	25.7%		46.8%	46.8%	27.5%	74.3%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.37	0.32	0.77	0.53	0.77	0.40
Control Delay	39.4	15.3	28.8	13.0	39.2	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.4	15.3	28.8	13.0	39.2	5.9
Queue Length 50th (m)	16.6	22.4	88.4	23.7	60.8	31.0
Queue Length 95th (m)	31.3	49.4	131.6	57.6	#113.6	56.1
Internal Link Dist (m)	679.1		533.6			775.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	980	832	2003	965	1109	3069
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.29	0.52	0.40	0.64	0.32

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 91.2

Natural Cycle: 90

Control Type: Semi Act-Uncoord

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


Queue shown is maximum after two cycles.

Splits and Phases: 9: Ramsey Lake Rd & Paris St



700 Paris St  
9: Ramsey Lake Rd & Paris St





















HCM Signalized Intersection Capacity Analysis  
Total (2027) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕	↔	↔↔	↕↕
Traffic Volume (vph)	180	232	1009	368	680	954
Future Volume (vph)	180	232	1009	368	680	954
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1568	3505	1545	3467	3471
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1568	3505	1545	3467	3471
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	188	242	1051	383	708	994
RTOR Reduction (vph)	0	17	0	121	0	0
Lane Group Flow (vph)	188	225	1051	262	708	994
Confl. Peds. (#/hr)		13		14	14	
Heavy Vehicles (%)	2%	3%	3%	2%	1%	4%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	13.5	43.6	35.9	35.9	24.3	65.2
Effective Green, g (s)	13.5	43.6	35.9	35.9	24.3	65.2
Actuated g/C Ratio	0.15	0.48	0.40	0.40	0.27	0.72
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	510	753	1387	611	928	2495
v/s Ratio Prot	0.05	c0.14	c0.30		c0.20	0.29
v/s Ratio Perm				0.17		
v/c Ratio	0.37	0.30	0.76	0.43	0.76	0.40
Uniform Delay, d1	34.8	14.3	23.6	19.9	30.5	5.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2	2.4	0.5	3.8	0.1
Delay (s)	35.2	14.5	26.1	20.4	34.3	5.1
Level of Service	D	B	C	C	C	A
Approach Delay (s)	23.6		24.6			17.3
Approach LOS	C		C			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			21.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.69			
Actuated Cycle Length (s)			90.7		Sum of lost time (s)	17.0
Intersection Capacity Utilization			75.7%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						



700 Paris St  
1: Paris St & Brady St

Queues  
Total (2027) PM Peak Hour

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	181	575	608	478	108	1080	778	26	852	253
Future Volume (vph)	181	575	608	478	108	1080	778	26	852	253
Lane Group Flow (vph)	181	649	608	492	108	1080	778	26	852	253
Turn Type	pm+pt	NA	Prot	NA	pm+pt	NA	pt+ov	Perm	NA	pm+ov
Protected Phases	7	4	3	8	5	2	2 3		6	7
Permitted Phases	4				2			6		6
Detector Phase	7	4	3	8	5	2	2 3	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0		15.0	15.0	5.0
Minimum Split (s)	10.0	31.2	10.0	31.2	10.0	40.1		40.1	40.1	10.0
Total Split (s)	35.1	40.3	34.0	39.2	22.0	63.0		41.0	41.0	35.1
Total Split (%)	25.6%	29.4%	24.8%	28.6%	16.0%	45.9%		29.9%	29.9%	25.6%
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7		3.7	3.7	3.0
All-Red Time (s)	2.0	2.5	2.0	2.5	2.0	2.4		2.4	2.4	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	6.2	5.0	6.2	5.0	6.1		6.1	6.1	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min		Min	Min	None
v/c Ratio	0.48	0.79	0.79	0.42	0.43	0.54	0.72	0.22	0.65	0.39
Control Delay	23.4	50.6	53.0	32.7	28.9	28.8	17.1	42.2	41.8	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0
Total Delay	23.4	50.6	53.0	32.7	28.9	28.8	20.2	42.2	41.8	18.0
Queue Length 50th (m)	24.8	82.2	75.2	49.7	17.3	76.6	107.6	5.2	70.1	29.5
Queue Length 95th (m)	43.9	111.9	#109.5	75.5	31.9	97.3	177.4	14.9	93.5	52.1
Internal Link Dist (m)		364.5		324.4		160.9			177.4	
Turn Bay Length (m)	57.0		85.0		70.0		6.0	24.0		6.0
Base Capacity (vph)	599	1076	894	1227	340	2573	1134	151	1635	878
Starvation Cap Reductn	0	0	0	0	0	0	249	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.60	0.68	0.40	0.32	0.42	0.88	0.17	0.52	0.29

Intersection Summary

Cycle Length: 137.3

Actuated Cycle Length: 116.8










Natural Cycle: 95

Control Type: Semi Act-Uncoord

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






















Queue shown is maximum after two cycles.

Splits and Phases: 1: Paris St & Brady St

		
63 s	34 s	40.3 s
		
22 s	41 s	35.1 s
		
		39.2 s



















700 Paris St  
1: Paris St & Brady St

HCM Signalized Intersection Capacity Analysis  
Total (2027) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	575	74	608	478	14	108	1080	778	26	852	253
Future Volume (vph)	181	575	74	608	478	14	108	1080	778	26	852	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.2		5.0	6.2		5.0	6.1	6.1	6.1	6.1	5.0
Lane Util. Factor	1.00	0.95		0.97	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1580	3525		3467	3491		1751	5085	1615	1774	5085	1574
Flt Permitted	0.47	1.00		0.95	1.00		0.17	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	786	3525		3467	3491		306	5085	1615	471	5085	1574
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	181	575	74	608	478	14	108	1080	778	26	852	253
RTOR Reduction (vph)	0	8	0	0	1	0	0	0	15	0	0	45
Lane Group Flow (vph)	181	641	0	608	491	0	108	1080	763	26	852	208
Confl. Peds. (#/hr)	9		6	6		9	25		33	33		25
Heavy Vehicles (%)	14%	0%	4%	1%	3%	0%	3%	2%	0%	1%	2%	0%
Turn Type	pm+pt	NA		Prot	NA		pm+pt	NA	pt+ov	Perm	NA	pm+ov
Protected Phases	7	4		3	8		5	2	2 3		6	7
Permitted Phases	4						2			6		6
Actuated Green, G (s)	41.0	27.1		26.1	39.3		45.7	45.7	77.9	30.2	30.2	44.1
Effective Green, g (s)	41.0	27.1		26.1	39.3		45.7	45.7	77.9	30.2	30.2	44.1
Actuated g/C Ratio	0.35	0.23		0.22	0.34		0.39	0.39	0.67	0.26	0.26	0.38
Clearance Time (s)	5.0	6.2		5.0	6.2		5.0	6.1		6.1	6.1	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	372	822		778	1180		250	1999	1082	122	1321	597
v/s Ratio Prot	0.06	c0.18		c0.18	0.14		0.04	0.21	c0.47		0.17	0.04
v/s Ratio Perm	0.11						0.13			0.06		0.09
v/c Ratio	0.49	0.78		0.78	0.42		0.43	0.54	0.71	0.21	0.64	0.35
Uniform Delay, d1	27.5	41.8		42.4	29.6		24.3	27.2	12.0	33.7	38.2	25.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	4.8		5.1	0.2		1.2	0.3	2.1	0.9	1.1	0.4
Delay (s)	28.5	46.6		47.5	29.8		25.5	27.5	14.1	34.6	39.3	26.1
Level of Service	C	D		D	C		C	C	B	C	D	C
Approach Delay (s)		42.6			39.6			22.1			36.3	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			32.5	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			116.2	Sum of lost time (s)				22.3				
Intersection Capacity Utilization			99.5%	ICU Level of Service				F				
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
2: Paris St & Van Horne St

Queues  
Total (2027) PM Peak Hour

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	48	70	219	68	154	164	1702	121	1368
Future Volume (vph)	48	70	219	68	154	164	1702	121	1368
Lane Group Flow (vph)	49	297	223	69	157	167	2103	123	1441
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Minimum Split (s)	31.7	31.7	31.7	31.7	31.7	9.0	41.1	9.0	41.1
Total Split (s)	45.0	45.0	45.0	45.0	45.0	12.0	55.0	9.0	52.0
Total Split (%)	41.3%	41.3%	41.3%	41.3%	41.3%	11.0%	50.5%	8.3%	47.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.14	0.32	0.84	0.13	0.32	0.66	0.79	0.69	0.56
Control Delay	25.6	16.3	58.5	25.1	10.7	25.8	21.5	36.2	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	16.3	58.5	25.1	10.7	25.8	21.5	36.2	18.6
Queue Length 50th (m)	7.1	14.0	40.2	10.0	6.9	11.8	108.8	8.2	66.3
Queue Length 95th (m)	15.8	24.2	68.6	19.9	21.4	#47.7	176.7	#43.3	107.4
Internal Link Dist (m)		187.2		465.5			478.0		160.9
Turn Bay Length (m)	21.0		133.0		62.0	34.0		48.0	
Base Capacity (vph)	543	1410	419	817	715	252	2673	177	2552
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.21	0.53	0.08	0.22	0.66	0.79	0.69	0.56

Intersection Summary

Cycle Length: 109

Actuated Cycle Length: 95







Natural Cycle: 85

Control Type: Semi Act-Uncoord

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























Queue shown is maximum after two cycles.

Splits and Phases: 2: Paris St & Van Horne St

		
9 s	55 s	45 s
		
12 s	52 s	45 s















700 Paris St  
2: Paris St & Van Horne St

HCM Signalized Intersection Capacity Analysis  
Total (2027) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	70	221	219	68	154	164	1702	359	121	1368	44
Future Volume (vph)	48	70	221	219	68	154	164	1702	359	121	1368	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1689	3125		1767	1900	1521	1770	4938		1805	5056	
Flt Permitted	0.71	1.00		0.52	1.00	1.00	0.11	1.00		0.08	1.00	
Satd. Flow (perm)	1266	3125		977	1900	1521	207	4938		159	5056	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	49	71	226	223	69	157	167	1737	366	123	1396	45
RTOR Reduction (vph)	0	84	0	0	0	79	0	26	0	0	2	0
Lane Group Flow (vph)	49	213	0	223	69	78	167	2077	0	123	1439	0
Confl. Peds. (#/hr)	13		3	3		13	3		17	17		3
Heavy Vehicles (%)	6%	2%	1%	2%	0%	4%	2%	2%	1%	0%	2%	3%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	25.9	25.9		25.9	25.9	25.9	58.6	51.0		52.9	47.9	
Effective Green, g (s)	25.9	25.9		25.9	25.9	25.9	58.6	51.0		52.9	47.9	
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.27	0.62	0.54		0.56	0.50	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	345	852		266	518	415	252	2653		175	2551	
v/s Ratio Prot		0.07			0.04		c0.05	c0.42		0.04	0.28	
v/s Ratio Perm	0.04			c0.23		0.05	0.35			0.35		
v/c Ratio	0.14	0.25		0.84	0.13	0.19	0.66	0.78		0.70	0.56	
Uniform Delay, d1	26.1	26.9		32.5	26.0	26.4	11.3	17.5		15.3	16.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		20.0	0.1	0.2	6.4	2.4		12.1	0.9	
Delay (s)	26.3	27.1		52.6	26.1	26.7	17.7	19.9		27.3	17.2	
Level of Service	C	C		D	C	C	B	B		C	B	
Approach Delay (s)		27.0			39.4			19.8			18.0	
Approach LOS		C			D			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			21.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			94.9				Sum of lost time (s)			13.5		
Intersection Capacity Utilization			86.4%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
3: Paris St & John St

Queues  
Total (2027) PM Peak Hour

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	3	63	0	8	2084	80	1717
Future Volume (vph)	10	3	63	0	8	2084	80	1717
Lane Group Flow (vph)	0	15	0	174	8	2193	82	1775
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	20.0	20.0	5.0	20.0
Minimum Split (s)	25.7	25.7	25.7	25.7	34.8	34.8	9.0	34.8
Total Split (s)	25.7	25.7	25.7	25.7	85.3	85.3	9.0	94.3
Total Split (%)	21.4%	21.4%	21.4%	21.4%	71.1%	71.1%	7.5%	78.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.1	2.1	1.0	2.1
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.7		5.7	5.8	5.8	4.0	5.8
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.08		0.69	0.06	0.91	0.51	0.67
Control Delay		39.8		45.1	8.1	22.3	22.4	8.4
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		39.8		45.1	8.1	22.3	22.4	8.4
Queue Length 50th (m)		2.8		25.7	0.6	196.4	3.5	83.3
Queue Length 95th (m)		9.3		50.7	2.7	#291.7	#20.8	128.0
Internal Link Dist (m)		561.8		431.0		175.2		478.0
Turn Bay Length (m)					33.0		23.0	
Base Capacity (vph)		296		347	150	2700	160	2935
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.05		0.50	0.05	0.81	0.51	0.60

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 102.8

Natural Cycle: 100

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.



















Splits and Phases: 3: Paris St & John St

 Ø1	 Ø2		 Ø4
9 s	85.3 s		25.7 s
 Ø6			 Ø8
94.3 s			25.7 s



















700 Paris St  
3: Paris St & John St

HCM Signalized Intersection Capacity Analysis  
Total (2027) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	3	2	63	0	106	8	2084	44	80	1717	5
Future Volume (vph)	10	3	2	63	0	106	8	2084	44	80	1717	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1799			1627		1801	3528		1736	3537	
Flt Permitted		0.76			0.87		0.10	1.00		0.05	1.00	
Satd. Flow (perm)		1422			1444		198	3528		99	3537	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	3	2	65	0	109	8	2148	45	82	1770	5
RTOR Reduction (vph)	0	2	0	0	53	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	13	0	0	121	0	8	2192	0	82	1775	0
Confl. Peds. (#/hr)	3		4	4		3	14		2	2		14
Heavy Vehicles (%)	0%	0%	0%	0%	0%	6%	0%	2%	0%	4%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.2			14.2		69.8	69.8		77.5	77.5	
Effective Green, g (s)		14.2			14.2		69.8	69.8		77.5	77.5	
Actuated g/C Ratio		0.14			0.14		0.68	0.68		0.75	0.75	
Clearance Time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		195			198		133	2386		133	2656	
v/s Ratio Prot							c0.62			0.02	c0.50	
v/s Ratio Perm		0.01			c0.08		0.04			0.44		
v/c Ratio		0.07			0.61		0.06	0.92		0.62	0.67	
Uniform Delay, d1		38.7			41.9		5.6	14.3		23.1	6.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			5.2		0.2	6.2		8.2	0.6	
Delay (s)		38.9			47.1		5.8	20.5		31.4	7.1	
Level of Service		D			D		A	C		C	A	
Approach Delay (s)		38.9			47.1			20.4			8.1	
Approach LOS		D			D			C			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		16.2					HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		103.2					Sum of lost time (s)		15.5			
Intersection Capacity Utilization		87.8%					ICU Level of Service		E			
Analysis Period (min)		15										
c Critical Lane Group												










700 Paris St  
4: Paris St & McNaughton St

HCM Unsignalized Intersection Capacity Analysis  
Total (2027) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	7	3	0	2	1	2109	1	1	1854	13
Future Volume (Veh/h)	9	0	7	3	0	2	1	2109	1	1	1854	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	9	0	7	3	0	2	1	2197	1	1	1931	14
Pedestrians		3			2							
Lane Width (m)		3.6			3.6							
Walking Speed (m/s)		1.2			1.2							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)								347			199	
pX, platoon unblocked	0.39	0.39	0.70	0.39	0.39	0.24	0.70			0.24		
vC, conflicting volume	3046	4145	976	3176	4152	1101	1948			2200		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	2488	112	17	2505	0	1499			0		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	99	100	99	100			100		
cM capacity (veh/h)	396	12	648	384	11	264	317			396		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	16	5	1100	1100	966	980						
Volume Left	9	3	1	0	1	0						
Volume Right	7	2	0	1	0	14						
cSH	477	325	317	1700	396	1700						
Volume to Capacity	0.03	0.02	0.00	0.65	0.00	0.58						
Queue Length 95th (m)	0.8	0.4	0.1	0.0	0.1	0.0						
Control Delay (s)	12.8	16.2	0.2	0.0	0.1	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	12.8	16.2	0.1		0.0							
Approach LOS	B	C										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			69.0%		ICU Level of Service					C		
Analysis Period (min)			15									

700 Paris St  
5: Paris St & Facer St

HCM Unsignalized Intersection Capacity Analysis  
Total (2027) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	16	2086	6	21	1838
Future Volume (Veh/h)	1	16	2086	6	21	1838
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	17	2196	6	22	1935
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			225			321
pX, platoon unblocked	0.38	0.22			0.22	
vC, conflicting volume	3212	1102			2203	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	93			94	
cM capacity (veh/h)	369	243			364	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	18	1464	738	667	1290	
Volume Left	1	0	0	22	0	
Volume Right	17	0	6	0	0	
cSH	248	1700	1700	364	1700	
Volume to Capacity	0.07	0.86	0.43	0.06	0.76	
Queue Length 95th (m)	1.9	0.0	0.0	1.5	0.0	
Control Delay (s)	20.7	0.0	0.0	2.0	0.0	
Lane LOS	C			A		
Approach Delay (s)	20.7	0.0		0.7		
Approach LOS	C					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			75.6%	ICU Level of Service		D
Analysis Period (min)			15			

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↱	↲
Traffic Volume (veh/h)	7	21	0	2	15	0
Future Volume (Veh/h)	7	21	0	2	15	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	10	31	0	3	22	0
Pedestrians	1			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			41		30	28
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			41		30	28
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1581		989	1052
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	41	3	22			
Volume Left	0	0	22			
Volume Right	31	0	0			
cSH	1700	1581	989			
Volume to Capacity	0.02	0.00	0.02			
Queue Length 95th (m)	0.0	0.0	0.5			
Control Delay (s)	0.0	0.0	8.7			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.7			
Approach LOS			A			
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			14.0%	ICU Level of Service		A
Analysis Period (min)			15			

700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

Queues  
Total (2027) PM Peak Hour

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group								
Lane Configurations		↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	25	1	44	3	23	2020	54	1728
Future Volume (vph)	25	1	44	3	23	2020	54	1728
Lane Group Flow (vph)	0	44	48	56	25	2268	59	1910
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	30.0	30.0	30.0	30.0
Minimum Split (s)	26.0	26.0	26.0	26.0	35.9	35.9	35.9	35.9
Total Split (s)	26.0	26.0	26.0	26.0	94.0	94.0	94.0	94.0
Total Split (%)	21.7%	21.7%	21.7%	21.7%	78.3%	78.3%	78.3%	78.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.7	3.7	3.7	3.7
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	5.9	5.9	5.9	5.9
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.33	0.38	0.34	0.18	0.77	0.76	0.65
Control Delay		39.8	55.8	40.2	6.1	8.0	68.1	5.6
Queue Delay		0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay		39.8	55.8	40.2	6.1	8.1	68.1	5.6
Queue Length 50th (m)		6.0	10.4	8.1	1.0	111.6	5.4	73.0
Queue Length 95th (m)		17.6	22.7	21.1	4.4	177.3	#22.2	113.5
Internal Link Dist (m)		192.5		282.1		313.9		201.2
Turn Bay Length (m)					40.0		100.0	
Base Capacity (vph)		262	263	320	141	2955	77	2961
Starvation Cap Reductn		0	0	0	0	86	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.17	0.18	0.17	0.18	0.79	0.77	0.65

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 105.9

Natural Cycle: 90

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.




















Splits and Phases: 7: Paris St & Boland Ave/Paris Driveway













94 s	26 s
94 s	26 s



700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

HCM Signalized Intersection Capacity Analysis  
Total (2027) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	1	15	44	3	49	23	2020	66	54	1728	29
Future Volume (vph)	25	1	15	44	3	49	23	2020	66	54	1728	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.95		1.00	0.86		1.00	1.00		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1628		1805	1608		1804	3522		1805	3530	
Flt Permitted		0.78		0.73	1.00		0.09	1.00		0.05	1.00	
Satd. Flow (perm)		1308		1384	1608		169	3522		93	3530	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	1	16	48	3	53	25	2196	72	59	1878	32
RTOR Reduction (vph)	0	15	0	0	17	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	29	0	48	39	0	25	2267	0	59	1909	0
Confl. Peds. (#/hr)	2					2	4		2	2		4
Heavy Vehicles (%)	4%	0%	14%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.9		7.9	7.9		87.4	87.4		87.4	87.4	
Effective Green, g (s)		7.9		7.9	7.9		87.4	87.4		87.4	87.4	
Actuated g/C Ratio		0.07		0.07	0.07		0.82	0.82		0.82	0.82	
Clearance Time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		96		101	118		137	2871		75	2878	
v/s Ratio Prot					0.02			c0.64			0.54	
v/s Ratio Perm		0.02		c0.03			0.15			0.64		
v/c Ratio		0.30		0.48	0.33		0.18	0.79		0.79	0.66	
Uniform Delay, d1		47.0		47.7	47.1		2.1	5.1		5.1	4.0	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.8		3.5	1.7		0.6	1.5		40.6	0.6	
Delay (s)		48.8		51.2	48.8		2.8	6.6		45.7	4.6	
Level of Service		D		D	D		A	A		D	A	
Approach Delay (s)		48.8			49.9			6.6			5.8	
Approach LOS		D			D			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		7.7					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.76										
Actuated Cycle Length (s)		107.2					Sum of lost time (s)		11.9			
Intersection Capacity Utilization		76.9%					ICU Level of Service		D			
Analysis Period (min)		15										
c Critical Lane Group												

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	220	112	152	1889	1576	212
Future Volume (vph)	220	112	152	1889	1576	212
Lane Group Flow (vph)	232	118	160	1988	1659	223
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	30.0	30.0	30.0
Minimum Split (s)	25.5	25.5	9.0	36.2	36.2	36.2
Total Split (s)	25.5	25.5	12.0	94.5	82.5	82.5
Total Split (%)	21.3%	21.3%	10.0%	78.8%	68.8%	68.8%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	2.2	2.2	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
v/c Ratio	0.74	0.32	0.68	0.81	0.83	0.23
Control Delay	54.4	10.2	33.3	13.2	20.8	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.4	10.2	33.3	13.2	20.8	2.2
Queue Length 50th (m)	42.6	0.0	13.1	127.5	131.4	1.1
Queue Length 95th (m)	#92.8	16.5	#50.6	165.3	166.3	10.2
Internal Link Dist (m)	376.5			774.4	313.9	
Turn Bay Length (m)	21.0		123.0			72.0
Base Capacity (vph)	389	430	236	3184	2875	1286
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.27	0.68	0.62	0.58	0.17

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 94.9

Natural Cycle: 80













Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.












Splits and Phases: 8: Paris St & York St



						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	220	112	152	1889	1576	212
Future Volume (vph)	220	112	152	1889	1576	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.97	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1557	1770	3539	3539	1539
Flt Permitted	0.95	1.00	0.07	1.00	1.00	1.00
Satd. Flow (perm)	1787	1557	129	3539	3539	1539
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	118	160	1988	1659	223
RTOR Reduction (vph)	0	97	0	0	0	90
Lane Group Flow (vph)	232	21	160	1988	1659	133
Confl. Peds. (#/hr)	6	15	4			4
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	16.8	16.8	66.0	66.0	53.8	53.8
Effective Green, g (s)	16.8	16.8	66.0	66.0	53.8	53.8
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.57	0.57
Clearance Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	317	276	232	2471	2014	876
v/s Ratio Prot	c0.13		0.06	c0.56	0.47	
v/s Ratio Perm		0.01	0.42			0.09
v/c Ratio	0.73	0.08	0.69	0.80	0.82	0.15
Uniform Delay, d1	36.7	32.4	20.9	9.8	16.5	9.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.4	0.1	8.3	2.0	2.9	0.1
Delay (s)	45.2	32.5	29.1	11.8	19.4	9.7
Level of Service	D	C	C	B	B	A
Approach Delay (s)	40.9			13.1	18.2	
Approach LOS	D			B	B	
Intersection Summary						
HCM 2000 Control Delay			17.5	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.83			
Actuated Cycle Length (s)			94.5	Sum of lost time (s)		15.7
Intersection Capacity Utilization			82.0%	ICU Level of Service		D
Analysis Period (min)			15			
c Critical Lane Group						

700 Paris St  
9: Ramsey Lake Rd & Paris St

Queues  
Total (2027) PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	532	698	1375	263	365	1290
Future Volume (vph)	532	698	1375	263	365	1290
Lane Group Flow (vph)	591	776	1528	292	406	1433
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	36.0		62.0	62.0	22.0	84.0
Total Split (%)	30.0%		51.7%	51.7%	18.3%	70.0%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.67	1.10	0.94	0.37	0.83	0.63
Control Delay	44.4	97.9	43.3	13.6	64.6	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	97.9	43.3	13.6	64.6	14.1
Queue Length 50th (m)	68.4	~219.8	183.1	26.2	51.1	102.0
Queue Length 95th (m)	88.6	#297.5	#235.9	47.5	#75.9	123.3
Internal Link Dist (m)	679.1		533.6			774.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	883	704	1666	808	492	2323
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	1.10	0.92	0.36	0.83	0.62

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 118.6

Natural Cycle: 110

Control Type: Semi Act-Uncoord

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 9: Ramsey Lake Rd & Paris St


















JD Engineering

Synchro 11 Report  
02-07-2023

700 Paris St  
9: Ramsey Lake Rd & Paris St

HCM Signalized Intersection Capacity Analysis  
Total (2027) PM Peak Hour




























						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		 		 	 
Traffic Volume (vph)	532	698	1375	263	365	1290
Future Volume (vph)	532	698	1375	263	365	1290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	1583	3539	1587	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	1583	3539	1587	3433	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	591	776	1528	292	406	1433
RTOR Reduction (vph)	0	7	0	62	0	0
Lane Group Flow (vph)	591	769	1528	230	406	1433
Confl. Peds. (#/hr)		16		5	5	
Heavy Vehicles (%)	1%	2%	2%	0%	2%	2%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	30.2	53.0	54.4	54.4	17.0	76.4
Effective Green, g (s)	30.2	53.0	54.4	54.4	17.0	76.4
Actuated g/C Ratio	0.25	0.45	0.46	0.46	0.14	0.64
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	882	707	1623	727	492	2279
v/s Ratio Prot	0.17	c0.49	c0.43		0.12	0.40
v/s Ratio Perm				0.14		
v/c Ratio	0.67	1.09	0.94	0.32	0.83	0.63
Uniform Delay, d1	39.7	32.8	30.6	20.3	49.4	12.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	60.4	11.3	0.3	10.8	0.5
Delay (s)	41.7	93.2	41.9	20.6	60.2	13.2
Level of Service	D	F	D	C	E	B
Approach Delay (s)	70.9		38.5			23.5
Approach LOS	E		D			C
<b>Intersection Summary</b>						
HCM 2000 Control Delay			41.8		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.07			
Actuated Cycle Length (s)			118.6		Sum of lost time (s)	17.0
Intersection Capacity Utilization			92.8%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						



700 Paris St  
1: Paris St & Brady St

Queues

Total (2032) AM Peak Hour w/ Improvements

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 	 	 		  			 	
Traffic Volume (vph)	181	457	586	422	99	621	465	29	904	260
Future Volume (vph)	181	457	586	422	99	621	465	29	904	260
Lane Group Flow (vph)	197	559	637	470	108	675	505	32	983	283
Turn Type	Prot	NA	Prot	NA	pm+pt	NA	pt+ov	pm+pt	NA	pt+ov
Protected Phases	7	4	3	8	5	2	2 3	1	6	6 7
Permitted Phases					2			6		
Detector Phase	7	4	3	8	5	2	2 3	1	6	6 7
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0		5.0	15.0	
Minimum Split (s)	10.0	31.2	10.0	31.2	10.0	40.1		10.0	40.1	
Total Split (s)	26.1	31.2	34.0	39.1	20.0	44.0		17.0	41.0	
Total Split (%)	20.7%	24.7%	26.9%	31.0%	15.8%	34.9%		13.5%	32.5%	
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7		3.0	3.7	
All-Red Time (s)	2.0	2.5	2.0	2.5	2.0	2.4		2.0	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.2	5.0	6.2	5.0	6.1		5.0	6.1	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None	Min		None	Min	
v/c Ratio	0.55	0.82	0.81	0.42	0.45	0.39	0.47	0.11	0.76	0.39
Control Delay	55.2	54.2	51.1	32.0	27.3	30.0	7.9	21.6	42.9	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Total Delay	55.2	54.2	51.1	32.0	27.3	30.0	8.2	21.6	42.9	15.0
Queue Length 50th (m)	23.9	67.2	75.0	44.8	16.5	48.9	33.2	4.7	81.5	27.5
Queue Length 95th (m)	37.5	#99.3	104.3	68.8	28.6	62.3	61.0	11.0	101.8	49.3
Internal Link Dist (m)		364.5		324.4		160.9			177.4	
Turn Bay Length (m)	57.0		85.0		70.0		6.0	24.0		6.0
Base Capacity (vph)	631	774	892	1167	294	1804	1099	378	1560	832
Starvation Cap Reductn	0	0	0	0	0	0	210	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.72	0.71	0.40	0.37	0.37	0.57	0.08	0.63	0.34

Intersection Summary

Cycle Length: 126.2

Actuated Cycle Length: 111.6









Natural Cycle: 105

Control Type: Semi Act-Uncoord

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






























Queue shown is maximum after two cycles.

Splits and Phases: 1: Paris St & Brady St

 Ø1	 Ø2	 Ø3	 Ø4
17 s	44 s	34 s	31.2 s
 Ø5	 Ø6	 Ø7	 Ø8
20 s	41 s	26.1 s	39.1 s



















700 Paris St  
1: Paris St & Brady St

HCM Signalized Intersection Capacity Analysis  
Total (2032) AM Peak Hour w/ Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 			  		  		
Traffic Volume (vph)	181	457	57	586	422	10	99	621	465	29	904	260
Future Volume (vph)	181	457	57	586	422	10	99	621	465	29	904	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.2		5.0	6.2		5.0	6.1	6.1	5.0	6.1	6.1
Lane Util. Factor	0.97	0.95		0.97	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3273	3357		3367	3461		1671	4988	1568	1717	4893	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.13	1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)	3273	3357		3367	3461		233	4988	1568	693	4893	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	197	497	62	637	459	11	108	675	505	32	983	283
RTOR Reduction (vph)	0	8	0	0	1	0	0	0	89	0	0	64
Lane Group Flow (vph)	197	551	0	637	469	0	108	675	416	32	983	219
Confl. Peds. (#/hr)	7		4	4		7	19		10	10		19
Heavy Vehicles (%)	7%	5%	10%	4%	4%	0%	8%	4%	3%	5%	6%	2%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	pt+ov	pm+pt	NA	pt+ov
Protected Phases	7	4		3	8		5	2	2 3	1	6	6 7
Permitted Phases							2			6		
Actuated Green, G (s)	12.2	22.4		26.0	36.2		47.9	38.8	70.9	35.9	31.8	50.1
Effective Green, g (s)	12.2	22.4		26.0	36.2		47.9	38.8	70.9	35.9	31.8	50.1
Actuated g/C Ratio	0.11	0.20		0.23	0.32		0.42	0.34	0.62	0.32	0.28	0.44
Clearance Time (s)	5.0	6.2		5.0	6.2		5.0	6.1		5.0	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	351	661		770	1102		238	1703	978	255	1369	698
v/s Ratio Prot	0.06	c0.16		c0.19	0.14		c0.04	0.14	0.27	0.00	c0.20	0.14
v/s Ratio Perm							0.15			0.03		
v/c Ratio	0.56	0.83		0.83	0.43		0.45	0.40	0.43	0.13	0.72	0.31
Uniform Delay, d1	48.2	43.8		41.7	30.5		22.4	28.5	10.9	27.1	36.9	20.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	8.9		7.3	0.3		1.4	0.2	0.3	0.2	1.8	0.3
Delay (s)	50.2	52.7		49.0	30.8		23.8	28.6	11.2	27.3	38.7	20.9
Level of Service	D	D		D	C		C	C	B	C	D	C
Approach Delay (s)		52.0			41.2			21.4			34.5	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			35.4	HCM 2000 Level of Service				D				
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			113.6	Sum of lost time (s)				22.3				
Intersection Capacity Utilization			79.9%	ICU Level of Service				D				
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
2: Paris St & Van Horne St

Queues  
Total (2032) AM Peak Hour w/ Improvements

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	16	27	269	63	148	175	1077	82	1413
Future Volume (vph)	16	27	269	63	148	175	1077	82	1413
Lane Group Flow (vph)	18	132	296	69	163	192	1317	90	1608
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Minimum Split (s)	31.7	31.7	31.7	31.7	31.7	9.0	41.1	9.0	41.1
Total Split (s)	37.0	37.0	37.0	37.0	37.0	19.0	41.1	19.0	41.1
Total Split (%)	38.1%	38.1%	38.1%	38.1%	38.1%	19.6%	42.3%	19.6%	42.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.05	0.15	0.83	0.13	0.29	0.65	0.53	0.31	0.74
Control Delay	22.6	7.9	49.1	23.3	5.4	26.6	17.2	11.9	24.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.6	7.9	49.1	23.3	5.4	26.6	17.2	11.9	24.4
Queue Length 50th (m)	2.2	1.9	47.1	8.7	0.0	16.3	56.8	5.9	82.9
Queue Length 95th (m)	7.4	8.5	82.1	19.3	13.8	42.9	86.9	14.4	124.6
Internal Link Dist (m)		187.2		465.5			478.0		160.9
Turn Bay Length (m)	21.0		133.0		62.0	34.0		48.0	
Base Capacity (vph)	449	1176	485	700	704	365	2465	438	2183
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.11	0.61	0.10	0.23	0.53	0.53	0.21	0.74

Intersection Summary

Cycle Length: 97.1

Actuated Cycle Length: 85.9

Natural Cycle: 85























Control Type: Semi Act-Uncoord

Splits and Phases: 2: Paris St & Van Horne St

 Ø1	 Ø2	 Ø4
19 s	41.1 s	37 s
 Ø5	 Ø6	 Ø8
19 s	41.1 s	37 s

700 Paris St  
2: Paris St & Van Horne St















HCM Signalized Intersection Capacity Analysis  
Total (2032) AM Peak Hour w/ Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	27	93	269	63	148	175	1077	121	82	1413	50
Future Volume (vph)	16	27	93	269	63	148	175	1077	121	82	1413	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1566	2905		1801	1827	1576	1703	4871		1752	5049	
Flt Permitted	0.71	1.00		0.67	1.00	1.00	0.09	1.00		0.16	1.00	
Satd. Flow (perm)	1174	2905		1267	1827	1576	168	4871		304	5049	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	18	30	102	296	69	163	192	1184	133	90	1553	55
RTOR Reduction (vph)	0	74	0	0	0	118	0	12	0	0	3	0
Lane Group Flow (vph)	18	58	0	296	69	45	192	1305	0	90	1605	0
Confl. Peds. (#/hr)	4		4	4		4	6		6	6		6
Heavy Vehicles (%)	15%	4%	10%	0%	4%	1%	6%	5%	2%	3%	2%	5%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	24.2	24.2		24.2	24.2	24.2	53.5	43.3		44.3	38.1	
Effective Green, g (s)	24.2	24.2		24.2	24.2	24.2	53.5	43.3		44.3	38.1	
Actuated g/C Ratio	0.28	0.28		0.28	0.28	0.28	0.62	0.50		0.51	0.44	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	327	810		353	509	439	296	2432		258	2218	
v/s Ratio Prot		0.02			0.04		c0.08	0.27		0.02	c0.32	
v/s Ratio Perm	0.02			c0.23		0.03	0.32			0.15		
v/c Ratio	0.06	0.07		0.84	0.14	0.10	0.65	0.54		0.35	0.72	
Uniform Delay, d1	22.9	23.0		29.4	23.4	23.2	15.8	14.8		11.2	20.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.0		15.8	0.1	0.1	4.8	0.9		0.8	2.1	
Delay (s)	22.9	23.0		45.2	23.5	23.3	20.7	15.7		12.0	22.1	
Level of Service	C	C		D	C	C	C	B		B	C	
Approach Delay (s)		23.0			35.6			16.3			21.5	
Approach LOS		C			D			B			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			21.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			86.7				Sum of lost time (s)			13.5		
Intersection Capacity Utilization			72.6%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
3: Paris St & John St

Queues

Total (2032) AM Peak Hour w/ Improvements

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	8	0	40	2	4	1367	46	1692
Future Volume (vph)	8	0	40	2	4	1367	46	1692
Lane Group Flow (vph)	0	14	0	110	4	1459	48	1772
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	20.0	20.0	5.0	20.0
Minimum Split (s)	25.7	25.7	25.7	25.7	34.8	34.8	9.0	34.8
Total Split (s)	25.7	25.7	25.7	25.7	50.8	50.8	14.0	64.8
Total Split (%)	28.4%	28.4%	28.4%	28.4%	56.1%	56.1%	15.5%	71.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.1	2.1	1.0	2.1
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.7		5.7	5.8	5.8	4.0	5.8
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.05		0.38	0.03	0.64	0.16	0.68
Control Delay		0.3		18.4	8.2	11.6	4.0	7.7
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		0.3		18.4	8.2	11.6	4.0	7.7
Queue Length 50th (m)		0.0		4.9	0.2	68.5	1.3	56.2
Queue Length 95th (m)		0.0		20.6	1.7	110.6	4.4	98.5
Internal Link Dist (m)		561.8		431.0		175.2		478.0
Turn Bay Length (m)					33.0		23.0	
Base Capacity (vph)		574		566	157	2673	421	3198
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.02		0.19	0.03	0.55	0.11	0.55

Intersection Summary

Cycle Length: 90.5

Actuated Cycle Length: 60.6

Natural Cycle: 75

Control Type: Semi Act-Uncoord



















Splits and Phases: 3: Paris St & John St





















700 Paris St  
3: Paris St & John St

HCM Signalized Intersection Capacity Analysis  
Total (2032) AM Peak Hour w/ Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	0	6	40	2	63	4	1367	34	46	1692	9
Future Volume (vph)	8	0	6	40	2	63	4	1367	34	46	1692	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1726			1696		1803	3492		1770	3536	
Flt Permitted		0.84			0.87		0.11	1.00		0.11	1.00	
Satd. Flow (perm)		1493			1501		204	3492		197	3536	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	8	0	6	42	2	66	4	1424	35	48	1762	9
RTOR Reduction (vph)	0	12	0	0	59	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	2	0	0	51	0	4	1457	0	48	1772	0
Confl. Peds. (#/hr)	5		5	5		5	8		4	4		8
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.0			7.0		37.8	37.8		45.1	45.1	
Effective Green, g (s)		7.0			7.0		37.8	37.8		45.1	45.1	
Actuated g/C Ratio		0.11			0.11		0.59	0.59		0.71	0.71	
Clearance Time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		164			165		121	2075		221	2507	
v/s Ratio Prot								0.42		0.01	c0.50	
v/s Ratio Perm		0.00			c0.03		0.02			0.14		
v/c Ratio		0.01			0.31		0.03	0.70		0.22	0.71	
Uniform Delay, d1		25.2			26.1		5.3	9.0		5.5	5.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			1.1		0.1	1.1		0.5	0.9	
Delay (s)		25.2			27.2		5.4	10.1		6.0	6.3	
Level of Service		C			C		A	B		A	A	
Approach Delay (s)		25.2			27.2			10.1			6.3	
Approach LOS		C			C			B			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		8.7					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.71										
Actuated Cycle Length (s)		63.6					Sum of lost time (s)		15.5			
Intersection Capacity Utilization		66.3%					ICU Level of Service		C			
Analysis Period (min)		15										
c Critical Lane Group												










700 Paris St  
4: Paris St & McNaughton St

HCM Unsignalized Intersection Capacity Analysis  
Total (2032) AM Peak Hour w/ Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	9	2	0	2	1	1545	0	0	1771	7
Future Volume (Veh/h)	3	0	9	2	0	2	1	1545	0	0	1771	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	3	0	10	2	0	2	1	1717	0	0	1968	8
Pedestrians		2			1							
Lane Width (m)		3.6			3.6							
Walking Speed (m/s)		1.2			1.2							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)								347			199	
pX, platoon unblocked	0.76	0.76	0.63	0.76	0.76	0.74	0.63			0.74		
vC, conflicting volume	2836	3694	990	2714	3698	860	1978			1718		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1259	2384	0	1098	2389	113	1385			1271		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	97	100	99	98	100	100	100			100		
cM capacity (veh/h)	98	26	689	127	26	581	316			410		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	13	4	860	858	984	992						
Volume Left	3	2	1	0	0	0						
Volume Right	10	2	0	0	0	8						
cSH	288	208	316	1700	410	1700						
Volume to Capacity	0.05	0.02	0.00	0.51	0.00	0.58						
Queue Length 95th (m)	1.1	0.5	0.1	0.0	0.0	0.0						
Control Delay (s)	18.1	22.6	0.1	0.0	0.0	0.0						
Lane LOS	C	C	A									
Approach Delay (s)	18.1	22.6	0.1		0.0							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			59.2%		ICU Level of Service		B					
Analysis Period (min)			15									

700 Paris St  
5: Paris St & Facer St
















HCM Unsignalized Intersection Capacity Analysis  
Total (2032) AM Peak Hour w/ Improvements

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	20	1512	1	16	1769
Future Volume (Veh/h)	2	20	1512	1	16	1769
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	22	1680	1	18	1966
Pedestrians						1
Lane Width (m)						3.6
Walking Speed (m/s)						1.2
Percent Blockage						0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			226			321
pX, platoon unblocked	0.74	0.74			0.74	
vC, conflicting volume	2700	842			1681	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	988	72			1211	
tC, single (s)	6.8	6.9			6.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			3.2	
p0 queue free %	99	97			90	
cM capacity (veh/h)	164	724			174	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	24	1120	561	673	1311	
Volume Left	2	0	0	18	0	
Volume Right	22	0	1	0	0	
cSH	563	1700	1700	174	1700	
Volume to Capacity	0.04	0.66	0.33	0.10	0.77	
Queue Length 95th (m)	1.1	0.0	0.0	2.7	0.0	
Control Delay (s)	11.7	0.0	0.0	5.3	0.0	
Lane LOS	B			A		
Approach Delay (s)	11.7	0.0		1.8		
Approach LOS	B					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			70.5%		ICU Level of Service	C
Analysis Period (min)			15			

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	1	16	1	1	20	0
Future Volume (Veh/h)	1	16	1	1	20	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.50	0.50
Hourly flow rate (vph)	2	32	2	2	40	0
Pedestrians	1			2	2	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			36		27	22
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			36		27	22
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	100
cM capacity (veh/h)			1585		990	1057
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	34	4	40			
Volume Left	0	2	40			
Volume Right	32	0	0			
cSH	1700	1585	990			
Volume to Capacity	0.02	0.00	0.04			
Queue Length 95th (m)	0.0	0.0	1.0			
Control Delay (s)	0.0	3.6	8.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.6	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			4.7			
Intersection Capacity Utilization	14.6%		ICU Level of Service	A		
Analysis Period (min)	15					

700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

Queues  
Total (2032) AM Peak Hour w/ Improvements

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	28	0	60	0	6	1414	32	1747
Future Volume (vph)	28	0	60	0	6	1414	32	1747
Lane Group Flow (vph)	0	43	63	51	6	1522	34	1853
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	30.0	30.0	30.0	30.0
Minimum Split (s)	26.0	26.0	26.0	26.0	35.9	35.9	35.9	35.9
Total Split (s)	26.0	26.0	26.0	26.0	55.9	55.9	55.9	55.9
Total Split (%)	31.7%	31.7%	31.7%	31.7%	68.3%	68.3%	68.3%	68.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.7	3.7	3.7	3.7
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	5.9	5.9	5.9	5.9
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.18	0.30	0.18	0.05	0.59	0.18	0.72
Control Delay		12.9	30.4	13.7	5.0	6.8	7.2	8.9
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		12.9	30.4	13.7	5.0	6.8	7.2	8.9
Queue Length 50th (m)		0.4	6.8	1.0	0.2	45.2	1.3	66.1
Queue Length 95th (m)		8.7	19.2	10.3	1.5	75.6	5.7	112.2
Internal Link Dist (m)		198.2		192.5		314.0		201.8
Turn Bay Length (m)					40.0		100.0	
Base Capacity (vph)		484	456	560	142	2883	208	2887
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.09	0.14	0.09	0.04	0.53	0.16	0.64

Intersection Summary

Cycle Length: 81.9

Actuated Cycle Length: 62

Natural Cycle: 75

Control Type: Semi Act-Uncoord




















Splits and Phases: 7: Paris St & Boland Ave/Paris Driveway

 Ø2	 Ø4
55.9 s	26 s
 Ø6	 Ø8
55.9 s	26 s















700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

HCM Signalized Intersection Capacity Analysis  
Total (2032) AM Peak Hour w/ Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	0	13	60	0	48	6	1414	32	32	1747	13
Future Volume (vph)	28	0	13	60	0	48	6	1414	32	32	1747	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.96		1.00	0.85		1.00	1.00		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1757		1805	1615		1805	3495		1805	3502	
Flt Permitted		0.77		0.73	1.00		0.09	1.00		0.13	1.00	
Satd. Flow (perm)		1392		1385	1615		173	3495		252	3502	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	29	0	14	63	0	51	6	1488	34	34	1839	14
RTOR Reduction (vph)	0	34	0	0	36	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	9	0	63	15	0	6	1520	0	34	1852	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.4		7.4	7.4		43.9	43.9		43.9	43.9	
Effective Green, g (s)		7.4		7.4	7.4		43.9	43.9		43.9	43.9	
Actuated g/C Ratio		0.12		0.12	0.12		0.69	0.69		0.69	0.69	
Clearance Time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		162		162	189		120	2427		175	2432	
v/s Ratio Prot					0.01			0.43			c0.53	
v/s Ratio Perm		0.01		c0.05			0.03			0.13		
v/c Ratio		0.05		0.39	0.08		0.05	0.63		0.19	0.76	
Uniform Delay, d1		24.8		25.8	24.9		3.1	5.2		3.4	6.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		1.5	0.2		0.2	0.5		0.5	1.5	
Delay (s)		24.9		27.4	25.0		3.2	5.7		4.0	7.7	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		24.9			26.3			5.7			7.6	
Approach LOS		C			C			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			7.6			HCM 2000 Level of Service				A		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			63.2			Sum of lost time (s)			11.9			
Intersection Capacity Utilization			67.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
8: Paris St & York St

Queues  
Total (2032) AM Peak Hour w/ Improvements

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	193	153	70	1259	1592	228
Future Volume (vph)	193	153	70	1259	1592	228
Lane Group Flow (vph)	214	170	78	1399	1769	253
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	30.0	30.0	30.0
Minimum Split (s)	25.5	25.5	9.0	36.2	36.2	36.2
Total Split (s)	25.5	25.5	9.0	79.0	70.0	70.0
Total Split (%)	24.4%	24.4%	8.6%	75.6%	67.0%	67.0%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	2.2	2.2	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
v/c Ratio	0.67	0.48	0.40	0.60	0.84	0.25
Control Delay	47.5	21.9	11.4	8.8	19.1	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	21.9	11.4	8.8	19.1	2.1
Queue Length 50th (m)	37.7	11.7	3.7	61.2	129.6	0.9
Queue Length 95th (m)	68.2	34.0	10.6	87.7	178.2	10.6
Internal Link Dist (m)	376.5			775.4	314.0	
Turn Bay Length (m)	21.0		123.0			72.0
Base Capacity (vph)	440	449	195	2840	2625	1191
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.38	0.40	0.49	0.67	0.21

Intersection Summary

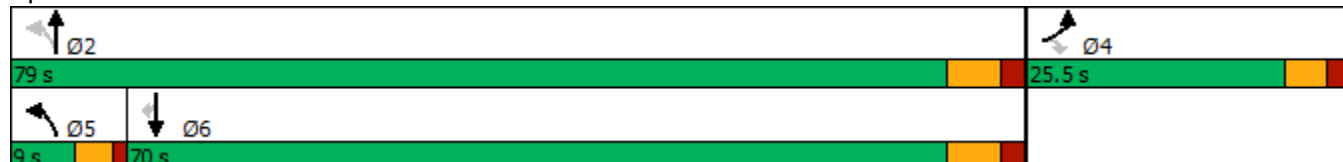
Cycle Length: 104.5

Actuated Cycle Length: 86.4

Natural Cycle: 90













Control Type: Semi Act-Uncoord

Splits and Phases: 8: Paris St & York St















700 Paris St  
8: Paris St & York St

HCM Signalized Intersection Capacity Analysis  
Total (2032) AM Peak Hour w/ Improvements

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	193	153	70	1259	1592	228
Future Volume (vph)	193	153	70	1259	1592	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.97	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1514	1770	3471	3539	1528
Flt Permitted	0.95	1.00	0.07	1.00	1.00	1.00
Satd. Flow (perm)	1770	1514	134	3471	3539	1528
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	214	170	78	1399	1769	253
RTOR Reduction (vph)	0	80	0	0	0	97
Lane Group Flow (vph)	214	90	78	1399	1769	156
Confl. Peds. (#/hr)	1	15	8			8
Heavy Vehicles (%)	2%	4%	2%	4%	2%	2%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	15.6	15.6	59.3	59.3	51.6	51.6
Effective Green, g (s)	15.6	15.6	59.3	59.3	51.6	51.6
Actuated g/C Ratio	0.18	0.18	0.68	0.68	0.60	0.60
Clearance Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	318	272	161	2376	2108	910
v/s Ratio Prot	c0.12		0.02	c0.40	c0.50	
v/s Ratio Perm		0.06	0.31			0.10
v/c Ratio	0.67	0.33	0.48	0.59	0.84	0.17
Uniform Delay, d1	33.1	30.9	13.6	7.2	14.1	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	0.7	2.3	0.4	3.1	0.1
Delay (s)	38.6	31.7	15.9	7.6	17.3	8.0
Level of Service	D	C	B	A	B	A
Approach Delay (s)	35.6			8.0	16.1	
Approach LOS	D			A	B	
Intersection Summary						
HCM 2000 Control Delay			14.9	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.80			
Actuated Cycle Length (s)			86.6	Sum of lost time (s)		15.7
Intersection Capacity Utilization			77.3%	ICU Level of Service		D
Analysis Period (min)			15			
c Critical Lane Group						

700 Paris St  
9: Ramsey Lake Rd & Paris St

Queues  
Total (2032) AM Peak Hour w/ Improvements

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	194	249	1085	397	729	1025
Future Volume (vph)	194	249	1085	397	729	1025
Lane Group Flow (vph)	202	259	1130	414	759	1068
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	30.8		56.2	56.2	33.0	89.2
Total Split (%)	25.7%		46.8%	46.8%	27.5%	74.3%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.49	0.20	0.78	0.55	0.78	0.41
Control Delay	44.4	13.9	28.4	13.3	38.8	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	13.9	28.4	13.3	38.8	4.8
Queue Length 50th (m)	19.0	13.1	97.8	28.9	67.5	31.1
Queue Length 95th (m)	33.7	26.2	130.4	59.8	#115.1	47.1
Internal Link Dist (m)	679.1		533.6			775.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	942	1356	1924	935	1066	3059
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.19	0.59	0.44	0.71	0.35

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 93

Natural Cycle: 90

Control Type: Semi Act-Uncoord

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













Queue shown is maximum after two cycles.

Splits and Phases: 9: Ramsey Lake Rd & Paris St



700 Paris St  
9: Ramsey Lake Rd & Paris St

HCM Signalized Intersection Capacity Analysis  
Total (2032) AM Peak Hour w/ Improvements





















						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	194	249	1085	397	729	1025
Future Volume (vph)	194	249	1085	397	729	1025
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	0.88	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	2760	3505	1545	3467	3471
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	2760	3505	1545	3467	3471
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	202	259	1130	414	759	1068
RTOR Reduction (vph)	0	24	0	118	0	0
Lane Group Flow (vph)	202	235	1130	296	759	1068
Confl. Peds. (#/hr)		13		14	14	
Heavy Vehicles (%)	2%	3%	3%	2%	1%	4%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	11.2	43.1	38.4	38.4	26.1	69.5
Effective Green, g (s)	11.2	43.1	38.4	38.4	26.1	69.5
Actuated g/C Ratio	0.12	0.46	0.41	0.41	0.28	0.75
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	414	1283	1451	640	976	2602
v/s Ratio Prot	c0.06	0.09	c0.32		c0.22	0.31
v/s Ratio Perm				0.19		
v/c Ratio	0.49	0.18	0.78	0.46	0.78	0.41
Uniform Delay, d1	38.1	14.5	23.5	19.7	30.6	4.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1	2.7	0.5	4.0	0.1
Delay (s)	39.0	14.6	26.2	20.2	34.6	4.3
Level of Service	D	B	C	C	C	A
Approach Delay (s)	25.3		24.6			16.9
Approach LOS	C		C			B
<b>Intersection Summary</b>						
HCM 2000 Control Delay			21.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			92.7		Sum of lost time (s)	17.0
Intersection Capacity Utilization			79.2%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						



700 Paris St  
1: Paris St & Brady St

Queues

Total (2032) PM Peak Hour w/ Improvements

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	195	619	652	515	116	1163	833	28	916	273
Future Volume (vph)	195	619	652	515	116	1163	833	28	916	273
Lane Group Flow (vph)	195	698	652	530	116	1163	833	28	916	273
Turn Type	Prot	NA	Prot	NA	pm+pt	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	7	4	3	8	5	2	2 3		6	6 7
Permitted Phases					2			6		
Detector Phase	7	4	3	8	5	2	2 3	6	6	6 7
Switch Phase										
Minimum Initial (s)	5.0	10.0	5.0	10.0	5.0	15.0		15.0	15.0	
Minimum Split (s)	10.0	31.2	10.0	31.2	10.0	40.1		40.1	40.1	
Total Split (s)	35.1	40.3	34.0	39.2	22.0	63.0		41.0	41.0	
Total Split (%)	25.6%	29.4%	24.8%	28.6%	16.0%	45.9%		29.9%	29.9%	
Yellow Time (s)	3.0	3.7	3.0	3.7	3.0	3.7		3.7	3.7	
All-Red Time (s)	2.0	2.5	2.0	2.5	2.0	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	6.2	5.0	6.2	5.0	6.1		6.1	6.1	
Lead/Lag	Lead	Lag	Lead	Lag	Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes			Yes	Yes	
Recall Mode	None	None	None	None	None	Min		Min	Min	
v/c Ratio	0.59	0.83	0.84	0.43	0.48	0.57	0.77	0.25	0.67	0.38
Control Delay	62.3	55.2	58.9	33.5	31.1	30.5	20.2	44.6	43.6	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0	0.0
Total Delay	62.3	55.2	58.9	33.5	31.1	30.5	29.1	44.6	43.6	19.4
Queue Length 50th (m)	27.5	97.4	92.3	59.7	19.7	88.9	140.3	5.9	80.4	35.4
Queue Length 95th (m)	40.2	121.6	#126.4	80.6	33.9	106.3	208.2	16.4	102.0	59.3
Internal Link Dist (m)		364.5		324.4		160.9			177.4	
Turn Bay Length (m)	57.0		85.0		70.0		6.0	24.0		6.0
Base Capacity (vph)	761	996	827	1224	317	2381	1107	128	1554	927
Starvation Cap Reductn	0	0	0	0	0	0	244	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.70	0.79	0.43	0.37	0.49	0.97	0.22	0.59	0.29

Intersection Summary

Cycle Length: 137.3

Actuated Cycle Length: 124.3







Natural Cycle: 105

Control Type: Semi Act-Uncoord

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























Queue shown is maximum after two cycles.

Splits and Phases: 1: Paris St & Brady St

		
63 s	34 s	40.3 s
		
22 s	41 s	35.1 s
		39.2 s

700 Paris St  
1: Paris St & Brady St



















HCM Signalized Intersection Capacity Analysis  
Total (2032) PM Peak Hour w/ Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	619	79	652	515	15	116	1163	833	28	916	273
Future Volume (vph)	195	619	79	652	515	15	116	1163	833	28	916	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.2		5.0	6.2		5.0	6.1	6.1	6.1	6.1	6.1
Lane Util. Factor	0.97	0.95		0.97	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3072	3526		3467	3491		1751	5085	1615	1774	5085	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.15	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	3072	3526		3467	3491		271	5085	1615	420	5085	1615
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	195	619	79	652	515	15	116	1163	833	28	916	273
RTOR Reduction (vph)	0	8	0	0	1	0	0	0	11	0	0	43
Lane Group Flow (vph)	195	690	0	652	529	0	116	1163	822	28	916	230
Confl. Peds. (#/hr)	9		6	6		9	25		33	33		25
Heavy Vehicles (%)	14%	0%	4%	1%	3%	0%	3%	2%	0%	1%	2%	0%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	7	4		3	8		5	2	2 3		6	6 7
Permitted Phases							2			6		
Actuated Green, G (s)	13.5	29.3		27.8	43.6		49.6	49.6	83.5	33.6	33.6	53.2
Effective Green, g (s)	13.5	29.3		27.8	43.6		49.6	49.6	83.5	33.6	33.6	53.2
Actuated g/C Ratio	0.11	0.24		0.22	0.35		0.40	0.40	0.67	0.27	0.27	0.43
Clearance Time (s)	5.0	6.2		5.0	6.2		5.0	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	334	833		777	1227		239	2034	1087	113	1377	692
v/s Ratio Prot	0.06	c0.20		c0.19	0.15		0.04	0.23	c0.51		0.18	0.14
v/s Ratio Perm							0.15			0.07		
v/c Ratio	0.58	0.83		0.84	0.43		0.49	0.57	0.76	0.25	0.67	0.33
Uniform Delay, d1	52.6	45.0		46.0	30.7		25.9	28.9	13.5	35.3	40.2	23.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	6.8		7.9	0.2		1.6	0.4	3.0	1.2	1.2	0.3
Delay (s)	55.2	51.8		53.9	31.0		27.4	29.3	16.5	36.5	41.4	23.9
Level of Service	E	D		D	C		C	C	B	D	D	C
Approach Delay (s)		52.5			43.6			24.2			37.4	
Approach LOS		D			D			C			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		36.1					HCM 2000 Level of Service		D			
HCM 2000 Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		124.0					Sum of lost time (s)		22.3			
Intersection Capacity Utilization		104.0%					ICU Level of Service		G			
Analysis Period (min)		15										
c Critical Lane Group												

700 Paris St  
2: Paris St & Van Horne St

Queues

Total (2032) PM Peak Hour w/ Improvements

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	52	75	236	73	165	176	1828	130	1468
Future Volume (vph)	52	75	236	73	165	176	1828	130	1468
Lane Group Flow (vph)	53	320	241	74	168	180	2260	133	1546
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases		4		8		5	2	1	6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	4.5	5.0	5.0	5.0
Minimum Split (s)	31.7	31.7	31.7	31.7	31.7	9.0	41.1	9.0	41.1
Total Split (s)	31.7	31.7	31.7	31.7	31.7	12.0	55.0	9.0	52.0
Total Split (%)	33.1%	33.1%	33.1%	33.1%	33.1%	12.5%	57.5%	9.4%	54.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.15	0.34	0.94	0.14	0.34	0.77	0.85	0.76	0.61
Control Delay	27.1	17.7	77.6	26.5	12.4	38.0	22.1	41.7	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	17.7	77.6	26.5	12.4	38.0	22.1	41.7	18.2
Queue Length 50th (m)	7.7	15.6	45.1	10.7	8.2	15.0	128.2	9.5	76.1
Queue Length 95th (m)	17.2	27.2	#91.8	21.8	24.9	#50.0	151.7	#39.1	91.5
Internal Link Dist (m)		187.2		465.5			478.0		160.9
Turn Bay Length (m)	21.0		133.0		62.0	34.0		48.0	
Base Capacity (vph)	363	985	269	547	516	233	2673	176	2544
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.32	0.90	0.14	0.33	0.77	0.85	0.76	0.61

Intersection Summary

Cycle Length: 95.7

Actuated Cycle Length: 94.5

Natural Cycle: 85

Control Type: Semi Act-Uncoord

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























Queue shown is maximum after two cycles.

Splits and Phases: 2: Paris St & Van Horne St

		
9 s	55 s	31.7 s
		
12 s	52 s	31.7 s

700 Paris St  
2: Paris St & Van Horne St















HCM Signalized Intersection Capacity Analysis  
Total (2032) PM Peak Hour w/ Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	75	238	236	73	165	176	1828	387	130	1468	47
Future Volume (vph)	52	75	238	236	73	165	176	1828	387	130	1468	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1689	3126		1767	1900	1521	1770	4937		1805	5056	
Flt Permitted	0.71	1.00		0.50	1.00	1.00	0.09	1.00		0.08	1.00	
Satd. Flow (perm)	1261	3126		935	1900	1521	173	4937		160	5056	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	53	77	243	241	74	168	180	1865	395	133	1498	48
RTOR Reduction (vph)	0	87	0	0	0	80	0	34	0	0	3	0
Lane Group Flow (vph)	53	233	0	241	74	88	180	2226	0	133	1543	0
Confl. Peds. (#/hr)	13		3	3		13	3		17	17		3
Heavy Vehicles (%)	6%	2%	1%	2%	0%	4%	2%	2%	1%	0%	2%	3%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	26.0	26.0		26.0	26.0	26.0	58.0	50.5		52.5	47.5	
Effective Green, g (s)	26.0	26.0		26.0	26.0	26.0	58.0	50.5		52.5	47.5	
Actuated g/C Ratio	0.28	0.28		0.28	0.28	0.28	0.61	0.53		0.56	0.50	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	346	860		257	522	418	232	2638		175	2541	
v/s Ratio Prot		0.07			0.04		c0.06	c0.45		0.04	0.31	
v/s Ratio Perm	0.04			c0.26		0.06	0.41			0.38		
v/c Ratio	0.15	0.27		0.94	0.14	0.21	0.78	0.84		0.76	0.61	
Uniform Delay, d1	25.9	26.8		33.5	25.8	26.3	14.3	18.7		16.9	16.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		39.1	0.1	0.3	14.9	3.5		17.5	1.1	
Delay (s)	26.1	27.0		72.6	26.0	26.6	29.3	22.2		34.4	17.9	
Level of Service	C	C		E	C	C	C	C		C	B	
Approach Delay (s)		26.9			49.4			22.7			19.2	
Approach LOS		C			D			C			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			24.4				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			94.5				Sum of lost time (s)			13.5		
Intersection Capacity Utilization			91.5%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

700 Paris St  
3: Paris St & John St

Queues

Total (2032) PM Peak Hour w/ Improvements

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	10	3	63	0	8	2238	80	1843
Future Volume (vph)	10	3	63	0	8	2238	80	1843
Lane Group Flow (vph)	0	15	0	174	8	2352	82	1905
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	20.0	20.0	5.0	20.0
Minimum Split (s)	25.7	25.7	25.7	25.7	34.8	34.8	9.0	34.8
Total Split (s)	25.7	25.7	25.7	25.7	85.3	85.3	9.0	94.3
Total Split (%)	21.4%	21.4%	21.4%	21.4%	71.1%	71.1%	7.5%	78.6%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7	3.7	3.0	3.7
All-Red Time (s)	2.0	2.0	2.0	2.0	2.1	2.1	1.0	2.1
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.7		5.7	5.8	5.8	4.0	5.8
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.09		0.74	0.07	0.94	0.57	0.70
Control Delay		40.2		49.1	8.5	25.4	29.4	8.7
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		40.2		49.1	8.5	25.4	29.4	8.7
Queue Length 50th (m)		2.8		25.7	0.6	239.6	3.5	96.5
Queue Length 95th (m)		9.3		50.7	2.8	#364.6	#25.0	148.3
Internal Link Dist (m)		561.8		431.0		175.2		478.0
Turn Bay Length (m)					33.0		23.0	
Base Capacity (vph)		245		311	119	2531	143	2825
Starvation Cap Reductn		0		0	0	0	0	0
Spillback Cap Reductn		0		0	0	0	0	0
Storage Cap Reductn		0		0	0	0	0	0
Reduced v/c Ratio		0.06		0.56	0.07	0.93	0.57	0.67

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 111.7


Natural Cycle: 120

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.



















Splits and Phases: 3: Paris St & John St

 Ø1	 Ø2		 Ø4
9 s	85.3 s		25.7 s
 Ø6			 Ø8
94.3 s			25.7 s



















700 Paris St  
3: Paris St & John St

HCM Signalized Intersection Capacity Analysis  
Total (2032) PM Peak Hour w/ Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	3	2	63	0	106	8	2238	44	80	1843	5
Future Volume (vph)	10	3	2	63	0	106	8	2238	44	80	1843	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1799			1627		1802	3529		1736	3537	
Flt Permitted		0.73			0.87		0.09	1.00		0.05	1.00	
Satd. Flow (perm)		1349			1443		166	3529		88	3537	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	3	2	65	0	109	8	2307	45	82	1900	5
RTOR Reduction (vph)	0	2	0	0	54	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	13	0	0	120	0	8	2351	0	82	1905	0
Confl. Peds. (#/hr)	3		4	4		3	14		2	2		14
Heavy Vehicles (%)	0%	0%	0%	0%	0%	6%	0%	2%	0%	4%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.1			14.1		79.0	79.0		86.9	86.9	
Effective Green, g (s)		14.1			14.1		79.0	79.0		86.9	86.9	
Actuated g/C Ratio		0.13			0.13		0.70	0.70		0.77	0.77	
Clearance Time (s)		5.7			5.7		5.8	5.8		4.0	5.8	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		169			180		116	2478		125	2732	
v/s Ratio Prot							c0.67			0.02	c0.54	
v/s Ratio Perm		0.01			c0.08		0.05			0.48		
v/c Ratio		0.08			0.67		0.07	0.95		0.66	0.70	
Uniform Delay, d1		43.5			46.9		5.2	14.9		29.3	6.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			8.9		0.3	8.8		11.7	0.8	
Delay (s)		43.7			55.9		5.5	23.7		41.1	7.1	
Level of Service		D			E		A	C		D	A	
Approach Delay (s)		43.7			55.9			23.7			8.5	
Approach LOS		D			E			C			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		18.3					HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio		0.91										
Actuated Cycle Length (s)		112.5					Sum of lost time (s)			15.5		
Intersection Capacity Utilization		87.8%					ICU Level of Service			E		
Analysis Period (min)		15										
c Critical Lane Group												












700 Paris St  
4: Paris St & McNaughton St

HCM Unsignalized Intersection Capacity Analysis  
Total (2032) PM Peak Hour w/ Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	0	7	3	0	2	1	2266	1	1	1990	13
Future Volume (Veh/h)	9	0	7	3	0	2	1	2266	1	1	1990	13
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	9	0	7	3	0	2	1	2360	1	1	2073	14
Pedestrians	3			2								
Lane Width (m)	3.6			3.6								
Walking Speed (m/s)	1.2			1.2								
Percent Blockage	0			0								
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)							347			199		
pX, platoon unblocked	0.41	0.41	0.66	0.41	0.41	0.24	0.66				0.24	
vC, conflicting volume	3269	4450	1046	3410	4456	1182	2090				2363	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	2826	49	261	2842	0	1625				308	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	98	100	99	99	100	99	100				100	
cM capacity (veh/h)	409	7	670	268	7	258	268				299	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	16	5	1181	1181	1038	1050						
Volume Left	9	3	1	0	1	0						
Volume Right	7	2	0	1	0	14						
cSH	493	264	268	1700	299	1700						
Volume to Capacity	0.03	0.02	0.00	0.69	0.00	0.62						
Queue Length 95th (m)	0.8	0.5	0.1	0.0	0.1	0.0						
Control Delay (s)	12.5	18.9	0.2	0.0	0.2	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	12.5	18.9	0.1		0.1							
Approach LOS	B	C										
Intersection Summary												
Average Delay				0.2								
Intersection Capacity Utilization				73.4%	ICU Level of Service			D				
Analysis Period (min)				15								

700 Paris St  
5: Paris St & Facer St

HCM Unsignalized Intersection Capacity Analysis  
Total (2032) PM Peak Hour w/ Improvements

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	1	16	2242	6	21	1975
Future Volume (Veh/h)	1	16	2242	6	21	1975
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	17	2360	6	22	2079
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	225			321		
pX, platoon unblocked	0.40	0.22			0.22	
vC, conflicting volume	3448	1184			2367	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			103	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	93			93	
cM capacity (veh/h)	386	238			328	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	18	1573	793	715	1386	
Volume Left	1	0	0	22	0	
Volume Right	17	0	6	0	0	
cSH	243	1700	1700	328	1700	
Volume to Capacity	0.07	0.93	0.47	0.07	0.82	
Queue Length 95th (m)	1.9	0.0	0.0	1.7	0.0	
Control Delay (s)	21.0	0.0	0.0	2.4	0.0	
Lane LOS	C			A		
Approach Delay (s)	21.0	0.0			0.8	
Approach LOS	C					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			79.4%	ICU Level of Service	D	
Analysis Period (min)			15			
















700 Paris St  
6: Bell Park Rd & Facer St

HCM Unsignalized Intersection Capacity Analysis  
Total (2032) PM Peak Hour w/ Improvements

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	7	21	0	2	15	0
Future Volume (Veh/h)	7	21	0	2	15	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	10	31	0	3	22	0
Pedestrians	1			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			41		30	28
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			41		30	28
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	100
cM capacity (veh/h)			1581		989	1052
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	41	3	22			
Volume Left	0	0	22			
Volume Right	31	0	0			
cSH	1700	1581	989			
Volume to Capacity	0.02	0.00	0.02			
Queue Length 95th (m)	0.0	0.0	0.5			
Control Delay (s)	0.0	0.0	8.7			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.7			
Approach LOS			A			
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			14.0%	ICU Level of Service		A
Analysis Period (min)			15			

700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

Queues  
Total (2032) PM Peak Hour w/ Improvements

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	27	1	44	3	24	2174	54	1860
Future Volume (vph)	27	1	44	3	24	2174	54	1860
Lane Group Flow (vph)	0	47	48	56	26	2435	59	2056
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	30.0	30.0	30.0	30.0
Minimum Split (s)	26.0	26.0	26.0	26.0	35.9	35.9	35.9	35.9
Total Split (s)	26.0	26.0	26.0	26.0	94.0	94.0	94.0	94.0
Total Split (%)	21.7%	21.7%	21.7%	21.7%	78.3%	78.3%	78.3%	78.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.7	3.7	3.7	3.7
All-Red Time (s)	2.5	2.5	2.5	2.5	2.2	2.2	2.2	2.2
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.0	6.0	6.0	5.9	5.9	5.9	5.9
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio		0.35	0.38	0.35	0.23	0.82	0.81	0.69
Control Delay		40.5	55.9	44.2	8.6	9.9	81.6	6.4
Queue Delay		0.0	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay		40.5	55.9	44.2	8.6	10.1	81.6	6.4
Queue Length 50th (m)		6.4	10.4	9.2	1.1	137.7	6.1	86.1
Queue Length 95th (m)		18.5	22.8	22.3	5.5	222.5	#24.6	135.0
Internal Link Dist (m)		192.5		282.1		313.9		201.2
Turn Bay Length (m)					40.0		100.0	
Base Capacity (vph)		261	261	315	112	2943	72	2948
Starvation Cap Reductn		0	0	0	0	74	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.18	0.18	0.18	0.23	0.85	0.82	0.70

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 106.3

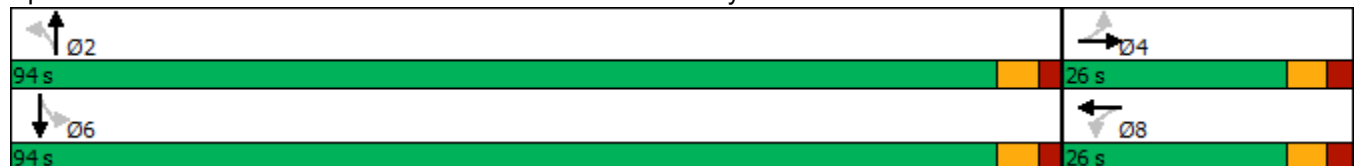
Natural Cycle: 100

Control Type: Semi Act-Uncoord

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

Queue shown is maximum after two cycles.




















Splits and Phases: 7: Paris St & Boland Ave/Paris Driveway

















700 Paris St  
7: Paris St & Boland Ave/Paris Driveway

HCM Signalized Intersection Capacity Analysis  
Total (2032) PM Peak Hour w/ Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	1	16	44	3	49	24	2174	66	54	1860	31
Future Volume (vph)	27	1	16	44	3	49	24	2174	66	54	1860	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.95		1.00	0.86		1.00	1.00		1.00	1.00	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1628		1805	1608		1805	3523		1805	3530	
Flt Permitted		0.78		0.73	1.00		0.07	1.00		0.05	1.00	
Satd. Flow (perm)		1307		1380	1608		135	3523		87	3530	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	1	17	48	3	53	26	2363	72	59	2022	34
RTOR Reduction (vph)	0	16	0	0	12	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	31	0	48	44	0	26	2434	0	59	2055	0
Confl. Peds. (#/hr)	2					2	4		2	2		4
Heavy Vehicles (%)	4%	0%	14%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.9		7.9	7.9		87.8	87.8		87.8	87.8	
Effective Green, g (s)		7.9		7.9	7.9		87.8	87.8		87.8	87.8	
Actuated g/C Ratio		0.07		0.07	0.07		0.82	0.82		0.82	0.82	
Clearance Time (s)		6.0		6.0	6.0		5.9	5.9		5.9	5.9	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		95		101	118		110	2874		70	2880	
v/s Ratio Prot					0.03			c0.69			0.58	
v/s Ratio Perm		0.02		c0.03			0.19			0.68		
v/c Ratio		0.33		0.48	0.37		0.24	0.85		0.84	0.71	
Uniform Delay, d1		47.3		47.9	47.5		2.3	5.9		5.8	4.4	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.0		3.5	2.0		1.1	2.5		56.9	0.9	
Delay (s)		49.4		51.4	49.5		3.4	8.4		62.7	5.2	
Level of Service		D		D	D		A	A		E	A	
Approach Delay (s)		49.4			50.3			8.3			6.8	
Approach LOS		D			D			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		9.0					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.82										
Actuated Cycle Length (s)		107.6					Sum of lost time (s)		11.9			
Intersection Capacity Utilization		81.3%					ICU Level of Service		D			
Analysis Period (min)		15										
c Critical Lane Group												

700 Paris St  
8: Paris St & York St

Queues  
Total (2032) PM Peak Hour w/ Improvements

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	236	121	164	2029	1694	228
Future Volume (vph)	236	121	164	2029	1694	228
Lane Group Flow (vph)	248	127	173	2136	1783	240
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	30.0	30.0	30.0
Minimum Split (s)	25.5	25.5	9.0	36.2	36.2	36.2
Total Split (s)	25.5	25.5	12.0	94.5	82.5	82.5
Total Split (%)	21.3%	21.3%	10.0%	78.8%	68.8%	68.8%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2	4.2
All-Red Time (s)	2.2	2.2	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
v/c Ratio	0.79	0.34	0.80	0.85	0.86	0.24
Control Delay	62.1	10.7	49.7	15.3	22.2	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.1	10.7	49.7	15.3	22.2	2.4
Queue Length 50th (m)	50.6	0.4	19.7	162.2	158.5	2.5
Queue Length 95th (m)#	104.2	17.9	#64.3	197.0	191.1	12.0
Internal Link Dist (m)	376.5			774.4	313.9	
Turn Bay Length (m)	21.0		123.0			72.0
Base Capacity (vph)	356	409	215	3022	2691	1218
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.31	0.80	0.71	0.66	0.20

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 102.7


Natural Cycle: 90

Control Type: Semi Act-Uncoord

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













Queue shown is maximum after two cycles.













Splits and Phases: 8: Paris St & York St

	
Ø2	Ø4
94.5 s	25.5 s
	
Ø5	Ø6
12 s	82.5 s

700 Paris St  
8: Paris St & York St

HCM Signalized Intersection Capacity Analysis  
Total (2032) PM Peak Hour w/ Improvements

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	236	121	164	2029	1694	228
Future Volume (vph)	236	121	164	2029	1694	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.97	1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1555	1770	3539	3539	1538
Flt Permitted	0.95	1.00	0.06	1.00	1.00	1.00
Satd. Flow (perm)	1787	1555	116	3539	3539	1538
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	248	127	173	2136	1783	240
RTOR Reduction (vph)	0	103	0	0	0	86
Lane Group Flow (vph)	248	24	173	2136	1783	154
Confl. Peds. (#/hr)	6	15	4			4
Heavy Vehicles (%)	1%	1%	2%	2%	2%	2%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	18.0	18.0	72.7	72.7	60.5	60.5
Effective Green, g (s)	18.0	18.0	72.7	72.7	60.5	60.5
Actuated g/C Ratio	0.18	0.18	0.71	0.71	0.59	0.59
Clearance Time (s)	5.5	5.5	4.0	6.2	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	314	273	214	2512	2090	908
v/s Ratio Prot	c0.14		0.06	c0.60	0.50	
v/s Ratio Perm		0.02	0.51			0.10
v/c Ratio	0.79	0.09	0.81	0.85	0.85	0.17
Uniform Delay, d1	40.4	35.3	27.8	10.9	17.3	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.4	0.1	19.7	3.0	3.6	0.1
Delay (s)	52.8	35.5	47.4	13.8	20.9	9.6
Level of Service	D	D	D	B	C	A
Approach Delay (s)	46.9			16.3	19.6	
Approach LOS	D			B	B	
Intersection Summary						
HCM 2000 Control Delay			20.2	HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.88			
Actuated Cycle Length (s)			102.4	Sum of lost time (s)		15.7
Intersection Capacity Utilization			86.4%	ICU Level of Service		E
Analysis Period (min)			15			
c Critical Lane Group						

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	573	749	1478	283	393	1387
Future Volume (vph)	573	749	1478	283	393	1387
Lane Group Flow (vph)	637	832	1642	314	437	1541
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Detector Phase	8	8 1	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0	15.0	10.0	15.0
Minimum Split (s)	30.8		40.2	40.2	15.0	40.2
Total Split (s)	32.0		64.5	64.5	23.5	88.0
Total Split (%)	26.7%		53.8%	53.8%	19.6%	73.3%
Yellow Time (s)	3.3		4.2	4.2	3.0	4.2
All-Red Time (s)	2.5		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8		6.2	6.2	5.0	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None		Min	Min	None	Min
v/c Ratio	0.84	0.71	0.96	0.38	0.84	0.64
Control Delay	55.5	32.5	43.8	13.0	63.8	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	32.5	43.8	13.0	63.8	12.3
Queue Length 50th (m)	78.5	94.0	199.8	28.2	54.7	102.8
Queue Length 95th (m)	#106.2	120.9	#256.8	50.0	#79.3	124.2
Internal Link Dist (m)	679.1		533.6			774.4
Turn Bay Length (m)	158.0			37.0	175.0	
Base Capacity (vph)	768	1153	1746	842	537	2450
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.72	0.94	0.37	0.81	0.63

#### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 118.2

Natural Cycle: 100

Control Type: Semi Act-Uncoord

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













Queue shown is maximum after two cycles.

Splits and Phases: 9: Ramsey Lake Rd & Paris St



700 Paris St  
9: Ramsey Lake Rd & Paris St

HCM Signalized Intersection Capacity Analysis  
Total (2032) PM Peak Hour w/ Improvements

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	573	749	1478	283	393	1387
Future Volume (vph)	573	749	1478	283	393	1387
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	6.2	6.2	5.0	6.2
Lane Util. Factor	0.97	0.88	0.95	1.00	0.97	0.95
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	2787	3539	1587	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	2787	3539	1587	3433	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	637	832	1642	314	437	1541
RTOR Reduction (vph)	0	10	0	61	0	0
Lane Group Flow (vph)	637	822	1642	253	437	1541
Confl. Peds. (#/hr)		16		5	5	
Heavy Vehicles (%)	1%	2%	2%	0%	2%	2%
Turn Type	Prot	pt+ov	NA	Perm	Prot	NA
Protected Phases	8	8 1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	25.9	49.7	57.3	57.3	18.0	80.3
Effective Green, g (s)	25.9	49.7	57.3	57.3	18.0	80.3
Actuated g/C Ratio	0.22	0.42	0.48	0.48	0.15	0.68
Clearance Time (s)	5.8		6.2	6.2	5.0	6.2
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	759	1171	1715	769	522	2404
v/s Ratio Prot	c0.18	0.29	c0.46		c0.13	0.44
v/s Ratio Perm				0.16		
v/c Ratio	0.84	0.70	0.96	0.33	0.84	0.64
Uniform Delay, d1	44.2	28.2	29.3	18.7	48.7	10.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.1	1.9	13.0	0.3	11.2	0.6
Delay (s)	52.3	30.1	42.2	18.9	59.9	11.4
Level of Service	D	C	D	B	E	B
Approach Delay (s)	39.7		38.5			22.1
Approach LOS	D		D			C
<b>Intersection Summary</b>						
HCM 2000 Control Delay			32.8		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.91			
Actuated Cycle Length (s)			118.2		Sum of lost time (s)	17.0
Intersection Capacity Utilization			87.5%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						



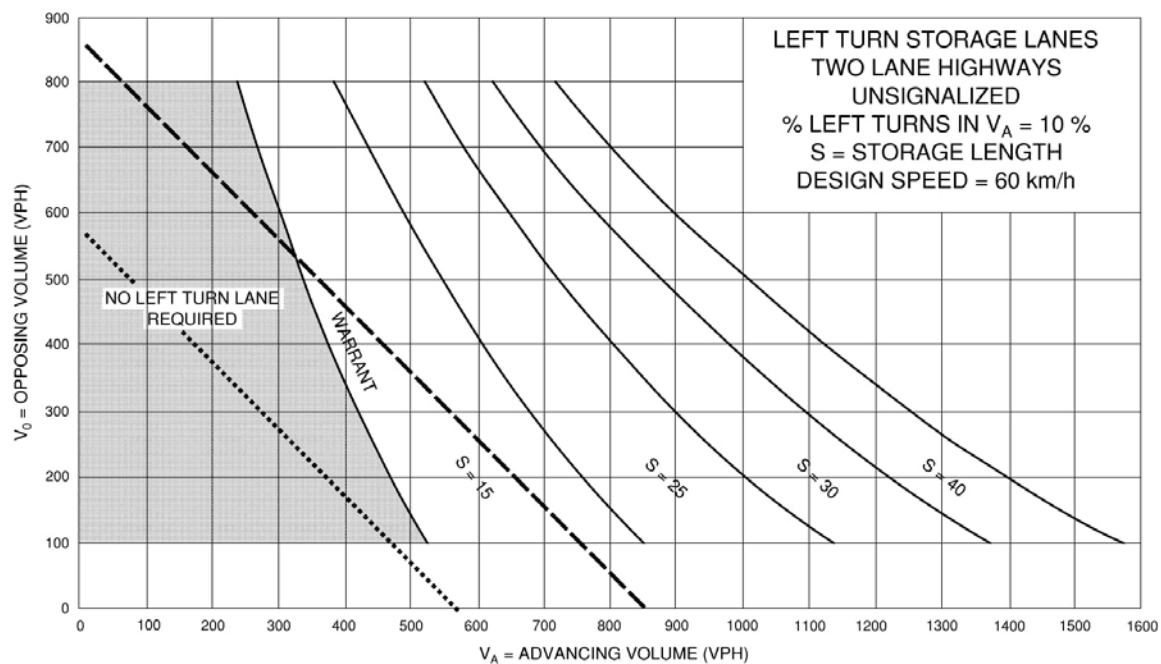
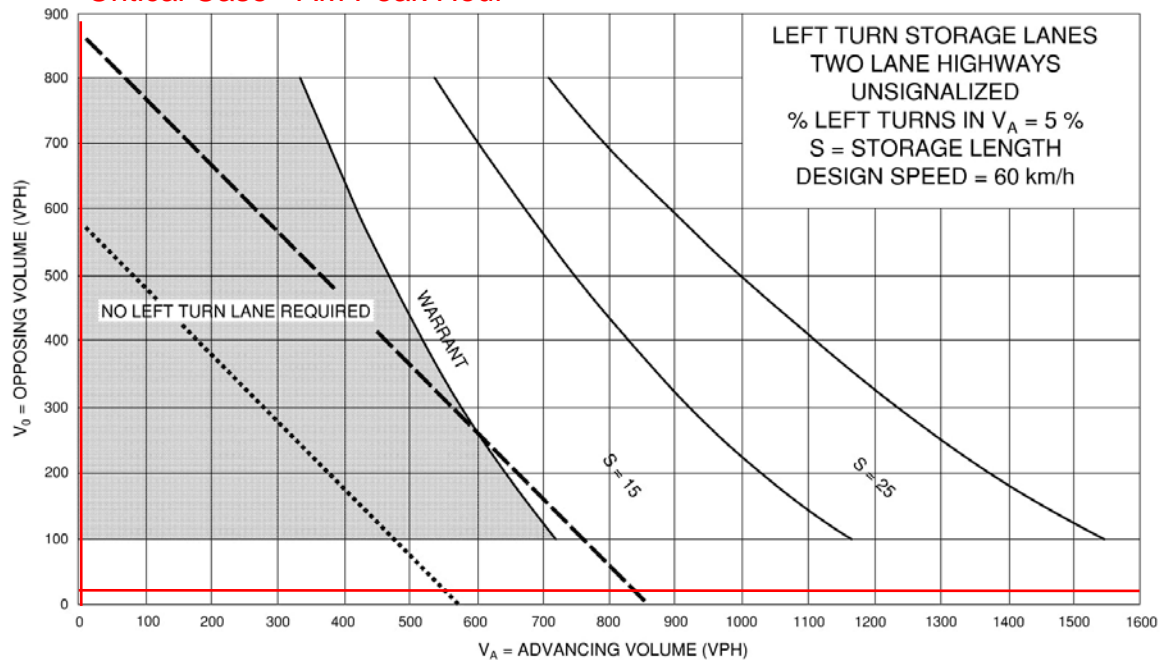
## Appendix G – MTO Left Turn Analysis

**Bell Park Road / Facer Street**

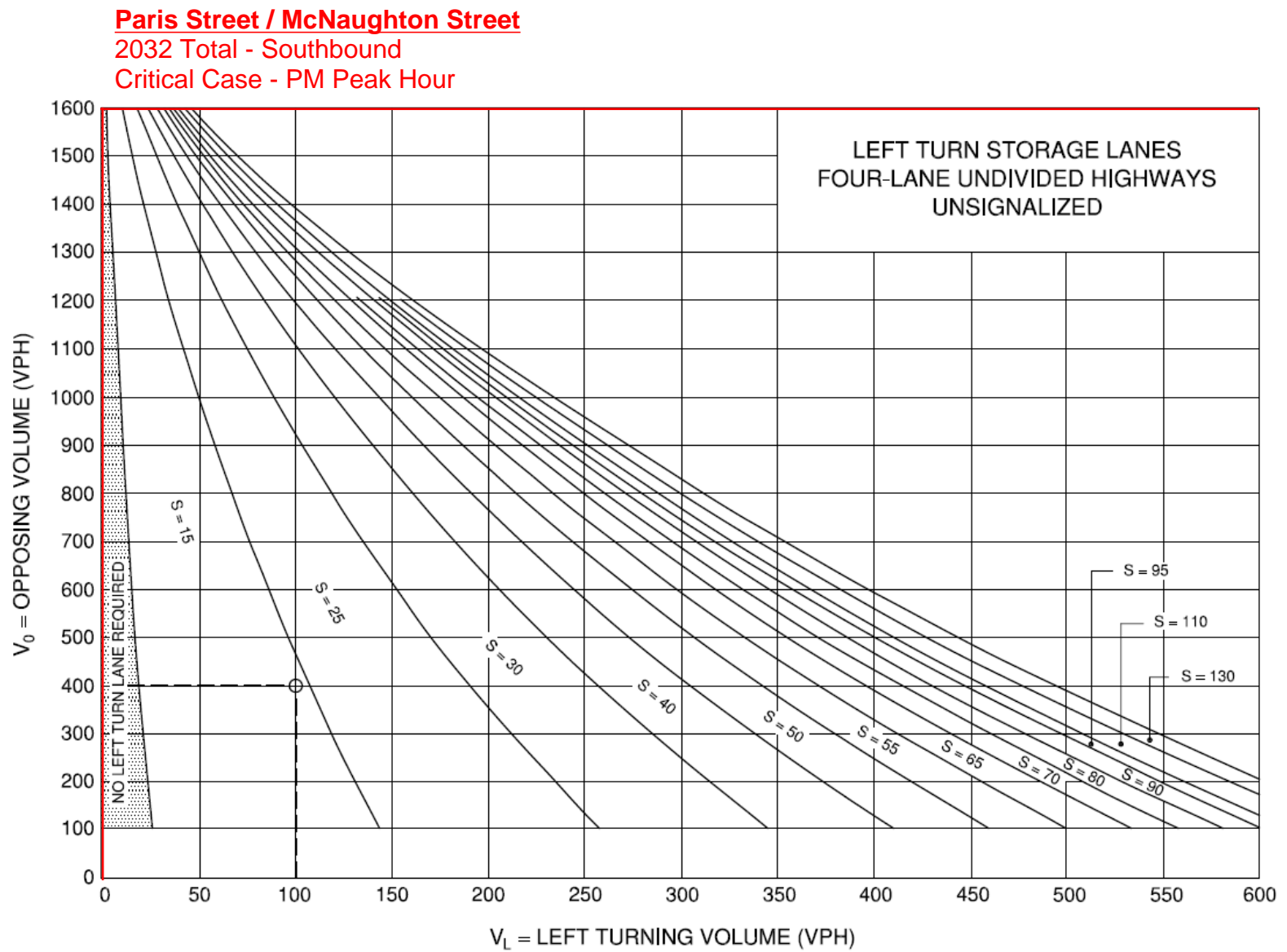
2032 Total - Westbound

**Exhibit 9A-6**

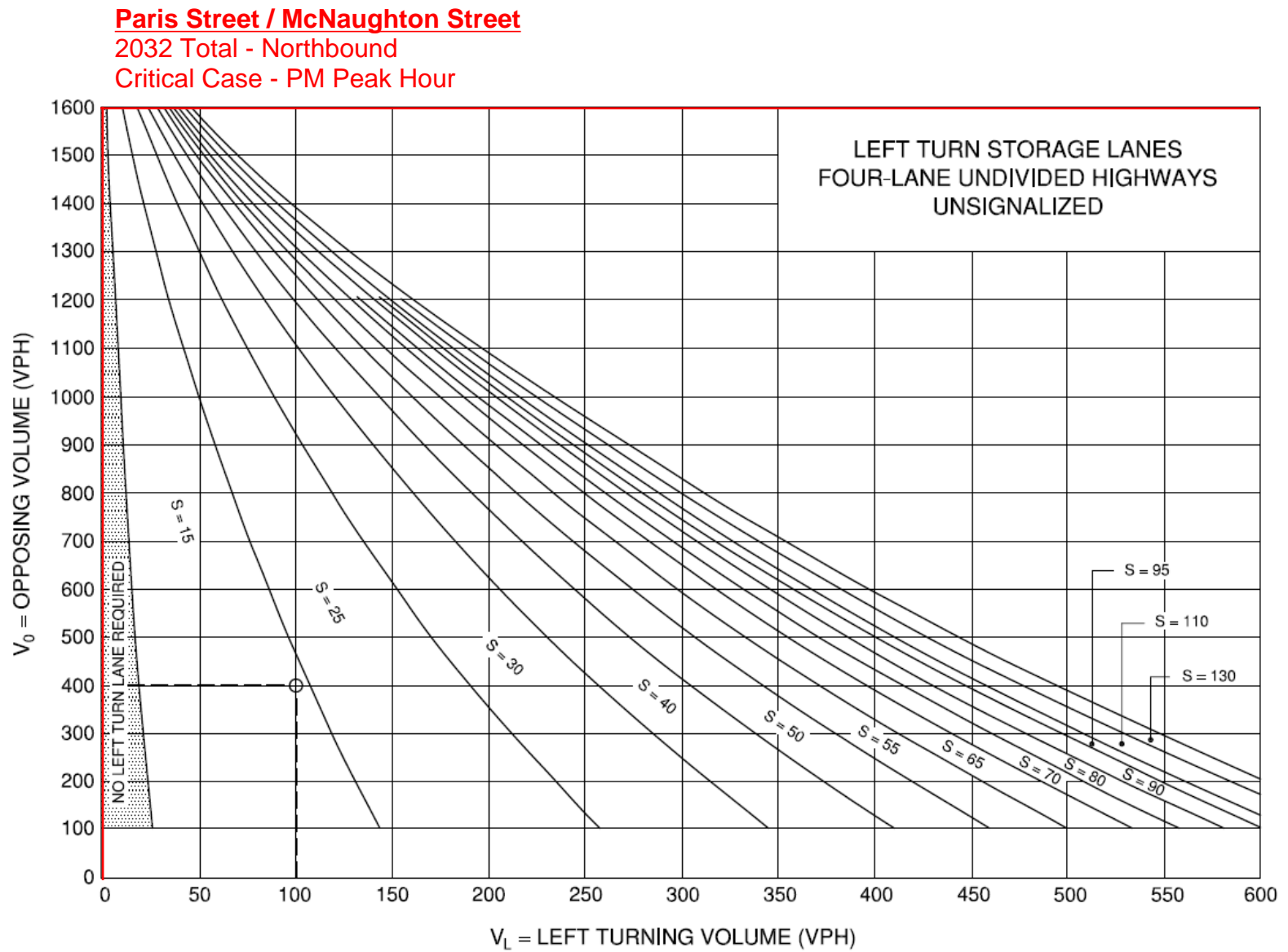
Critical Case - AM Peak Hour



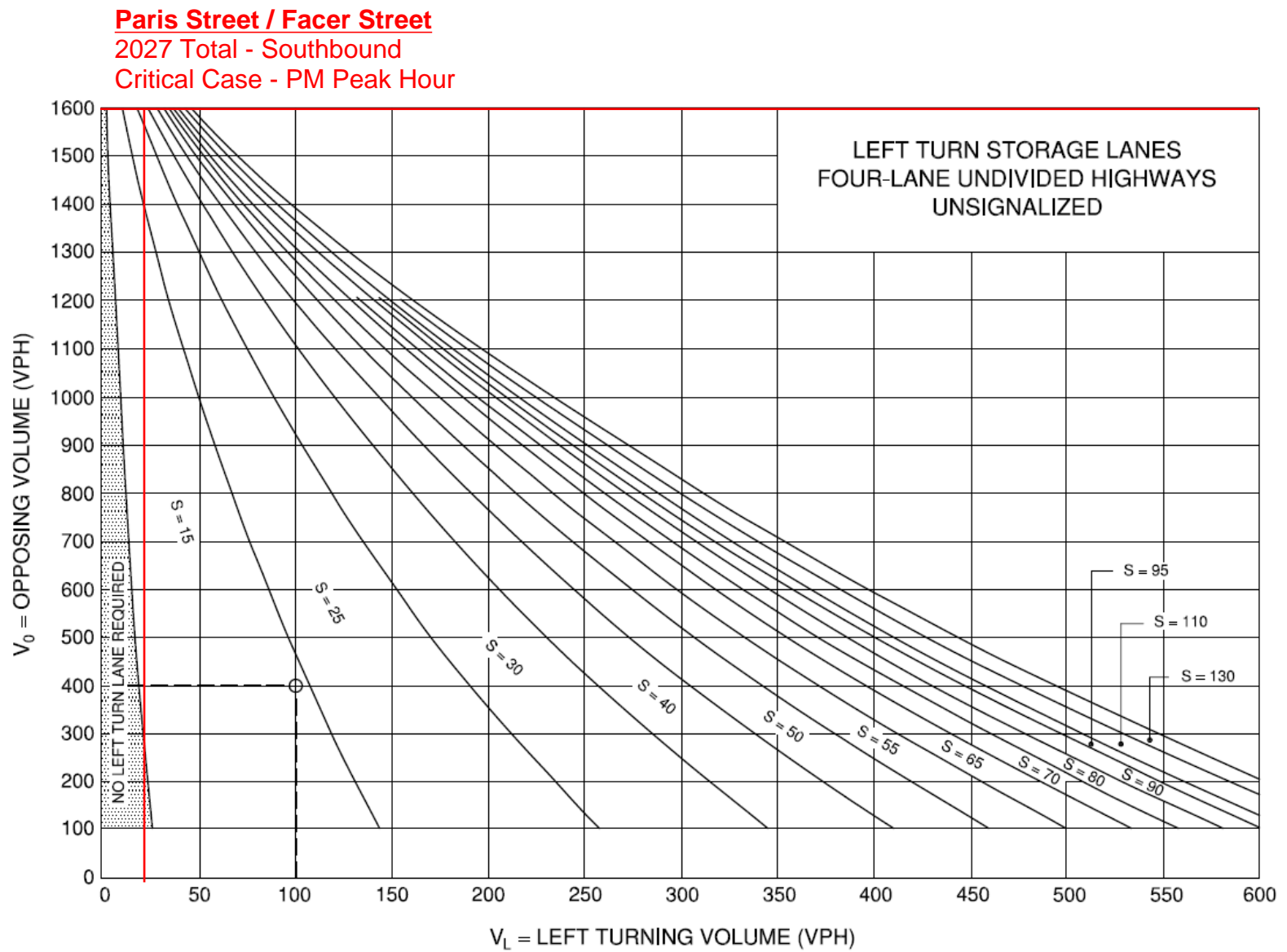
**Exhibit 9A-30**



**Exhibit 9A-30**

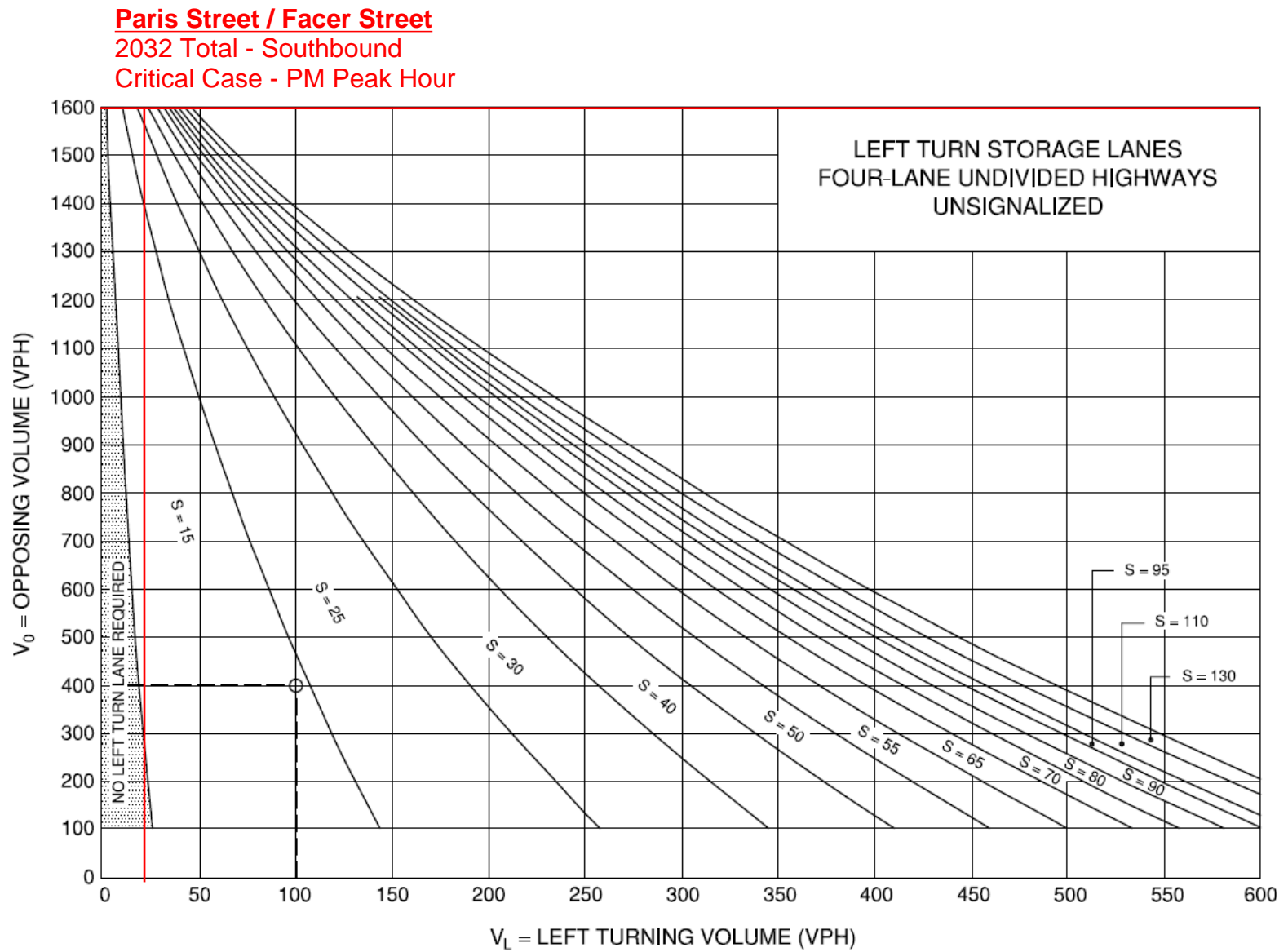


**Exhibit 9A-30**





**Exhibit 9A-30**



## **Appendix H – OTM Signal Justification Sheets**

**Justification No. 7 - 2032 Total Traffic (Critical Case)**

Paris Street / McNaughton Street

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
			Rest. Flow	Numerical			
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	900	1908	212%	5%	YES	YES
	B. Vehicle volume, along minor streets (average hour)	170	9	5%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	900	1894	210%	2%	YES	YES
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	170	4	3%		NO	NO

**Justification No. 7 - 2032 Total Traffic (Critical Case)**

Paris Street / Facer Street

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
			Rest. Flow	Numerical			
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	900	1895	211%	3%	YES	YES
	B. Vehicle volume, along minor streets (average hour)	255	10	4%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	900	1884	209%	0%	YES	YES
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	170	1	1%		NO	NO

**Justification No. 7 - 2032 Total Traffic (Critical Case)**

Bell Park Road / Facer Street

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
			Rest. Flow	Numerical			
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	720	21	3%	2%	NO	NO
	B. Vehicle volume, along minor streets (average hour)	255	9	3%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	3	0%	0%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	10	14%		NO	NO



## Appendix I – NCHRP Internal Capture Reports

NCHRP 684 Internal Trip Capture Estimation Tool					
<b>Project Name:</b>	700 Paris Street	<b>Organization:</b>	JD Engineering		
<b>Project Location:</b>	City of Greater Sudbury	<b>Performed By:</b>	Allister Aresta		
<b>Scenario Description:</b>	Build-Out	<b>Date:</b>	Friday, December 23 / 2022		
<b>Analysis Year:</b>	2027	<b>Checked By:</b>	John Northcote		
<b>Analysis Period:</b>	AM Street Peak Hour	<b>Date:</b>	Friday, December 23 / 2022		

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips <sup>3</sup>		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				0		
Restaurant				84	43	41
Cinema/Entertainment				0		
Residential				36	9	27
Hotel				0		
All Other Land Uses <sup>2</sup>				0		
				120	52	68

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized
Office						
Retail						
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment						
Residential	1.00	0%	0%	1.00	0%	0%
Hotel						
All Other Land Uses <sup>2</sup>						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	5	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	120	52	68
Internal Capture Percentage	8%	10%	7%
External Vehicle-Trips <sup>5</sup>	110	47	63
External Transit-Trips <sup>6</sup>	0	0	0
External Non-Motorized Trips <sup>6</sup>	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	N/A	N/A
Restaurant	12%	0%
Cinema/Entertainment	N/A	N/A
Residential	0%	19%
Hotel	N/A	N/A

<sup>1</sup> Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
<sup>2</sup> Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
<sup>3</sup> Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i> ).
<sup>4</sup> Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.
<sup>5</sup> Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.
<sup>6</sup> Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

<b>Project Name:</b>	700 Paris Street
<b>Analysis Period:</b>	AM Street Peak Hour

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	0	0	1.00	0	0
Restaurant	1.00	43	43	1.00	41	41
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	9	9	1.00	27	27
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	13	6		0	2	1
Cinema/Entertainment	0	0	0		0	0
Residential	1	0	5	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	10	0	0	0
Retail	0		22	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	9	0		0
Hotel	0	0	3	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	0	0	0	0	0	0
Restaurant	5	38	43	38	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	9	9	9	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	0	0	0	0	0	0
Restaurant	0	41	41	41	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	5	22	27	22	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

<sup>2</sup>Person-Trips

<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

\*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	700 Paris Street	Organization:	JD Engineering		
Project Location:	City of Greater Sudbury	Performed By:	Allister Aresta		
Scenario Description:	Build-Out	Date:	Friday, December 23 / 2022		
Analysis Year:	2027	Checked By:	John Northcote		
Analysis Period:	PM Street Peak Hour	Date:	Friday, December 23 / 2022		

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips <sup>3</sup>		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				0		
Restaurant				62	32	30
Cinema/Entertainment				0		
Residential				38	24	14
Hotel				0		
All Other Land Uses <sup>2</sup>				0		
				100	56	44

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized
Office						
Retail						
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment						
Residential	1.00	0%	0%	1.00	0%	0%
Hotel						
All Other Land Uses <sup>2</sup>						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	4	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	3	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	100	56	44
Internal Capture Percentage	14%	13%	16%
External Vehicle-Trips <sup>5</sup>	86	49	37
External Transit-Trips <sup>6</sup>	0	0	0
External Non-Motorized Trips <sup>6</sup>	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	N/A	N/A
Restaurant	9%	13%
Cinema/Entertainment	N/A	N/A
Residential	17%	21%
Hotel	N/A	N/A

<sup>1</sup> Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
<sup>2</sup> Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
<sup>3</sup> Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i> ).
<sup>4</sup> Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made
<sup>5</sup> Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.
<sup>6</sup> Person-Trips
<sup>*</sup> Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

<b>Project Name:</b>	700 Paris Street
<b>Analysis Period:</b>	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	0	0	1.00	0	0
Restaurant	1.00	32	32	1.00	30	30
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	24	24	1.00	14	14
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	1	12		2	5	2
Cinema/Entertainment	0	0	0		0	0
Residential	1	6	3	0		0
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	1	0	1	0
Retail	0		9	0	11	0
Restaurant	0	0		0	4	0
Cinema/Entertainment	0	0	1		1	0
Residential	0	0	4	0		0
Hotel	0	0	2	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	0	0	0	0	0	0
Restaurant	3	29	32	29	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	4	20	24	20	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	0	0	0	0	0	0
Restaurant	4	26	30	26	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	11	14	11	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	0	0	0	0	0

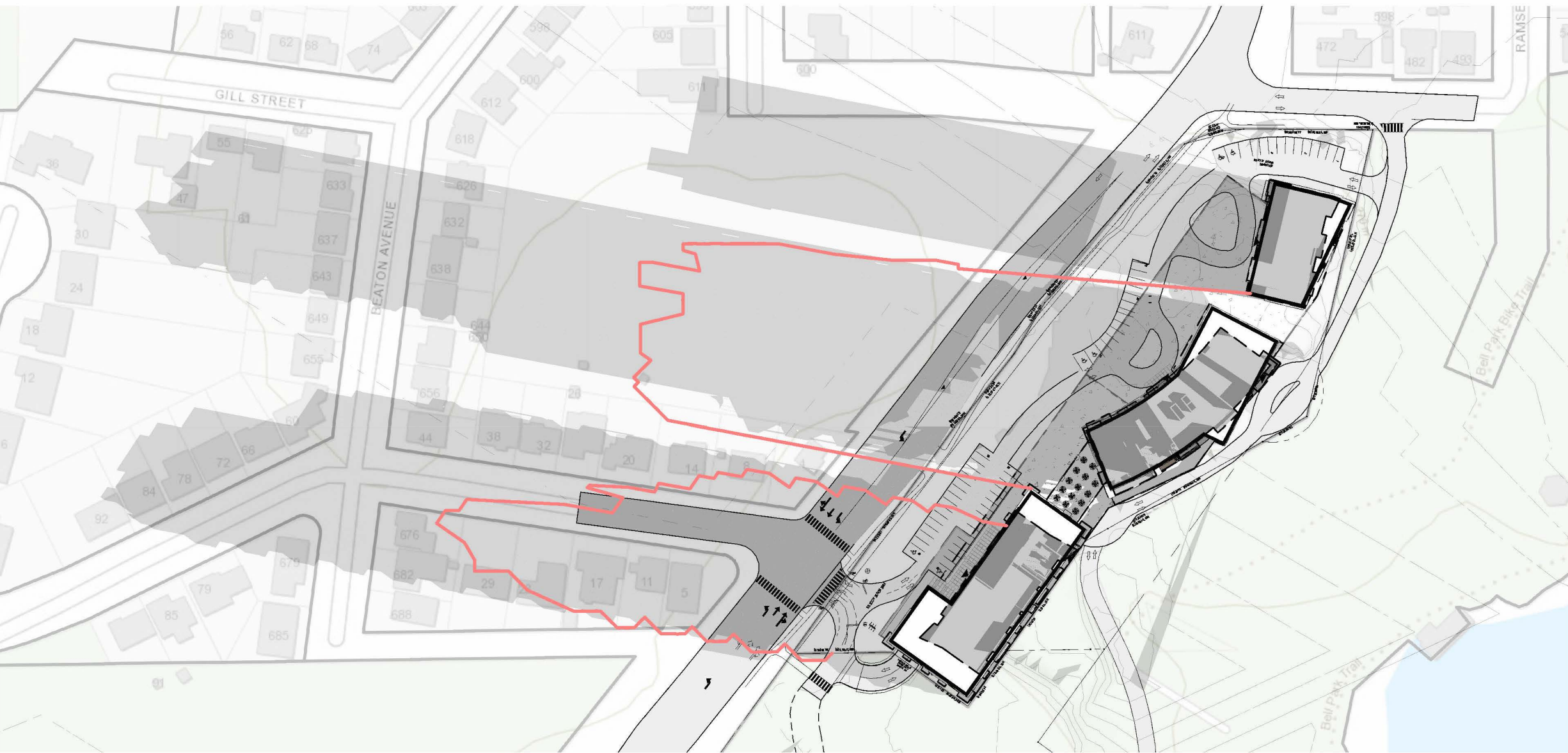
<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

<sup>2</sup>Person-Trips

<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

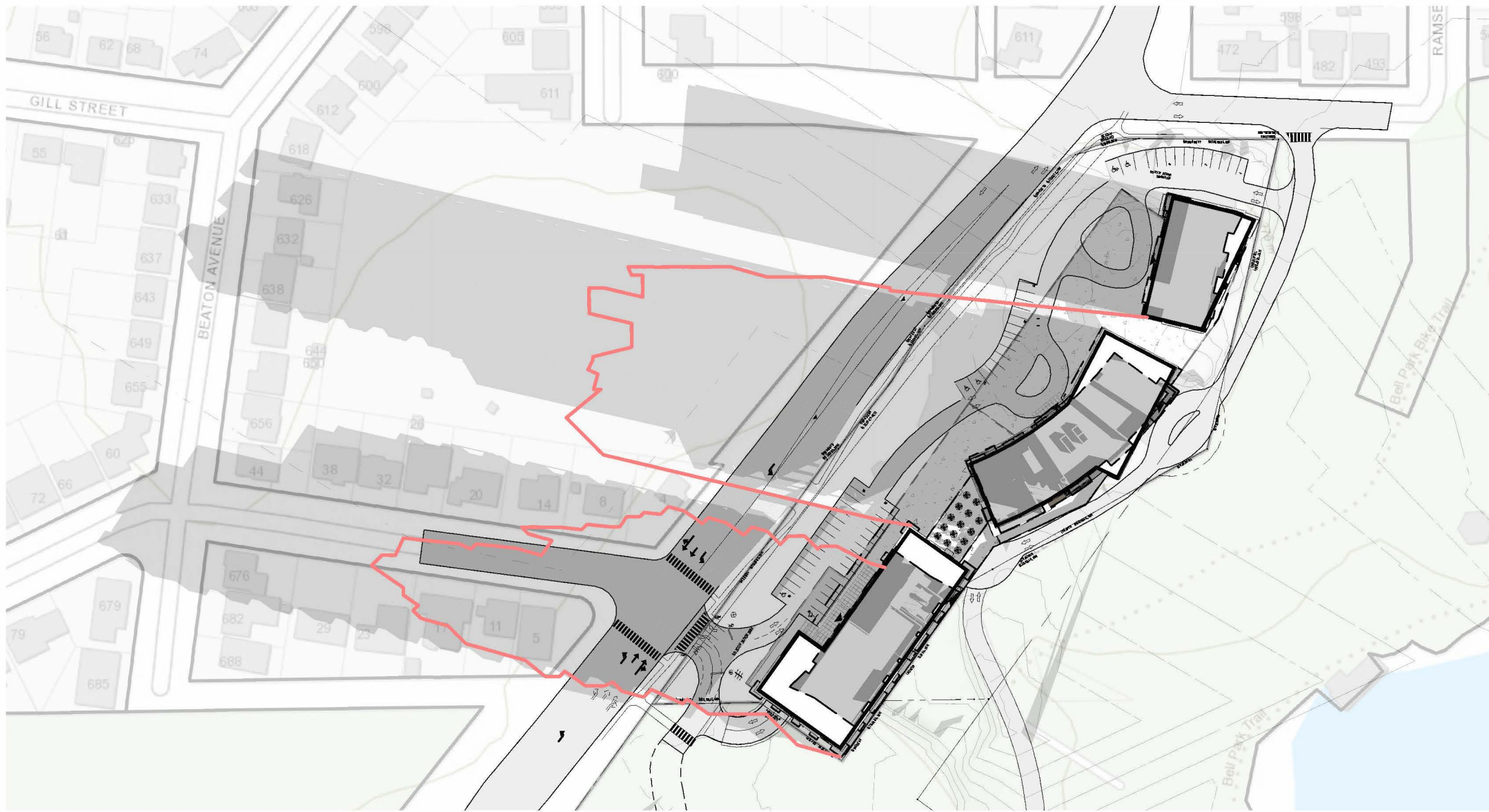
\*Indicates computation that has been rounded to the nearest whole number.





MARCH 21 7.30AM

1 : 1750



SEPTEMBER 21 7.30AM

1 : 1750

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NO.	DATE:	REVISION:	BY:
1	JULY 29 2019	SCHEMATIC CONCEPTS	JMR/MDA
2	AUG. 7 2019	SCHEMATIC CONCEPTS	JMR/MDA
3	MAY 7 2021	PARKING GARAGE LAYOUT	CH
4	JUNE 18 2021	REVISED BLD. HEIGHTS	CH
5	AUG. 4 2022	SHADOW STUDIES	CH
6	JULY 2023	JULY SHADOWS ADDED	CH

COMMISSION:

PROPOSED MIXED USE DEVELOPMENT

700 PARIS STREET, SUDBURY, ONTARIO

N

A · C · K  
architects  
STUDIO INC.

Architectural Office:  
290 Glendale Ave., St. Catharines, ON, L2T 2L3  
905 984 5545

SHEET TITLE:

SHADOW STUDY

Issued for Re-Zoning

Issued for Site Plan Agreement:

Issued for Permit:

Issued for Tender:

Issued for Construction:

DRAWN BY: JMR

CHECKED BY: MDA

DATE: JULY 2019

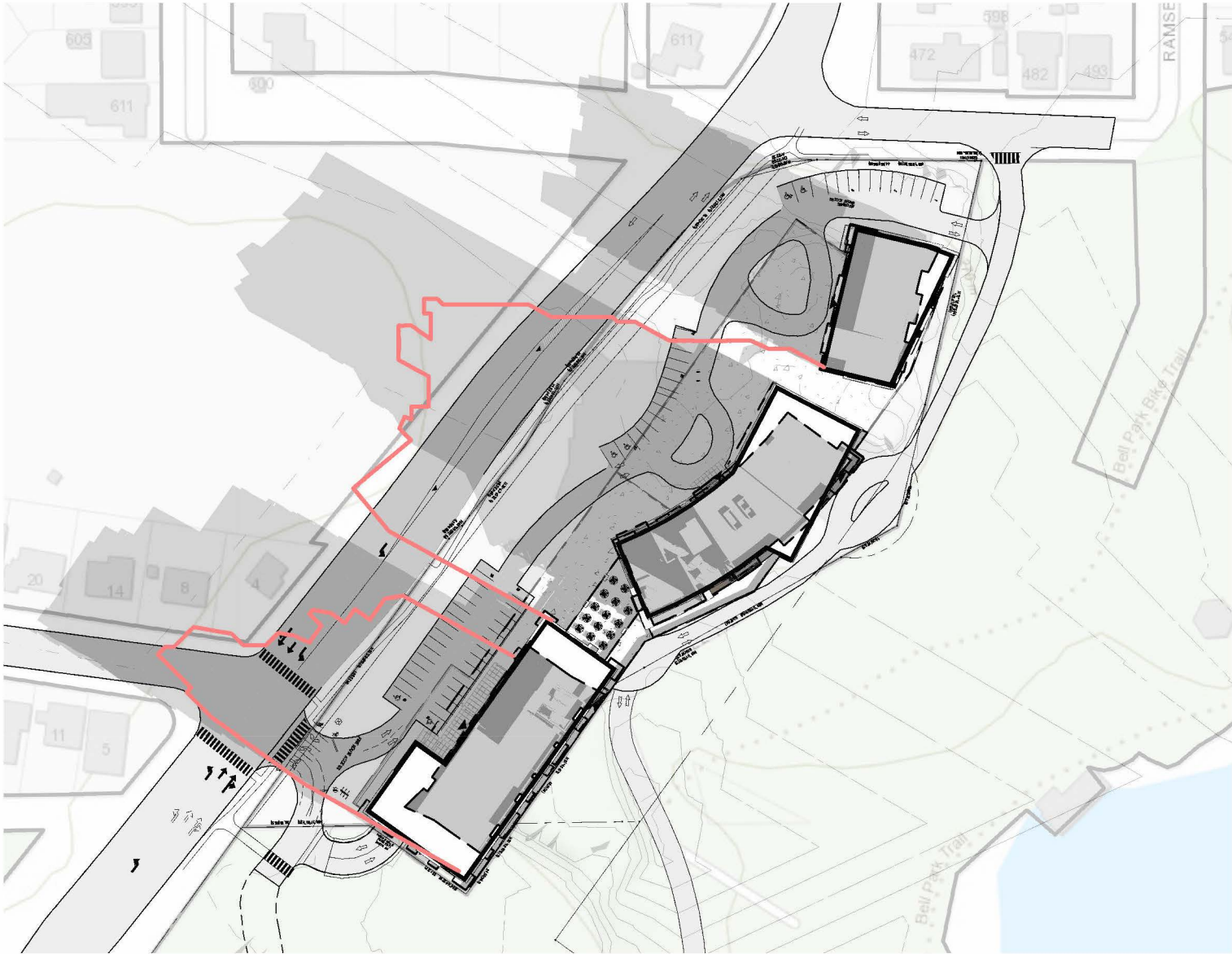
SCALE: AS SHOWN

PROJECT No.: 2010-210

DWG. No.

SS0





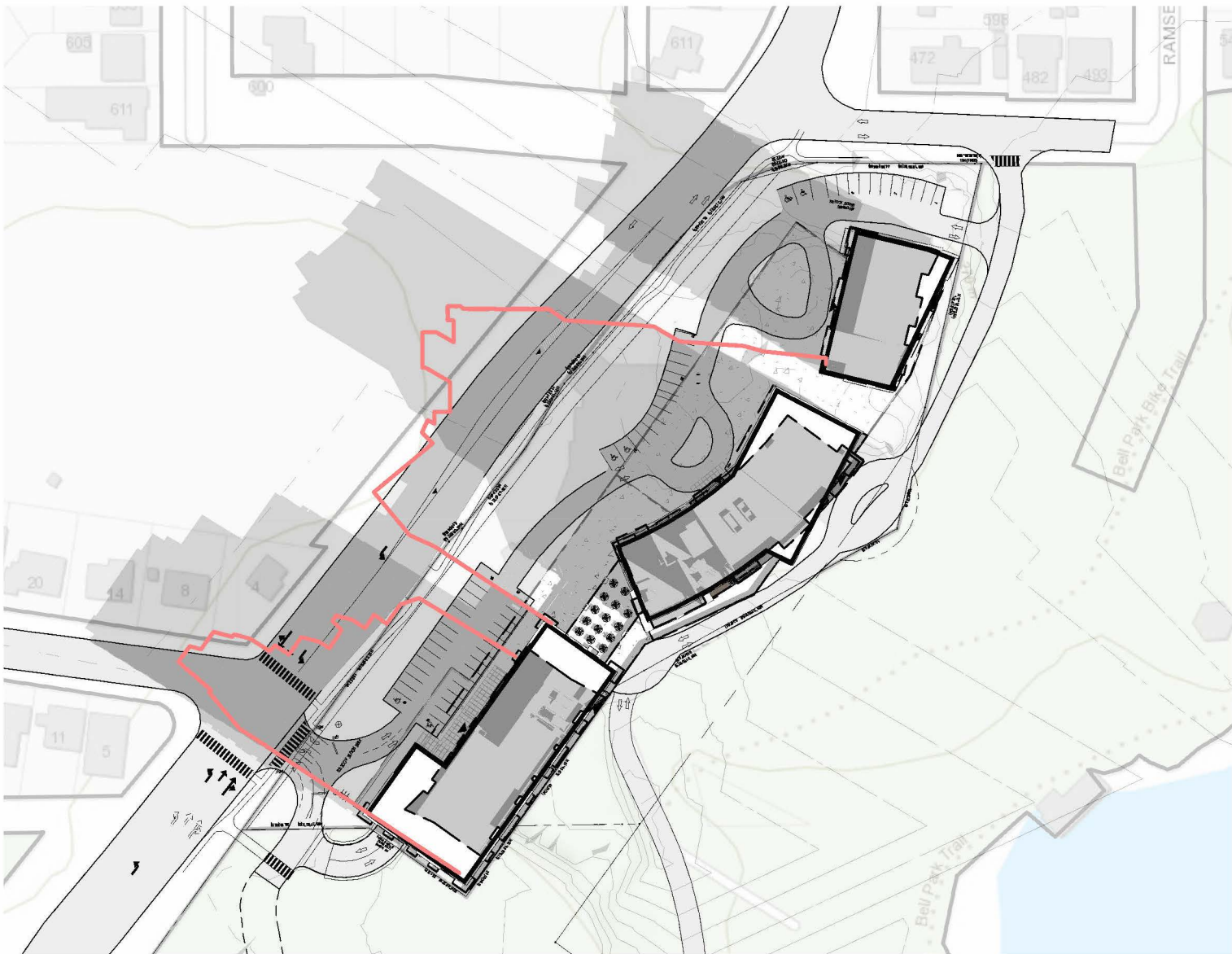
MARCH 21 9AM  
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MARCH 21 12PM  
1 : 1750



MARCH 21 3PM  
1 : 1750



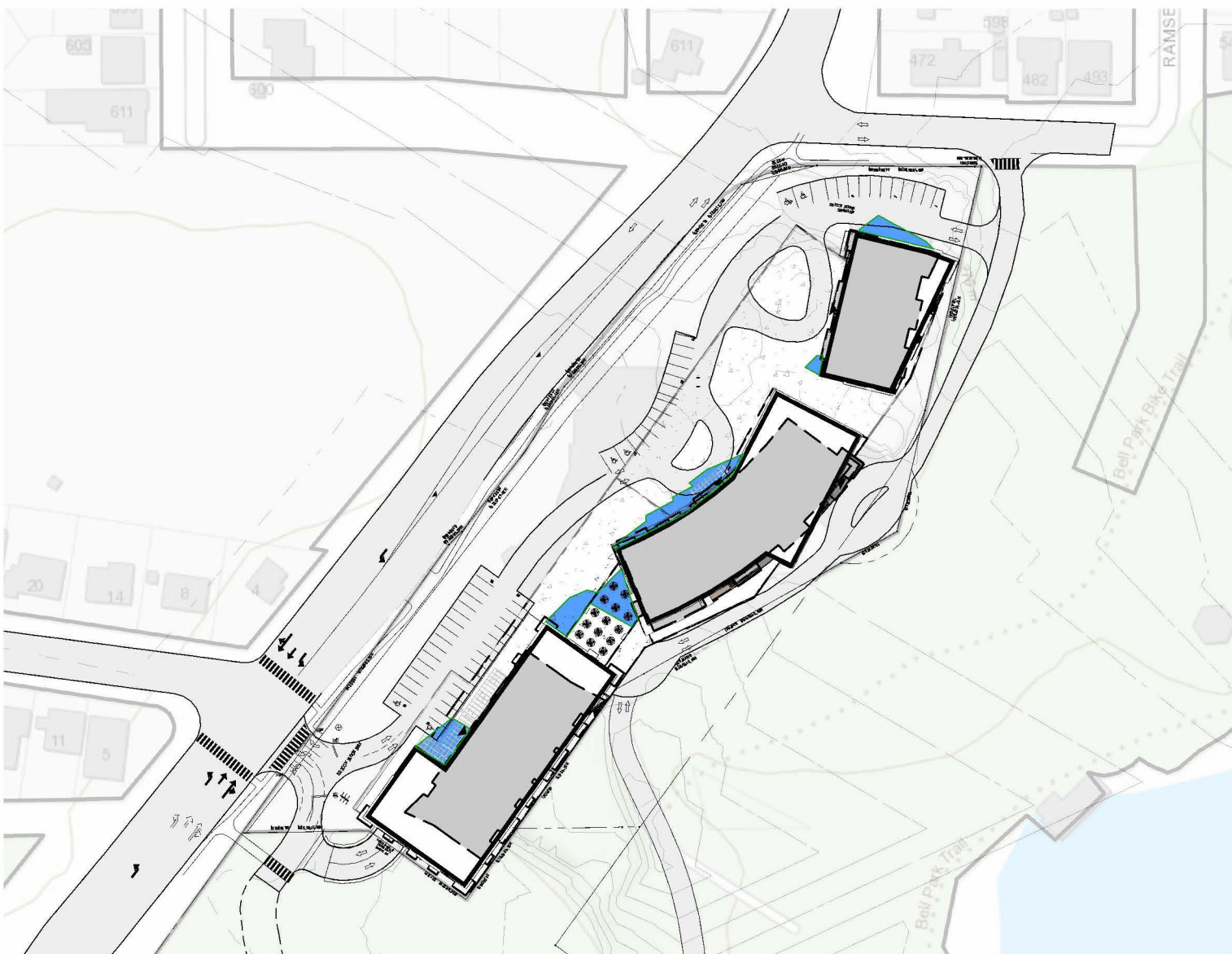
SEPTEMBER 21 9AM  
1 : 1750



SEPTEMBER 21 12PM  
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SEPTEMBER 21 3PM  
1 : 1750



ALWAYS SHADED (DECEMBER - FEBRUARY)  
1 : 1750

BASED ON OVERLAID SHADING OF THE FOLLOWING DATES/TIMES:  
DECEMBER 1ST 9AM, 12PM, 3PM  
FEBRUARY 21ST 9AM, 12PM, 3PM

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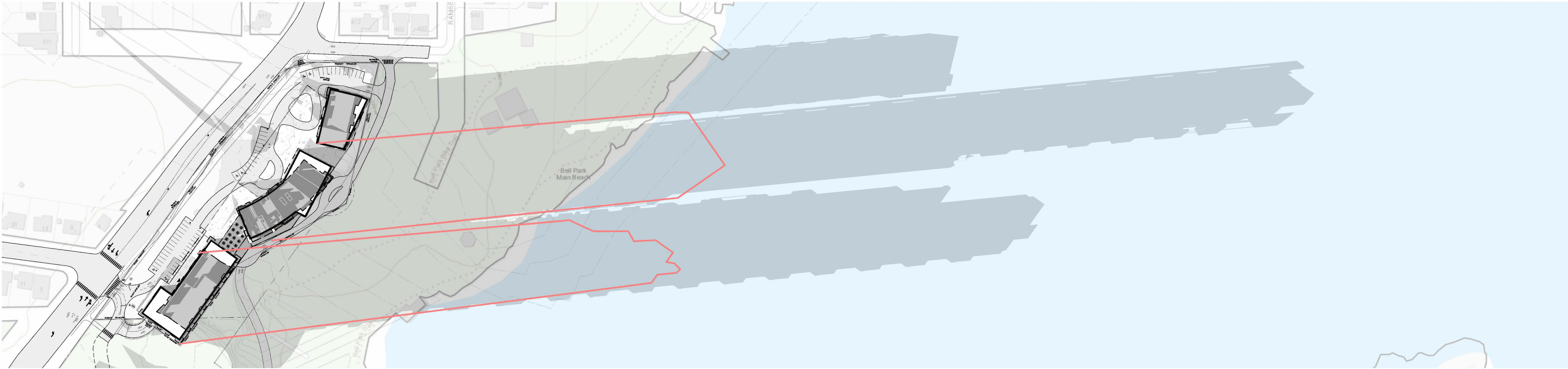
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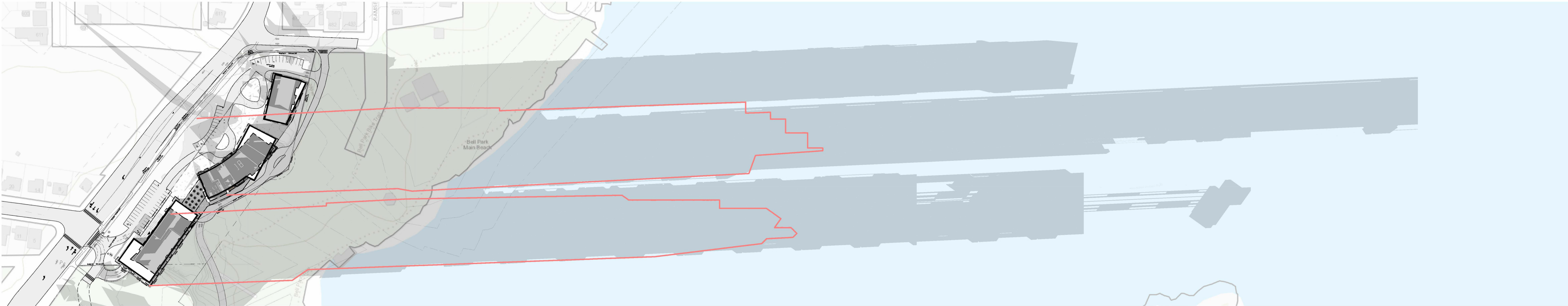
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CHECKED BY:	MDA	
DATE:	JULY 2019	
SCALE:	AS SHOWN	
PROJECT No.:	2010-210	

SS1





MARCH 21 6PM  
1 : 1750



SEPTEMBER 21 6PM  
1 : 1750

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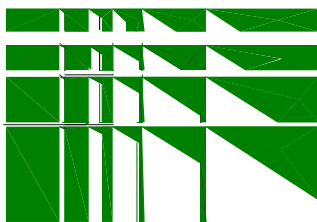
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SS2





**THEAKSTON ENVIRONMENTAL**  
**Consulting Engineers**  
596 Glengarry Cr., P.O. Box 390  
Fergus Ontario N1M 3E2

Telephone: (519) 787-2910  
Facsimile: (519) 787-2918  
[www.theakston.com](http://www.theakston.com)  
[spollock@theakston.com](mailto:spollock@theakston.com)

**September 19, 2023**

## **Preliminary Pedestrian Level Wind Assessment**

**700 Paris Street**  
**Sudbury, Ontario**

**Theakston Project No. 23037 (22898)**

**Submitted To:**

**Panoramic Properties**  
**Angelo Butera, President**  
**9582 Beaverdam Road**  
**Niagara Falls, ON**  
**L2E 6S4**

**Submitted By:**

**Theakston Environmental**  
**Consulting Engineers**  
**596 Glengarry Crescent**  
**Fergus, Ontario**  
**N1M 3E2**

**Stephen Pollock, P.Eng.**

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## 1. EXECUTIVE SUMMARY

Based upon our analysis, wind conditions on and around the proposed 700 Paris Street Development site are considered mainly suitable for standing, or better, throughout the year in the existing setting.

The proposed 700 Paris Street Development occupies a portion of a block of land bound by Facer Street to the north, Bell Park Road to the east, and Paris Street to the west, within the City of Sudbury, Ontario. The former St. Joseph's Health Centre currently occupies the site and will be removed.

The 700 Paris Street Development involves a proposal to construct 3 residential buildings, 20, 16 and 12 storeys in height. Outdoor Amenity Space is proposed on the 13<sup>th</sup> floor of Building A, the 13<sup>th</sup>, 14<sup>th</sup>, and 20<sup>th</sup> floors of Building B, and at-grade and at the 3<sup>rd</sup> floor of Building C.

With inclusion of the proposed Development, prevailing pedestrian comfort conditions are predicted to remain comfortable and suitable for mainly standing, or better, under normal to high ambient wind conditions. Localised areas proximate to the north and southmost corners of the Development and in the gaps between the buildings will realise windier conditions on occasion. Additional mitigation is recommended for the Main Entrances and Outdoor Amenity Spaces to improve pedestrian comfort conditions and extend the useability of the areas into the shoulder seasons. To the extent mitigation may be warranted is best assessed through quantitative analysis.

The overall upset to pedestrian comfort conditions with inclusion of the proposed Development is well managed by the proposed Development's wind mitigative design features, resulting in conditions that are, in many cases, similar to the existing setting.

Should you have questions or comments, please do not hesitate to call.

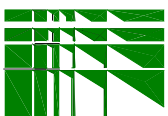
Kindest regards,



Emily Prevost, EIT



Stephen Pollock, P.Eng





## 2. INTRODUCTION

Panoramic Properties has retained Theakston Environmental Consulting Engineers to conduct a preliminary pedestrian level wind assessment for the proposed residential development at 700 Paris Street, Sudbury, Ontario, herein referred to as the proposed Development. The assessment is based upon project plans prepared by ACK Architects Studio Inc. The objective of this preliminary analysis is to estimate pedestrian level wind conditions resulting from inclusion of the proposed Development, relative to comfort and safety. The analysis is based upon the historical wind conditions and our experience with similar microclimatic analyses that were conducted on other properties in the area and/or on similar projects. The qualitative assessment utilises numerical analysis of local wind data predicted at the site and provides a synopsis of pedestrian comfort conditions anticipated on, and adjacent to, the property.

## 3. SITE INFORMATION & PROPOSED DEVELOPMENT

The proposed Development occupies a block of land south of Facer Street, bounded by Paris Street to the west and Bell Park Road to the east, within the City of Sudbury, Ontario. The site is currently occupied by the former St. Joseph's Health Care, pictured below, which will be removed.



*700 Paris Street existing site, looking north from adjacent parking lot*

The Development involves a proposal to construct 3 residential buildings, denoted Building A, Building B, and Building C. The buildings are 16, 20, and 12 storeys in

height, respectively. Outdoor Amenity Spaces are proposed at the 13<sup>th</sup> floor of Building A, 13<sup>th</sup>, 14<sup>th</sup>, and 20<sup>th</sup> floors of Building B, and at-grade and at the 3<sup>rd</sup> floor of building C. The Main Residential Entrances to the buildings are proposed along the northwest façades, accessed via a private driveway parallel to Paris and Facer Streets. The site plan is shown in Figure 2.

#### **4. SURROUNDING AREA**

Low-rise residential buildings, open spaces, and mature vegetation, for all intents and purposes, surround the site, as indicated in Figure 1.

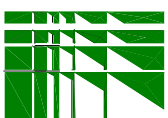
Lands to the immediate north of the proposed Development are occupied by low-rise, single detached houses and mature vegetation. Mature vegetation, low rise concession buildings and open spaces associated with Bell Park occupy the land to the immediate east through south of the proposed Development which slopes down towards Ramsey Lake. A municipal parking lot occupies the land southwest of the proposed Development, accessed via Paris Street. Lands to the immediate west of Paris Street are comprised of rocky hillside and vegetation, with low-rise, single detached houses beyond.

The suburban landscape has mitigative effects upon the wind climate to varying degrees, providing surface roughness that reduces the wind's energy at the pedestrian level. Conversely, the more open areas of Ramsey Lake present a relatively smooth surface to approaching winds, affording wind the opportunity to accelerate.

#### **5. METEOROLOGICAL DATA**

Historical weather data recorded at the Greater Sudbury Airport were analysed for the seasons, and the resulting wind roses presented as velocity and percent frequency in Figure 3. The airport is approximately 21km to the northeast of the site, which, considered in concert with the site's distance from Ramsey Lake, indicate the wind climate at the proposed Development is well represented by said airport. From the historical wind data, it is apparent that winds can occur from any direction, however, the data indicates the directional characteristics of strong winds at Greater Sudbury Airport are most likely to occur from the southwest and the northwest through northeast quadrant, with a far less significant northeast through southeast component.

The historical meteorological data presented in the wind roses is measured at an elevation of 10m. This data is numerically processed with AERMET, a meteorological processor that considers wind speed and direction. Thus, representative ground level velocities at a



height of 2m, for a suburban macroclimate, are 63% of the mean values indicated on the wind rose. For urban and rural macroclimates, the values are 52% and 78%, respectively.

The macroclimate for the subject site is considered suburban. Figure 3 depicts wind velocity categories relative to directionality at the airport with strong winds, greater than 31.7km/h, occurring approximately 1.3% of the time during the summer and 5.5% during the winter, and emanating from the aforementioned quadrants during both the winter and summer seasons, with calm conditions occurring approximately 0.27% of the time during the summer and 0.32% of the time during winter.

## 6. COMFORT CRITERIA

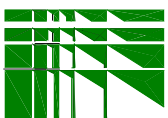
The assignment of pedestrian comfort takes into consideration pedestrian safety and comfort attributable to mean and gust wind speeds. Gusts have a significant bearing on safety, while winds flowing at or near mean velocities have a greater influence upon comfort. The effects of mean and gust wind conditions are described as suitable for Sitting, Standing, Walking, or Uncomfortable over 80% of the time.

In order for a point to be rated as suitable for Sitting, for example, the wind conditions must be less than 10 km/h. The rating would include conditions ranging from calm up to wind speeds that would rustle tree leaves or wave flags slightly. As the name infers, the category is recommended for outdoor space such as terraces and patios where people might sit for extended periods and generally applied to the summer months.

The Standing category is slightly more tolerant of wind, including wind speeds from calm up to 15km/h. In this situation, the wind would rustle tree leaves and, on occasion, move smaller branches while flags would be partially extended. This category would be suitable for locations where people might sit for short periods or stand in relative comfort, such as building entrances and drop-off areas.

The Walking category includes wind speeds from calm up to 20km/h. These winds would set tree limbs in motion, lift leaves, litter and dust, and the locations are suitable for sidewalks and parking.

The Uncomfortable category covers a broad range of wind conditions, including wind speeds above 20km/h. These winds would set trees in motion, cause inconvenience when walking, and are not generally suitable to activities. Safety concerns are associated with wind speeds that are beyond the uncomfortable category, being sufficient to affect a person's balance.



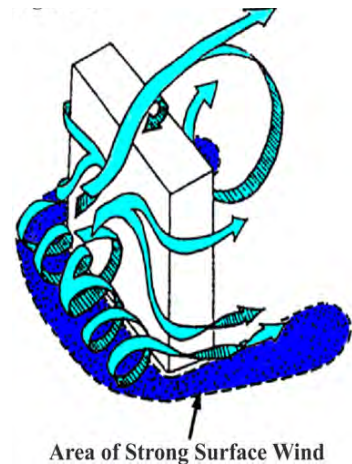
Many variables contribute to a person's perception of the wind environment beyond the seasonal variations presented. While people are generally more tolerant of wind during the summer months, than during the winter, due to the wind cooling effect, people become acclimatized to a particular wind environment. Persons dwelling near the shore of an ocean, large lake or open field are more tolerant of wind than someone residing in a sheltered wind environment.

## 7. PEDESTRIAN LEVEL WIND ASSESSMENT

Variables beyond the orientation and conformation of a proposed development must be considered in predicting wind speed and occurrence at a given location. These include the previously discussed historical wind climate, surrounding terrain, and neighbouring buildings, each of which is quantified and/or analysed in the microclimatic analysis of pedestrian level winds. The results of such quantitative analyses have afforded a knowledge base that allows an estimation of pedestrian level wind conditions.

The site and surrounds, in the present circumstances as a mix of suburban residential neighbourhoods, mature vegetation, and open spaces, have a sympathetic relationship with the existing wind climate. Suburban development provides turbulence inducing surface roughness that can be wind friendly, while open settings afford wind the opportunity to accelerate as the wind's boundary layer profile thickens at the pedestrian level, owing to lack of surface roughness. Transition zones from open to suburban settings can prove problematic, as winds exacerbated by the open setting are redirected to flow over, down, around and between buildings.

High-rise buildings may exacerbate wind conditions within their immediate vicinity, to varying degrees, by redirecting wind currents to the ground level and along streets and open areas. Wind tends to split upon impact with a high-rise building, as pictured, with portions flowing up and over the building without consequence to the pedestrian level, along the facades of the building, around the corners and beyond, or down the face of the building to the pedestrian level as downwash, where it is deflected, or otherwise redirected to flow along the building and around its corners, creating localized zones of increased pedestrian level wind. Conversely, points situated to the leeward, or in the wake of buildings will often enjoy an improvement in pedestrian comfort. It is reasonable to expect the inclusion of the proposed development will alter wind conditions under specific wind directions and velocities from those of the existing



site condition, resulting in an improvement over the existing conditions at some points, with more windy conditions at others.

Wind approaching façades at skewed angles will, for the most part, split upon contact with the building and flow along the façades. Wind approaching at near right angles to the building generally result in the propensity for a downwash of wind to the pedestrian level, the magnitude of which is dependent upon several variables. Those variables commanding primary consideration are the building height, and the effective width of the presented façade.

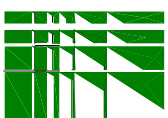
### **Discussion of Northerly Winds**

Northerly winds make up a moderate percentage of the prevailing wind climate, tend to be of mid- to high velocity, with a higher percentage of stronger winds expected in the winter and spring seasons. Northerly winds are preconditioned upon approach by low-rise residential houses, associated open spaces, mature vegetation, and a rock cut, that will induce some turbulence into the wind's approach flow, reducing the wind's energy realized at the pedestrian level.

### **Proposed Setting**

Northerly winds approaching the site at higher streamlines will come into contact with the upper levels of the north and northwest façades of the proposed Development. The winds will display a propensity to split upon contact with the building's northmost corners to flow up and over the rooftops, along the façades of the buildings, around the corners and beyond, with portions, depending upon the angle of incidence, downwashing towards the pedestrian level. The winds that deflect to flow up and around the proposed Development at elevations above the pedestrian level will have little consequence on the pedestrian level wind climate. Downwash to the pedestrian level is well mitigated by the skewed angle of northerly winds impact, balconies, podiums, stepped façades and canopies, however, downwash that finds its way to the pedestrian level will be redirected along the façades of the buildings, around the corners, and through the gaps between, before dissipating over the coarser terrain of Bell Park.

Northerly winds approaching the site in lower streamlines will similarly contact the north façade of Building C and, the northmost corners and adjacent façades of Buildings A and B, where the wind streamlines will split and flow along the northwest façades of the buildings, around corners, in gaps, and beyond.





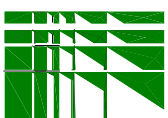
As a result, conditions along the northwest façades of the buildings are mainly predicted suitable for standing on the occasion of northerly winds, with localised conditions suitable for walking near the northeast corner of Building C, the southwest corners of Building B and Building A, and in the gaps between the buildings. Areas along the southeast façades of the proposed Development, as well as south of Building A, are within the aerodynamic shade region of the Development for northerly winds and as a result will realise conditions suitable for sitting throughout much of the year.

The Main Entrances to the proposed Development are located centrally along the northwest façades of the buildings and are subjected to northerly winds that are redirected to flow along the buildings' façades. The Entrances are well removed from the corners and are protected from downwash by canopies, balconies, and/or podiums, and will be suitable for standing most of the time, walking on the occasion of high ambient northerly winds, and are considered appropriate for their intended use most of the time. Mitigation is recommended in order to achieve more comfortable conditions throughout the year and can include recessing the Entrances into their façades such that wind cannot act upon the door leaves, utilizing revolving or sliding doors, incorporating wind screens perpendicular to the façades, including coniferous and/or marcescent vegetation, raised planter beds populated with dense vegetation, trellises, and others.

The proposed Development is well removed from Paris Street and Facer Street and, as such, sidewalk conditions are predicted to remain similar to those of the existing setting, suitable for standing or walking, appropriate to their intended use with the inclusion of the proposed Development. Bell Park Road will realise protection from northerly winds with the inclusion of the proposed Development. Localized areas near the northeast corner of Building C, and near the gaps between the buildings, will experience windier conditions, suitable for standing or walking, however they remain appropriate for their intended use.

### **Discussion of Westerly Winds**

Westerly winds make up a smaller percentage of the prevailing wind climate, occurring slightly more frequently during the summer and fall months. They tend to be of lower velocity and are preconditioned upon approach by rocky terrain with mature vegetation and low-rise residential houses with mature vegetation beyond, providing some surface roughness to winds, decreasing the wind's energy realised at the pedestrian level upon approach.



### **Proposed Setting**

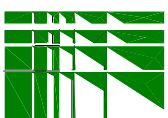
Westerly winds approaching in higher streamlines will similarly contact the westmost corners of the buildings, and/or the northwest façades of the buildings at a skewed angle. These winds will split to flow along the adjacent façades, around the corners and beyond, and to a lesser extent up and over the buildings. Portions of the westerly wind climate will also downwash towards the pedestrian level, however this is well mitigated by the skewed angle of approach, stepped façades, podiums, balconies and canopies that will interrupt winds before reaching the pedestrian level. Downwash that does reach the pedestrian level will be limited, but that which does occur will be redirected to flow along the façades of the buildings, around the corners, between the gaps, and beyond over Bell Park.

Winds approaching the site in lower streamlines similarly contact the westmost corners and façades of the buildings and will split to flow along the respective façades, around the corners and through the gaps between, resulting in localised windy conditions.

As a result, conditions along the Paris Street façades of the buildings are mainly predicted suitable for standing on the occasion of westerly winds, with localised conditions suitable for walking at the northwest corners of Buildings A, B, and C, the southmost corners of Building A, and in the gaps between the buildings. Areas along the eastern Bell Park façades of the proposed Development are within the aerodynamic shade region of the Development and will realise conditions suitable for sitting throughout much of the year. Areas leeward to the gaps or near Building A's southmost corners will be windy, but are expected to remain suitable to the intended purpose.

The Main Entrances located along the northwest façades of the buildings will be subjected to winds redirected to flow along the façades and, as a result, will be windy at times, however, they are predicted suitable for standing most of the time, and appropriate for their intended use. This rating is partially attributed to the Entrances being well removed from the corners and protected from downwash by the balconies, canopies, and/or stepped condition at the podium. Mitigation, as described above, is recommended at the Main Entrances.

Similar to northerly winds, the proposed Development is well removed from Paris Street and Facer Street and, as such, sidewalk conditions are expected to remain similar to the existing setting, suitable for their intended use, with inclusion of the proposed Development on the occasion of westerly winds. Bell Park Road will be in the aerodynamic shade region of the proposed Development for westerly winds, resulting in sitting conditions in these areas, with localized sections near the gaps in buildings experiencing higher wind speeds due to the funneling of winds between the buildings, resulting in conditions predicted suitable for walking.



## **Discussion of Southerly Winds**

Southerly winds make up a moderate percentage of the prevailing wind climate, tend to be of lower velocity, and are preconditioned on approach by an open parking lot to the southwest, affording wind the opportunity to accelerate, and mature vegetation and low-rise building to the southeast, introducing some turbulence to the approaching wind and reducing the wind's energy at the pedestrian level.

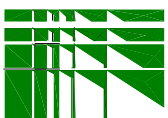
### **Proposed Setting**

Southerly winds approaching the site in higher streamlines will contact the southmost corners of the buildings and southeast façades at a skewed angle where they will split to varying degrees to flow along the adjacent façades. Downwash acting upon Buildings A and C will be limited due to the angle of incidence. Building B presents a broader façade to southerly winds, making it slightly more susceptible, however it features stepped conditions to the southwest, resulting in a modest contribution to winds realised at the pedestrian level.

Southerly winds, approaching at or near the pedestrian level will be significantly moderated upon approach by the landscape of Bell Park, comprised of a mature mix of deciduous and coniferous trees. Southerly winds, once upon Building A, will be redirected along the southeast and southwest façades of Building A, through the gap between Buildings A and B, and beyond. This will result in windy conditions in the gap between Buildings A and B and at the westmost corner of Building A. The gap between Buildings B and C is for the most part within the aerodynamic shade region of Building B and as such will be more comfortable, suitable for the intended purpose most of the time, on the occasion of southerly winds.

As such, conditions along the Bell Park Road façades of the buildings are mainly predicted suitable for standing on the occasion of southerly winds, with localised conditions suitable for walking near the southeast corner of Building A, the northeast corner of Building C, and the gaps between the buildings. Areas along the Paris Street façades of the proposed Development are within the aerodynamic shade region of the Development for southerly winds and as such will realise conditions suitable for sitting throughout much of the year, with localized areas near the west corner of Building A and between the buildings experiencing windier conditions, expected to be suitable for walking.

The Main Entrances located along the Paris Street façades of the buildings are in the aerodynamic shade region of the proposed Development, for southerly winds, and as such, are expected to be comfortable, suitable for sitting, and appropriate for their intended use.



Conditions along Bell Park Road will be exposed to larger portions of the southerly wind climate that are directed to flow around the proposed Development, resulting in conditions that are windy from time to time, but are expected to remain suitable for standing through most of the year. Paris Street and Facer Street are predominantly in the aerodynamic shade region of the proposed development for southerly winds, and as such, will realize conditions suitable for their intended purpose.

## **Discussion of Easterly Winds**

Easterly winds are infrequent and, as indicated by the historical weather data, are of moderate velocity, however they are often associated with storms. The approach terrain over Bell Park consists of mainly mature vegetation, a few low-rise buildings, open spaces, and Ramsey Lake beyond. Although easterly winds are afforded the opportunity to accelerate over Ramsey Lake, the mature vegetation induces turbulence, reducing the wind's energy at the pedestrian level.

### **Proposed Setting**

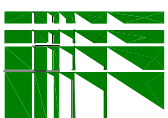
Easterly winds approaching the proposed Development in upper streamlines will contact the eastmost corners and southeast façades of the proposed Development where they will split to flow around the façades or downwash towards the pedestrian level below. Downwash will similarly be well mitigated by the wind's skewed angle of incidence, and the buildings' stepped façades, podiums and balconies.

Easterly winds approaching near the pedestrian level will similarly split upon contact with the proposed Development, flowing along the southeast façades, around the corners, between the buildings, and beyond towards Paris Street.

As a result, conditions along the southeast façades of the buildings are mainly predicted suitable for standing on the occasion of easterly winds, with localised conditions suitable for walking between the buildings, around the northeast corner of Building C and the southmost corner of Building A. Areas along the Paris Street façades of the proposed Development are within the aerodynamic shade region of the Development for easterly winds and as such will realise conditions suitable for sitting.

The Main Entrances along the southwest façades of the buildings are located within the aerodynamic shade region of the Development for easterly winds, and as such will be suitable for sitting and appropriate for their intended use.

Bell Park Road will be exposed to easterly winds that are directed to flow along the proposed Development, resulting in windier conditions than the existing site, but are considered suitable for standing most of the time, and appropriate for the intended use.



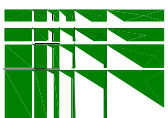
Paris Street is in the aerodynamic shade region of the proposed Development for easterly winds and will realize comfortable conditions also suitable for its' intended purpose.

### **Discussion of Ordinal Winds**

Ordinal Winds approaching from the northwest, northeast, southeast, and southwest also make up an appreciable percentage of the prevailing wind climate, particularly from the southwest and to a lesser degree, northeast, and can be of higher velocity, as depicted in Figure 3.

The proposed Development considered as a whole, is orientated with the long axis nearly parallel with the southwest and northeast wind directions, resulting in said winds coming into contact with relatively narrow façades, with the balance of the site being in the aerodynamic shade region of the windward building. Windy conditions would be expected along the southwest façade of Building A, in the event of high ambient southwesterly winds, as winds split upon impact and flow along the façade, around the corners and beyond. Similarly, the windward façade of Building C will experience windy conditions in the event of high ambient northeasterly winds, as wind splits upon contact to flow along the façade and around the corners, with the remainder of the site being situated in the aerodynamic shade region, experiencing much calmer conditions, once beyond the respective corners. As such, wind conditions resulting from said ordinal winds are expected to pose a less significant influence upon pedestrian comfort than the cardinal winds discussed above.

Winds approaching from the northwest and southeast make up a considerably smaller percentage of the wind climate, and are of mid - to higher velocity, particularly from the northwest. Northwesterly and southeasterly winds will contact the proposed Development at nearly right angles, to a lesser extent for Buildings B and C, increasing the propensity of downwash to the pedestrian level. However, downwash was effectively mitigated by the buildings being punctuated with balconies, stepped podiums and canopies above the entrances. Downwash that reaches the pedestrian level will be redirected along the respective façades, around the corners, between the buildings, and beyond, resulting in pedestrian comfort conditions that are very similar to those discussed for the cardinal directions.





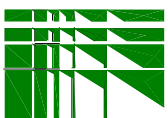
## Discussion of Outdoor Amenity Space

Outdoor Amenity Space is proposed on the 13<sup>th</sup> floor of Building A, the 13<sup>th</sup>, 14<sup>th</sup>, and 20<sup>th</sup> floors on Building B, and at-grade and at the 3<sup>rd</sup> floor of Building C. The amenity spaces are, for the most part, higher than the neighbouring surroundings and, as a result, are exposed to large portions of the wind climate that are not as effectively moderated upon approach compared to the windward ground level.

The proposed rooftop amenity space on the 13<sup>th</sup> floor of Building A is located along the northeast façade within the eastmost corner. The Amenity Space is located within the aerodynamic shade region of the 14<sup>th</sup> through 16<sup>th</sup> floors of Building A on the occasion of winds emanating from the near northwest through southwest, which make up a significant portion of the wind climate. The Amenity Space is similarly within the aerodynamic shade region of Building B for winds emanating from the near northeast, which make up a considerable portion of the wind climate, particularly in the spring and summer. As a result, the Amenity Space is predicted to experience comfortable conditions, suitable for sitting, under these wind conditions.

Conversely, the Amenity Space will be exposed to winds from the near north as well as southeast quadrant being redirected by the windward façades of Building A and Building B to flow along the façades and through the gap, resulting in windy conditions at times. Winds from the southeast quadrant occur less frequently, tend to be of lower velocity, and are not predicted to have a significant influence on the Amenity Space overall. Northerly winds will result in windy conditions from time to time and, as a result, 2.0m high wind screens are recommended around the perimeter of the space. The need for and extent of mitigation necessary is best determined through quantitative analysis.

Outdoor Amenity Spaces are proposed for Building B at the 13<sup>th</sup> and 14<sup>th</sup> floors along the southwest façade and a covered Roof Top Terrace at the 20<sup>th</sup> floor along the southeast façade, at the southmost corner of the building. Similar to above, the Amenity Spaces are located within the aerodynamic shade region of Building B for winds emanating from the northeast, which makes up a considerable portion of the wind climate, particularly in the spring and summer. They will also realise protection from Building A on the occasion of winds from the southwest, which make up a significant portion of the wind climate. The Amenity Space is predicted to experience comfortable conditions, suitable for sitting, under these wind conditions. Conversely, they will be exposed to winds from the remaining directions flowing along the northwest and southeast façades of Buildings A and B and through the gap between and, as a result, 2.0m high wind screens situated around the perimeter of the Amenity Spaces is recommended.



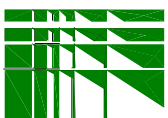
The 20<sup>th</sup> floor Covered Roof Top Terrace of Building B is located within the aerodynamic shade region of Building B for winds emanating from the west through north to northeast. The Rooftop Terrace will be exposed to winds emanating from the remaining compass points, unmitigated as it approaches over the lower surrounds. The Roof Top Terrace is covered, reducing exposure, however, 2.0m high wind screens are recommended to achieve conditions seasonally appropriate for the area's intended use. If more comfortable conditions are desired, coniferous vegetation, raised planter beds populated with coarse plantings, trellises, and/or others can be included in the mitigation plan.

Outdoor Amenity Spaces are proposed for Building C at-grade along the northwest façade, proximate to the northmost corner, and at the 3<sup>rd</sup> floor, along the southeast façade. The at-grade Patio Area will be protected by the Development for winds emanating from the east through south to southwest, however it is exposed to the remaining directions, which makes up much of the prevailing wind climate. Locating Amenity Spaces away from corners is preferable when practical. Consideration of existing and proposed landscape features will result in more comfortable conditions, however, the area is expected to be windy, and mitigation including wind screens, coniferous plantings, raised planter beds populated with coarse plantings, trellises, and others is recommended to achieve seasonally appropriate conditions for the area's intended use.

The Outdoor Amenity Space proposed along the southeast façade of Building C is located within the aerodynamic shade region of Building C for winds emanating from the north through west to southwest, making up a significant portion of the prevailing wind climate, resulting in comfortable conditions suitable for sitting, much of the time. The Amenity Space will be exposed to northeasterly winds flowing along the façade, which are common in the spring and summer. Incorporating a porous screen wall along the northeast façade of the building across the width of the Amenity Space would redirect northeasterly winds to flow around the Amenity Space, resulting in more comfortable conditions throughout the year. Winds emanating from the remaining compass points occur less frequently and are not likely to significantly influence comfort conditions.

## **Discussion of Residential Entrances**

The Main Residential Entrances to the proposed Development are located centrally along the northwest, Paris Street, façades of the buildings. Downwash is moderated by balconies, overhangs, stepped façades, and canopies. The Entrances will be exposed to winds from the northwest quadrant, while they are sheltered by the proposed



Development for winds emanating from the southeast quadrant. They are well removed from the buildings' corners, reducing the impact of winds from the remaining directions flowing along the façades, and around the corners. As a result, pedestrian comfort conditions at the Entrances are generally predicted to be suitable for standing most of the time, walking on the occasion of high ambient winds, and are considered appropriate for their intended use most of the time.

Comfort conditions appropriate for standing or better are preferable at building Entrances, and conditions suitable for walking are appropriate for the related sidewalks. A mitigation plan is recommended for the Entrances in order to achieve conditions more appropriate for their intended use throughout the year and can include recessing the entrances into the façades, utilizing revolving or sliding doors, incorporating wind screens perpendicular to the facades, including coniferous/marcescent vegetation, raised planter beds populated with dense plantings, trellises, and/or others.

With consideration of the aforementioned mitigative features, the Main Residential Entrances to the proposed Development are predicted to be comfortable and suitable for their intended use throughout the year.

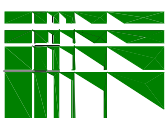
## **8. MITIGATION STRATEGIES**

The proposed 700 Paris Street Development plans establish a context for development in terms of height, massing, and location that allow the prediction of wind issues/problems that may persist once built.

The proposed Development employs an overall wind mitigative design that assists in moderating the upset in winds with inclusion of the building, causing limited influence upon pedestrian comfort conditions realised along the flanking streets and at neighbouring properties. The proposed Development's wind mitigative design features include:

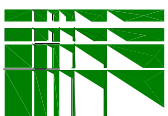
- podiums,
- stepped massing,
- textured façades,
- balconies,
- overhangs,
- canopies,
- landscaping,

and others, that will increase surface roughness apparent to the wind.



Additional mitigation is recommended for the Main Entrances and Outdoor Amenity Spaces to achieve conditions that are suitable for the intended uses, as described within.

Comfort conditions expected at, and around, the proposed Development site are considered suitable to the context, based upon qualitative analysis.





**Figure 1: Site Aerial Photo**

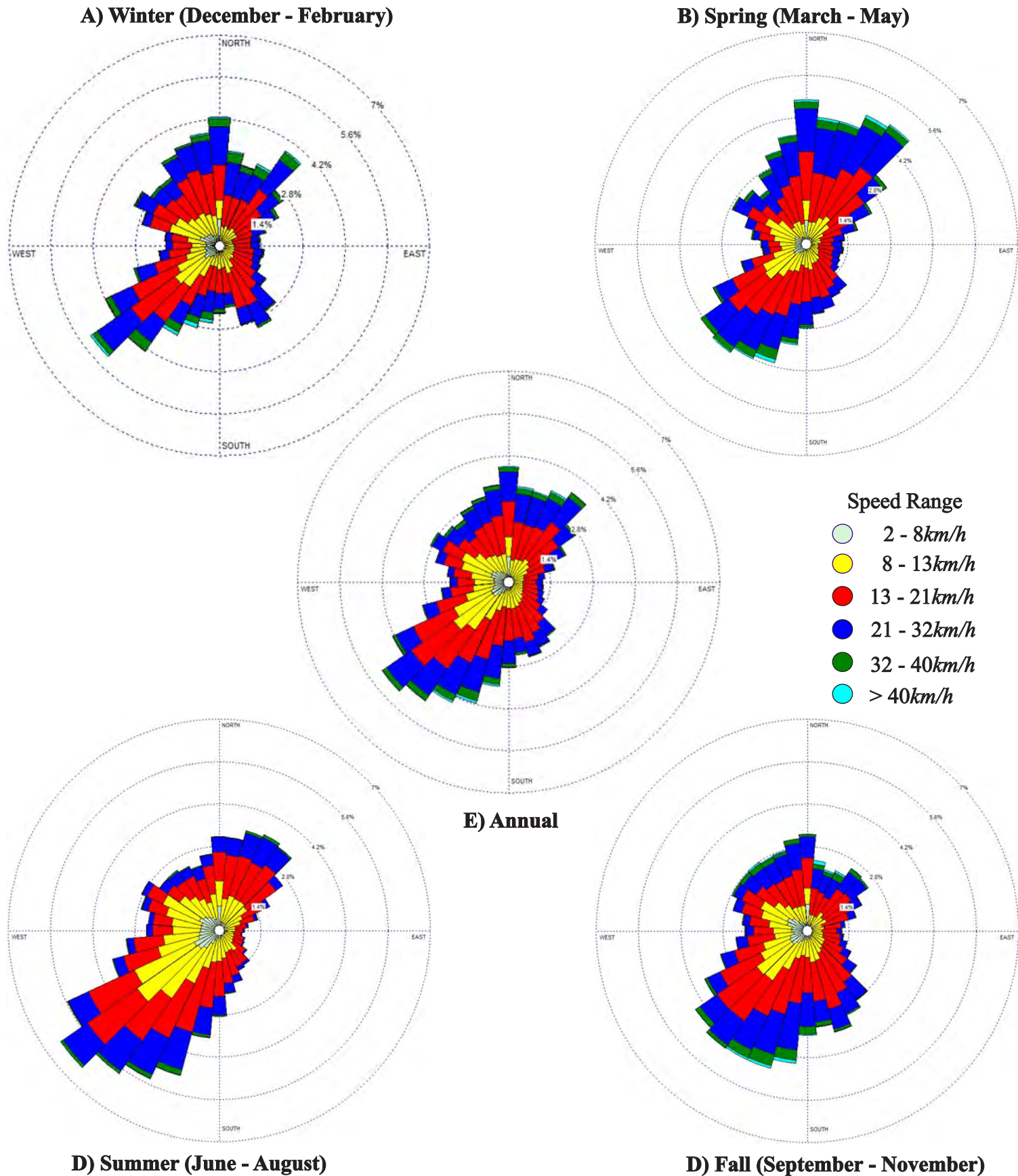








Figure 3: Wind Roses - Greater Sudbury Airport





# Terraprobe

*Consulting Geotechnical & Environmental Engineering  
Construction Materials Inspection & Testing*

**GEOTECHNICAL AND ROCK PROBE INVESTIGATION  
CONDOMINIUM DEVELOPMENT  
700 PARIS STREET  
SUDBURY, ONTARIO**

**Prepared for:** Michael D. Allen Architect c/o  
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**Attention:** Michael D. Allen

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## **1.0 INTRODUCTION**

Terraprobe Inc. (Terraprobe) was retained by Michael D. Allen Architect c/o 2226553 Ontario Inc. to carry out a geotechnical and rock probe investigation for a proposed condominium development. The subject property is located at 700 Paris Street in the City of Greater Sudbury, Ontario (see Figure 1).

This report is a revision of our previous rock probe report (File No. 51-14-9026, December 3<sup>rd</sup>, 2014) entitled:

**ROCK PROBE INVESTIGATION  
PROPOSED CONDOMINIUM DEVELOPMENT  
700 PARIS STREET  
SUDBURY, ONTARIO**

This revision provides additional information with respect to the subgrade soils and the underlying bedrock Rock Quality Designation (RQD).

The exploratory geotechnical and rock probe investigation program was devised to collect subgrade soil samples and map the bedrock profile at the site by advancing two exploratory boreholes and eighteen rock probes. Based on the results of the exploratory borehole and rock probe investigation, geotechnical engineering recommendations are presented for the following items:

- Frost depth;
- Bearing capacity of the sub-strata;
- Appropriate types of foundations;
- Foundation factors for earthquake forces;
- Excavation procedures;
- Trench stability;
- Bedding and compaction requirements;
- Dewatering and drainage requirements;
- Geotechnical Construction Implications; suitability of on site soil to reuse as backfill;
- Unit density of soil and coefficients for lateral load design;
- Considerations for constructibility.

## **2.0 SITE AND BRIEF PROJECT DESCRIPTION**

The property was the former site of the General Hospital. The south of the existing building was demolished consist to permit the construction of an underground parking garage and condominium building. The terrain at the site generally slopes in a easterly direction towards Ramsey Lake.

For discussion purposes, Paris Street is assumed to be running in a north-south direction at this location.

The subject property is bound by the following:

- North - Facer Street, residential properties;
- West - Paris Street, residential properties;
- South - Municipal parking lot;
- East - Bell Park, Ramsey Lake.

It is proposed to construct an eight floor condominium building that would be supported by a three storey underground parking garage. The condominium building will be serviced by the City of Greater Sudbury municipal services consisting of storm and sanitary sewers and municipal drinking water system.

### **3.0 FIELD INVESTIGATION**

#### **3.1 Rock Probes**

The initial field investigation to advance rock probes was conducted on November 5<sup>th</sup>, 2014. The proposed initial rock probe program consisted of advancing twenty six (26) exploratory rock probes. Based on the depth of the current existing excavation and the rock probes locations along the east and south sections were not accessible. The final field investigation program consisted of advancing eighteen (18) exploratory rock probes to depths of up to 10.67 metres within the building footprint (See figure 2 for the location of the rock probes).

Prior to conducting the exploratory Rock Probes investigation, the underground services locates were provided by all members of Ontario One.

The rock probe location were marked in the field by Tulloch based on the building layout provided by Michael D. Allen Architect. The geodetic elevations of the borings were determined by Tulloch relative to the City of Greater Sudbury vertical controls and UTM Zone 17 NAD 83 CSRS datum.

The drilling work was carried out by Belanger Construction utilizing a hydrotrack drill rig. The operation was monitored by a Terraprobe technician who logged the probable bedrock depth.

#### **3.2 Boreholes**

The exploratory borehole investigation was carried out by Terraprobe between July 25 to 26<sup>th</sup>, 2016. The geotechnical investigation consisted of advancing the following exploratory boreholes (see figure 3 for the borehole locations):

1. Borehole 1 was advanced in close proximity of RP 72.
2. Borehole 2 was advanced in close proximity of RP 64.

Prior to conducting the exploratory borehole investigation, the underground services locates were provided by Ontario One.

The location of the boreholes were located in the field by Tulloch Geomatics. The elevations of the borings were determined relative to the City of Greater Sudbury vertical controls and UTM Zone 17 NAD 83 CSRS datum.

The drilling work was carried out by Landcore Drilling utilizing a truck mounted drill rig, equipped with conventional soil sampling equipment and rock coring equipment (NQ cores). The operation was monitored by a Terraprobe Engineer in Training (EIT) whom logged the borings and examined the samples as they were obtained. All samples obtained from these boreholes were sealed into plastic jars, and transported to the Terraprobe laboratory for detailed inspection and testing. All of the borehole samples were examined (tactile) in detail by the project engineer, and classified according to visual and index properties. The boreholes were backfilled once the soil samples were retrieved.

The Standard Penetration Test (SPT) was used to obtain samples of the strata penetrated in the exploratory boreholes, using the Split-Barrel Method technique as outlined in ASTM D1586. The soil samples were taken with a conventional 50 mm diameter split barrel sampler at 0.75 m intervals for the entire length of the boreholes. The conventional interval sampling procedure used for this investigation does not recover continuous samples of soil at any borehole locations. There is consequently some interpolation of the borehole layering between samples and indications of changes in stratigraphy as shown on the borehole logs are therefore approximate.

The rock cores (NQ) were retrieved from each location and were placed in rock core boxes and transported to the Terraprobe laboratory for detailed inspection and classified according to visual and index properties.

Groundwater level observations are noted on the borehole logs in Appendix A.

## 4.0 SUBSURFACE CONDITIONS

### 4.1 Rock Probes

Details of the subsurface conditions encountered at the site are summarized below. The bedrock depth encountered in the rock probes are presented on the attached Rock Probe Log sheets in Appendix A.

It should be noted that the subsurface conditions are confirmed at the rock probe locations only. The stratigraphic boundaries indicated on the Rock Probe Log sheets are inferred from non-continuous samples and observations of drilling resistance and typically represent a transition from one soil or rock type to another. These boundaries should not be interpreted to represent exact planes of geological change. The subsurface conditions have been confirmed in a series of widely spaced rock probes and will vary between and beyond the rock probe locations. The following discussion has been simplified in terms of the major soil and rock strata for the purposes of geotechnical design. It may not be possible to drill a sufficient number of rock probes and report them in a way that would provide all the subsurface information that could affect construction costs, techniques, equipment and scheduling.

For this soil investigation, no soil samples were retrieved.

#### 4.1.1 Probable Bedrock Subgrade Elevation

The following table presents the exploratory rock probe elevations and recorded depths:

**Probable Bedrock Subgrade Elevation**

<b>Rock Probe Location</b>	<b>Surface Elevation (m)</b>	<b>Depth to Probable Bedrock (m)</b>	<b>Probable Bedrock Subgrade Elevation (m)</b>
60	264.26	3.05	261.21
61	263.73	3.05	260.68
62	263.39	4.57	258.82
63	263.52	10.67	252.85
64	264.17	6.10	258.07



<b>Rock Probe Location</b>	<b>Surface Elevation (m)</b>	<b>Depth to Probable Bedrock (m)</b>	<b>Probable Bedrock Subgrade Elevation (m)</b>
65	265.13	3.96	261.17
66	265.17	2.44	262.73
67	266.09	2.44	263.65
68	264.94	1.22	263.72
70	264.96	1.83	263.13
71	264.11	1.52	262.59
72	264.01	2.44	261.57
73	264.14	3.96	260.18
74	264.43	3.05	261.38
75	263.89	9.75	254.14
76	264.00	1.22	262.78
77	265.04	0.00	265.04
78	264.13	1.22	262.91

The rock probes indicate that the underlying probable bedrock depth varies between 1.22 metres (RP 68,76 & 78) to 10.67 metres (RP 67) below the existing grades within the proposed building footprint. At RP 77, the bedrock was exposed.

It also indicates that the underlying probable bedrock subgrade generally slopes in a south east direction (towards RP63) dropping from a high of 262.91 m (RP78) to a low of 252.58 m (RP63) with some peaks (RP 77) and valleys (RP 75) that were noted.

The average depth of the probable bedrock is in the range of 3.47 metres (elevation 260.92 metres).

## 4.2 Boreholes

Details of the subsurface conditions encountered at the site are summarized below. The subsurface soil and groundwater conditions encountered in the boreholes are presented on the attached Log of Borehole sheets in Appendix B.

It should be noted that the subsurface conditions are confirmed at the borehole locations only. The stratigraphic boundaries indicated on the Log of Borehole sheets are inferred from non-continuous samples and observations of drilling resistance typically represent a transition from one soil or rock type to another. These boundaries should not be interpreted to represent exact planes of geological change. The subsurface conditions have been confirmed in a series of widely spaced boreholes, and will vary between and beyond the borehole locations. The following discussion has been simplified in terms of the major soil and rock strata for the purposes of geotechnical design. It may not be possible to drill a sufficient number of boreholes or sample and report them in a way that would provide all the subsurface information that could affect construction costs, techniques, equipment and scheduling.

All of the soil samples that were retrieved from this geotechnical investigation were tested in our soils laboratory to determine the water contents. In addition, grain size analysis and Atterberg Limits were conducted on selected soil samples. The results of this soil testing is presented in Appendix C.

### 4.2.1 Soil Stratigraphy

In general, fill materials were encountered in both boreholes. The fill materials extended up to 1.52 metres below the existing grades.

**BH1** The upper stratum of fill material consisted of a brown to red compact dry SAND, GRAVEL and pieces of brick which extended up to 0.76 metres below the existing grades. The upper stratum of fill was underlain by a dense dark brown gravelly, silty SAND, trace clay Fill stratum that was moist and approximately 0.61 metres thick. Split spoon refusal was recorded at a depth of 1.37 metres. The gravelly, silty SAND stratum was underlain by bedrock consisting of dark grey Gabbro that had a good (RQD = 90%) to fair (RQD = 60%) quality and extended to the full depth of the borehole of 4.42 metres.

**BH 2** The upper stratum of fill material consisted of a dark brown loose dry Sand, Gravel some silt which extended up to 0.76 metres below the existing grades. The upper stratum of fill was underlain by a loose brown sandy, silty GRAVEL, trace clay fill stratum that was moist and approximately 0.76 metres thick. The sandy, silty GRAVEL stratum was underlain by a loose light grey Clayey SILT, trace gravel, trace sand stratum that was wet and approximately 0.77 metres thick. The Clayey SILT stratum was underlain by a compact to dense brown SILT, trace clay, trace sand, trace gravel stratum that was wet and approximately 1.37 metres thick. Split spoon refusal was recorded at a depth of 3.66 metres. The Silt, trace clay, trace sand stratum was underlain by bedrock consisting of medium grey coloured Gabbro that had a fair (RQD = 62%) to good (RQD = 82%) quality and extended to the full depth of the borehole of 6.71 metres.

The following testing was conducted on representative soil samples:

1. Moisture contents.
2. Soil Gradations (hydrometers).

The following table presents the soil stratigraphy encountered at each borehole location:

### Borehole Soil Stratigraphy

Borehole (Elev.)	Depth (m)	Subgrade Description	SPT Values 'N' or RQD %	Water Content %
BH1 (264.06)	0.00 - 0.76	1 - Fill - SAND, GRAVEL, brick, brown, moist,	49	16
	0.76 - 1.37	compact		18
	1.37 - 2.90	2 - Fill - Gravelly, silty SAND, trace clay, dark brown,		
	2.90 - 4.42	moist, dense		
		3 - Bedrock - Good quality dark grey Gabbro	90 %	
		4 - Bedrock - Fair quality dark grey Gabbro	60 %	

Borehole (Elev.)	Depth (m)	Subgrade Description	SPT Values 'N' or RQD %	Water Content %
BH2 (264.08)	0.00 - 0.76	1 - Fill - SAND, GRAVEL, some silt, dark brown, dry, loose		14
	0.76 - 1.52	2 - Fill - Sandy, silty GRAVEL, trace clay, trace roots, brown, moist, loose.	8	17
	1.52 - 2.29	3 - Clayey SILT, trace gravel, trace sand, light grey, wet, loose	7	22
	2.29 - 3.66	4 - SILT, trace to some clay, trace sand, trace gravel, brown, wet, compact to dense	14 - 37	23
	3.66 - 5.18	5 - Bedrock - Fair quality medium grey Gabbro	62 %	
	5.18 - 6.71	6 - Bedrock - Good quality medium grey Gabbro	82 %	

#### 4.2.2 Bedrock Cores

The bedrock core retrieved from BH1 generally consist of an excellent to fair quality dark grey Gabbro (Sudbury Event, Mafic Intrusive Rocks, Nipissing Intrusive Rocks Group formation<sup>[1]</sup>).

The bedrock core retrieved from BH2 generally consist of a fair to good quality medium coloured grey Gabbro (Sudbury Event, Mafic Intrusive Rocks, Nipissing Intrusive Rocks Group formation<sup>[1]</sup>) that had been cleaned with compressed air to remove all loose debris and rock.

#### 4.4 Groundwater

Based on the current site conditions, the current excavation filled up with surface water based on the depth of the excavation located up to 9.24 metres or more below Paris Street. We would estimate the groundwater table to be located approximately 1.45 metres (in BH 2) below the existing grade to near the bedrock surface interface (BH 1) with local perched areas depending on the permeability of the underlying native soils.

It should be noted that the ground water table is expected to fluctuate seasonally with higher levels expected during the spring and fall seasons.

[1] Ministry of Natural Resources, Ontario Geological Survey, Map 2491, Sudbury Geological Compilation, 1984.

## **5.0 GEOTECHNICAL DESIGN**

The following discussions and recommendations are based on the factual data obtained from the investigation, and are presented for guidance of the design professionals only. The comments pertain to a specific project and location. This report is provided on the basis of these terms of reference and on the assumption that the preliminary design features relevant to the geotechnical analyses will be in accordance with applicable codes, standards and guidelines of practice. If there are any changes to the site development features relevant to the interpretation made of the subsurface information with respect to the geotechnical analyses or other recommendations, then Terraprobe should be retained to review the implications of these changes with respect to the contents of this report.

Comments about construction are presented only to bring attention to aspects which might impact the design. Contractors bidding on or conducting work associated with this project should review the factual data presented in the preceding sections of the report, to assess their effect on proposed construction methods and scheduling.

### **5.1 Frost Protection**

For the Sudbury area, the required frost protection is 1.80 metres of soil cover. As such, all exterior foundations and grade beams in unheated and heated areas constructed on undisturbed native soils or engineered fills must be provided with a minimum of 1.80 metres of earth cover for frost protection or alternative equivalent insulation in the City of Greater Sudbury. If required, Terraprobe can provide recommendations on the required equivalent insulation.

Footings and exterior columns placed on bedrock surfaces are not subjected to frost heave provided the footings are doweled into the bedrock.

### **5.2 Foundation Design - Underground Parking Garage Building**

For this project, the proposed elevation for the underground parking garage first floor is in the range of 264.00 metres. The current excavation plateau elevation (based on the rock probe locations) was in the range of 263.39 metres (RP62) to 266.09 metres (RP67). This indicate that some excavation will be required to construct the underground parking garage foundation system.



For this project, we anticipate that some drilling and blasting will be required along the west and south sections of the building footprint. Allowances should be made for overbreak conditions. Due consideration should also be given to controlled blasting procedures in order to prevent potential damage to the surrounding environment. All blasts must be monitored and conducted as per the latest version of the Occupational Health and Safety Act and Regulations for Construction Projects (Part II- General Construction, Sections 196- 206).

In addition, we would recommend that a pre-blast survey (as per OPSS 120.07.03) of all neighbouring properties should be undertaken prior to conducting some drilling and blasting activities. The preconstruction survey will serve to protect the client from claims unrelated to the construction activities in the development of this property.

For this project, we recommend placing the underground garage and condominium building foundation system on:

- A. On a series of micro piles advanced into the underlying bedrock subgrade in the deep bedrock areas. In the case of the micro pile, a steel casing is advanced and socketed into the underlying bedrock subgrade. The bedrock is then cored to a pre-determined depth based on the building loads and the entire column is filled with a grout mixture and reinforced with a Dywidag Threadbar® sized for the application.

The number and size of the piles (and type) are determined based on the building loads and configuration. The design of the micro piles would be provided by the supplier in conjunction with the probable bedrock subgrade depth provided by Terraprobe in this report. Depending on the micro pile supplier, the grade beam and pile caps can also be designed from their engineer team.

- B. Directly on the exposed bedrock in the areas of the exposed shallow bedrock subgrade.

### 5.3 Underlying Bedrock Characteristics

As noted in section 4.3, and based on local geological maps produced by the Ontario Geological Survey the local bedrock in the vicinity of the condominium development consist of a medium grey coloured to dark grey Gabbro.

The Gabbro bedrock can be assumed to have a unit weight,  $\gamma$ , of 26.50 kN/m<sup>3</sup> and a buoyant unit weight,  $\gamma'$  ( $\gamma_{\text{Gabbro}} - \gamma_{\text{water}}$ ), of 16.70 kN/m<sup>3</sup>.

The Bulk Modulus of a Gabbro that can be utilized for design would be in the range of 50 GPa.

### 5.3.1 Coefficient of Friction on Bedrock

The coefficient of friction angle between the underside of a cast in place concrete footing and a relatively rough bedrock surface can be taken as  $\tan \phi$  of  $43^\circ$  (0.93) and for a smooth bedrock surface can be taken as  $\tan \phi$  of  $30^\circ$  (0.577).

### 5.3.2 Rock Anchors - Allowable Bond Stress

If rock anchors are required to provide additional uplift or lateral capacity, then the structural engineer will design the length and diameter of the rock anchors based on the bedrock characteristics. For rock anchors established in bedrock, three predominant modes of failures can occur:

1. Failure can occur between the grout and the dowel;
2. Or failure can occur between the grout and the rock.
3. The third mode would consist of a quasi-conical rock mass failure.

Field testing (pull out tests) have indicated that the bond developed between the grout and the dowel is typically twice that of the bond developed between the grout and the rock. Therefore, the design analysis should be based on the failure between the grout and the bedrock interface.

The allowable bond stress should be smaller than 1/30 times the unconfined compressive strength of the bedrock and the compressive strength of the grout material whichever is less and should not exceed 1.3 MPa. From previous knowledge of the bedrock in this area, a relatively conservative unconfined compressive strength of approximately 1.0 MPa may be used. The required bond length (L) for the anchor is a function of the core hole diameter (d) and can be calculated as follows:

$$L = P / (\pi) \times (d) \times (\tau_b)$$

- L = length (m)  
P = working capacity of the anchor (kN)  
 $\tau_b$  = working bond stress (kPa)  
d = diameter of core hole (m)

Usually, the upper 300 mm of the bedrock, is not normally considered part of the bond length since this area is usually weathered/fractured. In this region, we usually assume that the ultimate bond strength will not develop based on the above calculation.

During construction, we recommend testing up to 10% of the rock anchors by conducting a pull out test to confirm the design strengths.

### **5.3.4 Bedrock Bearing Capacity**

Some footings or grade beams may bear directly on the exposed shallow bedrock subgrade.

Foundations placed directly on bedrock should be established on a relatively level rock surface, i.e. generally sloping at an angle of less than approximately  $10^{\circ}$  from the horizontal. In some instances, foundation bases can be placed on bedrock sloping at angles up to  $25^{\circ}$  to  $30^{\circ}$  from the horizontal, provided dowels are incorporated to resist shear. Dowels should consist of a minimum 25M bar embedded a minimum of 1.0 metres into the underlying bedrock subgrade and grouted or epoxied. The spacing of the anchors can vary between 600 mm to 800 mm depending on the slope. Where rock slopes are at steeper angles, the rock surface is to be levelled to provide a stepped footing base.

As an alternative to levelling the bedrock, where the bedrock surface is irregular and jagged, it may be more practical to provide level benching over these areas by pouring lean concrete (minimum 10 MPa) prior to constructing the foundations. This decision is made on site, since each situation will depend on site specific bedrock conditions.

The Rock Quality Designation (RQD) of the cores that were retrieved ranged between 60% (fair) to 90% (good). Based on the lower bound RQD, the bearing capacity of the underlying bedrock would be in the range of 35 MPa (ULS).

Serviceability Limit States (SLS) does not apply for shallow foundations bearing directly on bedrock since the loads required for unacceptable settlements to occur would be much larger than the factored resistance at the Ultimate Limit States (ULS). Foundations installed in accordance with the above recommendations would be expected to experience very little settlements limited to the elastic deformation of the concrete.

## **5.4 Underground Parking Garage Foundation Grade Beams**

It is anticipated that the grade beams will be supported by pile caps cast over the micro piles. In certain locations, it is anticipated that the bedrock will need to be drilled and blasted to accommodate the underground garage basement slab and foundation system. At these locations, the grade beams could bear upon exposed bedrock or on concrete columns bearing on the exposed bedrock. These transition zones would need to be designed once the final excavation elevation is completed.

Prior to pouring the concrete for the grade beams, the footing areas (original ground or engineered fill pad if applicable) should be cleaned of all deleterious materials such as topsoil, fill, softened, disturbed or caved materials, as well as any standing water.

If construction proceeds during freezing weather conditions, adequate temporary frost protection for the footing bases and concrete must be provided.

## **5.5 Underground Parking Garage Basement Slab**

The current overburden soil that were assessed from the borehole investigation indicate some loose fill materials underlying some compact Silt soils. We are also aware that some of the fill materials consists of deleterious fill materials (bricks, concrete blocks) that were placed in the centre of the excavation to permit access to the site to enable the drilling of the rock probes.

We recommend that the underground garage basement slab should be designed as a structural slab (not bearing on the subgrade soils) by transferring the weight to the grade beams.

In areas where shallow bedrock is exposed, a section of the underground garage basement slab may be designed to bear upon an engineered fill placed over dense till soils or exposed sound bedrock.

### **5.5.1 Engineered Fill Placement**

The engineered fill should consist of a Granular B Type II (OPSS MUNI 1010) placed in 150 mm lifts and compacted to 100% of its Standard Proctor Maximum Dry Density (SPMDD).

The engineered fill would be placed over the undisturbed dense till soils or bedrock subgrade. At the foundation level, sufficient engineered fill shall be constructed to ensure that it extends at least a distance

equal to the full depth of the engineered fill laterally beyond the edge of any foundations, and that it extends outward within an area defined by a 1 to 1 line downward from the edge of any engineered fill.

Full time monitoring of the placement and compaction of the engineered fill is required for each lift of engineered fill. For a well graded blast rock fill and Granular B Type II, witnessing the chinking on a full time basis would be utilized to verify and approve the compactive effort.

## **5.6 Building Foundation Drainage**

To assist in maintaining the building foundations dry from surface water seepage, it is recommended that exterior grades around the building be sloped away at a 2% gradient or more, for a distance of at least 2.0 metres. Roof drains should discharge a minimum of 1.5 metres away from the structure to a drainage swale or appropriate drainage outlet.

Since the underground garage building will consist of a basement, exterior perimeter foundation drains are required to drain the south west and north sides of the building. The foundation drains should consist of a minimum 150 mm diameter fabric wrapped perforated pipe surrounded by a 19 mm diameter clearstone gravel (OPSS 1004) with a minimum cover of 150 mm (OBC section 9.14.3, Division B, pg B9-60). The perimeter weeping tile would drain into a sump pit located in the basement area of the underground garage. The perimeter foundation drains should discharge towards the rear section of the property to a swale or suitable drainage outlet. The perimeter drain installation and outlet considerations must conform to the Ontario Building Code and plumbing code requirements.

The exterior foundation backfill should extend a minimum lateral distance of 600 mm out from the foundation wall and grade beam and should consist of free-draining granular material, such as a Granular B Type I (OPSS 1010) or suitable alternative drainage cellular media. Since the garage parking structure will be constructed underground, the foundation walls will need to be water proofed (water stop detail).

## **5.7 Re-use of Excavated Material & General Backfill**

Any topsoil/organic, fill and deleterious materials (building materials such as brick, concrete blocks, etc.) encountered at the site should not be reused as backfill in settlement sensitive areas, such as beneath the floor slabs, pavements and trench backfill areas. These material may be stockpiled and reused for landscaping purposes provide it is environmentally suitable to do so or removed from the site for disposal.



All backfill materials should consist of free draining material such as a Granular B Type I or Granular B Type II (OPSS MUNI 1010) which can be readily compacted. In settlement sensitive areas, such as beneath pavements and trenches, the backfill should be placed in lifts of 150 mm or less and compacted to a minimum of 100% of its SPMDD. It is recommended that inspection and testing be carried out during construction to confirm trench backfill quality, thickness and to ensure adequate compaction.

Should construction be conducted during the winter season, it is imperative to ensure that frozen material is not utilized as trench backfill.

## **5.8 Pipe Bedding**

The buried services should be placed on conventional Class 'B' granular bedding as per the City of Greater Sudbury GSSD-1227.010 specifications for sewer pipes & water mains for good ground conditions. The granular bedding would be placed over an engineered fill or undisturbed native soils. In the case of a soil trench, where disturbance of the trench base has occurred, such as due to groundwater seepage, or construction traffic, the disturbed soils should be sub-excavated and replaced with suitably compacted granular fill.

Bedding details should conform to the latest version of the City of Greater Sudbury GSSD-1227.010 specifications.

## **5.9 Trench Backfill**

Trench backfill above the springline of the pipe should conform to the latest version of the City of Greater Sudbury GSSD-1227.010 specifications. Backfilling of narrow trenches can be accomplished by reusing the excavated soils (provided they are not too wet) above the springline of the pipe to the underside of the roadway subbase materials provided the moisture content is maintained within 2% of optimum moisture content. If the native soils prove difficulty to compact with vibratory compaction equipment, it is recommended that a free draining material such as Granular B Type I (OPSS MUNI 1010) be used.

All fill should be placed in 150 mm lifts and compacted to a minimum of 95 percent Standard Proctor Maximum Dry Density (SPMDD). It needs to be noted that post-compaction settlement of fine grained fills on the order of 0.5 to 1.0 percent of the total height are common, even when adequately placed to specified compaction. It is best to schedule deep fill placement as far in advance of finish surfacing as possible for best grade integrity.

## 5.10 Earthquake Design Parameters

The current Ontario Building Code stipulates the methodology for earthquake design analysis, as set out in Subsection 4.1.8.7. The determination of the type of analysis is predicated on the importance of the structure, the spectral response acceleration and the site classification. The parameters for determination of Site Classification for Seismic Site Response are set out in Table 4.1.8.4A of the OBC (2006).

The classification is based on the determination of the average shear wave velocity in the top 30 metres of the site stratigraphy, where shear wave velocity measurements have been taken or alternatively estimated on the basis of rational analysis of undrained shear strength or penetration resistance.

$$v_{s-avg} = \frac{\sum_{i=1}^n d_i}{\sum_{i=1}^n \frac{d_i}{v_{si}}} \quad S_{u-avg} = \frac{\sum_{i=1}^n d_i}{\sum_{i=1}^n \frac{d_i}{S_{ui}}} \quad N_{avg} = \frac{\sum_{i=1}^n d_i}{\sum_{i=1}^n \frac{d_i}{N_i}}$$

**Shear wave velocity                      Undrained shear strength                      SPT N-values**

At this site, it is known the upper soil stratigraphy consists up to 3.0 metres or greater of soil with a loose to compact relative density with estimated average standard penetration resistance N values of less than 15. It is known that the deeper stratigraphy in this area is at least as competent as the existing stratum and that the competent bedrock consisting of igneous and metamorphic rocks could lie at depths of up to 10.67 metres (RP information) or greater below the existing grades.

In order to classify the bedrock as a Class A or B, the shear wave velocity of the actual bedrock formation must be measured on the site or on profiles of the same bedrock with equal or greater degree of weathering and fracturing. For this project, Terraprobe did not measure the shear wave velocity as part of the scope of work.

For a building designed to bear on micro piles driven into the underlying bedrock subgrade, the site designation for seismic analysis is Class C.

According to Tables 4.1.8.4.B and 4.1.8.4.C. of the same code, the applicable acceleration and velocity based site coefficients are tabulated below.

Site Class	Values of $F_a$				
	$S_a(0.2) \leq 0.25$	$S_a(0.2) = 0.50$	$S_a(0.2) = 0.75$	$S_a(0.2) = 1.00$	$S_a(0.2) = 1.25$
<b>C</b>	1.0	1.0	1.0	1.0	1.0

Site Class	Values of $F_v$				
	$S_a(1.0) \leq 0.1$	$S_a(1.0) = 0.2$	$S_a(1.0) = 0.3$	$S_a(1.0) = 0.4$	$S_a(1.0) \geq 0.5$
<b>C</b>	1.0	1.0	1.0	1.0	1.0

Values of  $F_a$  and  $F_v$  can be linearly interpolated for intermediate values of  $S_a$  between 0.2 and 1.0.

## **6.0 DESIGN CONSIDERATIONS FOR CONSTRUCTIBILITY**

### **6.1 Site Work**

It is recommended that the geotechnical aspects of the proposed works outlined within, be completed under appropriate geotechnical supervision to routinely check such items as subgrade preparation, fill compaction and material physical characteristics for compliance with the various recommendations and specifications presented within.

As noted, it is anticipated that some excavation for the services and underground parking garage foundations will require drilling and blasting in bedrock. Allowances should be made for overbreak conditions. Due consideration should also be given to controlled blasting procedures in order to prevent potential damage to the surrounding environment. All blasts must be monitored and conducted as per the latest Occupational Health and Safety Act and Regulations for Construction Projects (currently Nov. 1993, Part II- General Construction, Sections 196- 206).

In addition, we would recommend that a preconstruction survey of all neighbouring properties should be undertaken prior to conducting some drilling and blasting activities. The preconstruction survey will serve to protect the client from building damage claims unrelated to the construction activities in the development of this property.

If construction proceeds during freezing weather conditions, adequate temporary frost protection for the exposed soil in the foundation excavations and concrete must be provided.

### **6.2 Excavations**

Where workmen must enter excavations carried deeper than 1.20 metres, the trench excavations should be suitably sloped and/or braced in accordance with the latest version of the Occupational Health and Safety Act and Regulations for Construction Projects (Part III - Excavations, Section 226). Alternatively, the excavation walls may be supported by bracing or close shoring or a trench box.

The Occupational Health and Safety Act recognizes four (4) broad classifications of soils, which are summarized as follows:

**TYPE 1 SOIL**

- a. is hard, very dense, and only able to be penetrated with difficulty by a small sharp object;
- b. has a low natural moisture content and a high degree of internal strength;
- c. has no signs of water seepage; and
- d. can be excavated only by mechanical equipment.

**TYPE 2 SOIL**

- a. is very stiff, dense and can be penetrated with moderate difficulty by a small sharp object;
- b. has a low to medium natural moisture content and a medium degree of internal strength; and
- c. has a damp appearance after it is excavated.

**TYPE 3 SOIL**

- a. is stiff to firm and compact to loose in consistency or is previously excavated soil;
- b. exhibits signs of surface cracking;
- c. exhibits signs of water seepage;
- d. if it is dry, may run easily into a well-defined conical pile; and
- e. has a low degree of internal strength.

**TYPE 4 SOIL**

- a. is soft to very soft and very loose in consistency, very sensitive and upon disturbance is significantly reduced in natural strength;
- b. runs easily or flows, unless completely supported before excavating procedures;
- c. has almost no internal strength
- d. is wet or muddy; and
- e. exerts substantial fluid pressure on its supporting system.

Based on our previous test pit investigation report conducted at the site on October 1, 2013 (File No. 52-13-8196) and entitled:

**Proposed Excavation Slope Stability Comments  
St Joseph Hospital Building Demolition  
700 Paris Street, Sudbury, Ontario**

we would classify the compact fill materials (sand & gravel) and native soils (Silt and Sand) as a Type 3 soils above the groundwater table and Type 4 soils below under these guidelines.

Based on Type 3 soils; the excavations will need to be sloped at a minimum gradient of 1 horizontal to 1 vertical from the bottom of the excavation.



Based on Type 4 soils; the excavations will need to be sloped at a minimum gradient of 3 horizontal to 1 vertical from the bottom of the excavation.

Alternatively, the excavations may be shored by a support system complying with sections 235, 236, 237, 238, 239 and 241 under O. Reg. 231/91, s 234(1).

### **6.3 Anticipated Ground Water Management**

From the observed water levels located in the middle section of the site, it is expected that some surface water could enter any temporary excavations for the grade beam and pile installations depending on the time of the year the construction takes place.

Generally, groundwater inflow can be controlled to a depth of up to approximately 600 mm below the water table by installing strategically placed sumps and pumping the collected water out of the excavations. Deeper excavations in this type of material will require more positive control, such as through well points and/or interlocking steel sheet piles. It is noted that excavations carried below the water table in cohesionless soil (silt, sand, sand and gravel) will experience loosening and sloughing of the base and sides, unless the ground water level is lowered first.

It is the responsibility of the contractor to propose a suitable dewatering system based on the groundwater elevation at the time of construction. The method used should not undermine any adjacent structures. The contractor should submit their proposal to the prime consultant for review and approval prior to construction. A permit to take water may be required from the Ministry of the Environment. It is the responsibility of the contractor to make this application as required and any other applications from other Ministries or authorities as required (DFO, Conservation authorities, etc.).

All collected water is to discharge a sufficient distance away from the excavation to prevent re-entry. Sediment control measures, such as a silt fence should be installed at the discharge point of the dewatering system. The utmost care should be taken to avoid any potential adverse impacts on the environment.

It should be noted that the water table is expected to fluctuate seasonally with higher levels expected during the spring and fall seasons.

## 6.4 Temporary Shoring

For this project, it is anticipated that a temporary shoring design will be required to construct the underground parking garage structure along the west and south sides of the excavation limits. Once the building design is finalised, Terraprobe Design can provide this service.

## 6.5 Horizontal Earth Pressure

If required, walls or bracings subject to unbalanced earth pressures must be designed to resist a pressure that can be calculated based on the following equation:

$$P = K [\gamma (h - h_w) + \gamma' h_w + q] + \gamma_w h_w$$

where:

P =	the horizontal pressure at depth, h (m)
K =	the earth pressure coefficient,
$h_w$ =	the depth below the ground water level (m)
$\gamma$ =	the bulk unit weight of soil, (kN/m <sup>3</sup> )
$\gamma'$ =	the submerged unit weight of the exterior soil, ( $\gamma - 9.8$ kN/m <sup>3</sup> )
q =	the complete surcharge loading (kPa)

Where the wall backfill can be drained effectively to eliminate hydrostatic pressures on the wall, this equation can be simplified to:

$$P = K[\gamma h + q]$$

This equation assumes that free-draining granular backfill is used and positive drainage is provided to ensure that there is no hydrostatic pressure acting in conjunction with the earth pressure.

Resistance to sliding of earth retaining structures is developed by friction between the base of the footing and the soil. This friction (**R**) depends on the normal load on the soil contact (**N**) and the frictional resistance of the soil ( $\tan \phi$ ) expressed as  $R = N \tan \phi$ . This is an ultimate resistance value and does not contain a factor of safety.

Passive earth pressure resistance is generally not considered as a resisting force against sliding for conventional retaining structure design because a structure must deflect significantly to develop the full passive resistance.

The average values for use in the design of structure subjected to unbalanced earth pressures at this site are tabulated as follows:

Parameter	Definition	Units
$\phi$	internal angle of friction	degrees
$\gamma$	bulk unit weight of soil	kN/ m <sup>3</sup>
$K_a$	active earth pressure coefficient (Rankin)	dimensionless
$K_o$	at-rest earth pressure coefficient (Rankin)	dimensionless
$K_p$	passive earth pressure coefficient (Rankin)	dimensionless

### Material Types and Strength Properties

Stratum/Parameter	$\phi$	$\gamma$	$K_a$	$K_o$	$K_p$
Silt and Clay	26	18.5	0.39	0.56	2.56
Clayey/Sandy Silt or similar Fill	30	18.5	0.35	0.5	3
Silt and Sand/Sand	32	21.5	0.3	0.47	3.22
Granular B Type I (OPSS 1010)	34	21	0.28	0.44	3.54
Granular A (OPSS 1010)	38	22	0.24	0.38	4.2
Granular B Type II (OPSS 1010)	40	23	0.22	0.36	4.6

The values of the earth pressure coefficients noted above are for a horizontal grade behind the wall. The earth pressure coefficients for an inclined grade (retained soil) will vary based on its inclination.

Where permanent drainage for earth retaining walls is not install, hydrostatic pressure acting on the walls must be included in the above calculation; the unit weight of water,  $\gamma_w = 9.81 \text{ kN/m}^3$ . For sloping backfill, the Canadian Highway Bridge Design Code, section C 6.9 should be consulted for the design recommendations.

The surcharge effect from compaction equipment during construction must be taken into account. Where lighter compaction equipment and smaller lifts are used the surcharge effect will be minimized. This should be reviewed in detail by a structural engineer. Permanent earth retaining wall designs are to be carried out in accordance with the latest edition of the Canadian Foundation Engineering Manual and/or the Canadian Bridge Design Code.

## **6.6 Quality Control**

The installation of the piles for the condominium building and any foundation excavations must be monitored by Terraprobe to ensure that the founding bearing capacities achieved are consistent with the design bearing capacity intended by the geotechnical engineer.

The on-site review of the condition of the foundation soil as the foundations are constructed is an integral part of the geotechnical design function and is required by Section 4.2.2.2, Division B, of the 2006 Ontario Building Code. If Terraprobe is not retained to carry out foundation evaluations during construction, then Terraprobe accepts no responsibility for the performance or non-performance of the foundations, even if they are ostensibly constructed in accordance with the design recommendations contained in this report.

The requirements for fill placement on this project have been stipulated relative to Standard Proctor Maximum Dry Density as determined by ASTM D698. Terraprobe operates a CCIL (Canadian Council of Independent Laboratories) certified aggregates laboratory. In situ determinations of density during fill placement on site are recommended to demonstrate that the specified densities are achieved. Terraprobe is a CNSC licensed operator of appropriate nuclear density gauges for this work and can provide sampling and testing services for the project as necessary, with our qualified technical staff. For a Granular B Type II (OPSS 1010) witnessing the proof rolling on a full time basis would be utilised to verify and approve the compactive effort.

It has been assumed that concrete for this structure will be specified in accordance with the requirements of CAN3 - CSA A23.1. Terraprobe maintains a CSA certified concrete laboratory and can provide concrete sampling and testing services for the project as necessary.

## **7.0 STATEMENT OF LIMITATIONS AND RISK**

### **7.1 Procedures**

This reports presents geotechnical design recommendations for the constructibility of the proposed condominium development. It does not consider any environmental issues that may or not be present on the site. It is the responsibility of the client to assess any environmental potential issues on this property and was not part of the scope of work for this investigation.

This investigation has been carried out using investigation techniques and engineering analysis methods consistent with those ordinarily exercised by Terraprobe and other engineering practitioners, working under similar conditions and subject to the time, financial and physical constraints applicable to this project. The geotechnical engineering discussions and recommendations that have been presented are based on the factual data obtained from this investigation.

Any bedrock elevation and ground water observations discrepancies in relation to the findings in the field are not the responsibility of Terraprobe. The client must assume the risk of such description discrepancies findings and be prepared to adjust to potential extra costs to remedy the findings under the direction of Terraprobe. The data presented in the rock probe logs are based on non continuous sampling. There is consequently some interpolation of the probable bedrock depth and indications of changes in stratigraphy as described are therefore approximate.

It must be recognized that there are special risks whenever engineering or related disciplines are applied to identify subsurface conditions. Even a comprehensive sampling and testing program implemented in accordance with the most stringent level of care may fail to detect certain conditions. Terraprobe has assumed for the purposes of providing design parameters and advice, that the conditions that exist between rock probes are similar to those found at the rock probe locations. The conditions that Terraprobe has interpreted to existing between rock probes may differ from those that actually exist.

It may not be possible to advance a sufficient number of rock probes and boreholes and report them in a way that would provide all the subsurface information that could affect construction costs, techniques, equipment and scheduling. Contractors bidding on or undertaking work on the project should be directed to draw their own conclusions as to how the subsurface conditions may affect them, based on their own investigations and



their own interpretations of the factual investigation results, cognizant of the risks implicit in the subsurface investigation activities.

## **7.2 Changes In Site And Scope**

It must also be recognized that the passage of time, natural occurrences, and direct or indirect human intervention at or near the site have the potential to alter subsurface conditions. Ground water conditions are particularly susceptible to change as a result of season variation and alterations in drainage conditions.

The engineering discussion and design parameters recommendations that have been provided are based on the factual data obtained from the site investigation (consisting of rock probes and exploratory boreholes) conducted by Terraprobe and are intended for use by the owner and their retained designers in the design phase of the project.

Since the project is still in the design stage, all aspects of the project relative to the subsurface conditions cannot be anticipated. If there are changes to the project scope and development features the interpretations made of the subsurface information, the geotechnical design parameters and comments relating to constructibility issues and quality control may not be relevant to the revised project or complete.

Terraprobe must be retained to review the implications of changes with respect to the contents of this report and must be retained to review the design drawings and specifications prior to construction.

## 8.0 CLOSURE

This report was prepared for the express use of our client Michael D. Allen Architect c/o 2226553 Ontario Inc. and their retained design consultants. This report is copyright of Terraprobe and no part of this report may be reproduced by any means, in any form, without the prior written permission of Terraprobe.

Michael D. Allen Architect c/o 2226553 Ontario Inc. and their retained design consultants are authorized users.

We trust that the foregoing is sufficient for your present requirements. If you have any questions or if we can be of further assistance, please do not hesitate to contact us.

Yours truly,

**Terraprobe Inc.**



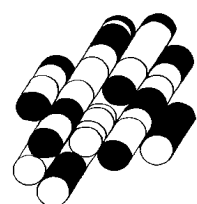
Denis Paquette, P.Eng.  
Principal, Sudbury Branch Manager

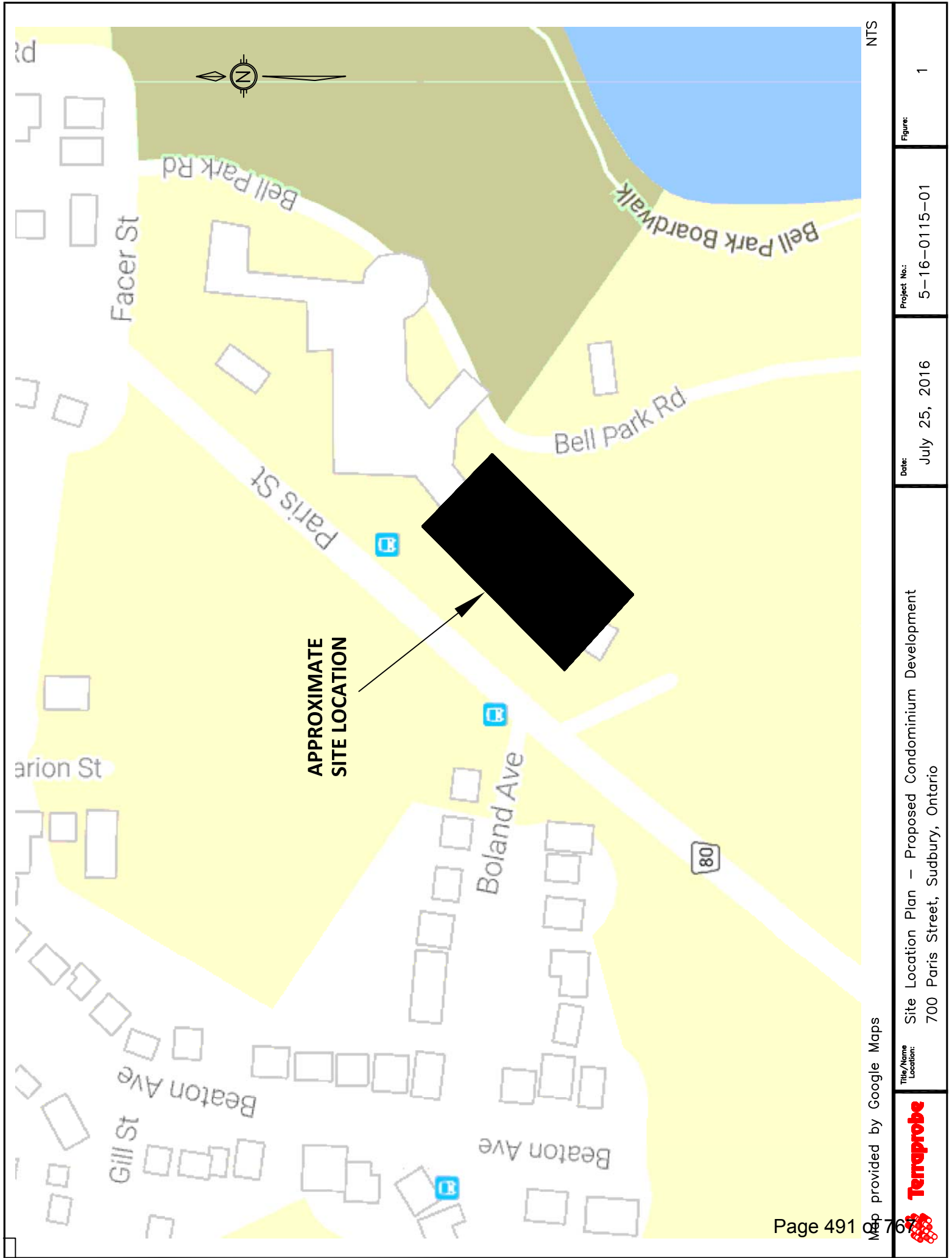
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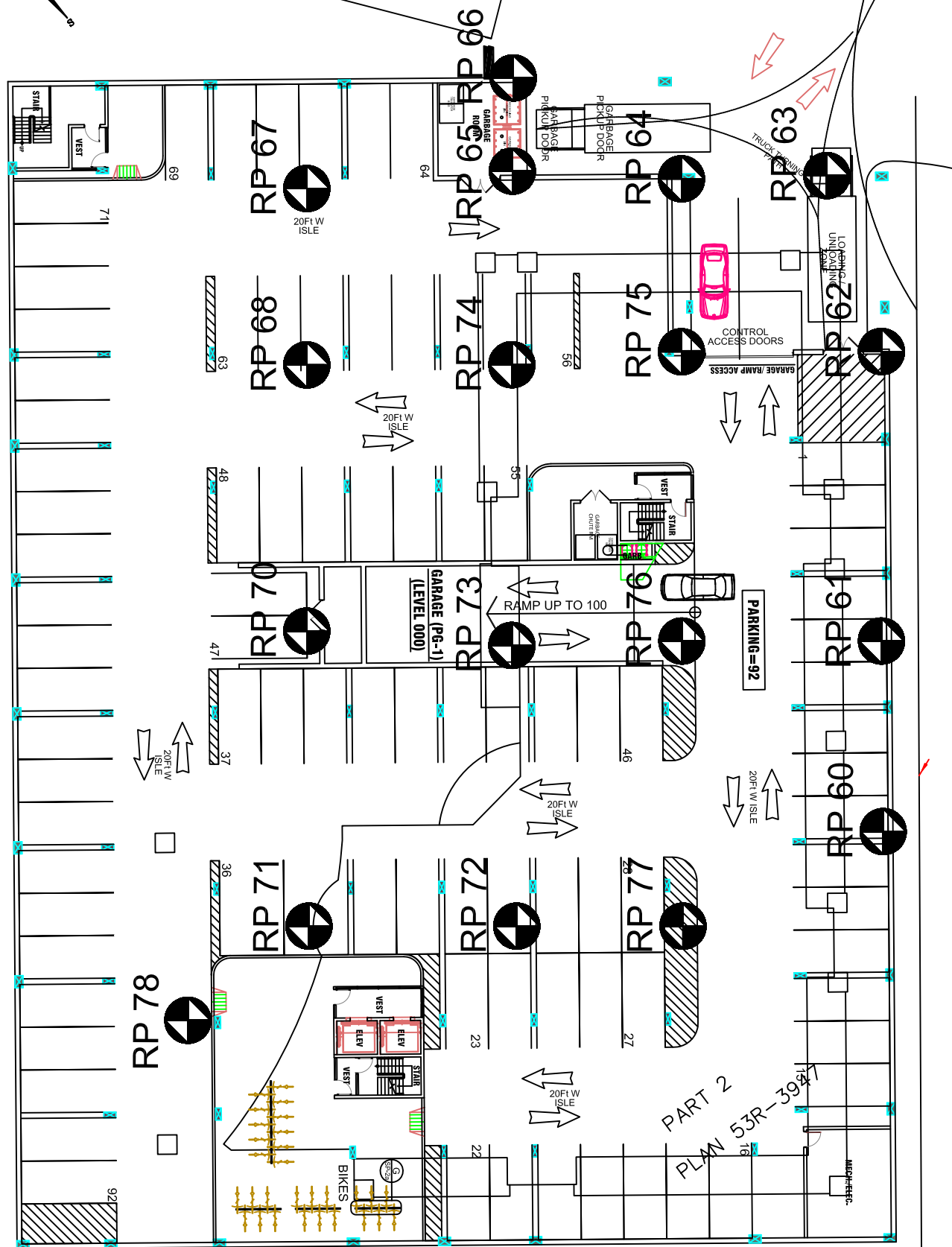


# FIGURES

**TERRAPROBE INC.**



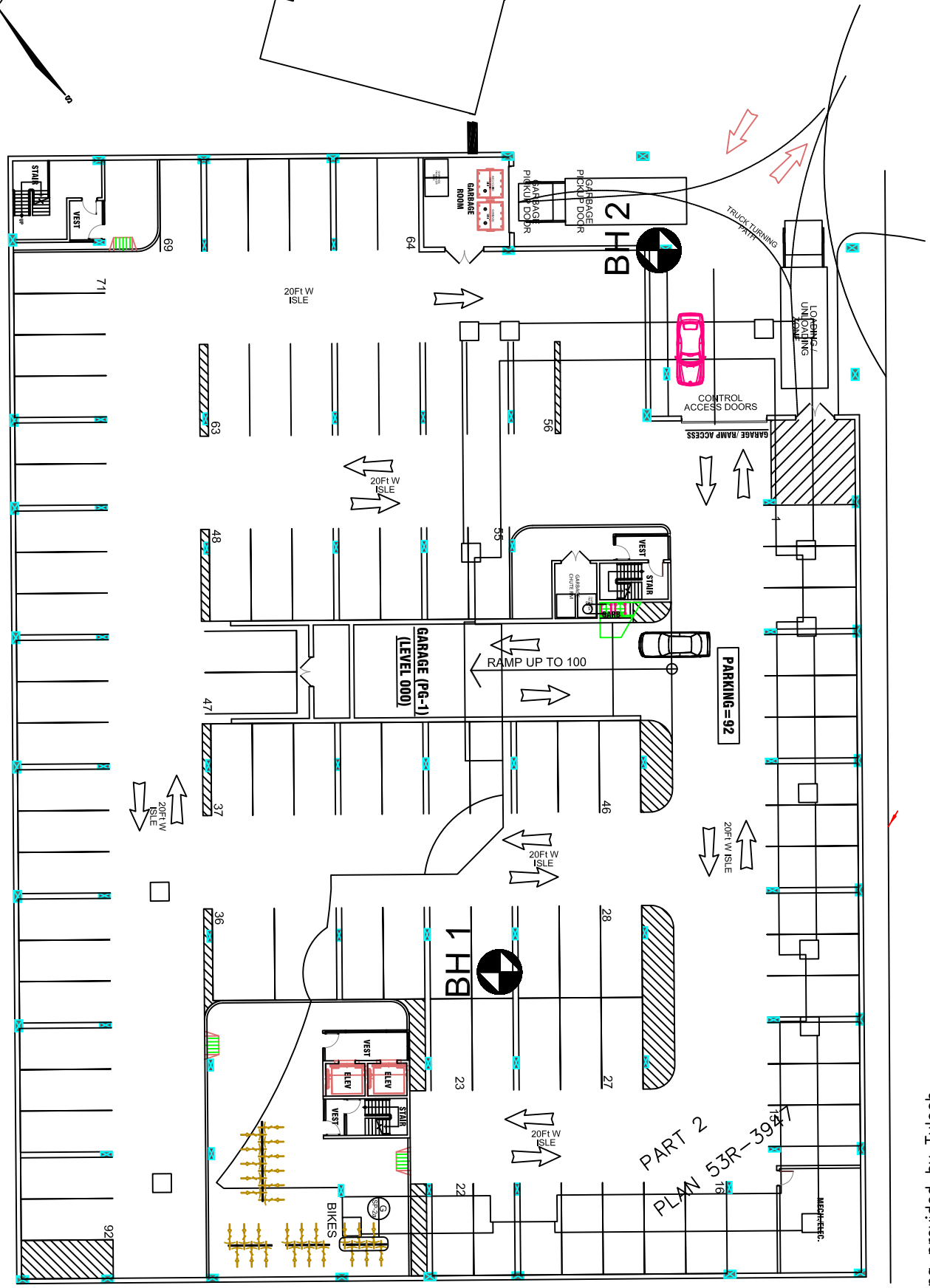
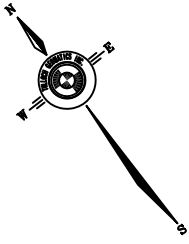




Drawing provided by Tuloch

Drawing NTS



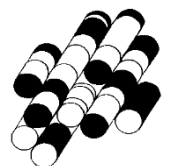


	Title Name Location: BH Location Plan – Proposed Condominium Development 700 Paris Street, Sudbury, Ontario	Date: June 23, 2016	Project No.: 5-16-0115-01	Figure: 3
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# APPENDIX A

## Rock Probe Logs

**Terraprobe Inc.**



**GEOTECHNICAL INVESTIGATION**  
**Rock Probe Logs**  
**Proposed Condominium Development**  
**700 Paris Street**  
**Sudbury, Ontario**

**ROCK PROBE 60**

**Location:** See Figure 2  
**Elevation:** 264.26 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00 to 3.05 m	Interpreted as granular fill underlain by native soils
3.05 m	Probable bedrock

**ROCK PROBE 61**

**Location:** See Figure 2  
**Elevation:** 263.73 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00 to 3.05 m	Interpreted as granular fill underlain by native soils
3.05 m	Probable bedrock

**ROCK PROBE 62**

**Location:** See Figure 2  
**Elevation:** 263.39 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00 to 4.57 m	Interpreted as granular fill underlain by native soils
4.57 m	Probable bedrock

**ROCK PROBE 63**

**Location:** See Figure 2  
**Elevation:** 263.52 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00 to 10.67 m	Interpreted as granular fill underlain by native soils
10.67 m	Probable bedrock

### **ROCK PROBE 64**

**Location:** See Figure 2  
**Elevation:** 264.17 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00 to 6.10 m	Interpreted as granular fill underlain by native soils
6.10 m	Probable bedrock

### **ROCK PROBE 65**

**Location:** See Figure 2  
**Elevation:** 265.13 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00 to 3.96 m	Interpreted as granular fill underlain by native soils
3.96 m	Probable bedrock

### **ROCK PROBE 66**

**Location:** See Figure 2  
**Elevation:** 265.17 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00 to 2.44 m	Interpreted as granular fill underlain by native soils
2.44 m	Probable bedrock

### **ROCK PROBE 67**

**Location:** See Figure 2  
**Elevation:** 266.09 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00 to 2.44 m	Interpreted as granular fill underlain by native soils
2.44 m	Probable bedrock

### **ROCK PROBE 68**

**Location:** See Figure 2  
**Elevation:** 264.94 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00 to 1.22 m	Interpreted as granular fill underlain by native soils
1.22 m	Probable bedrock

### **ROCK PROBE 70**

**Location:** See Figure 2  
**Elevation:** 264.96 m

DEPTH	DESCRIPTION
0.00 to 1.83 m	Interpreted as granular fill underlain by native soils
1.83 m	Probable bedrock

### **ROCK PROBE 71**

**Location:** See Figure 2  
**Elevation:** 264.11 m

DEPTH	DESCRIPTION
0.00 to 1.52 m	Interpreted as granular fill/native soils
1.52 m	Probable bedrock

### **ROCK PROBE 72**

**Location:** See Figure 2  
**Elevation:** 264.01 m

DEPTH	DESCRIPTION
0.00 to 2.44 m	Interpreted as granular fill underlain by native soils
2.44 m	Probable bedrock

### **ROCK PROBE 73**

**Location:** See Figure 2  
**Elevation:** 264.14 m

DEPTH	DESCRIPTION
0.00 to 3.96 m	Interpreted as granular fill underlain by native soils
3.96 m	Probable bedrock

### **ROCK PROBE 74**

**Location:** See Figure 2  
**Elevation:** 264.43 m

DEPTH	DESCRIPTION
0.00 to 3.05 m	Interpreted as granular fill underlain by native soils
3.05 m	Probable bedrock



### **ROCK PROBE 75**

**Location:** See Figure 2  
**Elevation:** 263.89 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00 to 9.75 m	Interpreted as granular fill underlain by native soils
9.75 m	Probable bedrock

### **ROCK PROBE 76**

**Location:** See Figure 2  
**Elevation:** 264.00 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00 to 1.22 m	Interpreted as granular fill underlain by native soils
1.22 m	Probable bedrock

### **ROCK PROBE 77**

**Location:** See Figure 2  
**Elevation:** 265.04 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00	Exposed Bedrock

### **ROCK PROBE 78**

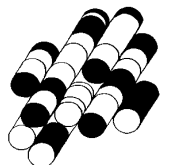
**Location:** See Figure 2  
**Elevation:** 264.13 m

<b>DEPTH</b>	<b>DESCRIPTION</b>
0.00 to 1.22 m	Interpreted as granular fill underlain by native soils
1.22 m	Probable bedrock

# **APPENDIX B**

## **Borehole Logs**

**TERRAPROBE INC.**



**BOREHOLE AND TEST PIT LOGS**

SAMPLING METHOD		PENETRATION RESISTANCE		
SS	split spoon	<b>Standard Penetration Test (SPT)</b> resistance ('N' values) is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a standard 50 mm (2 in.) diameter split spoon sampler for a distance of 0.3 m (12 in.).		
ST	Shelby tube			
AS	auger sample			
WS	wash sample			
RC	rock core			
WH	weight of hammer	<b>Dynamic Cone Test (DCT)</b> resistance is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a conical steel point of 50 mm (2 in.) diameter and with 60° sides on 'A' size drill rods for a distance of 0.3 m (12 in.).		
PH	pressure, hydraulic			
SOIL DESCRIPTION - COHESIONLESS SOILS		SOIL DESCRIPTION - COHESIVE SOILS		
Relative Density	'N' value	Consistency	Undrained Shear Strength, kPa	'N' value
very loose	< 4	very soft	< 12	< 2
loose	4 - 10	soft	12 - 25	2 - 4
compact	10 - 30	firm	25 - 50	4 - 8
dense	30 - 50	stiff	50 - 100	8 - 16
very dense	> 50	very stiff	100 - 200	16 - 32
		hard	> 200	> 32
SOIL COMPOSITION		TESTS, SYMBOLS		
	% by weight	MH	mechanical sieve and hydrometer analysis	
		w, w <sub>c</sub>	water content	
		w <sub>l</sub>	liquid limit	
		w <sub>p</sub>	plastic limit	
		I <sub>p</sub>	plasticity index	
		k	coefficient of permeability	
		Y	soil unit weight, bulk	
		φ'	angle of internal friction	
		c'	cohesion shear strength	
		C <sub>c</sub>	compression index	
GENERAL INFORMATION, LIMITATIONS				
The conclusions and recommendations provided in this report are based on the factual information obtained from the boreholes and/or test pits. Subsurface conditions between the test holes may vary.				
The engineering interpretation and report recommendations are given only for the specific project detailed within, and only for the original client. Any third party decision, reliance, or use of this report is the sole and exclusive responsibility of such third party. The number and siting of boreholes and/or test pits may not be sufficient to determine all factors required for different purposes.				
It is recommended Terraprobe be retained to review the project final design and to provide construction inspection and testing.				



## RECOVERY

- TCR** **Total Core Recovery** is the total length of core pieces, irrespective of their individual lengths obtained in a core run, and expressed as a percentage of the length of that core run.
- SCR** **Solid Core Recovery** is the total length of sound full-diameter core pieces obtained in a core run, expressed as a percentage of the length of that core run.
- RQD** **Rock Quality Designation** pertains to the sum of those pieces of sound core which are 10 cm or greater in length obtained in a core run, expressed as a percentage of the length of that core run.

RQD (%)	0 - 25	25 - 50	50 - 75	75 - 90	90 - 100
QUALITY	very poor	poor	fair	good	excellent

## JOINT CHARACTERISTICS

**Joint Spacing** (adapted from Bieniawski 1989, ISRM 1981)

Classification	Spacing
very close	< 60 mm
close	60 – 200 mm
moderately close	0.2 to 0.6 m
wide	0.6 to 2 m
very wide	> 2 m

### Natural Fracture Frequency (per 0.3 m)

Refers to the number of natural fractures (joints, faults, etc.) which are present per 0.3m. Ignores mechanical or drill-induced breaks, and closed discontinuities (e.g. bedding planes).

### Orientation

Orientation	Angle from horiz.
horizontal/flat	0 - 20°
dipping	20 - 50°
vertical	50 - 90°

### Joint Filling

Description	Approx. $\Phi$
tight, hard, non-softening	25 - 35
oxidation, surface staining only	25 - 30
slightly altered, clay-free	25 - 30
sandy particles, clay-free	2□ - 25
sandy□ and silty, minor clay	1□ - 24
non-softening clays	6 - 12
swelling clay fillings	n/a

### Joint Aperture

Classification	Aperture
closed / tight	< 0.5 mm
gapped	0.5 to 10 mm
open	> 10 mm

### Planarity

- Planar
- Undulating
- Stepped
- Irregular
- Discontinuous

### Roughness

- Very rough
- Rough
- Smooth
- Slickensided
- Polished

Coating	Description
clean	no filling
veneer	< 1 mm filling
coating / infill	> 1 mm filling

## GENERAL

**Degree of Weathering** (after MTO, RR229 Evaluation of Shales for Construction Projects)

Zone	Degree	Description
Z1	unweathered	shale, regular jointing
Z2	partially weathered	angular blocks of unweathered shale, no matrix, with chemically weathered but intact shale
Z3		soil-like matrix with frequent angular shale fragments < 25mm diameter
Z4a		soil-like matrix with occasional shale fragments < 3mm diameter
Z4b	fully weathered	soil-like matrix only

**Strength classification** (after Marinos and Hoek, 2001)

Grade	Term	UCS (MPa)	Field Estimate (Description)
R6	extremely strong	> 250	can only be chipped by geological hammer
R5	very strong	100 - 250	requires many blows from geological hammer
R4	strong	50 - 100	requires more than one blow from geological hammer
R3	medium strong	25 - 50	can't be scraped, breaks under one blow from geological hammer
R2	weak	5 - 25	can be peeled / scraped with knife with difficulty
R1	very weak	1 - 5	easily scraped / peeled, crumbles under firm blow of geo. hammer
R0	extremely weak	< 1	indented by thumbnail

**Bedding Thickness** (Quarterly Journal of Engineering Geology, Vol 3, 1970)

Very thickly bedded	> 2 m	Medium bedded	200 – 600mm	Very thinly bedded	20 – 60mm	Thinly Laminated < 6mm
Thickly bedded	0.6 – 2m	Thinly bedded	60 – 200mm	Laminated	6 – 20mm	

### Bedrock Graphic Legend



Inferred bedrock



Shale



Limestone



LOCATION: 700 Paris Street, Sudbury, Ontario

## ELEVATION DATUM: Geodetic FILE: 5-16-0115-01

NOTES: Ground water level not recorded in consideration of use of water for bedrock coring procedures





LOCATION: 700 Paris Street, Sudbury, Ontario

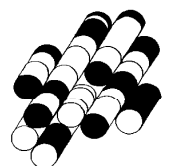
ELEVATION DATUM: Geodetic FILE: 5-16-0115-01

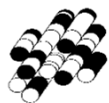
NOTES:

# **APPENDIX C**

## **Soil Laboratory Results**

**TERRAPROBE INC.**





## WATER CONTENT TEST FORM

PROJECT: **Condominium Development**  
LOCATION: **700 Paris Street, Sudbury, Ontario**  
CLIENT: **Michael D. Allen Architect c/o 2226553 Ontario Inc.**

FILE NO.: **5-16-0155-01**  
LAB NO.: **6270**  
SAMPLE DATE: **July 25, 2016**  
SAMPLE BY: **D.T.**  
TEST DATE: **August 2, 2016**  
TESTED BY: **T.E.**

BOREHOLE NUMBER		<b>1</b>	<b>1</b>
SAMPLE NUMBER		<b>1</b>	<b>2</b>
DEPTH OF SAMPLE (m)		<b>0.2 - 0.5</b>	<b>0.76 - 1.22</b>
WT. OF WET SOIL + TARE (g)	A	<b>101.41</b>	<b>669.90</b>
WT. OF DRY SOIL + TARE (g)	B	<b>91.90</b>	<b>630.80</b>
WEIGHT OF TARE (g)	C	<b>30.65</b>	<b>410.90</b>
WATER CONTENT (%)	A-B/B-C*100	<b>16%</b>	<b>18%</b>

BOREHOLE NUMBER		<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
SAMPLE NUMBER		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
DEPTH OF SAMPLE (m)		<b>0.2 - 0.6</b>	<b>0.76 - 1.22</b>	<b>1.52 - 1.98</b>	<b>2.29 - 2.75</b>	<b>3.05 - 3.51</b>
WT. OF WET SOIL + TARE (g)	A	<b>83.32</b>	<b>650.80</b>	<b>664.70</b>	<b>668.00</b>	<b>658.80</b>
WT. OF DRY SOIL + TARE (g)	B	<b>76.83</b>	<b>614.80</b>	<b>618.60</b>	<b>619.40</b>	<b>612.40</b>
WEIGHT OF TARE (g)	C	<b>30.55</b>	<b>407.40</b>	<b>411.00</b>	<b>410.70</b>	<b>407.80</b>
WATER CONTENT (%)	A-B/B-C*100	<b>14%</b>	<b>17%</b>	<b>22%</b>	<b>23%</b>	<b>23%</b>

COMMENT:

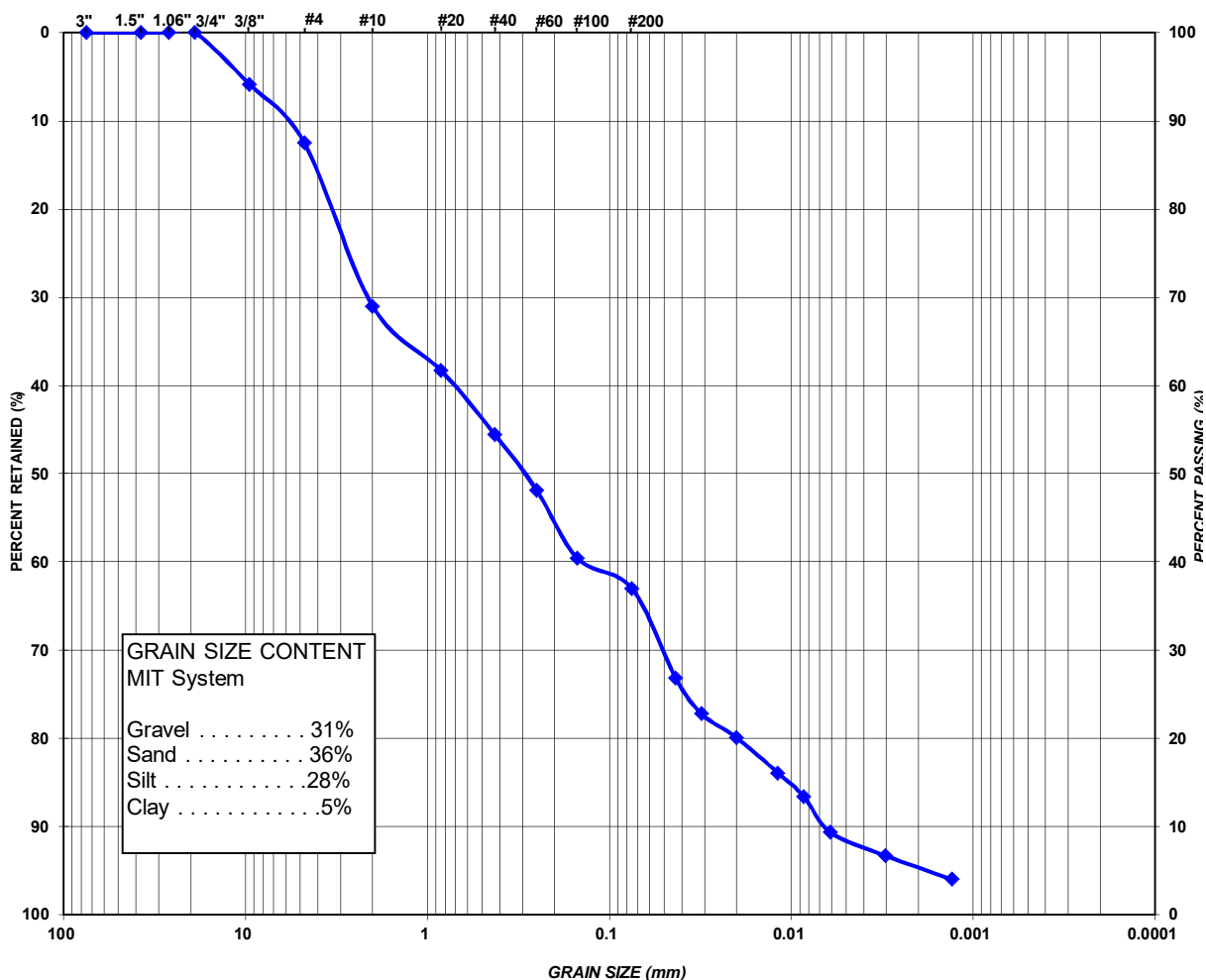


PROJECT: Condominium Development  
 LOCATION: 700 Paris Street, Sudbury, Ontario  
 CLIENT: Michael D. Allen Architect c/o 2226553 Ontario Inc.  
 BOREHOLE NUMBER: 1  
 SAMPLE NUMBER: 2  
 SAMPLE DEPTH (m): 0.76 - 1.22  
 SAMPLE DESCRIPTION: Gravelly, Silty SAND, trace clay

FILE NO.: 5-16-0115-01  
 SAMPLE DATE: July 25, 2016  
 SAMPLED BY: D.T.  
 TEST DATE: August 3, 2016  
 TESTED BY: T.E.  
 LAB NO.: 6270

### GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	CBLLS	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
		GRAVEL			SAND				

UNIFIED SYSTEM	USCS	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY
		GRAVEL		SAND			

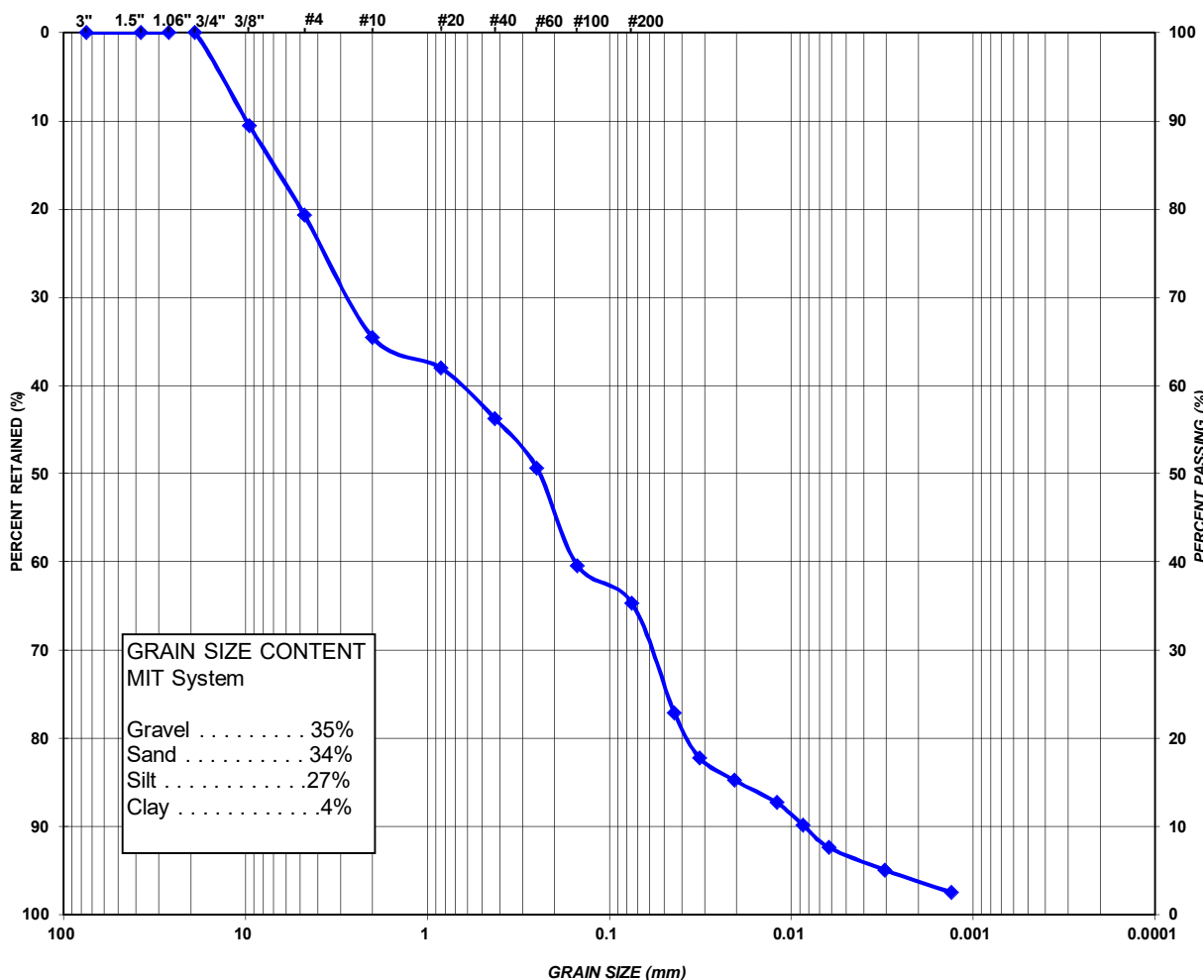


PROJECT: Condominium Development  
 LOCATION: 700 Paris Street, Sudbury, Ontario  
 CLIENT: Michael D. Allen Architect c/o 2226553 Ontario Inc.  
 BOREHOLE NUMBER: 2  
 SAMPLE NUMBER: 2  
 SAMPLE DEPTH (m): 0.76 - 1.22  
 SAMPLE DESCRIPTION: Sandy, Silty GRAVEL, trace clay

FILE NO.: 5-16-0115-01  
 SAMPLE DATE: July 25, 2016  
 SAMPLED BY: D.T.  
 TEST DATE: August 3, 2016  
 TESTED BY: T.E.  
 LAB NO.: 6270

### GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	CBLLS	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
		GRAVEL			SAND				

UNIFIED SYSTEM	USCS	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY
		GRAVEL		SAND			



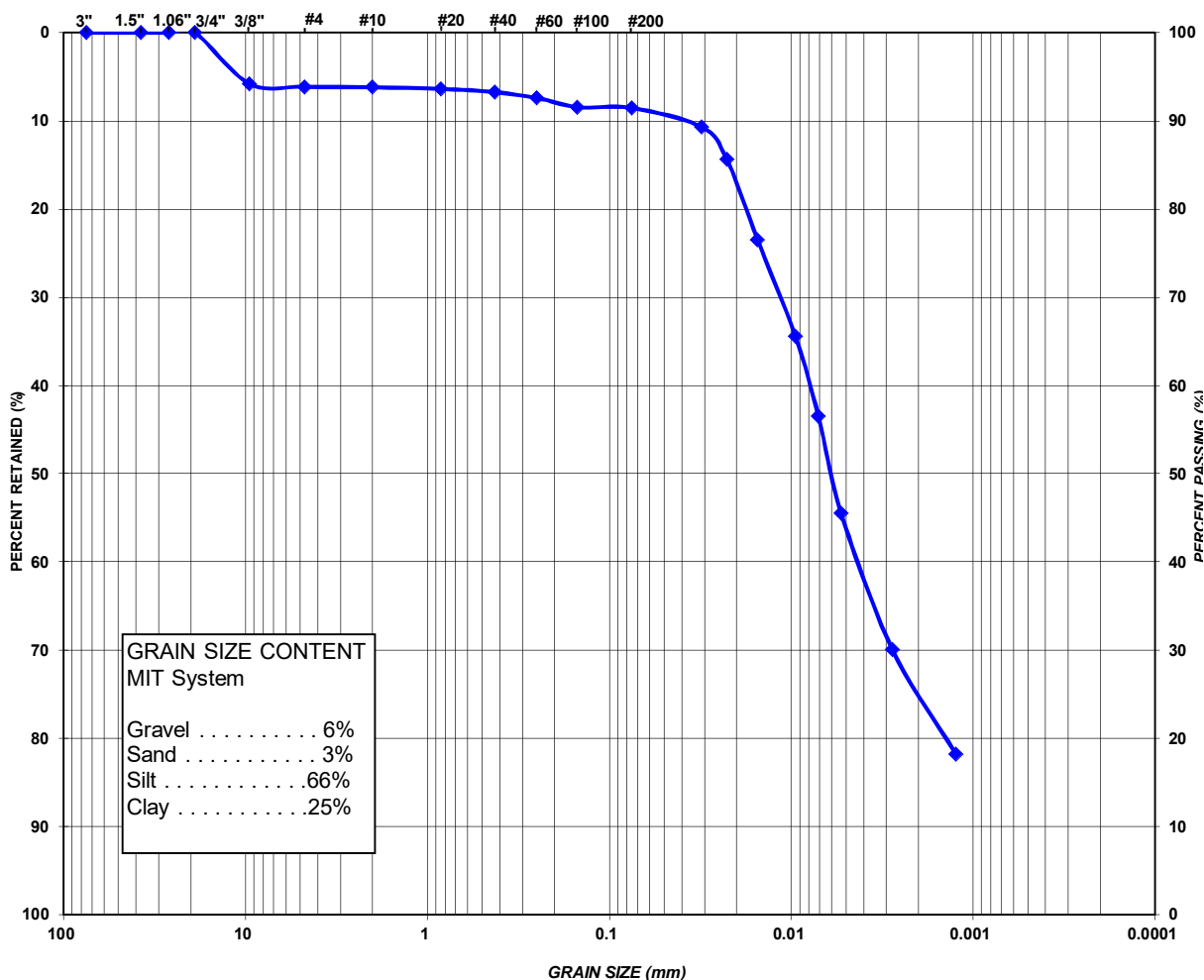


PROJECT: Condominium Development  
 LOCATION: 700 Paris Street, Sudbury, Ontario  
 CLIENT: Michael D. Allen Architect c/o 2226553 Ontario Inc.  
 BOREHOLE NUMBER: 2  
 SAMPLE NUMBER: 3  
 SAMPLE DEPTH (m): 1.52 - 1.98  
 SAMPLE DESCRIPTION: Clayey SILT, trace gravel, trace sand

FILE NO.: 5-16-0115-01  
 SAMPLE DATE: July 25, 2016  
 SAMPLED BY: D.T.  
 TEST DATE: August 3, 2016  
 TESTED BY: T.E.  
 LAB NO.: 6270

### GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	CBLLS	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
		GRAVEL			SAND				

UNIFIED SYSTEM	USCS	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY
		GRAVEL		SAND			

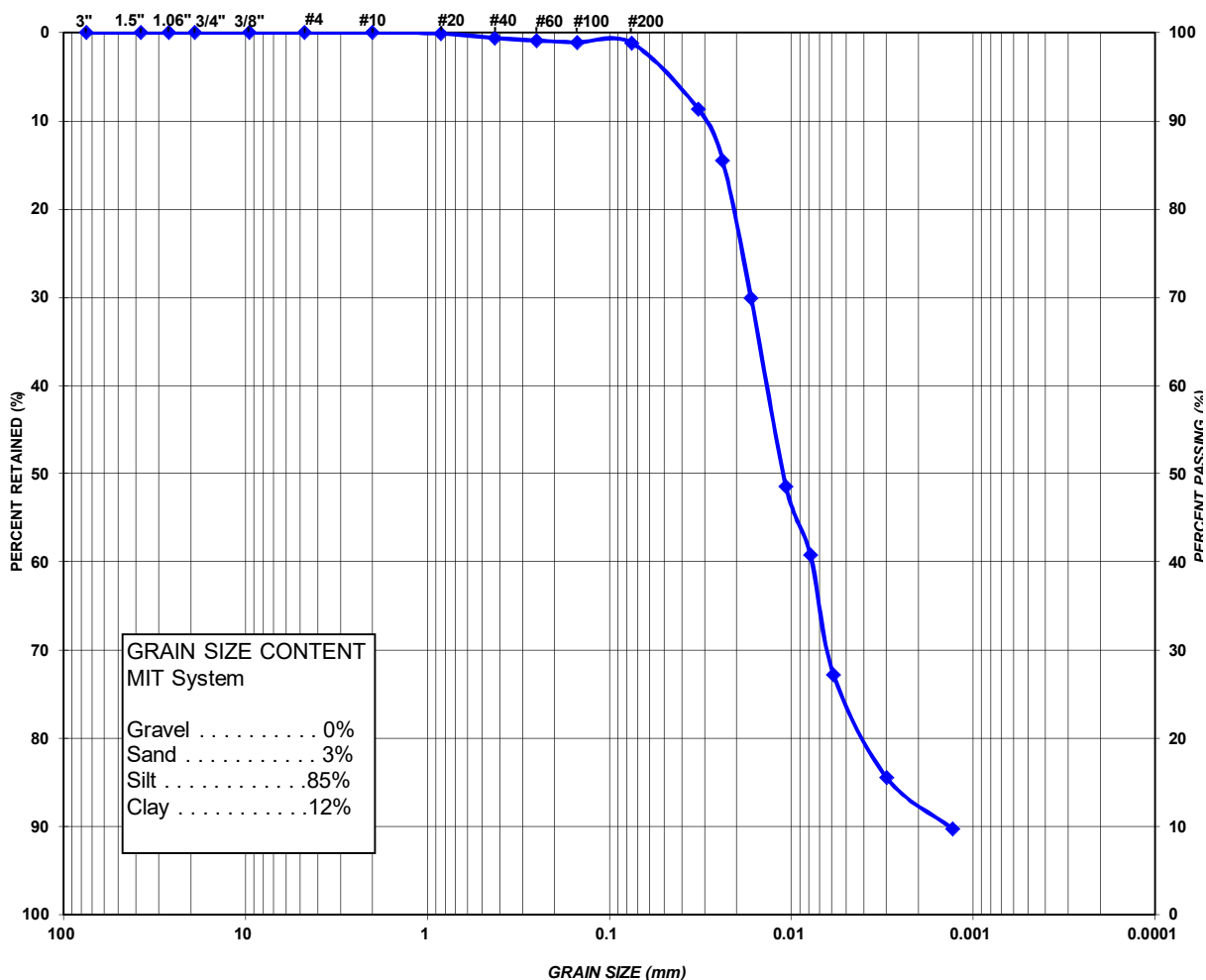


PROJECT: Condominium Development  
 LOCATION: 700 Paris Street, Sudbury, Ontario  
 CLIENT: Michael D. Allen Architect c/o 2226553 Ontario Inc.  
 BOREHOLE NUMBER: 2  
 SAMPLE NUMBER: 4  
 SAMPLE DEPTH (m): 2.29 - 2.75  
 SAMPLE DESCRIPTION: SILT, some clay, trace sand

FILE NO.: 5-16-0115-01  
 SAMPLE DATE: July 25, 2016  
 SAMPLED BY: D.T.  
 TEST DATE: August 3, 2016  
 TESTED BY: T.E.  
 LAB NO.: 6270

### GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	CBCLSL	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
		GRAVEL			SAND				

UNIFIED SYSTEM	USCS	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY
		GRAVEL		SAND			

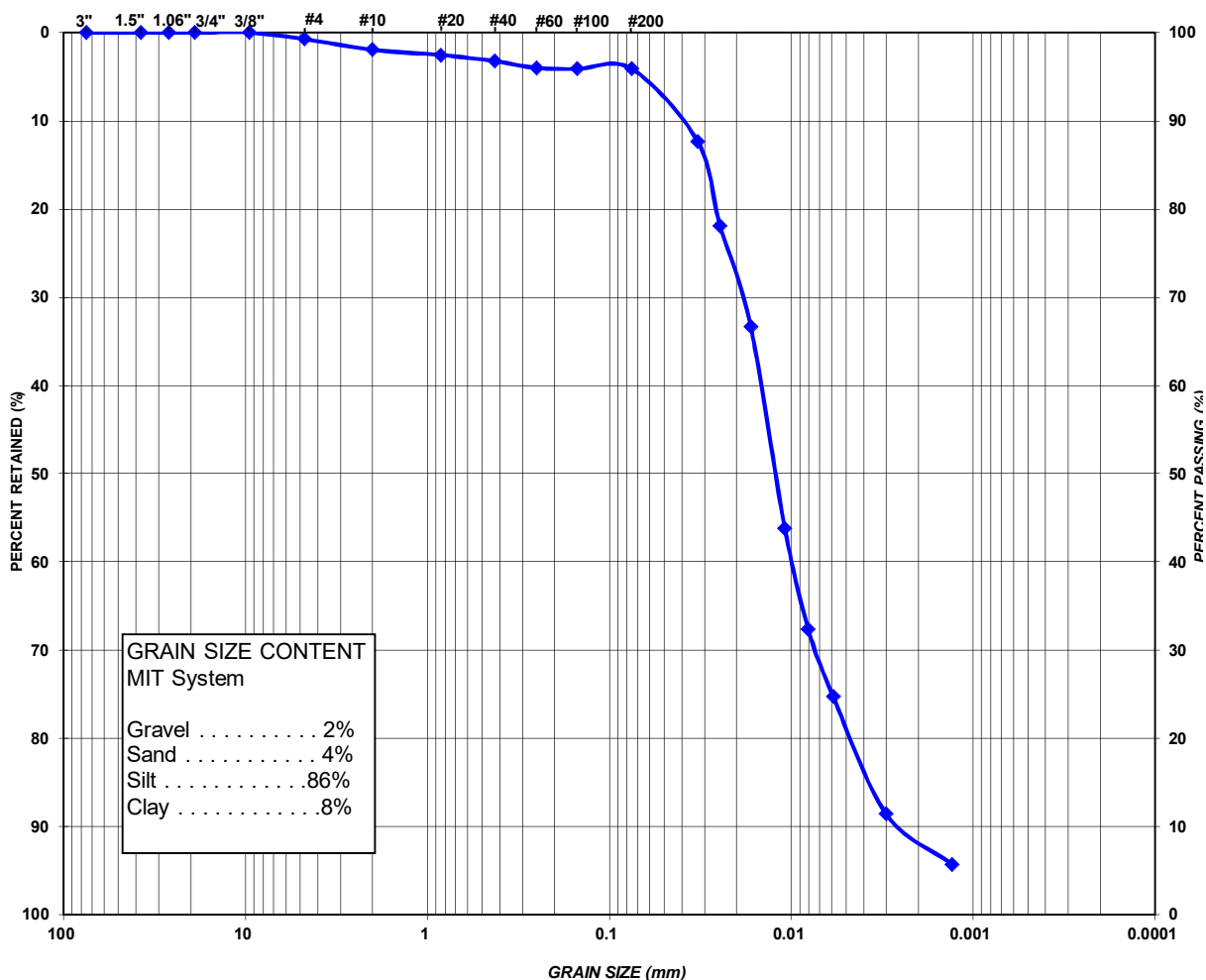


PROJECT: Condominium Development  
 LOCATION: 700 Paris Street, Sudbury, Ontario  
 CLIENT: Michael D. Allen Architect c/o 2226553 Ontario Inc.  
 BOREHOLE NUMBER: 2  
 SAMPLE NUMBER: 5  
 SAMPLE DEPTH (m): 3.05 - 3.51  
 SAMPLE DESCRIPTION: SILT, trace clay, trace sand, trace gravel

FILE NO.: 5-16-0115-01  
 SAMPLE DATE: July 25, 2016  
 SAMPLED BY: D.T.  
 TEST DATE: August 3, 2016  
 TESTED BY: T.E.  
 LAB NO.: 6270

### GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	CBLLS	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
		GRAVEL			SAND				

UNIFIED SYSTEM	USCS	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY
		GRAVEL		SAND			

## Vanessa Smith

---

**From:** Glen Ferguson <Glen.Ferguson@greatersudbury.ca>  
**Sent:** April 14, 2023 5:08 PM  
**To:** Kevin Jarus; Carol Skanes  
**Cc:** Vanessa Smith  
**Subject:** Re: Geotech- 700 Paris Street

Caution! This message was sent from outside your organization.

Hi Kevin.

Thanks for copying me on this and please include a printed copy with the rest of the application form and materials.

Take care.

Glen

—

Glen Ferguson

Get [Outlook for iOS](#)

---

**From:** Kevin Jarus <kevin.jarus@tulloch.ca>  
**Sent:** Friday, April 14, 2023 12:49:31 PM  
**To:** Carol Skanes <Carol.Skanes@greatersudbury.ca>  
**Cc:** Glen Ferguson <Glen.Ferguson@greatersudbury.ca>; Vanessa Smith <vanessa.smith@tulloch.ca>  
**Subject:** RE: Geotech- 700 Paris Street

Many thanks Carol.

Glen – see below re: need for Geotech only at site plan/BP stage for subject property. The MOU showed as required at ZBLA.

Kevin



**Kevin Jarus**, M.P.I., RPP  
Project Manager | Senior Land Use Planner  
Sr. Associate

Phone: 705-671-2295 ext 606  
Mobile: 416-856-7935  
Sudbury Office | [www.TULLOCH.ca](http://www.TULLOCH.ca)



---

**From:** Carol Skanes <Carol.Skanes@greatersudbury.ca>  
**Sent:** April-14-23 12:11 PM  
**To:** Vanessa Smith <vanessa.smith@tulloch.ca>  
**Cc:** Sherri Budgell <Sherri.Budgell@greatersudbury.ca>; Guido Mazza <Guido.Mazza@greatersudbury.ca>; Kevin Jarus

<kevin.jarus@tulloch.ca>

**Subject:** RE: Geotech- 700 Paris Street

Caution! This message was sent from outside your organization.

Good afternoon,

I've discussed the comments with the Plans Examiner in attendance at the meeting, and the intent for geotechnical review was to be for information moving forward to Site Plan Agreement and Building Permit.

Regards,

*Carol Skanes, CBCO*  
*Manager of Plans Examination, Building Services*  
*City of Greater Sudbury*  
*705-674-4455 ext 4321*  
[Carol.Skanes@greatersudbury.ca](mailto:Carol.Skanes@greatersudbury.ca)



---

**From:** Vanessa Smith <[vanessa.smith@tulloch.ca](mailto:vanessa.smith@tulloch.ca)>  
**Sent:** Tuesday, April 11, 2023 3:10 PM  
**To:** Carol Skanes <[Carol.Skanes@greatersudbury.ca](mailto:Carol.Skanes@greatersudbury.ca)>  
**Cc:** Sherri Budgell <[Sherri.Budgell@greatersudbury.ca](mailto:Sherri.Budgell@greatersudbury.ca)>; Guido Mazza <[Guido.Mazza@greatersudbury.ca](mailto:Guido.Mazza@greatersudbury.ca)>; Kevin Jarus <[kevin.jarus@tulloch.ca](mailto:kevin.jarus@tulloch.ca)>  
**Subject:** Geotech- 700 Paris Street

Hi Carol,

Just wanted to confirm whether the geotechnical report is required at the rezoning stage or if such can be provided at site plan control.

Geotech was included as part of complete rezoning application at pre-con. See MOU attached.

Many thanks,



**Vanessa Smith**, M.PI., RPP

Land Use Planner

Phone: 705-671-2295 ext 604

Mobile: 705-618-2898

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## Chelsea Streich

---

**From:** Kevin Jarus  
**Sent:** December 13, 2023 1:55 PM  
**To:** Vanessa Smith  
**Cc:** Chelsea Streich  
**Subject:** FW: 700 Paris St (General Hospital) - NDCA SPART MOU  
**Attachments:** PCUA (PC2021-073 - 700 Paris Street, Sudbury - 2226553 Ontario Inc.).pdf; 5160115-01 700 Paris St Condos Geo Report 2016-08-10 TC SIGNED.pdf



**Kevin Jarus**, M.Pl., RPP  
Planning Manager  
Sr. Associate

Sudbury Office  
Phone: 705-671-2295 ext 606  
Mobile: 416-856-7935

*We want to build an organization where everyone loves their job and their leaders care for them.*

**From:** Sarah Woods <Sarah.Woods@ConservationSudbury.ca>  
**Sent:** Friday, June 16, 2023 10:57 AM  
**To:** Kevin Jarus <kevin.jarus@tulloch.ca>  
**Cc:** Glen Ferguson <Glen.Ferguson@greatersudbury.ca>; Melanie Venne <Melanie.Venne@ConservationSudbury.ca>  
**Subject:** RE: 700 Paris St (General Hospital) - NDCA SPART MOU

Caution! This message was sent from outside your organization.

Hello Kevin,

Conservation Sudbury's comments on this parcel, as described in the attached Pre-Consultation MOU (CGS file no. PC2021-073, January 10, 2019), are focused on the potential erosion hazard associated with Ramsey Lake. Erosion hazards are sometimes associated with shoreline development, and understanding the nature and location of the hazard is important to understand risk to the development. The hazard is identified, in part, based on topography. It is also dependent on underlying materials – and in cases where the site is dominated by sound bedrock the hazard is fully mitigated.

To better understand the underlying materials you supplied the attached Geotechnical and Rock Probe Investigation by Terraprobe, dated August 10, 2016. The rock probe results show that the bedrock elevation (in those areas that were sampled) varies from 252.85 to 265.04 masl, all above the elevation of the lake and the flood elevation. These results fully mitigate any concerns about the erosion hazard within the location of the study, which was focused on the southwest of the existing building.

The sketches provided as part of the MOU show one proposed building in the location covered by the Rock Probe Investigation, and two additional buildings (within the footprint of the existing hospital, and one to the northeast). I have reviewed available topographic information in the location of the two additional buildings, and I find the slopes to be sufficiently shallow to conclude that they are not within an erosion hazard associated with Ramsey Lake.

Given all of the above, I am comfortable confirming that no additional information is required to address our concerns, as expressed in the Pre-Consultation MOU. Conservation Sudbury does not require any further circulation on this file.



**Kevin Jarus**, M.Pl., RPP  
Project Manager | Senior Land Use Planner  
Sr. Associate  
Phone: 705-671-2295 ext 606  
Mobile: 416-856-7935  
Sudbury Office | [www.TULLOCH.ca](http://www.TULLOCH.ca)



**From:** Kevin Jarus  
**Sent:** April-14-23 10:36 AM  
**To:** Sarah Woods <[Sarah.Woods@ConservationSudbury.ca](mailto:Sarah.Woods@ConservationSudbury.ca)>  
**Cc:** Vanessa Smith <[vanessa.smith@tulloch.ca](mailto:vanessa.smith@tulloch.ca)>  
**Subject:** 700 Paris St (General Hospital) - NDCA SPART MOU

Hi Sarah,

Just left you a voicemail. If you could call me back on my cell regarding the attached SPART MOU comments would be much appreciated. Will be a brief discussion.

Thanks as always,  
Kevin



**Kevin Jarus**, M.Pl., RPP  
Project Manager | Senior Land Use Planner  
Sr. Associate  
Phone: 705-671-2295 ext 606  
Mobile: 416-856-7935  
Sudbury Office | [www.TULLOCH.ca](http://www.TULLOCH.ca)



October 17, 2023

Tulloch Engineering  
1942 Regent Street, Unit L  
Sudbury, ON  
P3E 5V5

Attention: Rebecca Dawson, EIT

PO BOX 5000 STN A  
200 BRADY STREET  
SUDBURY ON P3A 5P3

**Re: Sewer and Water Capacity Analysis  
700 Paris, Sudbury  
Township of Balfour**

---

CP 5000 SUCC A  
200, RUE BRADY  
SUDBURY ON P3A 5P3

The Development Engineering Section has reviewed your request for a Sewer and Water Capacity Analysis at the above noted location and have the following to report:

705.671.2489

[www.greatersudbury.ca](http://www.greatersudbury.ca)  
[www.grandsudbury.ca](http://www.grandsudbury.ca)

A review of the sewage mains downstream from the proposed connection at MH-MCK-07-09-1122 700 Paris, revealed that the mains are capable of conveying the additional 25.7 L/s of flow expected from your development.

A capacity analysis performed by our WaterCAD model, developed the following results at the 200mm watermain junction J\_S\_5558 at an elevation of 272.26m

Values Obtained from Model

Max Hour: 70 psi  
Max Day: 71 psi  
Fire Flow: 400 + l/s

C.G.S. Minimum Requirements

- 40 psi
- 50 psi

The results of the WaterCAD analysis indicate that sufficient water capacity and pressure exist for the proposal in question.

*It should be noted that these results are derived at by using a theoretical computer model based on our best available data. In the event that these developments do not proceed within a one (1) year period, then you should make the necessary arrangements to have a current analysis carried out to take into account any changes made in our sewer or WaterCAD models and to ensure that there is sufficient Sewage, Fire Flows and/or Domestic Pressures available for your proposal(s).*

Should you have any questions or concerns please contact me at 671-2489 ext 2409.

Yours truly,



David Longarini  
Development Engineering Technician

DVL/ds

cc: Akli BenAnteur, Wastewater Project Engineer, (Kelly Lake)



# PLANNING JUSTIFICATION REPORT

## 700 PARIS STREET, SUDBURY

OFFICIAL PLAN & ZONING BY-LAW AMENDMENT APPLICATIONS

DECEMBER 2023



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# 1.0 | INTRODUCTION

# 1.0 INTRODUCTION

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## PROJECT OVERVIEW

TULLOCH has been retained by 2226553 ONTARIO INC. (Panoramic Properties Inc.), the owner of 700 Paris Street in the City of Greater Sudbury, to prepare a Planning Justification Report as part of complete applications to amend the *City of Greater Sudbury Official Plan* and the *City of Greater Sudbury Zoning By-Law 2010-100Z*.

The proposed development and associated amendments seek to redevelop the site through the delivery of three new residential buildings along with limited commercial (restaurant) uses on a ±1.78-hectare site generally situated between Paris Street and Bell Park on the eastern edge of Sudbury's Kingsmount-Bell Park neighbourhood.

The proposed development will positively contribute to Sudbury's Ramsey Lake waterfront as well as is responsive to provincial and municipal targets of creating 3,800 more homes in Greater Sudbury by 2031, through the delivery of a distinctive urban waterfront development that provides a total of 421-residential units, 109-retirement guest suites, and 380m<sup>2</sup> of restaurant floorspace. The development has been designed to respond to the surrounding natural and built context, which is evident in the architecture, site design, and related public realm and landscaped improvements (See *Figure 1*).

To permit the proposed redevelopment, amendments to the City's *Official Plan* and to the *Zoning By-Law 2010-100Z* are required. This report provides a land use planning analysis and justification for the Official Plan Amendment needed to permit a density of 237-units per hectare where densities above 150 units per hectare are only permitted in the Downtown land use designation and to permit 380m<sup>2</sup> of commercial space (i.e. restaurant uses) where a maximum of 150m<sup>2</sup> is permitted in the Living Area 1 designation, and the Zoning By-law Amendment required to rezone the subject lands from the existing "R4(3)", High Density Residential Special Zone to an amended "R4(3)", High Density Residential Special Zone with revised site standards for height, setbacks, etc., and an added land use permission in the form of a Restaurant use.

The legal description of lands is as follows:

PIN 73584-0652, PT S1/2 LT 5 CON 3 MCKIM AS IN S116343; GREATER SUDBURY  
PIN 735910047, PT N1/2 LT 5 CON 2 MCKIM PT 2, 53R3947; GREATER SUDBURY

This Planning Justification Report reviews the consistency and the conformity of the planning applications within the context of applicable land use policies found within the:

- *2020 Provincial Policy Statement;*
- *Growth Plan for Northern Ontario;*
- *City of Greater Sudbury Strategic Plan;*
- *City of Greater Sudbury Official Plan;*
- *Greater Sudbury Community Energy and Emissions Plan;*
- *Ramsey Lake Community Improvement Plan; and,*
- *City of Greater Sudbury Zoning By-Law 2010-100Z.*



## REPORT INTENT

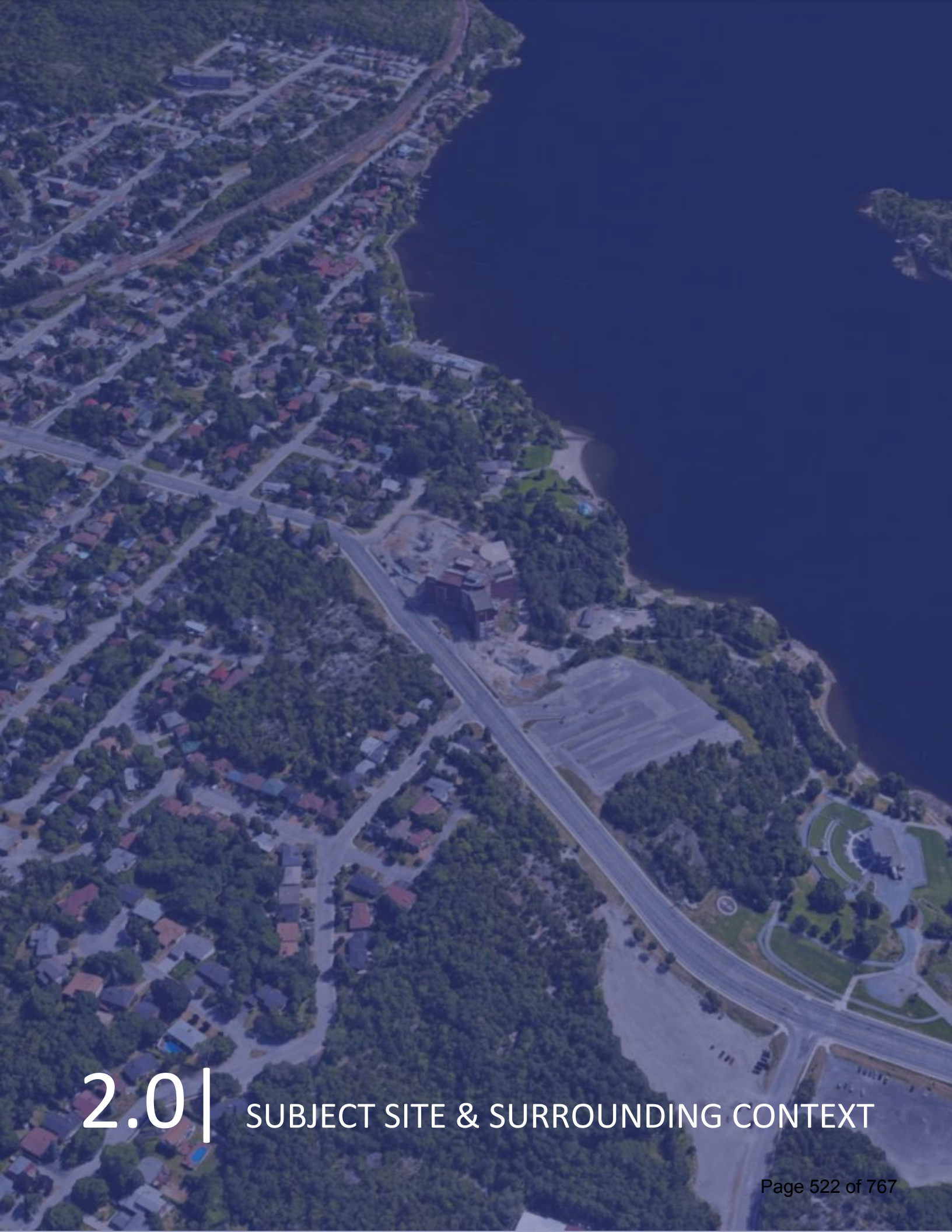
The Planning Justification Report comprises the following sections:

- **Section 1.0** introduces the development proposal and describes the purpose of this report.
- **Section 2.0** introduces the subject site and the surrounding area context.
- **Section 3.0** describes the proposed development in detail including several architectural renderings.
- **Section 4.0** outlines all supporting technical studies that have been completed in support of the development proposal and the required applications for Official Plan and Zoning By-law Amendment.
- **Section 5.0** describes the land use planning policy context applicable to the subject site including provincial, and municipal planning policy, and the development proposal's response to these policies.
- **Section 6.0** provides a summary of the land use planning rationale in support of the development proposal and conclusions of the report.



*Figure 1: Proposed Development from Paris Street/ East Perspective (ACK Architects).*





# 2.0 | SUBJECT SITE & SURROUNDING CONTEXT



## 2.0 SUBJECT SITE & SURROUNDING CONTEXT

This section describes the subject site including its topography and other site features, the surrounding neighbourhood context, transit and transportation network access, along with a description of the property's historic context.

### SUBJECT SITE

The subject parcel is located at the corner of Paris Street and Facer Street in the Kingsmount-Bell Park neighbourhood abutting Bell Park. The subject property has an area of approximately 1.78ha with approximately 69.0-metres of frontage on Facer Street and approximately 233.0-metres frontage on Paris Street (see *Figure 2*).



*Figure 2: Approximate Location of Subject Lands*

### EXISTING BUILDING & USE

The subject site was originally used as the location of the *Sudbury General Hospital of the Immaculate Heart of Mary* (i.e. St. Joseph's Health Centre or 'the General Hospital'), which opened in 1950 (See *Figures 3-4*). The existing building is recognizable by its brick façade along with a steel beam grid system and a building height that varies between a 6-storey building face along Paris Street and an 8-storey building face along Bell Park Road.

At the time of the hospital's closing in March 2010, it accommodated 326-beds. The subject site was then acquired by the existing property owner in July 2010 and has remained largely in its existing state (other than limited structure demolitions) since that time.



*Figure 3: View of the former St. Joseph's Hospital from Paris Street (Image: Google Maps, August 2012).*



*Figure 4: View of the former St. Joseph's Hospital from Facer Street (Image: Google Maps, May 2012).*

From 2013 through 2014, portions of the former hospital were demolished including the Mason Residence located at the north end of the site next to Facer Street and the southerly wing and chimney stack of the hospital located to the south of the site.

In August of 2019, the property owner agreed for the building to be used as a canvas for the creation of a 687m<sup>2</sup> mural as part of Up Here Festival - an annual art and music festival. The mural created by graffiti artist RISK seen in is now the largest mural in Canada (See Figure 5-9).



# TOPOGRAPHY AND SITE FEATURES

The subject site is largely unvegetated with a sloping topography and grade change between its Paris Street and Bell Park Road (See Figure 10). The site does not contain any floodplain, watercourses or other natural features and as such is not subject to Conservation Sudbury’s regulations for fill or construction. The site is however located within the Ramsey Lake Watershed and a *Section 59 Source Water Protection Application* will be submitted as part of the Official Plan and Zoning By-law Amendment applications.



Figure 5: View of existing building from Bell Park Road



Figure 6: View of Subject Lands from Bell Park Road



Figure 7: View of rear of existing building looking north towards Facer Street



Figure 8: View of existing building looking south along Paris Street

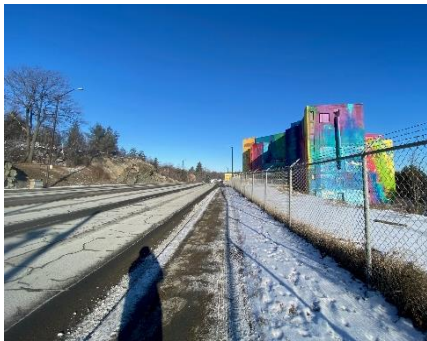


Figure 9: View of existing building looking North along Paris Street



Figure 10: Southerly side of the subject lands

# SURROUNDING NEIGHBOURHOOD CONTEXT

The subject site is located within a wider area known as the Kingsmount-Bell Park neighbourhood. Surrounding land uses can be described as follows (see Table 1):

Table 1: Surrounding Land Uses

NORTH	Low to Medium Density Residential & Downtown Sudbury
SOUTH	Municipal Parking Lot and Bell Park

<b>EAST</b>	Bell Park & Ramsey Lake
<b>WEST</b>	Vacant Lands and Low Density Residential

To the west of Paris Street and north of Facer Street is an established low density residential neighbourhood dating from the early 1900s (See Figures 11-16). These single detached homes vary in height from 1-3 storeys.



Figure 11: View of new Single Detached Dwelling along Ramsey Road



Figure 12: View of single detached dwellings along Facer Street looking north



Figure 13: View of single detached dwellings along Boland Avenue looking northwest



Figure 14: View of single detached dwelling and personal service shop west of subject lands



Figure 15: View of single detached dwellings north of subject lands (East side of Paris Street)



Figure 16: View of single detached dwellings and bed and breakfast north of subject lands (west side of Paris Street)

To the south and east are City owned parklands known as Bell Park (See Figures 17-19). Bell Park is located on the western shores of Ramsey Lake and is the City's largest urban waterfront park. The park includes many recreational opportunities including the Grace Hartman Amphitheatre, Ramsey Lake boardwalk, gazebos, flowerbeds, children's play structures, outdoor workout equipment, and supervised and unsupervised beaches. The park is the site of many cultural and recreational events in the City.





Figure 17: View of Bell Park Gazebo looking southeast over Ramsey Lake



Figure 18: View of Bell Park Beach looking east towards Ramsey Lake



Figure 19: View of Pitter Patter Park (outdoor exercise equipment) looking west towards subject lands

A City owned parking lot consisting of approximately 290-parking spaces abuts immediately to the south of the subject lands (See *Figure 20-22*). Access to the City parking lot currently traverses a southerly portion of the subject site at the driveway entrance on Paris Street.



Figure 20: View of City owned parking lot/lands looking south



Figure 21: View of entrance to City owned parking lot/lands looking west along Paris Street



Figure 22: View of City owned parking lot/lands looking north

Sudbury's Downtown is located approximately 800-metres from the subject site. Downtown Sudbury is the urban heart of the city and is regarded as a centre for business, culture, retail, dining, entertainment, and government activities.

## TRANSPORTATION, TRANSIT & ACTIVE TRANSPORTATION

The subject site fronts on the east side of Paris Street which is categorized as a Primary Arterial Road under *Schedule 7* of the *City of Greater Sudbury's Official Plan*. Facer Street is categorized as a Local Road and Bell Park Road is classified as a Private Road.

The site abuts and is serviced by two bus routes on the City's GOVA Transit system - Transit Route #1 (Main Line) is a high frequency service line connecting Sudbury's South End to the New Sudbury Centre and Transit Route #4 (Laurentian U via Paris) is a high frequency line connecting Downtown Sudbury to Health Sciences North and Laurentian University.

- Route #1 travels from the South End Walmart to New Sudbury Centre via Long Lake Road, Paris Street, Notre Dame Avenue and LaSalle Boulevard and includes a bus stop at the Downtown Transit Hub and Health Sciences North. The route provides service:
  - On weekdays with buses running every 15 minutes between 6:15 a.m. and 8:45 p.m. then every 30 minutes until the end of the service day



- On weekends with buses running every 30 minutes between 7:15 a.m. and 10:15 a.m., every 15 minutes between 10:15 a.m. and 6:45 p.m. then every 30 minutes to the end of the service day. To the South End, buses run every 30 minutes between 7:30 a.m. and 10:30 a.m., every 15 minutes between 10:30 a.m. and 6:30 p.m. then every 30 minutes to the end of the service day.
- Route #4 travels from the Downtown Transit Hub to Laurentian University via Cedar Street, Elgin Street and Paris Street and includes a bus stop at Health Sciences North. The route provides service:
  - On weekdays with buses running every 30 minutes between 7:15 a.m. and 9:45 a.m. and 1:45 p.m. and 5:45 p.m.

There is an existing bus stop along the property's Paris Street frontage as well as a bus stop located at the corner of Boland Avenue and Paris Street.

The site is well connected to the City's active transportation network with sidewalks located along both sides of Paris Street, and future bike lanes proposed along the property's direct frontage through the City's Paris-Notre Dame Bikeway project. Construction of this portion of the bikeway is planned through 2024-2025.

Further opportunities for active transportation and passive recreation can be found in Bell Park, which features a range of pedestrian trails in addition to the Ramsey Lake Boardwalk, Bell Park beach, playgrounds, outdoor workout equipment, Bell Park Skating Path and programmable space that can host community events. These trails also act as connecting active transportation links between the Downtown, York Street, and Science North/the current Hospital.

## FORMER ZONING BY-LAW AMENDMENT

In 2012, the existing property owner applied for a Zoning By-law Amendment to rezone the property from "I", Institutional and "P", Park to "R4", Residential High Density to permit the development of a total of 190 dwelling units, a 3,691m<sup>2</sup> wellness centre comprised of a wellness clinic, exercise rooms, pool and fitness facility and a 418m<sup>2</sup> restaurant on the former helipad.

Following public consultation efforts and public concern regarding the proposed commercial uses, the applicant revised the proposal to remove the restaurant and wellness centre and increased the number of dwelling units to 210 units with a 332-space parking garage and a further 20 parking spaces at grade.

In October 2012, Planning Committee approved the rezoning application and Council enacted an amending zoning by-law to facilitate the development with the following site-specific development standards:

*R4(3) Notwithstanding any other provision hereof to the contrary, within any area designated R4(3) on the Zone Maps, all provisions of this By-law applicable to the [R4](#) Zone shall apply subject to the following modifications:*

*i) The lot line abutting Paris Street shall be deemed to be the front lot line.*

*ii) The only permitted uses shall be multiple dwellings with a maximum of 210 dwelling units of which, a maximum of 85 dwelling units shall be permitted in a new building to be located on the lot after November 20, 2012.*

*iii) The maximum number of multiple dwelling buildings permitted on the lot shall be two.*

*iv) The existing building as located on the lot shall be permitted and the enlargement of the existing building shall be permitted within the setbacks to the existing building.*

*v) Notwithstanding (iv) above, the maximum addition permitted to the existing helipad structure shall be one storey located above the helipad platform.*

*vi) The minimum setback from Facer Street to a multiple dwelling shall be 55 metres.*

- vii) The minimum setback from the rear lot line and interior side lot line to a parking structure shall be 2 metres.*
- viii) The minimum setback from the rear lot line and interior side lot line to multiple dwelling units in a building located above a parking structure shall be 7.5 metres.*
- ix) The maximum building height shall be eight storeys and 32 metres.*
- x) The minimum setback from the front lot line to a multiple dwelling comprising a new building to be located on the lot after November 20, 2012, shall be 11.3 metres.*
- xi) The maximum number of surface parking spaces on the lot not including loading spaces shall be 20.*
- xii) The minimum width of a landscape strip abutting Paris Street shall be 2.6 metres and from Paris Street to the existing building the minimum width of the landscape strip shall be 1.3 metres.*
- xiii) Loading spaces shall also be permitted in the corner side yard.*

Following the approved rezoning, the applicant then proceeded through the City's site plan control application process.



Café

# 3.0 | DEVELOPMENT PROPOSAL



## 3.0 DEVELOPMENT PROPOSAL

---

This section describes the proposed development in detail, including a discussion of the residential and commercial uses, public realm improvements and design, massing, and height considerations.

### PLANNING APPLICATIONS

The lands are proposed to be developed to accommodate a mixed-use, high-rise development of varying residential tenure and type along with 380m<sup>2</sup> of restaurant space (*See Figure 24*).

To advance the proposed redevelopment, amendments to both the City's *Official Plan* and to the *Zoning By-Law 2010-100Z* are required.

An Official Plan Amendment is required to permit a density of 237-units per hectare (421 units/ 1.78ha) where such is only permitted in the Downtown land use designation and to permit 380m<sup>2</sup> of restaurant use where a maximum of 150m<sup>2</sup> local commercial use is permitted.

A Zoning By-Law Amendment is required to rezone the subject lands from "R4(3)", High Density Residential Special to an amended "R4(3)", High Density Residential Special Zone with site-specific development standards to accommodate the proposed built-form, and permission to add a restaurant use.

To promote land use compatibility and place the buildings most appropriately on the site, the following development standards are proposed as part of the amending zoning by-law:

- That a maximum of three building be permitted on the lands, consisting of the following:
  - A 109-guest room Retirement Home with maximum building height of 40.0-metres (12-storeys);
  - A 199-unit Multiple Dwelling with a maximum building height of 56.0-metres (16-storeys);
  - A 222-unit Multiple Dwelling with a maximum building height of 68.2-metres (20-storeys); and,
  - With all buildings having permission for 1-3 levels of below grade shared parking levels (storeys).
- To require a minimum corner side yard setback (along Facer Street) of 18.0-metres

In addition to the above the development proposal requires the following site-specific relief:

- To permit a lot area of 41m<sup>2</sup> per multiple dwelling unit where 65.0m<sup>2</sup> is required;
- To permit a rear yard setback of 0.0-metres where 25.0-metres would be required;
- To permit an interior side yard setback of 0.0-metres where 21.0-metres would be required;
- To only require a minimum court of 15.0-metres between multiple dwellings where typically 50% of the height of the higher of such walls would be required and,
- To permit a maximum building height for a 222-unit multiple dwelling (i.e. Building B) of 20-storeys and 69-metres where a maximum height of 63.0-metres is permitted.

## RESIDENTIAL AND COMMERCIAL USES

The proposed development provides for an urban residential development with ancillary restaurant uses.

### *199-UNIT MULTIPLE DWELLING BUILDING (URBAN LOFT/ STUDIO APARTMENTS)*

Referred to as Building A, the 16-storey (56.0m) building situated at the southern end of the parcel is proposed to have 199 multiple dwelling units intended for market rental purposes. The residential apartment units will be located on floors 1 to 16 of which at this time, 32.5% (64-units) are proposed to be 1-bedroom units, 66.5% (133units) are proposed as 2-bedroom units, and 1.0% (2-units) will be 3-bedroom units. Each residential unit will benefit from a private balcony. Common amenity spaces for residents will be provided on the 1<sup>st</sup> floor (i.e. common area, gym, games room), 2nd floor (i.e. common area), and 13th floor (i.e. outdoor amenity space).

Pedestrian access to Building A is provided via the residential lobby area at grade along Paris Street and via an entrance to the east along Bell Park Road.

### *222-UNIT MULTIPLE DWELLING BUILDING (CONDOMINIUM)*

Referred to as Building B, the 20-storey (68.2m) building is proposed to have 222 condominium units for freehold tenure. The residential condominium units will be located on floors 1 to 20 of which 17.1% (38-units) will be 1-bedroom units, 68.0% (151-units) will be 2-bedroom units, and 14.9% (33-units) will be 3-bedroom units. Each residential unit will benefit from private amenity space in the form of a balcony. In addition to private balconies, common amenity space for residents will be provided on the 1<sup>st</sup> floor (i.e. common area), 13<sup>th</sup> floor (i.e. outdoor amenity space), 14<sup>th</sup> floor (i.e. outdoor amenity space), and 20<sup>th</sup> floor (i.e. common area).

Pedestrian access to the building is provided via the residential lobby at grade along Paris Street and via an entrance along Bell Park Road.

### *109-GUEST ROOM RETIREMENT HOME*

Referred to as Building C, this 12-storey (40.0m) building is proposed as a 109-guest room retirement home, situated at the north/central area of the parcel facing both Paris St and Facer St. Each guest room will benefit from a private balcony. A total of 123.8m<sup>2</sup> of accessory health/medical space is proposed.

Parking for the building will be provided via a 1-storey underground parking garage, which is connected to the rest of the residential development. Visitor parking for the retirement home is provided via 6 surface-level parking spaces. Pedestrian access to the building is provided via the residential lobby on the ground floor along Paris Street.

### *RESTAURANT USE*

The development proposal also requires permission for 380m<sup>2</sup> of Restaurant use across the site, where only 150m<sup>2</sup> of Local Commercial use is permitted in the Living Area 1 designation.

### *BUILDING B RESTAURANT*

A 288m<sup>2</sup> restaurant with ±149m<sup>2</sup> of indoor dining is proposed on the 20th floor of Building B. The restaurant will be open to the public and will feature panoramic views of Ramsey Lake with capabilities for outdoor dining and private events via a ±139m<sup>2</sup> covered rooftop terrace.

Pedestrian access to the restaurant will be provided through Building B via the main lobby at grade along Paris Street.



## BUILDING C CAFE

The development proposal also includes ±85.0m<sup>2</sup> of restaurant space on the ground floor of Building C which is anticipated to take the form of a small café/restaurant open to the public. Six surface-level parking spaces are dedicated for the proposed use.

## PARKING

The majority of the vehicle parking will be located below grade in a 3-storey underground parking garage which can be accessed from Bell Park Road and Paris Street. A total of 647-vehicle parking spaces will be provided within the parking structure. Entrance and exit to the underground parking structure will be accessed via three points - first via the southerly entrance at Building A, the second via the Bell Park Road entrance between Buildings A and B, and the third via a northerly entrance to Building B.

Parking spaces that are required for the proposed restaurant uses and visitor parking for the retirement home will be provided via surface parking with a total of 55-spaces. A breakdown of the parking across the entire site can be found in *Table 2*.

No relief from zoning by-law parking requirements for vehicle parking, accessible parking, loading spaces, and bicycle parking is required. **Section 5.5.1.1** of the City's Zoning By-Law states that, "... where a Multiple Dwelling, Long Term Care Facility or Retirement Home is permitted and the lot is directly abutting a GOVA route, the number of required parking spaces may be reduced by 10% of the minimum required parking spaces." **5.3.1** of the City's Zoning By-Law states that, "... where a commercial use is permitted and the lot is directly abutting GOVA Routes, the number of required parking spaces associated with commercial uses are permitted to be reduced by 10% of the minimum required parking spaces."

**Table 2: Parking Spaces Breakdown**

PROPOSED PARKING			
BUILDING	USE	REQUIRED PARKING	# OF PARKING SPACES PROVIDED
Building A	199-residential dwelling units Urban Lofts/ Studio Apartments (i.e. Multiple Dwelling)	1.35 spaces/unit 199 x 1.35 = 269 Spaces (inc. 10% GOVA reduction)	269 Spaces
	222-residential dwelling units Condominium Building (i.e. Multiple Dwelling)	1.35 spaces/unit 222 x 1.35 = 300 Spaces (inc. 10% GOVA reduction)	300 Spaces
Building B	288m <sup>2</sup> Restaurant Use	1/12.5m <sup>2</sup> 287.4/12.5 = 21 spaces (inc. 10% GOVA reduction)	21 Spaces (at grade)
	109-guest rooms Seniors Residence (i.e. Retirement Home)	109-guest rooms = 51 Spaces (inc. 10% GOVA reduction)	51 Spaces (6 visitor spaces at grade)
Building C	85.0m <sup>2</sup> Restaurant Use (i.e. Café)	1/12.5m <sup>2</sup> 85.0/12.5= 6 spaces (inc. 10% GOVA reduction)	6 Spaces (at grade)
	TOTAL	647 Spaces	647 Spaces

## PUBLIC REALM

Significant public realm improvements will also be provided along the Paris Street and Facer Street frontages, through the implementation of streetscape/landscaping and road improvements. The integration of these public realm improvements

will promote a strong sense of place, foster social interaction, and support a positive pedestrian experience. Significant streetscape improvements such as the widening of sidewalks, bike lanes, and introduction of a bus lay-by are proposed. The introduction of landscaped areas and vegetated strips along the property's outer boundaries will enhance this stretch of Paris Street, promote sustainability, and a healthier, more beautiful and climate friendly neighborhood. The benefits will be experienced by both new residents living within the development, as well as the neighbourhood's existing residents and make a positive contribution towards the building of a healthy and complete local community.

## DESIGN, MASSING & HEIGHT

The proposed development incorporates a context-sensitive approach to its design and massing. The proposed massing and orientation have been designed to respond to the surrounding urban context while at the same time balancing its proximity to a large urban park.

The combined effect of the arrangement, volume and shape of the buildings on the subject site is an important consideration as it relates to good urban design and the development of high-quality spaces. To reduce impacts related to massing, the development proposal is comprised of three buildings, which have been articulated using step-backs and enhanced corner side yard setbacks to the adjacent low-density properties (*See Figure 23.*)

Height determines the impact of development on views, vistas and skylines. The development features three buildings at varying heights (i.e. 12-storeys, 16-storeys and 20-storeys). The three-building design results in floor plate sizes that lead to slimmer buildings. This along with other innovative design solutions assist in reducing the visual and physical impact (i.e. massing) that are sometimes associated with tall buildings. Such building design with podiums and step-backs tend to be preferred over slab-style building design where important views need to be protected. Most significantly, the buildings have been positioned to ensure that views toward Ramsey Lake from and along the Paris Street corridor are maintained, which was an integral design component within the context of the overall site design.

The buildings have been architecturally massed and detailed in ways that animate and lighten their facades through a range of building materials and façade treatments, such as brick, concrete, metal, and glass. The development will include sustainable building design measures as well as high quality and durable materials - ensuring the longevity of the development and its resilience to climate change over time.



*Figure 23: Conceptual Rendering of the Development looking west ((ACK Architects).*



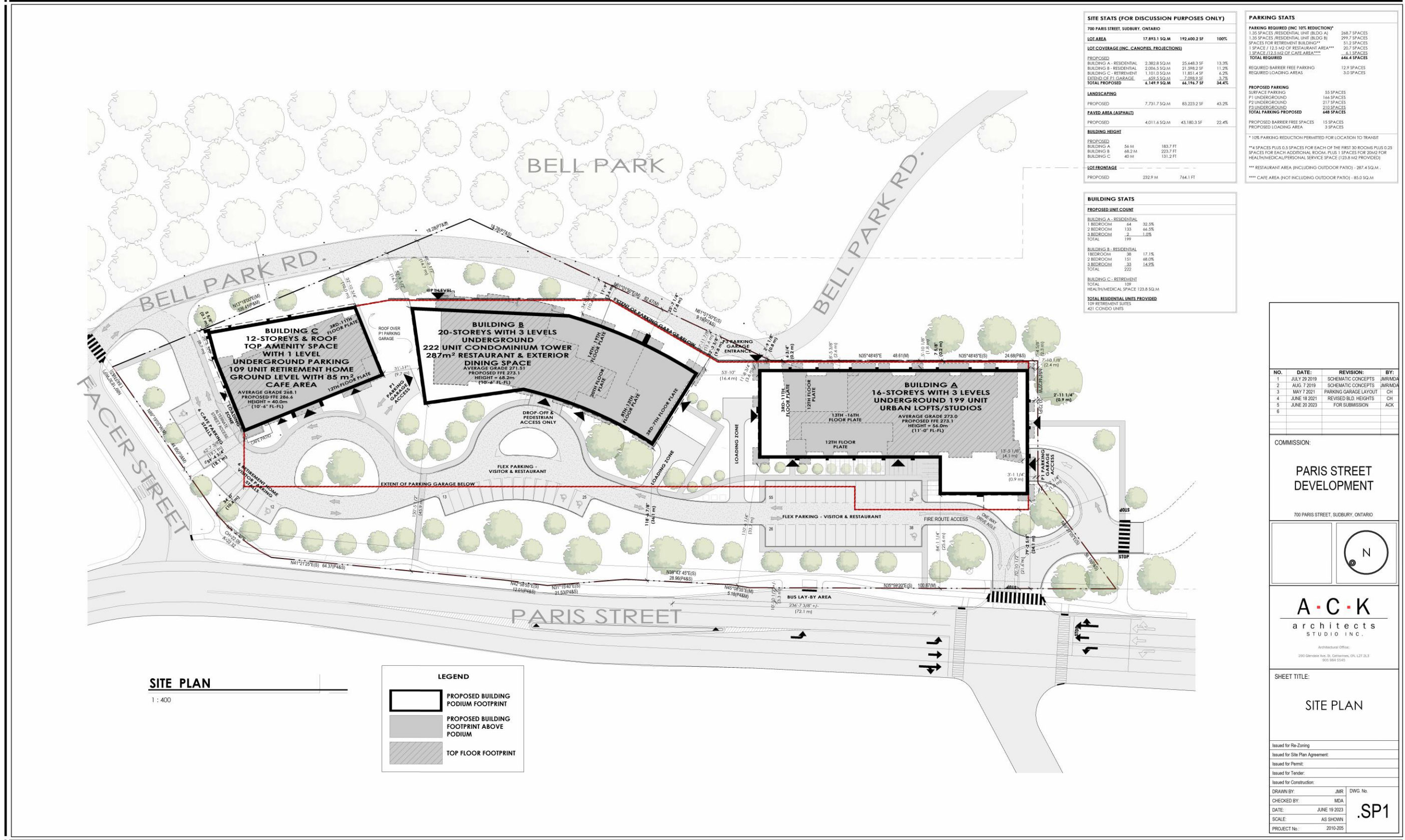


Figure 24: Concept Pla





# 4.0 | TECHNICAL STUDIES

## 4.0 TECHNICAL STUDIES

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The following technical studies and documents were prepared in support of the applications and include information that was identified by the City as being required on the pre-consultation understanding document (CGS File #: PC2021-073) and from feedback provided at the City's SPART meeting on September 8, 2021.

- Architectural Drawings and Renderings by ACK Architects (dated June 19<sup>th</sup>, 2023):
  - A1, EL.1, EL.2, EL.3, EL.3b, EL.4, EL.5, EL.6, EL.7
  - SP1, SP1.1, UG1, UG2
  - A1.1, A1.2, A1.3, A1.4, A1.5
  - A2.1, A2.2, A2.3, A2.4, A2.5, A2.6; and,
  - A3.1, A3.2, A3.3, A3.4, A3.5
- Preliminary Pedestrian Level Wind Assessment prepared by Theakston Environmental (dated September 19, 2023)
- Sanitary & Water Capacity Analysis prepared by TULLOCH (dated September 18, 2023)
- Traffic Impact Study prepared by JD Engineering (dated December 23, 2022)
- Sun Shadow Study prepared by ACK Architects

### PRELIMINARY PEDESTRIAN LEVEL WIND ASSESSMENT

A *Preliminary Pedestrian Level Wind Assessment* dated September 19<sup>th</sup>, 2023, was prepared by Theakston Environmental to support the proposed development. The assessment concluded the following:

*"With inclusion of the proposed Development, prevailing pedestrian comfort conditions are predicted to remain comfortable and suitable for mainly standing, or better, under normal to high ambient wind conditions. Localised areas proximate to the north and southmost corners of the Development and in the gaps between the buildings will realise windier conditions on occasion. Additional mitigation is recommended for the Main Entrances and Outdoor Amenity Spaces to improve pedestrian comfort conditions and extend the useability of the areas into the shoulder seasons. To the extent mitigation may be warranted is best assessed through quantitative analysis.*

*The overall upset to pedestrian comfort conditions with inclusion of the proposed Development is well managed by the proposed Development's wind mitigative design features, resulting in conditions that are, in many cases, similar to the existing setting."*

### SANITARY & WATER CAPACITY ANALYSIS

TULLOCH Engineering Inc. was retained to evaluate the servicing demand associated with the development of the property located at 700 Paris Street to identify the anticipated servicing demand needed to support the proposed development. The results of the analysis were reviewed by the Development Engineering Section at the City of Greater Sudbury to confirm adequate capacities/flows are available within the existing municipal infrastructure system.

Based on the analysis the City of Greater Sudbury has confirmed that:

- A review of the sewage mains downstream from the proposed connection at MH-MCK-07-09-1122 700 Paris, revealed that the mains are capable of conveying the additional 25.7 L/s of flow expected from the development; and,



- The results of the WaterCAD analysis indicate that sufficient water capacity and pressure exist in order to properly service the development proposal, as presented.

## TRAFFIC IMPACT STUDY

A Traffic Impact Study (TIS) dated December 23<sup>rd</sup>, 2022, was prepared by JD Engineering to assess the impact of traffic related to the development.

The TIS included a of the capacity of the Paris St corridor, including an analysis of the following intersections:

- Paris Street / Brady Street;
- Paris Street / Van Horne Street;
- Paris Street / John Street;
- Paris Street / McNaughton Street;
- Paris Street / Facer Street;
- Facer Street / Bell Park Road;
- Paris Street / Boland Avenue & Paris Driveway;
- Paris Street / York Street; and
- Paris Street / Ramsey Lake Road.

A summary of the conclusions of the TIS– as they relate to the impacts on the proposal on the existing condition of the Paris St corridor - is as follows:

- *The proposed development is expected to generate a total of 202 AM and 206 PM peak hour primary trips and 18 PM peak hour pass-by trips;*
- *Background traffic and pedestrian counts were commissioned for the existing intersections of Paris Street / Van Horne Street, Paris Street / McNaughton Street, Paris Street / Facer Street, Facer Street / Bell Park Road and Paris Street / York Street and were completed on Wednesday, April 20th, 2022. Background traffic and pedestrian counts at the study area intersections were also obtained from the City; and,*
- *An intersection operation analysis was completed at the study area intersections, using the existing (2022) and background (2027 & 2032) traffic volumes, with the adjacent development traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the proposed development. These improvements are warranted based on the anticipated growth in the city and traffic generated by future developments in the study area without the proposed development. The following improvements are recommended.*

### **Existing (2022) Traffic Volumes**

- **Paris Street / John Street and Paris Street / Ramsey Lake Road**
  - Optimize signal timing plan.

### **Background (2027) Traffic Volume**

- **Paris Street / Van Horne Street, Paris Street / McNaughton Street, Paris Street / Boland Avenue & Paris Driveway and Paris Street / York Street**
  - Optimize signal timing plan.

### **Background (2032) Traffic Volumes**

- **Paris Street / Brady Street**
  - Adjust eastbound pavement markings to accommodate a double left-turn lane.
  - Adjust eastbound signal heads to accommodate a protected eastbound left-turn phase.
  - Optimize signal timing plan.
- **Paris Street / Ramsey Lake Road**
  - Widen Ramsey Lake Road to accommodate westbound double right-turn lane with a 100-metre storage length and 60 metre taper length.
  - Optimize signal timing plan.
- An estimate of the amount of traffic that would be generated by the Subject Site was prepared and assigned to the study area streets and intersections.
- An intersection operation analysis was completed under total (2027 & 2032) traffic volumes with the proposed development operational at the study area intersections. The following improvements are recommended prior to build-out of the proposed development.

### **Opening Day (2027) Traffic Volumes**

- **Paris Street / Boland Avenue & Paris Driveway**
  - Shift the Paris Driveway to align with Boland Avenue.
  - The westbound configuration of Paris Driveway at the intersection shall include a left turn lane and through-right lane.
- **Facer Street**
  - Construct sidewalk on the south side of the road between Paris Street and Bell Park Road.
- **Bell Park Road**
  - Reconstruct Bell Park Road south of Facer Street to a 6.0-metre-wide paved condominium road.
  - Bell Park Road shall have a posted speed limit of 20 km/h once Bell Park Road is reconstructed.
- The proposed development will shift the location of the Paris Driveway slightly further north at the intersection to align with Boland Avenue. It is recommended the westbound lane configuration at the Paris Street / Boland Avenue & Paris Driveway intersection include a left turn lane and through-right lane. A single ingress and egress lane at the Paris Driveway will provide the necessary capacity to service the proposed development. The Paris Driveway will provide ingress and egress access to the underground parking and surface parking.
- The Bell Park Access will operate as full-movement access driveway. A single ingress and egress lane at the Bell Park Access will provide the necessary capacity to service the proposed development. The Bell Park Ingress will operate efficiently with a single ingress only driveway. A single ingress lane at the Bell Park Ingress will provide the necessary capacity to service the proposed development. Bell Park Access will provide ingress and egress access to the surface parking and the Bell Park Ingress will provide ingress only access to the underground parking.
- There are no issues regarding the sight distance available for the proposed Paris Driveway and Bell Park Access.
- The proposed parking supply for the proposed development meets the minimum parking requirement specified in the City's Zoning By-law 2010-100Z.

- *In summary the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.*

## TRAFFIC DEMAND MANAGEMENT

As noted in Section 3.4 and 5.2 of the TIS, the traffic volumes along Paris Street in the study area are reaching overcapacity thresholds and further widening of the road itself is not feasible. It is recommended that the City implement TDM measures to reduce the number of residents relying upon single-occupancy vehicles and to improve the accessibility of transit and non-automotive modes of transportation. The following TDM measures are recommended as part of the proposed development:

- *Construct sidewalk on the south side of Facer Street extending from Facer Street to Bell Park Road;*
- *The proposed development includes an internal sidewalk network with pedestrian connections to the proposed sidewalk on Facer Street and the existing municipal pedestrian infrastructure on Paris Street;*
- *The proposed development includes 227 bicycle parking spaces;*
- *An information display board will be provided in a central location in the apartment buildings to display travel information such as bicycle maps, local transit map/schedule and other relevant information;*
- *Information packages will be distributed to new residents including transit and cycling maps; and*
- *Subsidized transit passes be provided to residents.*

## SUN SHADOW ANALYSIS

ACK Architects Studio Inc was retained to provide a Sun Shadow Analysis, which assessed the impact of the proposed developments height, mass, and location of shadows cast on adjacent residential areas, public sidewalks, and surrounding parklands.

The City's pre-consultation understanding required that the Sun Shadow Analysis tests be done for March 21 and September 21 between the hours of 9:00AM and 6:00PM and include the identification of permanently shaded areas between the start of December to the end of February.

The Sun Shadow Analysis also included an analysis of the existing sun shadowing that would result from the existing in-force "R4(3)" zoning permissions, to show the difference between existing permission shadowing conditions and proposed development shadowing conditions.

Given the sun shadow renderings it can be concluded that the:

- Majority of the proposed building's sun shadowing is contained within the subject site and municipal right-of-way during the late morning and early afternoon;
- There is an increase in shadowing over portions of Bell Park and Ramsey Lake in late afternoon and evening primarily caused by the addition of the 109-guest room retirement home and an increase in shadowing over single-detached dwellings along Boland Avenue and adjacent open space areas caused by the additional height and 109-guest room retirement home during the morning hours; and
- Year-round a sun-shadow would be observed over the entrances to each of the proposed buildings.





# 5.0 | POLICY OVERVIEW & ANALYSIS

## 5.0 POLICY OVERVIEW AND ANALYSIS

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The following section sets out the relevant land use planning policy framework to assess the appropriateness of the development proposal within the context of applicable provincial and municipal policies and regulations. Each sub-section outlines relevant policies and provide a land use planning analysis with respect to how the proposed Official Plan and Zoning By-law Amendments are consistent with or conforms to such policies.

### PROVINCIAL POLICY STATEMENT (PPS)

The *2020 Provincial Policy Statement (PPS)* provides a high-level provincial land use policy direction for planning approval authorities to consider in preparing municipal land use planning documents, and in making decisions on applications under the *Planning Act*. Those policies applicable to the proposed Official Plan and Zoning By-law Amendments are outlined and discussed below.

**Section 1.0** of the PPS speaks to managing and directing land use to achieve efficient and resilient development and land use patterns. **Section 1.1.1** states, in part:

- 1.1.1**      *Healthy, liveable, and safe communities are sustained by:*
- a) promoting efficient development and land use patterns which sustain the financial well-being of the province and municipalities over the long term;*
  - b) accommodating an appropriate affordable and market-based range and mix of residential types (including single-detached, additional residential units, multi-unit housing, affordable housing and housing for older persons), employment (including industrial and commercial), institutional (including places of worship, cemeteries and long-term care homes), recreation, park and open space, and other uses to meet long-term needs;*
  - c) avoiding development and land use patterns which may cause environmental or public health and safety concerns;*
  - e) promoting the integration of land use planning, growth management, transit-supportive development, intensification, and infrastructure planning to achieve cost-effective development patterns, optimization of transit investments, and standards to minimize land consumption and servicing costs;*
  - f) improving accessibility for persons with disabilities and older persons by addressing land use barriers which restrict their full participation in society*
  - i) preparing for the regional and local impacts of a changing climate.*

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### RESPONSE

The proposed development promotes efficient development and land use patterns by proposing high density residential land uses on a site well suited for such. The subject site is fully serviced by municipal water and sanitary sewer infrastructure with available capacity to support a density of 237-units per hectare and as such the development proposal makes better use of the existing available services thereby promoting the financial wellbeing of both the City and the Province.



Under **Section 1.1.1** of the PPS, municipalities shall accommodate an appropriate range and mix of residential uses to meet long-term needs, including housing for older persons. The development proposal supports **Section 1.1.1(b) & (f)** by permitting additional multi-unit housing options to the community and supporting a mix of residential housing types and tenures through the addition of retirement guest rooms, freehold condominium units and rental apartment dwelling units that contributes positively toward meeting the needs of changing demographics, while being cognisant of building massing, and appropriate landscaping to mitigate impacts between the development and surrounding urban residential neighbourhood.

The development of a range of housing types to meet long term needs is consistent with the intent of **Section 1.1.1(b)**. Similarly, the mix of housing forms are conducive to the needs of older adult than traditional single detached dwellings and will act to support accessibility with older persons and those with mobility constraints.

The development proposal is also consistent with **Section 1.1.1(e)** through the integration of land use planning, growth management, transit-supportive development, intensification, and infrastructure planning to achieve cost-effective development patterns, optimization of transit investments, and standards to minimize land consumption and servicing cost given that it provides for residential intensification of an underutilized site along a primary arterial within walking distance to the Downtown.

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**Section 1.1.3** of the PPS states that Settlement Areas shall be the focus of growth and development and their vitality and regeneration shall be promoted. Given that the subject site is located within the Sudbury Settlement Area, the following policies are applicable:

**1.1.3.1**        *Settlement areas shall be the focus of growth and development.*

**1.1.3.2**        *Land use patterns within settlement areas shall be based on densities and a mix of land uses which:*

*a) efficiently use land and resources;*

*b) are appropriate for, and efficiently use, the infrastructure and public service facilities which are planned or available, and avoid the need for their unjustified and/or uneconomical expansion;*

*c) minimize negative impacts to air quality and climate change, and promote energy efficiency;*

*d) prepare for the impacts of a changing climate;*

*e) support active transportation;*

*f) are transit-supportive, where transit is planned, exists or may be developed.*

**1.1.3.3**        *Planning authorities shall identify appropriate locations and promote opportunities for transit-supportive development, accommodating a significant supply and range of housing options through intensification and redevelopment where this can be accommodated taking into account existing building stock or areas, including brownfield sites, and the availability of suitable existing or planned infrastructure and public service facilities required to accommodate projected needs*

- 1.1.3.4** *Appropriate development standards should be promoted which facilitate intensification, redevelopment and compact form, while avoiding or mitigating risks to public health and safety.*
- 1.1.3.5** *Planning authorities shall establish and implement minimum targets for intensification and redevelopment within built-up areas, based on local conditions. However, where provincial targets are established through provincial plans, the provincial target shall represent the minimum target for affected areas..*

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## RESPONSE

The subject site is located within the City's identified settlement area boundary, which under **Section 1.1.3.1** shall be the focus of growth and development. Per **Section 1.1.3.2** the proposed development promotes growth and a mix of uses and densities within Sudbury's existing settlement area, which is suitable for and effectively uses existing municipal infrastructure, public service facilities and incorporates a mix of housing types and tenures in an area predominated by single-detached dwellings and parkland. Further, the development proposal represents the efficient use of land, infrastructure, and resources, given residential uses in this location would better utilize existing established soft and hard municipal services at the proposed density of 237-dwelling units per hectare.

The development appropriately locates a high-density residential use in a location which is adequately set back from existing adjacent low density urban residential development, in order to mitigate sun-shadowing and other impacts on neighbouring uses. The proposed transition in height as one moves inward to the centre of the subject site is a key design element to mitigate such impacts.

The development proposal is further consistent with **Section 1.1.3.3** of the PPS given that the redevelopment of the subject site will accommodate a range of housing built-forms and will serve to support the nearby GOVA transit system as well as nearby active transportation routes. The proposed development can also be supported by existing and planned public service facilities. Per **Section 1.1.3.4** of the PPS, the amending zoning by-law to facilitate the development proposal will also be utilized to establish appropriate development standards that balances the needs and demands for residential intensification within existing settlement areas within the context of the existing surrounding neighbourhood. Per **Section 1.1.3.5** of the PPS, the development proposal would also contribute positively to meeting the intensification target identified in the City's Official Plan of accommodating 20% of its future residential growth within the built-up area.

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**Section 1.3** of the PPS outlines policies related to employment. The following policies are relevant to the applications:

- 1.3.1** *Planning authorities shall promote economic development and competitiveness by:*
- a) providing for an appropriate mix and range of employment, institutional, and broader mixed uses to meet long-term needs;*
  - b) providing opportunities for a diversified economic base, including maintaining a range and choice of suitable sites for employment uses which support a wide range of economic activities and ancillary uses, and take into account the needs of existing and future businesses; and,*
  - d) encouraging compact, mixed-use development that incorporates compatible employment uses to support liveable and resilient communities, with consideration of housing policy 1.4.*

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## RESPONSE

The proposed development offers a compact development that incorporates a contextually-sensitive and appropriate ancillary employment generating uses (i.e. restaurant and retirement home) that are compatible with the existing neighbourhood, the proposed residential uses and the subject site's proximity to Sudbury's urban waterfront. These new business and employment opportunities are consistent with the PPS's intent of building liveable and resilient communities and promoting economic development and competitiveness, given the resulting ability for future residents to live, work, and play within this neighbourhood and/or have appropriate access to other areas of Sudbury that also provide such opportunity.

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**Section 1.4** of the PPS outlines policies associated with housing and states that:

- 1.4.3** *Planning authorities shall provide for an appropriate range and mix of housing options and densities to meet projected market-based and affordable housing needs of current and future residents of the regional market area by:*
- b) permitting and facilitating:*
    - 1. all housing options required to meet the social, health, economic and well-being requirements of current and future residents, including special needs requirements and needs arising from demographic changes and employment opportunities; and*
    - 2. all types of residential intensification, including additional residential units, and redevelopment in accordance with policy 1.1.3.3;*
  - c) directing the development of new housing towards locations where appropriate levels of infrastructure and public service facilities are or will be available to support current and projected needs;*
  - d) promoting densities for new housing which efficiently use land, resources, infrastructure and public service facilities, and support the use of active transportation and transit in areas where it exists or is to be developed*
  - e) requiring transit-supportive development and prioritizing intensification, including potential air rights development, in proximity to transit, including corridors and stations; and*
  - f) establishing development standards for residential intensification, redevelopment and new residential development which minimize the cost of housing and facilitate compact form, while maintaining appropriate levels of public health and safety.*
- 

## RESPONSE

The proposed development represents residential intensification that is appropriate and serves to direct growth to lands situated within the City's settlement boundary. Further to **Section 1.4.3**, the development proposal will aid in providing an appropriate and varied mix of housing tenure to the area through the addition of rental and freehold multi-unit housing and retirement home guest rooms. The development will propose to:

- Provide for a transit-supportive residential density that will be compact in form and represents an efficient use of land and resources including the use of existing and planned nearby transit (i.e. GOVA).
- Assist in meeting the social, health, economic and well-being of current and future residents and respond to demographic changes through the addition of varied housing tenures and types (i.e., retirement guest suites, apartment units, and freehold condominium units).
- Introduces a retirement home use to the neighbourhood in order to accommodate the housing needs of Sudbury's aging population and allow for aging in proximity to transit, amenities and active park spaces.
- Provide high density residential intensification at a scale that is respectful of the existing residential neighbourhood by using setbacks, landscape buffering and placement of the buildings closer to the easterly and southerly lot lines while still building upon and leveraging the central location, and historic use as a regional draw/community facility (Sudbury General Hospital).
- Assist the City of Greater Sudbury in meeting its municipal housing target of creating 3,800 more homes by 2031 via contributing 421 those units in addition to 109 retirement guest suites.
- Direct high density/new housing development to a location that efficiently uses land, infrastructure, and public service facilities given that the subject site is fully serviced with municipal infrastructure that has sufficient servicing capacity available.

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**Section 1.5** of the PPS outlines policies regarding public spaces, recreation, parks, trails, and open space. The following policies are relevant to the application:

**1.5.1**      *Healthy, active communities should be promoted by:*

- a) planning public streets, spaces and facilities to be safe, meet the needs of pedestrians, foster social interaction and facilitate active transportation and community connectivity;*
- b) planning and providing for a full range and equitable distribution of publicly accessible built and natural settings for recreation, including facilities, parklands, public spaces, open space areas, trails and linkages, and, where practical, water-based resources; and,*
- c) providing opportunities for public access to shorelines.*

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**RESPONSE**

The proposed development promotes healthy and active communities given its location and the significant enhancements to the public realm and streetscapes along both Paris Street and Facer Street. The proposed enhancements serve to assist in creating a safer and more pedestrian-friendly environment by providing an internal pedestrian circulation network that is well connected externally to the site.

The subject site is also well-connected to many publicly accessible built and natural settings for recreation, including facilities, parks and open spaces that are supportive of the principles of healthy community planning. Specifically, the site directly abuts Bell Park, which features a range of recreational opportunities including trails, the Ramsey Lake Boardwalk, Bell Park beach, programmable outdoor recreational space (i.e. Splash N Go Adventure Park, community/private events

etc.), playgrounds, outdoor workout equipment, the Bell Park Skating Path during the winter months and the other waterfront-related recreational activities that foster social interaction.

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**Section 1.6.6** of the PPS addresses the provision of sewage, water and stormwater infrastructure, and states in part that:

**1.6.6.1**      *Planning for sewage and water services shall:*

*a) accommodate forecasted growth in a manner that promotes the efficient use and optimization of existing:*

*1. municipal sewage services and municipal water services;*

*b) ensure that these systems are provided in a manner that:*

*1. can be sustained by the water resources upon which such services rely;*

*2. prepares for the impacts of a changing climate;*

*3. is feasible and financially viable over their lifecycle;*

*c) promote water conservation and water use efficiency; and,*

*d) integrate servicing and land use considerations at all stages of the planning process.*

**1.6.6.2**      *Municipal sewage services and municipal water services are the preferred form of servicing for settlement areas to support protection of the environment and minimize potential risks to human health and safety. Within settlement areas with existing municipal sewage services and municipal water services, intensification and redevelopment shall be promoted wherever feasible to optimize the use of the services.*

**1.6.6.7**      *Planning for stormwater management shall:*

*a) be integrated with planning for sewage and water services and ensure that systems are optimized, feasible and financially viable over the long term;*

*c) minimize erosion and changes in water balance, and prepare for the impacts of a changing climate through the effective management of stormwater, including the use of green infrastructure;*

*d) mitigate risks to human health, safety, property and the environment;*

*e) maximize the extent and function of vegetative and pervious surfaces; and,*

*f) promote stormwater management best practices, including stormwater attenuation and re-use, water conservation and efficiency, and low impact development.*

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**RESPONSE**

The development proposal is consistent with **Section 1.6.6** of the PPS as it promotes the efficient use of existing municipal infrastructure and provides new housing options in a location which does not require the extension of municipal infrastructure. The proposed development will be connected to full municipal water and sanitary sewer infrastructure



along Paris Street, which is the preferred method of servicing the City's settlement areas. Sufficient sewer and water capacity to support the proposed development has also been confirmed by the City's Development Engineering Section.

Site plan control will require a comprehensive stormwater management approach to address the quality and quantity of stormwater. The proposed underground parking structure has significantly reduced the amount of surface parking (and road salt and snow storage required to maintain large surface parking areas) thus leading to better stormwater management and lake quality outcomes.

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The PPS also provides policy direction for matters related to transportation in **Section 1.6.7**. The 2020 PPS states that:

- 1.6.7.1**      *Transportation systems should be provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs.*
- 1.6.7.2**      *Efficient use should be made of existing and planned infrastructure, including through the use of transportation demand management strategies, where feasible.*
- 1.6.7.4**      *A land use pattern, density and mix of uses should be promoted that minimize the length and number of vehicle trips and support current and future use of transit and active transportation.*

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#### RESPONSE

Locating a mix of uses and higher density housing along arterial roads is encouraged as it supports feasibility of transit services, which increases ridership/utilization of a public investment, alleviates traffic congestion, and reduces reliance on the automobile. The proposed residential and limited restaurant uses will have direct access to the GOVA public transit system and nearby active transportation networks, thereby encouraging the use of public transit per **1.6.7.4** of the PPS. The subject site is also optimally connected to the Downtown via public transit service, thereby reducing the need for personal vehicle usage as per **1.6.7.4** of the PPS. The housing mix and densities along with their proximity to transit and future bike lanes on Paris Street will also assist in reducing the number of vehicle trips and will support alternative transportation methods.

The Traffic Impact Study concluded that, "... the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.", thus responding to PPS policy **1.6.7** that requires transportation systems provide the safe movement of people and goods. Transportation Demand Management (TDM) considerations were also included with the TIS, which detail several TDM initiatives that will reduce automobile travel demand from the development.

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**Section 1.7** of the PPS provides a policy direction for municipalities to pursue and achieve long-term economic prosperity. The following policies are relevant:

- 1.7.1**      *Long-term economic prosperity should be supported by:*
  - a)** *promoting opportunities for economic development and community investment-readiness;*
  - b)** *encouraging residential uses to respond to dynamic market-based needs and provide necessary housing supply and range of housing options for a diverse workforce*

- c) optimizing the long-term availability and use of land, resources, infrastructure and public service facilities;*
- d) maintaining and, where possible, enhancing the vitality and viability of downtowns and mainstreets;*
- e) encouraging a sense of place, by promoting well-designed built form and cultural planning, and by conserving features that help define character, including built heritage resources and cultural heritage landscapes*

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## RESPONSE

The proposed development will support long-term economic prosperity through the redevelopment of an underutilized site to provide the opportunity for new housing (i.e. 530-units), businesses and public realm enhancements that will create a sense of place and bring vitality to the site. The applications are consistent with **1.7.1(a)** as they enable an opportunity for economic development (and respond directly to a community investment opportunity).

The applications encourage residential uses which respond to market-based housing needs (i.e. more affordable housing options and changing demographics) and aid in providing necessary housing supply and a range of housing options through the addition of rental apartments, freehold condominiums and retirement home guest rooms in the City per **1.7.1(b)**. The proposed residential built-form has been designed to mitigate impact to the neighbourhood and complement the adjacent parklands via landscaping, setbacks, careful massing, and the buffering provided via increased setbacks and the Facer Street right-of-way.

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**Section 1.8** of the PPS speaks to energy conservation, air quality and climate change. It states in part:

- 1.8.1**      *Planning authorities shall support energy conservation and efficiency, improved air quality, reduced greenhouse gas emissions, and preparing for the impacts of changing climate through land use and development patterns which:*
- a) promote compact form and a structure of nodes and corridors;*
  - b) promote the use of active transportation and transit in and between residential, employment (including commercial and industrial) and institutional uses and other areas;*
  - e) encourage transit-supportive development and intensification to improve the mix of employment and housing uses to shorten commute journeys and decrease transportation congestion;*
  - g) maximize vegetation within settlement areas, where feasible.*

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## RESPONSE

The proposed development enables transit-supportive intensification and improves the mix of employment and housing uses to shorten commute journeys and decrease transportation congestion via the site's connectivity and location.

The proposed development will support improved air quality, reduced greenhouse emissions and respond to the impacts of climate change by promoting the use of active transportation and transit for new residents, as the development is located adjacent to existing public transit routes and active transportation options.

The new sidewalks and future bicycle lanes proposed along Paris Street will further enhance active transportation and safety as it relates to accessing the transit system.

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**Section 2.2.1** provides a policy direction respecting the quantity and quality of water resources and states in part:

- 2.2.1**                    *Planning authorities shall protect, improve or restore the quality and quantity of water by:*
- f)                    implementing necessary restrictions on development and site alteration to:*
- 1.                    protect all municipal drinking water supplies and designated vulnerable areas; and,*
  - 2.                    protect, improve or restore vulnerable surface and ground water, sensitive surface water features and sensitive ground water features, and their hydrologic functions*

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**RESPONSE**

Per **Section 2.2.1** of the PPS, the subject site is located within the Ramsey Lake Intake Protection Zone 1 and 2 Area and has a vulnerability score of 10. It is noted that in such areas the preparation of a Risk Management Plan may be required to address the ‘significant threat activities’ that are associated with the application of road salt and the storage of snow if the exterior parking lot is equal to or greater than 1 hectare in area. The handling and storage of road salt (i.e. 0.5 tonnes or greater) is prohibited. The proposed underground parking structure has significantly eliminated the amount of surface parking required to service the proposed housing units, which would otherwise require significant road salt and snow storage. The proposed at-grade parking spaces do not have a total area greater than one hectare and therefore a Risk Management Plan is not required. A *Section 59 Source Water Protection Application* will be submitted as part of the Official Plan and Zoning By-law Amendment applications.

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**PPS SUMMARY**

The proposed development and its implementing Official Plan and Zoning By-law Amendments are consistent with the 2020 Provincial Policy Statement. The proposed development provides a compact urban development which more efficiently uses land and existing municipal services and infrastructure along a primary arterial road adjacent to existing public transit routes.

The provision of a total of 530-residential units will serve to diversify the supply of housing in the City, support housing affordability, provide housing choices that respond to market demands and facilitate the creation of housing options for Sudbury’s aging demographic and smaller household sizes.

The subject lands connectivity to the Downtown, and broader City allows its residents to have easy access to employment centres, public service facilities and commercial centres. The proposal also supports and provides future residents access to parks and open space amenities supporting healthy living. Moreover, the introduction of contextually appropriate commercial (restaurant) use to this area will aid in building liveable and resilient communities, given the resulting ability for future residents to live, work, and play within their neighbourhood.

## GROWTH PLAN FOR NORTHERN ONTARIO

The *Growth Plan for Northern Ontario* (GPNO) is a 25-year plan that provides guidance in aligning provincial decisions and investment in Northern Ontario. It contains policies to guide decision-making surrounding growth that promotes economic prosperity, sound environmental stewardship, and strong, sustainable communities that offer northerners a high quality of life. It also recognizes that a holistic approach is needed to plan for growth in Northern Ontario.

**Section 3.4.3** of the GPNO promotes a diverse mix of land uses within northern communities. The GPNO states that:

- 3.4.3** *Municipalities are encouraged to support and promote healthy living by providing for communities with a diverse mix of land uses, a range and mix of employment and housing types, high-quality public open spaces, and easy access to local stores and services.*

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### RESPONSE

Per **Section 3.4.3** the development proposal introduces a further range of housing types in the community by increasing freehold and rental housing stock and introducing a more diverse urban residential built form in an appropriate location. The development also introduces a limited amount of non-residential use (i.e. restaurant) that aims to contribute to a healthy and high-quality urban space. Further, the proposed development is appropriate given that the lands are located adjacent to public open space (Bell Park) and will contribute to the park's usage.

The site's connectivity to the City's Downtown, South End, and broader City via active transportation, transit, and other mobility means, allows for easy access to stores and services.

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**Section 4.3** of the GPNO provides that economic and service hubs such as the City of Greater Sudbury shall develop strategies for developing a diverse mix of land uses and encouraging future residential development in certain areas. **Section 4.4** speaks to the City of Greater Sudbury as a municipality with strategic core areas.

The GPNO states in part that:

- 4.4.2** *Municipalities that contain strategic core areas are encouraged to plan for these areas to function as vibrant, walkable, mixed-use districts that can:*
- a. attract employment uses and clusters, including office and retail*
  - b. accommodate higher densities*
  - c. provide a broad range of amenities accessible to residents and visitors including vibrant streetscapes, shopping, entertainment, transportation connections, lodging, and educational, health, social and cultural services.*

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### RESPONSE

*Intensification Corridors* are defined in the GPNO as: *Areas along major roads, arterials or transit corridors that have the potential to provide a focus for higher density mixed-use development.* Per **Section 4.3.3** the development proposal will

add to the range of housing types available in this core area, as it is designated as a Primary Arterial Road in the City's Official Plan with transit and has the potential to accommodate higher density mixed use developments.

The development of high-density residential uses in this location will help promote a vibrant, walkable, mixed-use area which is near the Downtown and its shopping, entertainment, transportation connections, educational, services, and other health, social, and cultural service amenities.



CITY OF GREATER SUDBURY STRATEGIC PLAN

The City of Greater Sudbury’s Strategic Plan was updated in 2023. It states that ‘the City of Greater Sudbury operates approximately 60 lines of service...The plan highlights the changes City Council wants to make, which it believes are fundamentally important for the community’s sustainability, economic competitiveness, and quality of life’.

The development proposal assists in contributing positively to the strategic directions endorsed by City Council. Specifically, it aligns with the Strategic Plans objectives and goals 2.4, 3.2, 4.1, 4.3, 5.5 and 5.6.

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<b>STRATEGIC INITIATIVE 3.2</b>	<i>Complete and implement Community Energy and Emissions Plan that will provide guidance to reduce greenhouse gas emissions.</i>
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RESPONSE

The proposed development assists with achieving Goals 1, 2, and 7 of the CEEP as outlined later in this report through promoting the use of active transportation and facilitating compact infill development with varied housing tenure.

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<b>STRATEGIC INITIATIVE 4.1</b>	<i>Evaluate potential to partner with private sector developers through CIPs or directly to increase or accelerate mixed use rental housing projects</i>
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<b>STRATEGIC INITIATIVE 4.3</b>	<i>Improve services/housing for all those living or seeking to live in Greater Sudbury</i>
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RESPONSE

The proposed development will be eligible for, and benefit from the City’s Strategic Core Areas CIP which has been recently amended to encourage multi-residential development along the City’s Strategic Corridors (including Paris Street).

The proposed development supports housing for all those living or seeking to live in Greater Sudbury via developing a range of housing types and tenures - including a retirement residence - along a major transportation corridor and near Sudbury’s Downtown.

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<b>STRATEGIC INITIATIVE 5.5</b>	<i>Support a local culture of embracing the different lifestyles available (urban, suburban and rural) that make up Greater Sudbury</i>  <i>Examine options for appropriate commercial development in Bell Park and around Ramsey Lake</i>
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## RESPONSE

The proposed development supports urban living by establishing high density residential uses near the heart of the City, and adjacent to Bell Park and its numerous cultural and lifestyle amenities.

Modern waterfront development settings often promote the establishment of mixed-use communities that allow for non-residential development, such as restaurant and dining opportunities, as a means of tourism support, economic development and cultivating vibrant public spaces. The development introduces restaurant uses which are appropriate and compatible with both the proposal and the surrounding area and represents an appropriate commercial development per Strategic Initiative **5.5**.

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## CITY OF GREATER SUDBURY OFFICIAL PLAN

The *City of Greater Sudbury's Official Plan* is the principal and guiding land use planning policy document for the City of Greater Sudbury. The City's Official Plan (OP) establishes objectives and policies that guide both public and private development/decision-making. The subject site is designated 'Living Area 1' per *Schedule 1B* of the City's OP. The lands are also located within the 'Settlement Area' and 'Built Boundary' on *Schedule 3* of the City's OP.

**Section 2.3.2** speaks to the City's settlement area and states in-part:

- 2.3.2.1** *Future growth and development will be focused in the Settlement Area through intensification, redevelopment and, if necessary, development in designated growth areas.*
- 2.3.2.2** *Settlement Area land use patterns will be based on densities and land uses that make the most efficient use of land, resources, infrastructure, and public service facilities, minimize negative impacts on air quality and climate change, promote energy efficiency and support public transit, active transportation and the efficient movement of goods.*
- 2.3.2.3** *Intensification and development within the Built Boundary is encouraged in accordance with the policies of this Plan. Development outside of the Built Boundary may be considered in accordance with the policies of this Plan.*

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### RESPONSE

Per **Sections 2.3.2.1** and **2.3.2.3** the subject site is located within the City's built boundary and settlement area which is intended to accommodate the focus of intensification, future growth, and development in the City. With respect to **Section 2.3.2.2**, it is noted that the development represents the efficient use of land, infrastructure and public service facilities, and will support the public transit system and active transportation options and in doing so will aid in minimizing impacts on air quality.

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**Section 2.3.3** addresses intensification and states in-part:

- 2.3.3.1** *All forms of intensification are encouraged in accordance with the policies of this Plan.*
- 2.3.3.2** *The City will aim to accommodate 20 percent of future residential growth and development through intensification within the Built Boundary.*
- 2.3.3.3** *Large scale intensification and development is permitted in strategic core areas such as the Downtown, Regional Centres and major public institutions, in accordance with the policies of this Plan.*
- 2.3.3.5** *Intensification and development is permitted in established Living Area I lands, in accordance with the policies of this Plan.*
- 2.3.3.6** *Intensification will be encouraged on sites that are no longer viable for the purpose for which they were intended such as former commercial, industrial and institutional sites. It will also be encouraged where the present use is maintained but the addition of residential uses can be added in a complementary manner.*

- 2.3.3.7** *Intensification will be encouraged on sites with suitable existing or planned infrastructure and public service facilities.*
- 2.3.3.8** *Intensification will be compatible with the existing and planned character of an area in terms of the size and shape of the lot, as well as the siting, coverage, massing, height, traffic, parking, servicing, landscaping, and amenity areas of the proposal.*
- 2.3.3.9** *The following criteria, amongst other matters, may be used to evaluate applications for intensification:*
- a. the suitability of the site in terms of size and shape of the lot, soil conditions, topography and drainage;*
  - b. the compatibility proposed development on the existing and planned character of the area;*
  - c. the provision of on-site landscaping, fencing, planting and other measures to lessen any impact the proposed development may have on the character of the area;*
  - d. the availability of existing and planned infrastructure and public service facilities;*
  - e. the provision of adequate ingress/egress, off street parking and loading facilities, and safe and convenient vehicular circulation;*
  - f. the impact of traffic generated by the proposed development on the road network and surrounding land uses;*
  - g. the availability of existing or planned, or potential to enhance, public transit and active transportation infrastructure;*
  - h. the level of sun -shadowing and wind impact on the surrounding public realm;*
  - i. impacts of the proposed development of surrounding natural features and areas and cultural heritage resources;*
  - j. the relationship between the proposed development and any natural or man - made hazards; and,*
  - k. the provision of any facilities, services and matters if the application is made pursuant to Section 37 of the Planning Act. Where applicable, applications for intensification of difficult sites may be subject to Section 19.7.*
- 2.3.3.10** *Residential intensification proposals will be assessed so that the concerns of the community and the need to provide opportunities for residential intensification are balanced.*

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## RESPONSE

Per **Sections 2.3.3.5** and **2.3.3.6**, the lands are located within the Living Area 1 designation. The proposed addition of 530-units (including retirement residence) assist in meeting the City's target of accommodating 20% of future residential growth and development through intensification within the City's built boundary. Further, the development proposes to introduce 421 of the 3800 homes that the City has committed to achieving by 2031.

**Section 2.3.3.9** of the Official Plan sets out the criteria for evaluating whether a location is appropriate for intensification. The development proposal is an appropriate location for high density intensification given its location, sufficient

infrastructure and services, availability of transit and active transportation, proximity to the City's largest urban park, and appropriate compatibility mitigation measures (i.e., buffering, below grade parking, landscaping, and setbacks) provided.

Specifically, the development meets the intensification criteria and proposes appropriate high-density infill given:

- The site has a shape, size, and topography that is appropriate to accommodate a high-density residential use given:
  - The site has a large area and significant frontage ( $\pm 1.78$  hectares with  $\pm 233.0$  metres of frontage) to accommodate appropriate landscaping, outdoor amenity space, and parking.
  - The ability to utilize the site's topography to locate the 3-storey parking garage below grade thereby allowing for ground-oriented uses to activate the site's Paris and Facer Street frontage and reducing impervious surfaces resulting from large at-grade parking lots.
- The proposed buildings will have heights of 12-storeys, 20-storeys and 16-storeys from the north of the site to the south respectively. Setbacks and building step-backs have been provided to aid in reducing the impacts of the proposed development on surrounding low density residential uses while enabling an appropriate level of intensification given the site's location.
- The development will provide and, in many areas, exceed the minimum 3.0-metre-wide landscaping strip requirements of the City's Zoning By-law. Landscaping along the frontage will be improved from its existing condition with the addition of new landscaped open space, tree planting and pedestrian linkages to the City's transit and active transportation systems.
- The site will be fully serviced and efficiently using existing municipal infrastructure. Preliminary servicing information indicates that no extension of services is required and no upgrades to sewer and water servicing are required for the development. The City's Development Engineering Section has confirmed that there is sufficient domestic water pressure, and that the downstream sanitary sewer system has sufficient capacity to accommodate the proposed redevelopment.
- The development will provide all required parking and loading per zoning requirements and no site-specific relief from such are required to accommodate the land uses proposed.
- The TIS concluded that the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network;
- The development of the site will contribute to increased transit ridership and active transportation use in the area, all of which is sited and available near trails, schools and the Downtown and is well connected to the broader City of Greater Sudbury.
- The development is setback and screened by existing mature vegetation from the main recreational trails/areas along Bell Park's waterfront and therefore the increased height/density's impact to Bell Park's natural and cultural resources are being mitigated. The increase in residents living in proximity to the park should increase the usage of both the park and attendance at its numerous cultural and recreational events;
- There will be an increase in sun-shadowing caused by the three buildings from what the present zoning permissions allow as described in Section 4.0 of this Report;
- The Preliminary Wind Assessment determined that any upset to pedestrian comfort conditions is within a normal range and will be well managed by the proposed development's wind mitigative design features and no impacts are anticipated.
- No natural features or cultural heritage resources have been identified on the subject site; and
- No natural or man-made hazards such as floodplains have been identified on the subject site.



With respect to **Section 2.3.3.8** and **2.3.3.10** of the City’s Official Plan, the design, density and layout of the proposed development responds to potential compatibility concerns by physically separating but socially integrating the existing neighbourhood. The building closest to the neighbouring properties on Facer Street is limited to 12-storeys with the 16 and 20-storey buildings being located closer to the interior/southerly portion of the site. The proposed development also incorporates landscaped open space to lessen the impact of the three proposed buildings. Improvements to the landscaping and parking areas in the front and corner yard will enhance the appearance of the subject site from Facer Street and Paris Street as well as from other nearby properties.

The condominium, apartment and retirement guest room units will assist the City in meeting the current and future demand for these type of residential dwelling units, in an appropriate location.

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**Section 3.2** outlines general policies for Living Areas.

- 3.2.2**            *Medium density housing is permitted in all Living Area I designations where full municipal services are available. High density housing is permitted only in the community of Sudbury.*
- 3.2.3**            *New residential development must be compatible with the existing physical character of established neighbourhoods, with consideration given to the size and configuration of lots, predominant built form, building setbacks, building heights and other provisions applied to nearby properties under the Zoning Bylaw.*
- 3.2.9**            *Small-scale commercial uses that are intended to serve the convenience needs of local residents are permitted in all Living Areas by rezoning. Such uses are intended to be isolated rather than forming a group or cluster that could potentially change the residential character of an area. These uses, which may include confectionary stores, laundromats, and other personal service establishments, are limited to a maximum of 150 m2 of floor space per location. Zoning applications for local commercial uses will be reviewed on the basis of general conformity with the following policies:*

  - a. access to and traffic generated by the site will not create adverse traffic problems on surrounding roads;*
  - b. lighting and signage are located so as not to create any adverse visual impact on the surrounding residences;*
  - c. the use will provide landscaping and buffering in a manner that is in harmony with adjoining and nearby residential properties; and,*
  - d. the proposed small-scale commercial use must form a good fit with the existing neighbourhood fabric.*

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**RESPONSE**

As stated above the building closest to the neighbouring properties on Facer Street is limited to 12-storeys with the 16 and 20-storey buildings being located closer to the interior/southerly portion of the site. The proposed development also incorporates landscaped open space to lessen the impact of the three proposed buildings.

A public restaurant is proposed on the 20<sup>th</sup> floor of Building B. The development proposal also includes ±85.0m<sup>2</sup> of public restaurant space on the ground floor of Building C, which is anticipated to take the form of a small café/restaurant.

The introduction of such restaurant uses is considered limited, appropriate and compatible given the availability of sufficient parking and public transit to the site, the location of the commercial uses on the site, and the site’s proximity to Bell Park and Ramsey Lake. Further, **Section 5.5** of the City’s Strategic Plan requests that the City ‘*examine options for appropriate commercial development in Bell Park and around Ramsey Lake*’. The proposal incorporates small scale, commercial uses (consistent with the intent of OP 3.2.9 policy) with the Strategic Plans desire to explore appropriate waterfront-related commercial uses. This demonstrates that the proposed limited commercial use aligns with the intent of the Strategic Plan.

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**Section 3.2.1** establishes more detailed policies in the Living Area 1 land use designation:

- 3.2.1.3**      *High density housing is permitted only in the community of Sudbury. All housing types, excluding single detached dwellings, are permitted in high density residential areas to a maximum net density of 150 units per hectare. Densities in the downtown may exceed this maximum, as set out in the Zoning By-law.*
  
- 3.2.1.4**      *Medium and high-density housing should be located on sites in close proximity to Arterial Roads, public transit, main employment and commercial areas, open space areas, and community/recreational services.*
  
- 3.2.1.5**      *Medium and high-density housing are to be located in areas with adequate servicing capacity and a road system that can accommodate growth. Sites should be of a suitable size to provide adequate landscaping and amenity features.*
  
- 3.2.1.6**      *In considering applications to rezone land in Living Area I, Council will ensure amongst other matters that:*
  - a. the site is suitable in terms of size and shape to accommodate the proposed density and building form;*
  - b. the proposed development is compatible with the surrounding neighbourhood in terms of scale, massing, height, siting, setbacks, and the location of parking and amenity areas;*
  - c. adequate on-site parking, lighting, landscaping, and amenity areas are provided; and,*
  - d. the impact of traffic on local streets is minimal.**Applications for intensification in established Living Area I lands are also subject to Section 2.3.3.*

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**RESPONSE**

The proposed development conforms to policies under **Section 3.2.1** of the OP by delivering a mixed-use development which is in close proximity to arterial roads, has the benefit of public transit at its frontage, and is well connected to main employment, commercial, and open space areas.

The proposed high-density housing is located in an area with adequate servicing capacity and the Traffic Impact Study concluded that the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

The 1.78-hectare site will allow for extensive landscaped open spaces and amenity areas with approximately 43.2% of the subject site proposed to be landscaped, which will be detailed (along with on-site lighting) through the required site plan control agreement. As discussed previously the proposed development massing, siting, and setbacks are cognizant of the surrounding context.

**Section 8.3** addresses Source Water Protection Areas, intended to protect the City’s municipal drinking water sources. The policies in the Section state in part:

**8.3.1**                    *Development, certain land use activities and public works within the vulnerable areas will conform with the policies on List A of the Greater Sudbury Source Protection Plan.*

**RESPONSE**

With respect to **Section 8.3**, the proposed use of the lands does not present any conformity issues with the City’s Official Plan as the proposed development does not include any significant threats as set out in the City’s Source Protection Plan which is reviewed later in this report.

**Section 11.3.2** outlines land use policies that are intended to support public transit needs and options. Applicable policies to the development proposal includes:

- 11.3.2.1**                    *Urban design and community development that facilitate the provision of public transit will be promoted.*
- 11.3.2.2**                    *Development proposals will be reviewed to ensure efficient transit routing so that all dwellings in the development are ideally within 500 metres walking distance of a bus stop.*
- 11.3.2.3**                    *Mixed uses and higher density housing along Arterial Roads and at other strategic locations are encouraged as a means of enhancing the feasibility of transit services, increasing ridership, alleviating traffic congestion, and reducing reliance on the automobile.*
- 11.3.2.4**                    *Buildings should be sited as close to the street as possible to reduce walking distances for transit users*
- 11.3.2.6**                    *Pedestrian walkways, intersections of major roads, and pedestrian access systems are to be integrated with transit stops, and wherever possible, connected to trail systems*

**RESPONSE**

The development proposes a high-density residential/retirement development with scoped commercial uses along a primary arterial road and assists in enhancing the feasibility of transit services, increasing ridership, alleviating traffic congestion, and reducing reliance on the automobile. It does so by being directly adjacent to public transit that is well connected to major community destinations (i.e. the Downtown Transit Hub and points of interest such as Health Sciences North, Laurentian University, and the Larch Street Medical Centre). The development proposal also includes a public transit lay-by along Paris Street with pedestrian connections from all three of the residential buildings to the public right-

of-way. The TIS also proposes TDM measures, such as subsidized transit passes, and the installation of an information display board with bicycle maps, local transit map/schedule and other relevant information, which will aid in encouraging the use of public transit services, alleviating traffic congestion, and reducing reliance on the automobile.

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**Section 11.4** details policies related to parking and provides in part as follows:

**11.4.1**            *New developments generally must provide an adequate supply of parking to meet anticipated demands.*

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**RESPONSE**

The development includes 647-parking spaces with no site-specific parking relief being necessary under the City's Zoning By-law. Given that the development proposes to provide all required parking spaces on-site an adequate supply to meet anticipated demands (pursuant to the By-law anticipated parking needs for each use) is provided.

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**Section 11.7** speaks to active transportation, the pedestrian and bicycle network and provides in part as follows:

**11.7.2**            *Development proposals will be reviewed to ensure that there is adequate pedestrian access in new developments. The City may acquire lands to provide pedestrian facilities as a condition of approval. Wherever possible, the provision of adequate bicycle facilities will be encouraged.*

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**RESPONSE**

The development incorporates streetscape improvements along road frontages and the provision of bicycle parking (in conformity with the zoning by-law's requirements), which complements the existing and planned active transportation infrastructure in this area and will encourage both pedestrian and bicycle active transportation mobility, as well as connectivity to the wider public transit system.

The City's Roads, Transportation and Innovation staff have previously advised that a 3.0-metre road widening is required along Paris Street and that additional lands may be required to construct a new sidewalk, along with the Paris-Notre Dame Bikeway and a GOVA bus lay-by along the property's frontage. The new sidewalk will provide safe and convenient pedestrian access from the development to transit on Paris Street. An on-site pedestrian circulation network will also be designed as part of the site planning process to link the internal pathways and sidewalk network to Paris and Facer Street.

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**Section 12.2.2**, outlines policies related to the servicing of new development.

**12.2.2.1**            *Development in urban areas is permitted provided that existing and planned public sewage and water services have confirmed capacity to accommodate the demands of the proposed development. Alternatively, the proponent of the development will upgrade, at their own expense, the existing sewage and water systems to ensure adequate delivery and treatment facilities consistent with City standards, including the adequacy of fire flows.*

## RESPONSE

With respect to **Sections 12.2.2.1**, preliminary servicing information indicates that no extension of any municipal services is required and no upgrades to sewer and water infrastructure are required for the development. The City has also confirmed that there is sufficient water pressure and downstream sanitary sewer capacity to accommodate the proposed redevelopment of the subject site.

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**Section 14.3** addresses policies respecting Community and Neighbourhood design and states in part:

- 14.3.1** *The City will encourage community and neighbourhood design that:*
- a. creates a distinctive community character and strong sense of place;*
  - b. integrates a mix of land uses such as living areas, employment areas, institutional uses and parks and open spaces;*
  - c. fosters active transportation and public transit;*
  - d. incorporates natural and cultural heritage features and areas;*
  - e. provides an interconnected network of parks and open spaces; and,*
  - f. creates accessible, safe, sustainable and climate change resilient places.*
- 14.3.2** *Buildings, structures and other design elements that complement the surrounding built form and character are encouraged.*
- 14.3.4** *Area streetscapes are to be improved over time to provide safe, attractive, interesting and comfortable spaces through appropriate upgrades, such as landscaping, lighting, sidewalks, paving, street furniture and public art. These treatments should complement adjacent built form and open spaces, adding to a neighbourhood's character.*

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## RESPONSE

The intent of **Section 14.3.1** of the OP is to encourage high-quality community and neighbourhood design that creates a distinctive community character, strong sense of place, integrates a mix of land uses, promotes active transportation and public transit, and provides connectivity to parks and open spaces.

This development incorporates architectural design features including tower and podium-style configurations to reduce the visual and physical impact of height through facade articulation and fenestration techniques to mitigate impact to the existing neighbourhood and adjacent urban waterfront park setting. It will also foster a strong sense of place by integrating the development with the broader area through active transportation connections and including community-oriented uses (restaurants) at an appropriate scale. Further the development integrates a mix of land uses (i.e., restaurant, retirement and residential uses), that encourage the integration of private spaces with the existing public realm given the proximity to Bell Park and the café and restaurant use being accessible to the public.

The property's direct connectivity to the GOVA transit system and future Paris-Notre Dame bikeway will encourage the use of both active transportation and public transit with climate change resiliency in mind.



Area streetscapes are proposed to be improved to provide safe, attractive and comfortable spaces through the introduction of appropriate landscaping, lighting and new sidewalks/active transportation infrastructure.

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**Section 14.4** outlines policies related to site and building design, which states in part:

- 14.4.1**      *Development and intensification will be located and organized to fit with its existing or planned context. It will frame and support adjacent streets, parks and open spaces to improve activity, comfort and safety by:*
- a. generally locating buildings parallel to the street or along the edge of a park or open space with a consistent front yard setback. On a corner site, development and intensification should be located along both street frontages and give prominence to the corner. On a site that terminates a street corridor, the development should acknowledge the prominence of that site;*
  - b. massing buildings to define the edges of streets, parks and open spaces in good proportion;*
  - c. creating appropriate transitions in scale to neighbouring existing or planned buildings;*
  - d. locating main building entrances so that they are clearly visible and easily accessible from the public sidewalk;*
  - e. providing ground floor uses that have views into surrounding streets, parks and open spaces; and,*
  - f. minimizing shadowing and uncomfortable wind conditions on surrounding streets, parks and open spaces to preserve their utility.*
- 

#### RESPONSE

Regarding **14.4.1**, the development will:

- Introduce a café and retirement home in the northerly portion of the site (close to the corner) which will aid in giving prominence on the corner of Paris and Facer Street.
  - Locate buildings along the edge of abutting open spaces and provide an appropriate transition in scale to existing buildings.
  - Provide ground-floor uses that have views on to surrounding streets and introduce resident views on the park/open space.
  - Introduce additional shadowing impact but which preserves the utility of the surrounding streets, parks and open spaces.
  - The development proposal intends to provide setbacks along the public boulevard (i.e. Paris Street) that contribute to a desirable streetscape.
  - Provide building entrances that will be clearly visible and easily accessible from the public sidewalk.
  - Not introduce wind conditions that negatively impact the public realm (surrounding streets, parks and open and their utility).
-

**Section 14.4.2** address the design of vehicle parking, access, service areas and utilities and states:

- 14.4.2**      *Development and intensification will locate and organize vehicle parking, vehicular access, service areas and utilities to minimize their impact on the property and on surrounding properties and the public realm by:*
- a. minimizing the number of curb cuts and driveways that cross the public sidewalk;*
  - b. limiting surface parking between the front face of the building and the public street and sidewalk;*
  - c. locating servicing and utilities towards the sides or rear of the building and screening the servicing from views from adjacent streets;*
  - d. integrating servicing and utility functions within the building, where possible; and,*
  - e. providing adequate landscaping and buffering between adjacent properties.*

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#### RESPONSE

The majority of the parking spaces servicing the development will be provided through three levels of underground parking located at the rear of the property and provides an opportunity for utilities and service functions (e.g. loading, etc.) to be appropriately screened from Paris Street. This screening will assist in maintaining a street-facing ground level that enhances the aesthetics and compatibility of the proposed development. The natural vegetative areas between the east property line and those areas of Bell Park more actively used (i.e. directly along the waterfront) will also act to screen the rear parking structure (1-3 storeys) from the most publicly-active areas of the Park.

Per **Section 14.4.2**, only two driveways are proposed to provide access to the site which represents the same number of curb cuts/driveways as the existing condition. The siting of the buildings provides for significant setbacks and areas around the periphery of the site for tree planting between the proposal and adjacent properties.

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**Section 14.7** of the OP discusses design features, views, and corridors. It states that:

- 14.7.1**      *New land uses or design features that would detract from the enhancement of major focal point areas within the City, such as Science North, the Big Nickel, Bell Park, Tom Davies Square and Laurentian University are discouraged. The open space character and natural aesthetic environment of the Paris Street corridor, especially that section between Walford Road and York Street, will be preserved and enhanced. In particular, the view corridor to and from Science North will be protected.*
- 14.7.3**      *Landscaping will be used to frame desired views or focal points, direct pedestrian movement, and satisfy functional requirements, such as providing shade and buffering. All new development proposals will be evaluated for their opportunity to create, maximize or enhance existing views through landscaping.*
- 14.7.4**      *This Plan encourages the design and layout of streets, pedestrian walkways and bicycle routes such that they provide vantage points for significant views and vistas along their lengths, including trails and bike path*
- 14.7.5**      *View corridors to lakes should be preserved.*

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## RESPONSE

The City's OP identifies the Paris Street corridor, including views to Ramsey Lake, Bell Park, and Downtown as important view corridors. Impacts to views along the corridor and through the development to Ramsey Lake have been mitigated through the use of architectural techniques previously discussed (i.e., setbacks and building separation). Landscaping will be used to frame this stretch of Paris Street, direct pedestrian movement, and re-green this presently barren site to better mirror Bell Park and Paris Street's open space character and natural aesthetic.

Changes to viewpoints/vistas along Paris St will result from the development, however the development's design will maintain views (and in some instances improve such), from the condition the property experienced when it was actively used as a General Hospital (prior-to the demolition of some portions of the former building complex). In some areas, view corridors to the lake will be opened given the three-building configuration, proposed building separation and placement of the parking structure below grade.

Views to and from Downtown along Paris Street will change through the addition of this development. Specifically heading south along Paris Street from the Bridge of Nations where the development will be featured on the horizon and heading north along Paris Street towards Downtown as a landmark. This new land use will not detract from major focal points given its location and will introduce new landscaping to the Paris Street corridor as called for in **14.7**.

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**Section 14.9** sets out policies respecting energy efficiency and climate change resiliency and states in part:

- 14.9.1**        *The City will encourage urban design solutions that minimize non-renewable resource consumption, maximize the use of renewable energy and takes into account the impact of climate change by:*
- a. encouraging compact, mixed use and infill developments that concentrate complementary land uses and support active transportation and public transit.*

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## RESPONSE

With respect to **Section 14.9.1**, as discussed previously the proposed development represents a compact, contextually sensitive mixed-use infill development that will complement and support the existing GOVA transit lines and existing and future active transportation investments in the area.

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**Section 16.2** of the City's OP promotes policies which plan for and are supportive of Sudbury's aging population. Those applicable policies include:

- 16.2**        **PLANNING FOR AN AGING POPULATION**
- 1)** *Support development that is age-friendly including the creation of smaller, unique, shared and transitional housing opportunities for an aging population through the rezoning process, where necessary, promotes 'aging in place' and is in close proximity to amenities and services in the Downtown, Regional Centres, Town Centres and Mixed Use Commercial areas.*

- 2) Create a safe and secure physical and social environment for Greater Sudbury's aging population with supportive design standards such as sidewalk policies, curb heights, park facilities.*
- 4) Support the creation of more affordable housing and long-term care facilities with support services for an aging population.*
- 5) Facilitate 'aging in place' to allow residents to live healthy, independent lives in the comfort and dignity of their own homes.*
- 6) Support an active lifestyle for an aging population by increasing the availability and accessibility of social and recreational opportunities.*

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## RESPONSE

Per the policies in **Section 16.2.1**, the proposed development is age friendly and will allow its residents to live healthy, active, and independent lives. It proposes the creation of smaller and more affordable residential dwelling units and the establishment of a 109-guest room retirement home, which will provide the opportunity for aging in place in a location well connected to local amenities, recreational opportunities, and services in the Downtown and broader City of Greater Sudbury. The proposed retirement home's proximity to Sudbury's largest urban park will support an active lifestyle and increase the availability of accessibility of social and recreational opportunities.

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**Section 17.2** of the City's OP details policies related to housing:

- 17.2.1**      *To encourage a greater mix of housing types and tenure, it is policy of this Plan to:*
- a. encourage a wide range of housing types and forms suitable to meet the housing needs of all current and future residents;*
  - b. encourage production of smaller (one and two bedroom) units to accommodate the growing number of smaller households;*
  - c. promote a range of housing types suitable to the needs of senior citizens;*
  - d. discourage downzoning to support increased diversity of housing options; and,*
  - e. support new development that is planned, designated, zoned and designed in a manner that contributes to creating complete communities – designed to have a mix of land uses, supportive of transit development, the provision of a full range of housing including affordable housing, inclusive of all ages and abilities, and meet the daily and lifetime needs of all residents.*

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## RESPONSE

The development proposal is consistent with **Section 17.2.1** as the proposed mix of residential uses will enhance and promote complete communities that will better meet the daily and lifetime needs of Sudbury residents. With respect to the policies in **17.2.1**, the proposed development will contribute to providing a mix of housing types and tenures in the area. The proposed development includes 109 retirement home guest rooms, 102 one-bedroom units, 284-two-bedroom

units and 35-three-bedroom units, which are suitable for senior citizens, smaller households and other current and future residents.

The proposed development will also contribute to creating complete communities given its mix of land uses, its transit supportive nature and provision of range of housing types and tenures that better meet the daily and lifetime needs of all residents.

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**Section 17.2.2** speaks to the intersection of housing and economic development:

- 17.2.2.**      *a. promote residential development in the Downtown as a stimulus to downtown revitalization and small business development;*
- b. support a range of housing types available to seniors, retirees, and younger cohorts by encouraging the development of alternative housing options and exploring opportunities for lifestyle housing targeted to niche markets; and,*
- c. promote intensified residential development at main commercial nodes in the City as a means of promoting urban redevelopment and achieving effective residential intensification*

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#### RESPONSE

The development proposal promotes residential intensification near the Downtown which may assist with revitalization and the support of small businesses/the City's commercial core.

The development proposal provides a range of housing types which are appropriate for seniors, retirees and younger age cohorts given that three distinct housing types and tenures that are proposed (i.e. retirement guest rooms, freehold condos, and rental apartments).

The subject site falls within the Paris Street corridor. The City-wide Nodes and Corridors Strategy states that, 'Corridors are significant connections either leading to a node or connecting one node to another. These significant corridors are made up of mixed-use areas and are priority areas for long-term investment and revitalization'. Given the proposal represents an intensified residential development on a corridor leading to the Downtown, it may promote urban redevelopment in the City's main commercial node.

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#### OFFICIAL PLAN SUMMARY

The redevelopment of the former hospital site as a high-density residential development with limited commercial use addresses many of the City's Official Plan objectives, including residential intensification, transit supportive development, the efficient use of infrastructure and services, and increasing the mix of housing types and tenures to respond to changing demographic needs.

The proposed development has been designed to be mitigate impact with the existing uses in the surrounding area through good urban design and public realm and landscaping improvements to the site and Bell Park property lines. Future residents will benefit from the development's connectivity, nearby recreational and active transportation opportunities thereby promoting healthy, livable and complete communities. Given all the above the proposal conforms to the City of Greater Sudbury's Official Plan.



## GREATER SUDBURY SOURCE PROTECTION PLAN

Pursuant to the *Clean Water Act, 2006*, the Greater Sudbury Source Protection Plan, sets out Source Protection policies addressing existing and potential threats to drinking water. The subject lands are located within the Ramsey Lake Intake Protection Zone 2(IPZ2) which forms part of the Ramsey Lake Issue Contributing Area which is comprised of all three of the Intake Protection Zone (IPZ) areas (i.e. 1, 2 and 3).

Threats associated with phosphorus are:

- The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act
- The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage
- The application of agricultural source material to land
- The storage of agricultural source material
- The application of non-agricultural source material to land
- The handling and storage of non-agricultural source material
- The application of commercial fertilizer to land
- The handling and storage of commercial fertilizer
- The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm animal yard

The threats that are associated with the sodium issue in the Ramsey Lake Issue Contributing Area are:

- The application of road salt
- The handling and storage of road salt
- The storage of snow

As per the City's Source Protection Plan's salt and snow policies, Risk Management Plans may be required for the application of road salt and storage of snow if the exterior parking lot is equal to or greater than 1 hectare in area. The handling and storage of road salt at volumes of 0.5 tonnes or greater is also prohibited. It is noted that the parking area on the subject site is smaller than 1 hectare with majority of the parking being contained within an underground parking structure. It appears there are no significant threats to the drinking water of Ramsey Lake resulting from the proposed development, however, a Sourcewater Protection Plan Application will be submitted as part of complete applications.

## COMMUNITY ENERGY AND EMISSIONS PLAN (CEEP)

The *Community Energy and Emissions Plan* (CEEP) is the long-term plan to reduce carbon emissions and pollution in Greater Sudbury. It responds to City Council's *Climate Emergency Declaration* in May 2019, which included a commitment to achieve net-zero emissions by 2050. That means reducing greenhouse gas emissions (GHG) caused by human activity to as close to zero as possible and removing remaining emissions from the atmosphere.

The proposed development assists with achieving Goals **1, 2, and 7** of the CEEP.

**GOAL 1:** *Achieve energy efficiency and emissions reductions by creating compact, complete communities through infill developments, decreasing dwelling size through an increase in multi-family buildings, and increasing building type mix.*

**GOAL 2:** *Periodically increase the energy efficiency of new buildings until all new buildings in 2030 onward are Passive House energy efficiency compliant.*

**GOAL 7:** *Enhance transit service to increase transit mode share to 25% by 2050.*

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### RESPONSE

The proposed development supports **Goal 1** given that infill and compact, complete communities intrinsically reduce greenhouse gas emissions through being transit and active transportation supportive. The CEEP states that through *'its implementation, it is expected that residential development would focus on multi-family and mixed-use buildings. Apartment and condominium buildings are typically more energy efficient than single family homes. This is in part due to smaller dwelling sizes. The focus on multi-family and mixed-use housing would also result in fewer new single-family homes. By 2050, the share of new single-family homes being built would decrease to 10% of total housing starts'*. The proposed compact development will add 530-units on to an existing primary arterial, increasing the building and type mix as set out in **Goal 1** of the CEEP.

The proposed development supports **Goal 2** given that the development proposes to demolish the existing building and replace such with three new energy efficient buildings.

As transportation is responsible for the most emissions of all sectors in Greater Sudbury, replacing trips made by car with transit trips is an important emissions reductions action. The proposed development supports **Goal 7** given that the development proposes a high-density development on the existing GOVA transit Main Line. As new building and land-use actions are coordinated, enhanced transit services will become increasingly viable with increasing transit frequency, and usage. Additionally, the completion of the Paris-Notre Dame Bikeway and Bell Park's trail network will increase the use of bicycling infrastructure.

## RAMSEY LAKE COMMUNITY IMPROVEMENT PLAN

The *Ramsey Lake Community Improvement Plan* was adopted by the Regional Municipality in 1992 to establish a long-term vision for the Ramsey Lake Area and proposed a set of programmes and development projects to guide future development within the Plan area. The CIP included the St. Joseph's Hospital site should enhance its landscaping and better integrate the site with Bell Park and the Paris Street corridor. The plan emphasized the importance of regenerating the natural landscape.

### RESPONSE

The development proposal assists in achieving the objectives of the CIP through re-naturalizing a site which is presently vacant of vegetation. Landscaped improvements are proposed along the Paris Street and Facer Street frontages as well as between the interface of Bell Park and the residential development (See Figure 25).

Specifically, the development's design proposes to include:

- 43.2% (0.77ha) of landscaped open space where 30% is required per the R4 zone standards
- 3.0-metre-wide landscaped strips (or greater) along all street frontages
- Pedestrian connectivity from Bell Park into the site and to the adjacent Paris Street corridor

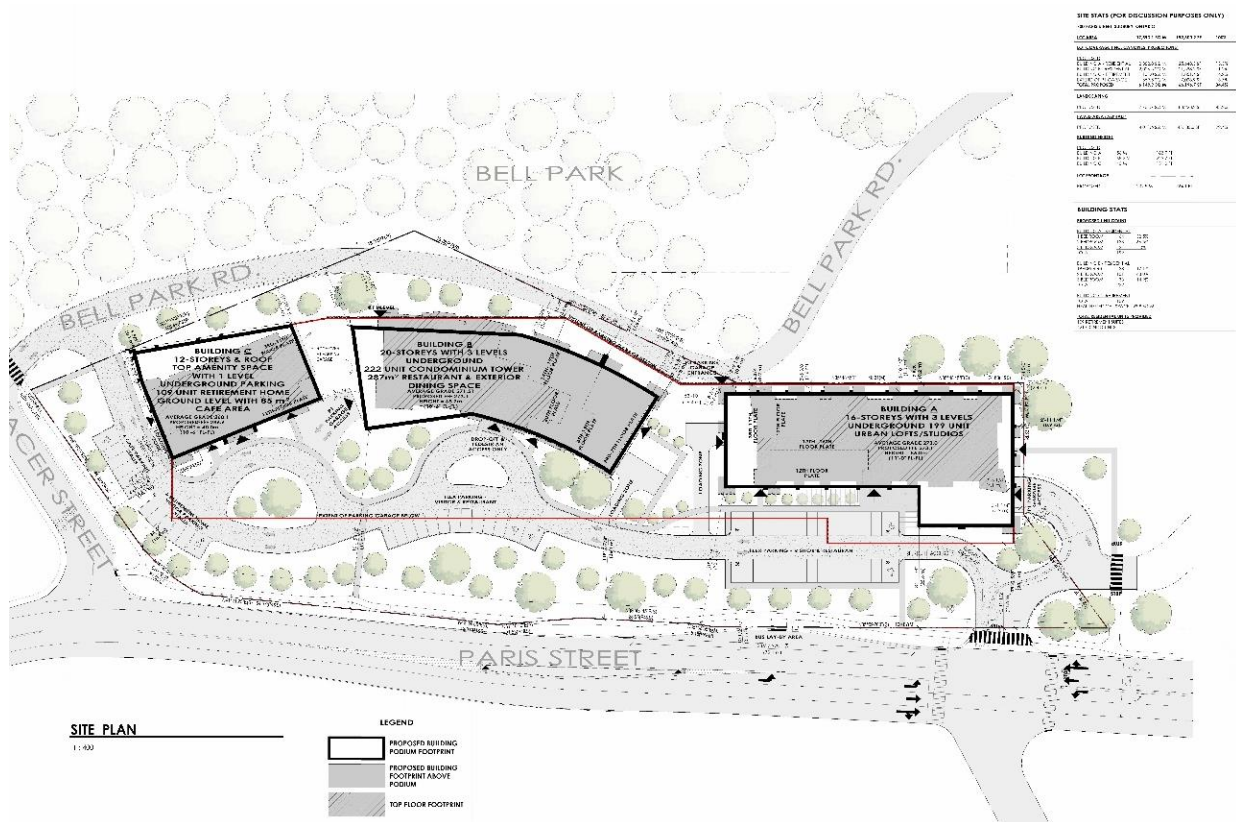


Figure 25: Site Plan showing proposed extent of introduced landscaping

## CITY OF GREATER SUDBURY ZONING BY-LAW 2010-100Z

The subject site is presently zoned 'R4(3)' in the *City of Greater Sudbury Zoning By-law 2010-100Z* (See Figure 26).

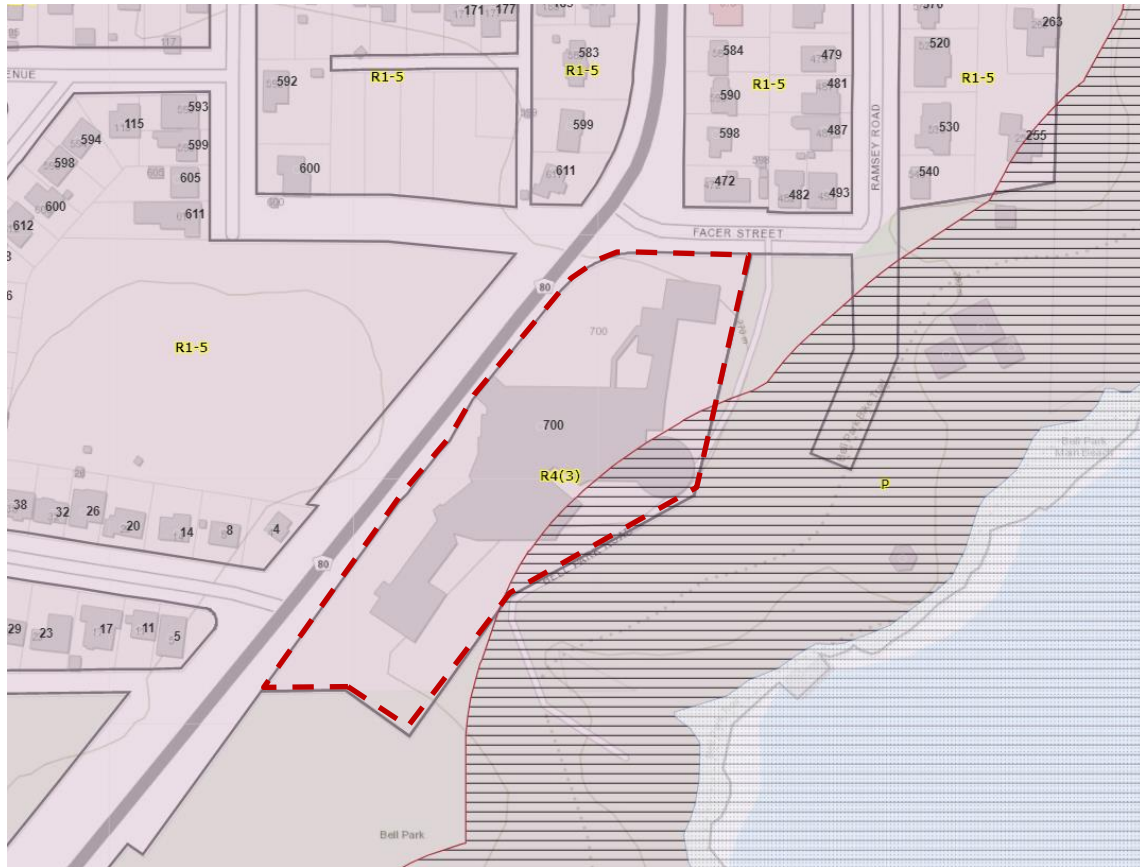


Figure 26: Existing Zoning Map

### **(210 MULTIPLE DWELLING UNITS)**

#### **(c) R4(3)**

#### **McKim Township Maps Lot 5, Con 2; Lot 5, Con 3**

Notwithstanding any other provision hereof to the contrary, within any area designated R4(3) on the Zone Maps, all provisions of this By-law applicable to the R4 Zone shall apply subject to the following modifications:

- i) The lot line abutting Paris Street shall be deemed to be the front lot line;
- ii) The only permitted uses shall be multiple dwellings with a maximum of 210 dwelling units of which, a maximum of 85 dwelling units shall be permitted in a new building to be located on the lot after November 20, 2012;
- iii) The maximum number of multiple dwelling buildings permitted on the lot shall be two;
- iv) The existing building as located on the lot shall be permitted and the enlargement of the existing building shall be permitted within the setbacks to the existing building;
- v) Notwithstanding (iv) above, the maximum addition permitted to the existing helipad structure shall be one storey located above the helipad platform;
- vi) The minimum setback from Facer Street to a multiple dwelling shall be 55 metres;
- vii) The minimum setback from the rear lot line and interior side lot line to a parking structure shall be 2 metres;

- viii) The minimum setback from the rear lot line and interior side lot line to multiple dwelling units in a building located above a parking structure shall be 7.5 metres;*
- ix) The maximum building height shall be eight storeys and 32 metres;*
- x) The minimum setback from the front lot line to a multiple dwelling comprising a new building to be located on the lot after November 20, 2012, shall be 11.3 metres;*
- xi) The maximum number of surface parking spaces on the lot not including loading spaces shall be 20;*
- xii) The minimum width of a landscape strip abutting Paris Street shall be 2.6 metres and from Paris Street to the existing building the minimum width of the landscape strip shall be 1.3 metres;*
- xiii) Loading spaces shall also be permitted in the corner side yard.*

To facilitate the development, the lands are proposed to be rezoned to an amended 'R4-Special'. To maintain land use compatibility and place the buildings most appropriately on the site, the following development standards are proposed as part of the amending zoning by-law:

- The maximum number of buildings on the lot shall be three:
  - A 109-guest room retirement home with maximum building height of 40.0-metres (12-storeys);
  - A 199-unit multiple dwelling with a maximum building height of 56.0-metres (16-storeys);
  - A 222-unit multiple dwelling with a maximum building height of 68.2-metres (20-storeys); and,
  - All with a 1-3 storey below grade parking structure.
- To require a minimum corner side yard setback (along Facer Street) of 18.0-metres.

In addition to the above standards the development requires the following site-specific relief:

- To permit a lot area of 41m<sup>2</sup> per unit where 65.0m<sup>2</sup> would be required for multiple dwellings;
- To permit a rear yard setback of 0.0-metres where 25.0-metres would be required;
- To permit an interior side yard setback of 0.0-metres 21.0-metres would be required;
- To only require at minimum court of 15.0-metres between multiple dwellings where typically 50% of the height of the higher of such walls would be required and,
- To permit a maximum building height for the 222-unit multiple dwelling (Building B only) of 20-storeys and 68.20-metres where a maximum height of 63.0-metres is permitted.

Table 3 compares the proposed development's standards with the Zoning By-Law's High Density Residential (R4) Zone, the Former Hospital's historic condition, and the current R4(3) site-specific zone standards.



Table 3: Zoning Matrix Comparison Table

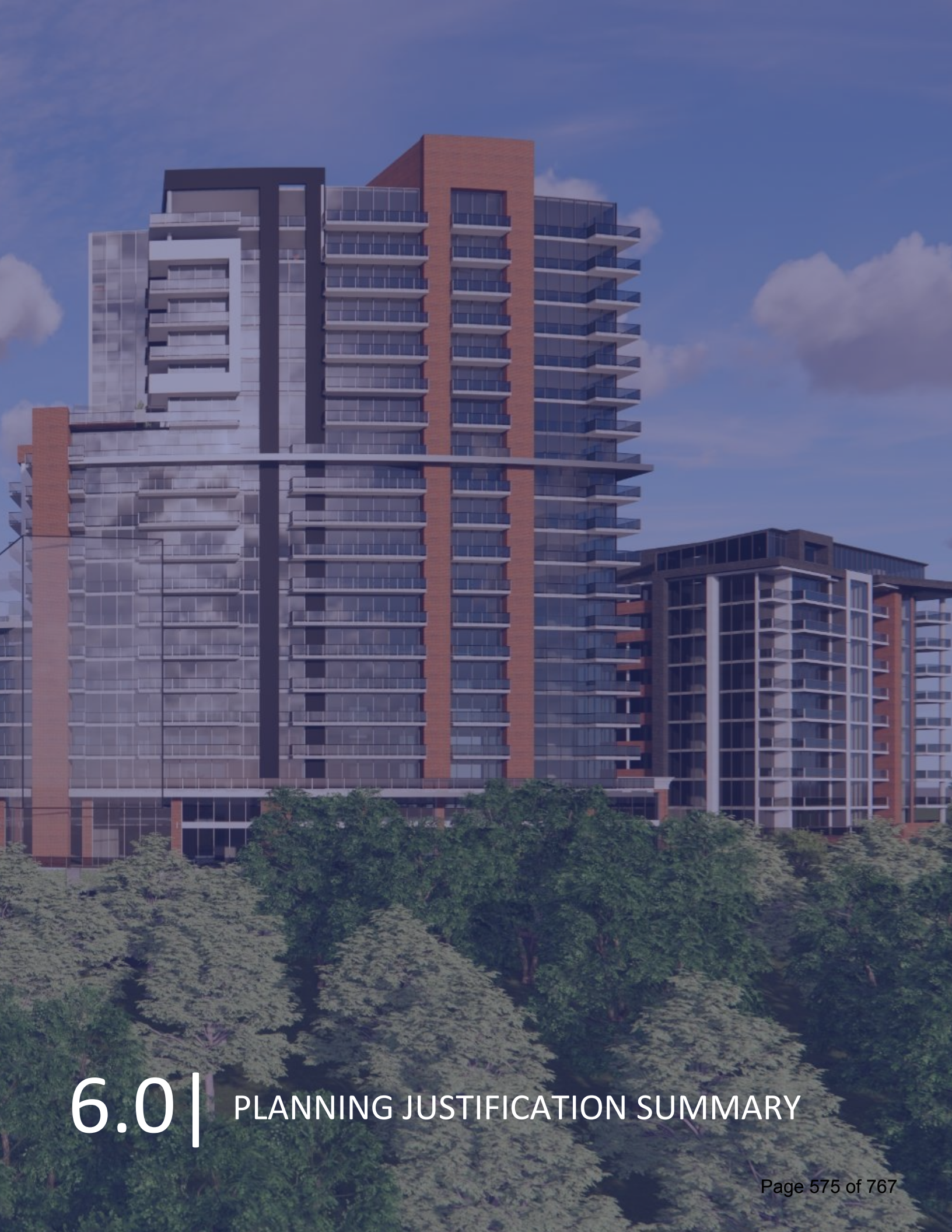
	R4 ZONE	FORMER 360-BED HOSPITAL	CURRENT R4(3) APPROVED SITE PLAN	PROPOSED DEVELOPMENT
<b>Min Lot Area</b>	Multiple Dwelling: 65.0m <sup>2</sup> per unit Retirement Home: 1350.0m <sup>2</sup>	1.75ha	1.75ha	Multiple Dwellings: 41m <sup>2</sup> per multiple dwelling unit (Area: 1.615ha) Retirement Home: 1350.0m <sup>2</sup>
<b>Min Frontage</b>	30.0m	232.92m	232.92m	232.92m
<b>Min Lot Depth</b>	45.0m	66.94m	66.94m	66.94m
<b>Min Front Yard</b> (Paris St)	15.0m	7.50m	11.3m	24.1m
<b>Min Rear Yard</b> (Bell Park)	28.0m	4.2m	2.0m (parking structure) 7.5m (for a multiple dwelling located above a parking structure)	0.0m
<b>Min Interior Side Yard</b> (South Lot Line)	21.0m	6.3m	2.0m (for a parking structure) 7.5m (for a multiple dwelling located above a parking structure)	0.0m
<b>Min Corner Side Yard</b> (Facer Street)	10.0m	17.5m	55.0m	18.1m
<b>Minimum Building Separation</b>	15.0m	N/A	N/A	9.7m
<b>Max Lot Coverage</b>	50%	N/A	34.1%	34.4%
<b>Max Height</b>	63.0m	32.5m	32.5m (8-storeys)	Building A: 56.0m (16-storey) Building B: 68.2m (20-storey) Building C: 40.0m (12-storey)
<b>Min Landscaped Open Space</b>	30%	N/A	40.9%	43%

The existing site-specific zoning does not permit a density/level of residential intensification that is appropriate for this unique site. When reviewing all applicable policies against the development proposal, it is this authors opinion that the reliefs required are appropriate to facilitate the highest and best use of the lands, leveraging the site's infrastructure availability, connectivity to abutting resources and other areas of the City, better utilization of transit investments and housing potential, while being cognizant of the surrounding urban residential context and recreational character of the area.

Specifically:

- The reduction in interior side yard and rear yard setbacks to 0.0-metres is appropriate as the adjacent properties are City owned lands (i.e. Bell Park and municipal parking lot) and therefore impacts typically associated with reducing side yard setbacks to other land uses is minimal (thus the preservation of the R4 zone's required setbacks to such boundaries is unnecessary to maintain compatibility of the proposal, while the retention of such setbacks would represent the underutilization of lands).
- The reduction in lot area per unit is appropriate given that the lands abut a large municipal park providing recreational opportunities to residents, and speciality amenity areas are provided in each building.
- The reduction in the minimum courts between the multiple dwellings is appropriate as building separation is still being provided, while enabling the more efficient use of the lands through a taller built form;
- The increase in height from the existing permissions to 68.2-metre was partially assessed via the Preliminary Pedestrian Wind Assessment and Sun Shadow Study. The Wind Study did not identify issues with the proposed height beyond limited wind reduction measures applicable to taller buildings, and the increased height did not result in sun shadow impacts over residential areas significantly greater than what would be generated by the existing R4(3) zoning permissions between the hours of 9:00am and 6:00pm

Based on the foregoing, the proposed amendment to the zoning by-law is appropriate in implementing the intended land use framework and policy directions of the City's Official Plan and maintains the general intent of the parent zone category (R4) under *Zoning By-law 2010-100Z*.



# 6.0 | PLANNING JUSTIFICATION SUMMARY

## 6.0 PLANNING JUSTIFICATION SUMMARY

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The proposed Official Plan Amendment and Zoning By-law Amendment will facilitate a development that integrates an appropriate and reasonable mix of uses that is primarily urban residential in nature, along with an enhanced public realm while providing new housing that will help to meet changing demographics/market demands and provincial and municipal intensification targets of creating 3,800 more homes by 2031.

The proposed development represents good land use planning that is in the public interest as it will revitalize a currently underutilized site to provide a high-quality urban development near Sudbury's Downtown and the Ramsey Lake waterfront.

### **CONSISTENCY WITH PROVINCIAL AND MUNICIPAL PLANNING POLICY**

The proposed amendments will facilitate development on a fully serviced site, significantly enhance both the private and public realm, and diversify the neighbourhoods existing housing tenure by provide new housing that assists in meeting projected demographic housing needs and municipal growth and density targets. The site is situated on the City's GOVA main transit line and is directly abutting a large urban park, trails, and other recreational opportunities which promote healthy community living, while better utilizing existing infrastructure. The proposed development is consistent with and conforms with provincial and municipal policy.

### **COMPATIBILITY/NEIGHBOURHOOD SENSITIVITY**

The proposed development is contextually sensitive and appropriately designed with increased setbacks from Facer Street, well sited buildings, step-backs and transitions in height and multiple buildings to reduce effects associated with block-massing.

The use of an underground parking structure to provide an appropriate amount of (non-intrusive/screened) user parking, the proposed streetscape improvements and new landscaping will enhance the street frontages and act to mitigate impacts of the development to the existing community.

The proposed mix of uses will aid in building complete communities and the introduction of scoped restaurant uses serves to maintain compatibility with the surrounding area, while leveraging Bell Park's Ramsey Lake Waterfront.

### **A RANGE OF HOUSING OPTIONS AND CHOICE**

The development proposal incorporates a mix of contextually appropriate housing types and tenures being rental apartments, retirement guest suites and freehold condominium units into a predominately low-density urban residential neighbourhood. The proposed development will therefore support the municipalities target of creating 3800 more units while also diversifying the housing mix of the area and improving the availability of varying housing forms suitable for all demographics in an appropriate location.

### **TRANSIT ORIENTED & ACTIVE TRANSPORTATION SUPPORTIVE DEVELOPMENT**

The proposed development represents transit-oriented development at a transit supportive density. The site benefits from two GOVA transit stops located along the property's frontage, proximity to the Main Downtown Bus Terminal and the future Paris-Notre Dame Bikeway project that will run along the property's Paris Street frontage.



## CONNECTIVITY TO THE DOWNTOWN & GREATER SUDBURY

The proposed development is located approximately 800-metres from the City's Downtown which already benefits from having a strong mixed-use urban context. Residents of the development will benefit from proximity to nearby amenities, services and commercial centres within the Downtown, while its location on a corridor is indicative of the connectivity of the site with the broader Sudbury community, allowing residents to have easy access to employment opportunities and everyday needs.

## CONCLUSION

Given the land use planning analysis provide herein, it is the author's opinions that the proposed Official Plan Amendment and Zoning By-law Amendment to permit 530-housing units (including retirement residence), along with 380m<sup>2</sup> of contextually appropriate commercial (restaurant) use is consistent with the 2020 PPS, conforms with the Growth Plan for Northern Ontario and the City of Greater Sudbury Official Plan, represents good planning and is in the public interest.

Respectfully submitted,

Prepared By:



**Vanessa Smith, M.Pl., RPP.**

Project Manager | Land Use Planner

Reviewed By:



**Kevin Jarus, M.Pl., RPP**

Planning Manager | Senior Associate



## Maria Gonzalez Santos

---

**From:** Laura Tagliafierro <[REDACTED]>  
**Sent:** Friday, February 9, 2024 12:19 PM  
**To:** Alex Singbush  
**Subject:** Notice of application for old St Jo's site

You don't often get email from [REDACTED]. [Learn why this is important](#)

Hello,

I would like to express some issue with the proposed development at Paris Street and Boland intersection at the former site of Saint Joseph's Hospital.

Being directly adjacent to the development means:

Decrease scope of view to the lake

Increase in light pollution and ambient light in the night sky (an issue we already deal with due to the new led lighting in the adjacent parking lot which is turned off in winter months.)

increased traffic

Increased cars parked along adjacent streets

increased noise

increased garbage

Increased foot track traffic to an already extremely busy area especially in the summer.

Since the installation of parking at the site for the public and post Covid, we have seen an increase in people camping overnight in the parking lot, significant garbage throughout the summer at the site, as well as an increase in noise, crime and such behaviour in the late night hours 12am to 5am.

We frequently have foot traffic people entering our properties in yards as well as significant noise from Paris Street.

At the intersection, there is significant running of the red light in the north and south bound directions.

Despite recent traffic calming measures with posted signage of 40 km/h on Boland Street we continue to see extremely high speeds of driving in a residential area where children play.

Though I would like to see the development of this site, I believe the significant number of units is far too many for this neighbourhood to maintain the nature of the community. In addition, there is concern that the development will block the view and access of neighbours and community members to the lake and the park, something which we have been paying a premium to have the opportunity to live near.

I would like to see some measures of what will occur in terms of the following:

- pedestrian management for walkways adjacent to the park to limit wind factors which are already significant.
- the pedestrian environment around the development.
- proposed continued access for the park and lake front
- study on shading and how the development will affect light to surrounding street- for example we will no longer have the morning sun.

-light management in terms of ambient light and light pollution in the night sky.

-garbage management around the park parking lot area and side streets other areas in the community due to traffic.

-Proposed significant traffic calming measures by the city as well as by the developers and how traffic will flow in and out of the development.

-sound barriers were possible.

- most importantly a reduction in the number of units.

-will there be access to grocery, cafe and restaurants in the facility will these be accessible to the surrounding community.

We would like to see a reduction in the

Number of units, and or maintain the current height of the building that exists on the site. Otherwise we feel a study to examine how it will affect neighboring properties and community is necessary before such a large development is built.

Sincerely,

Laura and Anthony Tagliafierro

11 Boland Ave.

## Maria Gonzalez Santos

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**From:** Alex Singbush  
**Sent:** Thursday, February 15, 2024 3:32 PM  
**To:** Wendy Kaufman; Maria Gonzalez Santos  
**Subject:** FW: NOTICE OF APPLICATION - file# 701-6/23-04 & 751-6/23-25  
**Attachments:** TO CITY OF SUDBURY.docx

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

**Categories:** COMMENTS

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**From:** Mike Parsons <[REDACTED]>  
**Sent:** Thursday, February 15, 2024 10:13 AM  
**To:** Alex Singbush <Alex.Singbush@greatersudbury.ca>  
**Subject:** NOTICE OF APPLICATION - file# 701-6/23-04 & 751-6/23-25

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Hello Alex.

Please see attached comments regarding "NOTICE OF APPLICATIONS " in connection with old St Joseph's Health Centre, file# 701-6/23-04 & 751-6/23-25.

Thank you.

Michael Parsons  
578 Paris Street  
Sudbury Ontario. P3B-3B4  
[REDACTED]



Virus-free. [www.avast.com](http://www.avast.com)

To:

February 14/2024

City of Greater Sudbury.

Alex Singbush.

Manager of Development Approvals, Planning Services Division.

PO Box 5000, Station A, 200 Brady Street, Sudbury, ON P3A-5P3.

([alex.singbush@greatersudbury.ca](mailto:alex.singbush@greatersudbury.ca))

Hello Alex.

In response to "NOTICE OF APPLICATIONS" regarding the old St Joseph's Health Centre, Sudbury.

The current application for the abandoned St Joseph's Health Centre property presents at least three problems for the citizens of Sudbury who enjoy the benefits of Bell Park.

First, the request for zero set back on the Bell Park side of the proposed construction. This would place an exclusion zone for construction on the Bell Park property, removing that land from the use and enjoyment of people of Sudbury for the duration of construction.

Second, the proposal shows the annex of a public access road that presently runs underneath the old helicopter pad. Rerouting this road would destroy a stand of pine trees and walking path in the park.

Third, the proposal contains no time line for completion of the development. Based on the progress over the last ten or more years, that means Bell Park will be dominated by perpetual construction for decades.

Thank you.

Michael Parsons

578 Paris Street

Sudbury Ontario. P3B-3B4

[REDACTED]

[REDACTED]

## Maria Gonzalez Santos

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**From:** Ray Spangler <[REDACTED]>  
**Sent:** Friday, March 8, 2024 2:14 PM  
**To:** Alex Singbush  
**Subject:** Notice of Applications File 701-6/23-04 & 751-6/23-25

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**To: Mr. Alex Singbush, Manager of Development Approvals.**

**Re: Notice of Applications**

**File 701-6/23-04 & 751-6/23-25**

**Applicant: 2226553 Ontario Inc.**

We object to this application.

**My reasons are as follows:**

- There is no timeline. The applicant has had possession of this property for more than 10 years and it could be vacant for another 10 years. He has left the site in a derelict state without consideration to adjacent property owners or passing traffic. The applicant provides no guaranty that they will continue to develop the property. If development does progress, the site could be under construction for many years causing traffic issues and unsightly conditions.
- The increase of traffic and turning movements on Paris Street will be significant.
- The City will have little control of the building aesthetics or the site landscaping. These structures will be adjacent to Bell Park and will no doubt be unattractive and ordinary apartment buildings.
- A 12, 16 and 20 story building will have an obvious and negative impact on Bell Park. This fact alone should be sufficient reason for Planning Services to reject the application.

**We also forward further comments which we feel are applicable to this application.** I have expressed my concern with this development via several emails to my Councillor over the past years.

The Master Plan for Bell Park calls for the City to purchase any adjacent property that becomes available over time. The City has already ignored this policy as they have permitted residential development adjacent to the park on Facer Street

The previous council should have taken the opportunity to purchase the old hospital site and letting the most valuable piece of property within the City go to a developer was a major mistake. This can now be rectified by the current administration and council by the expropriation of the property. Costs are irrelevant - considering the property would forever belong to the people of the City of Sudbury.

We question the integrity of the applicant. At the first public meeting, they presented architectural renderings for high end condominiums. We later found that they did not build and sell but only built to rent. The condominium plan was a



ploy to get the City and neighboring property owners to approve the development and donate a small piece of land to permit additional parking.

We question the integrity of the City. The building is an eyesore. Why the City has not forced demolition and restoration remains a question and we wonder if the City will continue to allow this applicant to be unrestricted.

There is activity inside the existing building which is a major Health and Safety concern – putting the developer and the City at risk.

We would appreciate notification of the decision on the proposed zoning amendment.

I have also forwarded this email to Councillor Cormier. Please feel free to contact us if you have any questions or comments.

Ray and Connie Spangler

530 Ramsey Road, Sudbury



## Maria Gonzalez Santos

---

**From:** Philip Hopkins <[REDACTED]>  
**Sent:** Friday, February 2, 2024 10:12 AM  
**To:** Alex Singbush  
**Subject:** FW: Notice of Applications 701-6/23-04 & 751-6/23-25 - 2226553 Ontario Inc

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Attention: Mr Alex Singbush  
Manager of Development Approvals  
City of Greater Sudbury

Re: Notice of Applications  
File: 701-6/23-04 & 751-6/23-25

Dear Mr Singbush,

In reference to the letter I received from yourself (29 January 2024) regarding the Notice of Applications (File: 701-6/23-04 & 751-6/23-25) I would like to make comment on the proposed applicatytions (1 & 2) outlined in your letter.

As noted below (see address), my wife (Mary) and I reside in a single home dwelling directly on Paris Street some three homes to the north of the proposed rezoning and ultimate construction site. We would like to note for the record that we are wholly in support of both the rezoning and ultimate construction of the joined and multiple use building outlined in your letter of 29 January 2024. Furthermore, we would be supportive of seeing this development move forward as smoothly and unhindered as possible.

In sending this letter of support we fully understand and expect: traffic restrictions and interruptions, some noise matters, some dust and general area "housekeeping" matters and local movement disruptions throughout the development process and that this overall period may last a number of years. We respect this may/will result in some challenges from time to time with us as local residents but fully respect the work and approach here and will support this development in any feasible way we can.

We wish you the greatest success here and know the final outcomes will greatly improve the city and area overall.

Sincerely  
Philip Hopkins (& Mary)

Personal details are as follows:

Mary & Philip Hopkins  
584 Paris Street  
Sudbury, Ontario  
P3E 3B4

Phone: [REDACTED] (Philip)

## Remington Road, Sudbury

Presented To:	Planning Committee
Meeting Date:	April 29, 2024
Type:	Public Hearing
Prepared by:	Bailey Chabot Planning Services
Recommended by:	General Manager of Growth and Infrastructure
File Number:	780-6/23002

## Report Summary

This report provides a recommendation regarding an application for Plan of Subdivision in order to permit the creation of four blocks and one road.

This report is presented by Bailey Chabot, Senior Planner.

## Resolution

THAT the City of Greater Sudbury's delegated official be directed to issue draft plan approval for a plan of subdivision on those lands described as PINs 73478-1049, 73475-1506, 73478-1179, and 73475-1240, Part of Part 2, Plan 53R-12196, Parts 8-11, Plan 53R-16629, Parts 3, 5-7, Plan 53R-17925, Parts 5-8, Plan 53R-19303, Part 2, Plan 53R-19410 and Parts 1-2, Plan 53R-19563, Concession 6, Township of Broder, as outlined in the report entitled "Remington Road, Sudbury", from the General Manager of Growth and Infrastructure, presented at the Planning Committee meeting on April 29, 2024, not sooner than 14 days following the date of the public meeting in accordance with the requirements of Section 51(25) of the Planning Act, subject to the following draft approval conditions:

1. That this approval applies to a draft plan of subdivision on lands described as PINs 73478-1049, 73475-1506, 73478-1179, and 73475-1240, Part of Part 2, Plan 53R-12196, Parts 8-11, Plan 53R-16629, Parts 3, 5-7, Plan 53R-17925, Parts 5-8, Plan 53R-19303, Part 2, Plan 53R-19410 and Parts 1-2, Plan 53R-19563, Concession 6, Township of Broder, as shown on the draft plan of subdivision titled "DRAFT PLAN OF PROPOSED SUBDIVISION OF PIN 73478-1049, PIN 73475-1506, PIN 73478-1179, PIN 73475-1240, PIN 73475-0518 PART OF LOTS 4 & 5 CONCESSION 6 GEOGRAPHIC TOWNSHIP OF BRODER CITY OF GREATER SUDBURY" prepared by R.V. Anderson Associates Limited with Tulloch Geomatics Inc. as Ontario Land Surveyor and dated October 4, 2023.
2. That the draft plan of subdivision be signed and sealed by a registered Ontario Land Surveyor.
3. That Parts 4 and 5 on Plan 53R-16172, PIN 73478-1179 be incorporated into Block 4.
4. That this draft approval shall lapse three years from the date on which draft approval is issued.

5. That prior to the signing of the final plan the Planning Services Division shall be advised by the Ontario Land Surveyor responsible for preparation of the final plan that the lot areas, frontages and depths appearing on the final plan do not violate the requirements of the Restricted Area By laws of the municipality in effect at the time such plan is presented for approval to the satisfaction of the Director of Planning Services.
6. That parkland and/or cash-in-lieu of parkland be provided to the City of Greater Sudbury in accordance with section 7.3 of the City's Official Plan and the *Planning Act*, to the satisfaction of the Director of Leisure Services.
7. That the street(s) be named and approved by the municipality and to the satisfaction of the City Solicitor.
8. That any dead ends or open sides of road allowances created by this plan of subdivision shall be terminated in 0.3 metre reserves that are to be conveyed to the municipality and held in trust by the municipality until required for future road allowances or the development of adjacent land and to the satisfaction of the City Solicitor.
9. That the subdivision agreement be registered by the municipality against the land to which it applies prior to any encumbrances and to the satisfaction of the City Solicitor.
10. That such easements as may be required for utility or drainage purposes shall be granted to the appropriate authority to the satisfaction of the City Solicitor.
11. That the owner agrees in writing to satisfy all municipal requirements, financial and otherwise, concerning the provision of roads, walkways, street lighting, sanitary sewers, watermains, storm sewers and surface drainage facilities to the satisfaction of the City Solicitor.
12. That the subdivision agreement contains provisions whereby the owner agrees that all the requirements of the subdivision agreement including installation of required services be completed within three years after registration to the satisfaction of the City Solicitor.
13. That in accordance with Section 59(4) of the Development Charges Act a notice agreement shall be registered on title to ensure that persons who first purchase the subdivided land after registration of the plan of subdivision are informed at the time the land is transferred of all development charges related to development and to the satisfaction of the City Solicitor.
14. The owner shall be responsible to have a Storm Water Management Report prepared to assess how the quality and quantity of storm water will be managed for the subdivision development. The report shall establish how the quantity of storm water generated within the subdivision will be controlled to pre-development levels for both the 1:5, 1:100 and regional storm events. The owner shall be required to submit a comprehensive drainage plan of the subject property. This stormwater management will address the stormwater generated on the road portion of the subdivision. Any lots for industrial development will be required to provide their own on-site stormwater management.
15. Prior to the submission of servicing plans, the owner/applicant shall, to the satisfaction of the Director of Planning Services, provide an updated Geotechnical Report prepared, signed, sealed, and dated by a geotechnical engineer with a valid Certificate of Authorization from the Association of Professional Engineers of Ontario. Said report shall, as a minimum, provide factual information on the soils and groundwater conditions within the proposed development. Also, the report should include design information and recommend construction procedures for any proposed storm and sanitary sewers, stormwater management facilities, watermains, roads to a 20 year design life, the mass filling of land, surface drainage works, erosion control, slope stability, slope treatment and building foundations. The

geotechnical information on building foundations shall be to the satisfaction of the Chief Building Official and Director of Planning Services. Included in this report must be details regarding removal of substandard soils (if any) and placement of engineered fill (if required) for the construction of new homes.

16. Prior to the submission of servicing plans, the owner/applicant shall have a Stormwater Management Report and Plan prepared, signed, sealed, and dated by a professional engineer with a valid Certificate of Authorization from the Association of Professional Engineers of Ontario. Said report shall establish how the quantity and quality of stormwater will be managed both upstream and within the subdivision development and assess the impact of stormwater runoff from this developed subdivision on abutting lands, on the downstream storm sewer outlet systems and on downstream water courses. The report shall deal with the control of both the 1:5, 1:100 and regional storm events, so as to limit the volume of flow generated on the site to pre-development levels. The Regional Storm flow path is to be set out on the plan(s). The report shall set out any necessary improvements to downstream storm sewers and water courses. The civil engineering consultant shall meet with the Development Approvals Section prior to commencing the stormwater management report.
17. The owner/applicant shall be responsible for the design of any required stormwater management facility as part of the servicing plans for the subdivision and the owner/applicant shall provide the lands for the stormwater management facility as a condition of this development.
18. The owner/applicant shall provide Utilities Servicing Plans, designed by a consulting engineer with a valid Certificate of Authorization from the Association of Professional Engineers of Ontario, for the proposed lots, to the satisfaction of the Director of Planning Services. The utilities servicing plan, at a minimum, shall show the location of all utilities including City services, Greater Sudbury Hydro Plus or Hydro One, Bell, Union Gas, Eastlink and Canada Post. This plan must be provided prior to construction of any individual phase. The owner/applicant shall be responsible for all costs associated with the installation of said services.
19. The owner/applicant shall provide, as part of the submission of servicing plans, a Siltation Control Plan detailing the location and types of sediment and erosion control measures to be implemented during each phase of construction. Said plan shall be to the satisfaction of the General Manager of Growth and Infrastructure and the Nickel District Conservation Authority. The siltation control shall remain in place until all disturbed areas have been stabilized. All sediment and erosion control measures shall be inspected daily to ensure that they are functioning properly and are maintained and/or updated as required. If the sediment and erosion control measures are not functioning properly, no further work shall occur until the sediment or erosion problem is addressed.
20. The proposed internal subdivision roadway is to be built to a collector urban standard, including barrier curb and gutters, storm sewers, sidewalk on both sides of the roadway, one lane of travel in each direction, a centre turn lane, and a 2.1 meter wide boulevard, all to the City of Greater Sudbury Engineering Standards at the time of submission.
21. Streetlights for this subdivision will be designed and constructed by Greater Sudbury Hydro Plus Inc. at the cost of the owner/applicant.
22. The owner/applicant shall provide Master Servicing Plans for both the sanitary and storm sewer as well as watermains as they pertain to the new subdivision layout. Said plans are to show general alignment details, number of units and area serviced by individual runs, pipe diameter and flow direction. Said plan shall ensure that pipe diameters and alignments are established in order to support all phases of development.
23. The owner/applicant is to provide proof of sufficient fire flow in conjunction with the submission of construction drawings for each phase of construction to the satisfaction of the General Manager of



Growth and Infrastructure Services. All costs associated with upgrading the existing distribution system to service this subdivision will be borne totally by the owner/applicant.

24. The owner/applicant is to provide proof of sufficient sanitary sewer capacity in conjunction with the submission of construction drawings for each phase of construction to the satisfaction of the General Manager of Growth and Infrastructure Services. All costs associated with upgrading the existing collection system and/or sewage lift stations to service this subdivision will be borne totally by the owner/applicant.
25. The owner will be required to ensure that the corner radius for all intersecting streets is to be 9.0 m.
26. The owner agrees to provide the required soils report, stormwater, water, sanitary sewer and plans to the Director of Planning Services prior to or concurrently with the submission of servicing plans for the first phase of the subdivision.
27. Draft approval does not guarantee an allocation of sewer or water capacity. Prior to the signing of the final plan, the Director of Planning Services is to be advised by the General Manager of Growth and Infrastructure, that sufficient sewage treatment capacity and water capacity exists to service the development.
28. Final approval for registration may be issued in phases to the satisfaction of the Director of Planning Services, provided that:
  - a. Phasing is proposed in an orderly progression, in consideration of such matters as the timing of road improvements, infrastructure and other essential services; and,
  - b. All agencies agree to registration by phases and provide clearances, as required, for each phase proposed for registration; furthermore, the required clearances may relate to lands not located within the phase sought to be registered.
29. That the owner/applicant shall have completed all major outstanding infrastructure deficiencies that are critical to the overall function of the subdivision in previous phases of the plan that have been registered, or have made arrangements for their completion, prior to registering a new phase of the plan, to the satisfaction of the General Manager of Growth and Infrastructure Services.
30. A stormwater management report and associated plans must be submitted by the Owner's Consulting Engineer to the satisfaction of the General Manager of Growth and Infrastructure. The storm-water management report must address the following requirements:
  - a. The underground storm sewer system within the plan of subdivision must be designed to accommodate and/or convey the minor storm flow, that is, the rainfall runoff resulting from the subject site and any external tributary areas using the City's 2 year design storm. The permissible minor storm discharge from the subject development must be limited to the existing pre-development site runoff resulting from a 2 year design storm. Any resulting post development runoff in excess of this permissible discharge rate must be controlled and detained within the plan of subdivision;
  - b. The overland flow system within the plan of subdivision must be designed to accommodate and/or convey the major storm flow, that is, the rainfall runoff resulting from the subject site and any external tributary areas using the City's 100 year design storm or Regional storm event, whichever is greater, without causing damage to proposed and adjacent public and private properties. The permissible major storm discharge from the subject development must be limited to the existing pre-development runoff resulting from a 100 year design storm or Regional storm

event, whichever is greater. Any resulting post development runoff in excess of this permissible discharge rate must be controlled and detained within the plan of subdivision;

- c. "Enhanced" level must be used for the design of stormwater quality controls as defined by the Ministry of the Environment, Conservation and Parks;
  - d. The lands are located within the Algonquin Road watershed. Stormwater management must follow stormwater management approach as per direction of the General Manager of Growth and Infrastructure.
  - e. The drainage catchment boundary including external tributary catchments and their respective area must be clearly indicated with any stormwater management plan;
  - f. The final grading of the lands shall be such that the surface water originating on or tributary to the said lands, including roof water from buildings and surface water from paved areas, will be discharged in a manner satisfactory to the General Manager of Growth and Infrastructure;
  - g. Minor storm drainage from the plan of subdivision shall not be drained overland onto adjacent properties; and,
  - h. Existing drainage patterns on adjacent properties shall not be altered unless explicit permission is granted.
31. The owner shall be responsible for the design and construction of any required stormwater management works to the satisfaction of the General Manager of Growth and Infrastructure as part of the servicing plans for the subdivision and the owner shall dedicate the lands for stormwater management works as a condition of this development.
32. The owner acknowledge that a Traffic Impact Study(ies) will be required for any future development to the satisfaction of the General Manager of Growth and Infrastructure.
33. The applicant shall, to the satisfaction of the General Manager of Growth and Infrastructure, provide a soils report prepared by a geotechnical engineer licensed in the Province of Ontario.
- Said report shall, as a minimum, provide factual information on the soils and groundwater conditions within the proposed development. Also, the report should include design information and recommended construction procedures for the following items: storm and sanitary sewers, watermain, roads the mass filling of land, surface drainage works including erosion control, slope stability (if applicable) and building foundations. The geotechnical information on building foundations shall be to the satisfaction of the Chief Building Official. A soils caution agreement, if required, shall be registered on title to the satisfaction of the Chief Building Official and City Solicitor. The owner shall be responsible for the legal costs of preparing and registering the agreement.
34. The applicant shall provide proof of sufficient fire flow capacity in conjunction with the submission of construction drawings for each phase of construction.
35. The development shall require a Subdivision Agreement and during that process, based on anticipated quantities of removal of rock through blasting, the following conditions will be imposed.
- a. The owner/developer will be required to provide a geotechnical report on how the work related to blasting shall be undertaken safely to protect adjoining structures and other infrastructure. The geotechnical report shall be undertaken by a blasting consultant defined as a professional

engineer licensed in the Province of Ontario with a minimum of five (5) years experience related to blasting.

- b. The blasting consultant shall be retained by the developer and shall be independent of the contractor and any subcontractor doing blasting work. The blasting consultant shall be required to complete specified monitoring recommended in the report of vibration levels and provide a report detailing those recorded vibration levels. Copies of the recorded ground vibration documents shall be provided to the contractor and contract administration weekly or upon request for this specific project.
- c. The geotechnical report will provide recommendations and specifications on the following activity as a minimum but not limited to:
  - Pre-blast survey of surface structures and infrastructure within affected area;
  - Trial blast activities;
  - Procedures during blasting;
  - Procedures for addressing blasting damage complaints;
  - Blast notification mechanism to adjoining residences; and,
  - Structural stability of exposed rock faces.
- d. The above report shall be submitted for review to the satisfaction of the Chief Building Official prior to the commencement of any removal of rock by blasting.
- e. Should the owner/developer's schedule require to commence blasting and rock removal prior to the Subdivision Agreement having been signed, a site alteration permit shall be required under the City of Greater Sudbury's By-law #2099-170 and shall require a similar geotechnical report as a minimum prior to its issuance.
- f. The geotechnical engineer will be required to address the On-site and Excess Soil Management in accordance with Ontario Regulation 406/19 under jurisdiction of Environmental Protection Act, R.S.O. 1990, c. E.19.

36. The Owner acknowledges and agrees to convey any easement(s) as deemed necessary by Bell Canada to service this new development. The Owner further agrees and acknowledges to convey such easements at no cost to Bell Canada.

37. The Owner agrees that should any conflict arise with existing Bell Canada facilities where a current and valid easement exists within the subject area, the Owner shall be responsible for the relocation of any such facilities or easements at their own cost.

38. The owner/developer must transfer a three metre (3m) wide easement, to be registered on title to the subject property, to Greater Sudbury Hydro Inc. for that portion of the residential subdivision that fronts on any existing or proposed road allowances. The owner/developer must transfer a four metre (4m) wide easement, to be registered on title to the subject property, to Greater Sudbury Hydro Inc. for that portion of the industrial subdivision that fronts on any existing or proposed road allowances. The Owner/Developer will be responsible for all legal and survey costs associated with this. The owner/developer is also responsible for obtaining/providing a Postponement in favour of Greater Sudbury Hydro Inc's interest with respect to any and all existing Charge/Mortgage/Lien and/or Encumbrance of Land registered on title to this property. The Owner/Development will be responsible for all costs associated with obtaining said Postponement.

39. The Owner provides to Enbridge the necessary easements and/or agreements required by Enbridge for the provision of gas services for this project, in a form satisfactory to Enbridge Gas Inc.
40. The owner shall provide a geotechnical report prepared, sealed, signed, and dated by a geotechnical engineer licensed in the Province of Ontario that considers and addresses soil stability in the areas of historical wetlands.
41. The owner shall develop a Stormwater Management Report and plan prepared, sealed, signed, and dated by a professional engineer licensed in the Province of Ontario. The stormwater management report must consider the wetland areas in the hydrologic model of pre-development conditions. Should the stormwater system discharge to a natural receiver, the hydrologic model must consider the greater of the peak flows generated from 100 year and Timmins Storm events.

## **Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans**

The application for Plan of Subdivision is an operational matter under the Planning Act to which the City is responding. The application contributes to the 2019-2027 City of Greater Sudbury Strategic Plan goals related to housing by adding to the housing available in this area. The application aligns with the Community Energy and Emissions Plan (CEEP) by supporting the strategy of compact, complete communities.

## **Financial Implications**

This report has no financial implications.

## **Report Overview**

An application for a plan of subdivision has been submitted in order to permit the creation of four blocks, consistent with the existing zoning. Block 1 is for medium residential, Block 2 is for stormwater purposes, and Blocks 3 & 4 are for industrial uses. The subject land is designated Mixed Use Commercial in the Official Plan. The zoning is in place to support the uses: Block 1 is zoned "R3(36)", Medium Density Residential Special while Blocks 2, and 4 are zoned "M2", Light Industrial, while Block 3 is zoned "M1", Mixed Light Industrial/Service Commercial and "M2", Light Industrial all pursuant to the City's Zoning By-law 2010-100Z.

Staff recommends approval of the application, with the appropriate conditions of approval included in the resolution section, on the basis that it is consistent with the Provincial Policy Statement, 2020, conforms to the Growth Plan for Northern Ontario, 2011, the Official Plan for the City of Greater Sudbury, has regard for matters of provincial interest and represents good planning.

# Staff Report

## Proposal

The application is for plan of a subdivision on the parcel of land legally described as PINs 73478-1049, 73475-1506, 73478-1179, and 73475-1240, Part of Part 2, Plan 53R-12196, Parts 8-11, Plan 53R-16629, Parts 3, 5-7, Plan 53R-17925, Parts 5-8, Plan 53R-19303, Part 2, Plan 53R-19410 and Parts 1-2, Plan 53R-19563, Concession 6, Township of Broder and seeks to create four blocks and one road to permit the uses of the existing zoning. The proposed subdivision would allow for the extension of Remington Road to Algonquin Road.

In support of the proposed plan of subdivision, the following has been submitted by the proponent:

- Draft Plan of Subdivision prepared by R.V. Anderson Associates Ltd. and Tulloch Geomatics Inc., dated October 4, 2023;
- Water and Wastewater Capacity Analysis prepared by R.V. Anderson Associates Ltd., completed December 15, 2023; and,
- Updated Letter of Opinion for Species at Risk prepared by FRi Ecological Services, completed December 11, 2023.

## Location and Site Description

The subject lands are located between Regent Street to the east and Algonquin Road to the west, with frontage along Regent Street and Remington Road. The area has a mix of uses, with commercial and industrial uses to the north and residential uses to the south.

The subject lands have a total lot area of approximately 20.69 hectares. The lands are currently vacant, and the proposed blocks would be accessed via the extension of Remington Road that is proposed to bisect the lands. Municipal water and sanitary services exist in the area and would need to be extended through Remington Road to service the proposed blocks. There are City transit stops along Algonquin Road and Regent Street.

## Surrounding Land Uses:

North: A mix of commercial and industrial uses.

East: A mix of commercial and industrial uses.

South: Low and medium density residential uses.

West: A mix of low and medium density residential, industrial, and institutional uses.

The location map indicates the location of the proposed plan of subdivision and the zoning in the immediate area.

Staff conducted a site visit on March 20, 2024. Site photos show the subject lands, as well as the adjacent residential and industrial development.

## Public Consultation:

The statutory Notice of Application was provided to the public by newspaper and to nearby landowners and tenants located within 120 m (400 ft) of the subject lands on February 7, 2024. The statutory Notice of Public Hearing dated April 4, 2024 was provided to the public by newspaper and to nearby landowners and tenants located within 120 m (400 ft) of the subject lands.

At the time of writing this report, staff has not received any comments from members of the public.



## **POLICY AND REGULATORY FRAMEWORK**

The property is subject to the following policy and regulatory framework:

- [2020 Provincial Policy Statement \(PPS\)](#);
- [2011 Growth Plan for Northern Ontario](#);
- [Official Plan for the City of Greater Sudbury](#); and,
- [Zoning By-law 2010-100Z](#).

The PPS and the Growth Plan for Northern Ontario, along with the City's Official Plan, provide a policy framework for land use planning and development in the City of Greater Sudbury. This framework is implemented through a range of land use planning controls such as, but not limited to, zoning by-laws, plans of subdivision, and site plans.

### **Provincial Policy Statement, 2020 (PPS)**

Municipalities in the Province of Ontario are required under Section 3 of the *Planning Act* to ensure that decisions affecting planning matters are consistent with the 2020 PPS. The following PPS policies are pertinent to the application for Plan of Subdivision:

Policy 1.1.3.1 outlines that settlement areas shall be the focus of growth and development.

Policy 1.1.3.2 identifies that land use patterns within settlement areas shall have a mix of densities and land uses that efficiently use land and resources, are appropriate for and efficiently use the infrastructure and public service facilities which are planned or available and avoid the need for their unjustified and/or uneconomical expansion, minimize negative impacts to air quality and climate change and promote energy efficiency, prepare for the impacts of a changing climate, are supportive of active transportation, are transit-supportive where transit is planned, exists or may be developed, and are freight-supportive.

Policy 1.1.3.6 requires that new development taking place in designated growth areas should occur adjacent to the existing built-up area and should have a compact form, mix of uses and densities that allow for the efficient use of land, infrastructure and public service facilities.

Section 1.4.3 outlines that municipalities shall provide for an appropriate range and mix of housing options and densities to meet projected market-based and affordable housing needs of current and future residents by:

- a) Permitting and facilitating all housing options required to meet the social, health, economic and well-being requirements of current and future residents, including special needs requirements and needs arising from demographic changes and employment opportunities; and,
- b) Directing the development of new housing towards locations where appropriate levels of infrastructure and public service facilities are or will be available to support current and projected needs.

### **Growth Plan for Northern Ontario**

Municipalities in the Province of Ontario are required under Section 3 of the *Planning Act* to ensure that decisions affecting planning matters conform with the Growth Plan for Northern Ontario. There are no policies that are relevant to this application, therefore the application does not conflict with the Growth Plan.

### **Official Plan for the City of Greater Sudbury**

The subject lands are designated Mixed Use Commercial in the Official Plan for the City of Greater Sudbury. Given that the zoning is in effect for the area and this proposed plan of subdivision is meant to implement the zoning, the focus of relevant policies of the Official Plan are found in section 19.

Schedule 3 – Settlement Area and Built Boundary of the Official Plan shows that the subject lands are within an identified Settlement Area but situated outside of the City's Built Boundary. Section 2.3.2 identifies that Settlement Area land use patterns are to be based on densities and land uses that make the most efficient use of land, resources, infrastructure and public service facilities, minimize negative impacts on air quality and climate change, promote energy efficiency and support public transit, active transportation and the efficient movement of goods. Intensification and development within the Built Boundary are to be encouraged, while development outside of the Built Boundary may be considered in accordance with the policies of the Official Plan.

Policy 7.3.1.7 of the Official Plan requires the dedication of parkland consistent with the Planning Act.

Section 19 requires that plans of subdivision have regard for conformity with the Official Plan and matters of Provincial interest as noted in the Planning Act.

### **Zoning By-law 2010-100Z**

The subject lands have already been zoned to permit the proposed development. Block 1 is zoned "R3(36)", Medium Density Residential Special while Blocks 2, and 4 are zoned "M2", Light Industrial, while Block 3 is zoned "M1", Mixed Light Industrial/Service Commercial and "M2", Light Industrial all pursuant to the City's Zoning By-law 2010-100Z.

It is important to note that Block 2 is intended for stormwater management purposes only and will not contain industrial uses. It is also noted that this lot is undersized per the "M2", Light Industrial standards which requires a minimum lot area of 1,500 square metres, while only 1,224 square metres are provided. However, 4.40.1b) of Zoning By-law 2010-100Z notes that nothing in the by-law shall prevent or otherwise restrict in any way the installation or maintenance of a stormwater management pond. Therefore, so long as Block 2 is utilized as a stormwater management block it is deemed to comply with Zoning By-law 2010-100Z.

### **Site Plan Control**

Site Plan Control is required for the further development of Blocks 1, 3, and 4.

### **Department/Agency Review**

The application, including relevant accompanying materials, has been circulated to all appropriate agencies and departments. Responses received from agencies and departments have been used to assist in evaluating the application.

During the review of the proposal, comments provided by circulated agencies and departments included the following:

Development Engineering notes that both water and wastewater connections will be required to be made from both the east end and west end of the proposed Remington Road to the existing City system. The water and wastewater analysis showed that there are sufficient capacities for development provided that the watermain is looped through from Regent Street to Algonquin Road and that through the design of the subdivision, the wastewater will need to have more of the quantity flow eastward to the system on Regent Street. This is due to some constraints on Algonquin Road with regards to providing capacity for the proposed quantity. Conditions of approval have been provided.

Building Services indicated that they do not oppose the approval of the draft plan of subdivision and have provided conditions of approval.

Roads, being part of Infrastructure Capital Planning, has indicated that the design Remington Road must be constructed to a collector standard. Conditions of approval have been provided.

Conservation Sudbury has indicated that they do not oppose the draft plan of subdivision and have provided conditions of approval.

Bell Canada has indicated that they do not oppose the draft plan of subdivision and have provided conditions of approval.

Greater Sudbury Hydro has indicated that they do not oppose the draft plan of subdivision and have provided conditions of approval.

Strategic and Environmental Planning do not oppose the application. However, they advise that the owner is solely responsible for ensuring that vegetation removal, site alteration, and development undertaken on the subject lands do not result in a contravention of the provincial Endangered Species Act and the federal Migratory Birds Convention Act.

## **PLANNING ANALYSIS**

Planning staff circulated the development application to internal departments and external agencies. The PPS (2020), the Growth Plan (2011), and Greater Sudbury Official Plan, and other relevant policies and supporting guidelines were reviewed in their entirety. The following section provides a planning analysis of the application in respect of the applicable policies, including issues raised through agency circulation.

The application is consistent with both the PPS and Official Plan direction to direct development to fully serviced settlement areas to make the most efficient use of land, resources, infrastructure and public service facilities, minimize negative impacts on air quality and climate change, promote energy efficiency and support public transit, active transportation and the efficient movement of goods. Full municipal services with adequate capacity will be included in Remington Road, and public transit stops are available along Regent Street and Algonquin Road. Employment opportunities, commercial areas, and community services are all available on-site or in close proximity.

The PPS encourage municipalities to provide a range and mix of housing types and densities. The Official Plan identifies a key housing goal is to encourage a greater mix of housing types and tenure. The proposal will include medium density dwellings within Block 1 and represents an increase in housing options in the City.

With regards to parkland, the proponent will be required to supply parkland or provide cash-in-lieu, to the satisfaction of the City of Greater Sudbury, consistent with 7.3.1.7 of the Official Plan.

Finally, the proposal is an implementation of the existing zoning on the subject lands which would have been carefully reviewed for compliance against the relevant policies of the Official Plan and matters of Provincial interest. As such, staff is of the opinion that the proposed plan of subdivision is compliant with the policies of section 19 of the Official Plan.

### **Conclusion:**

Staff has reviewed the development proposal and is satisfied that it conforms with the Official Plan for the City of Greater Sudbury. The development proposal is also generally consistent with the land use planning policy directions identified in the PPS. Staff also notes that the development proposal conforms to and does not conflict with the Growth Plan for Northern Ontario.

Should the subdivision application be approved, the City's Delegated Official will also proceed to issue draft plan approval on the lands. The draft plan approval conditions would then need to be cleared by the owner prior to the registration of any lots and/or phases within the subdivision.

The Planning Services Division therefore recommends that the application for Plan of Subdivision be approved in accordance with the Resolution section of this report.

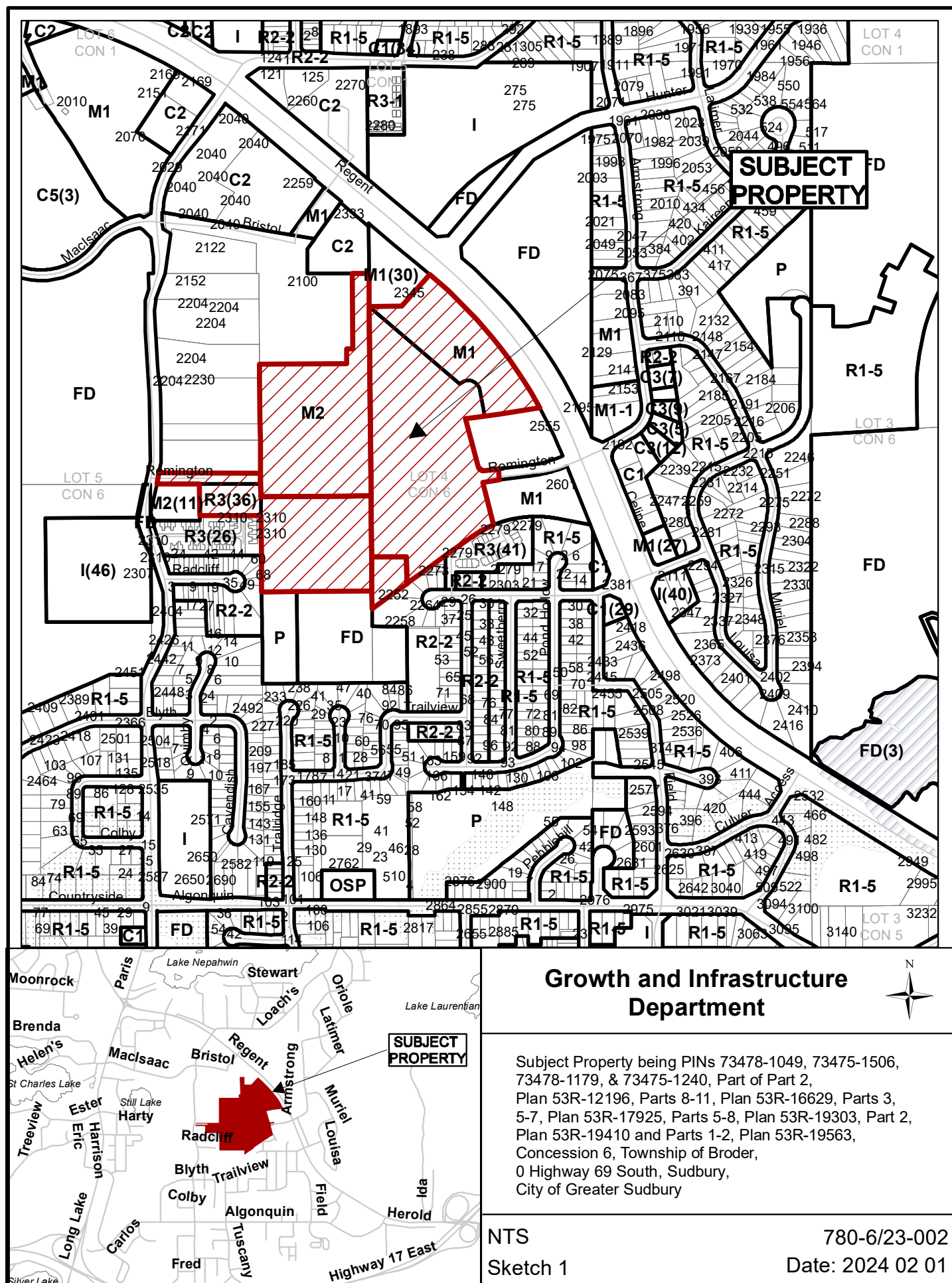




Photo 1: Remington Road Subdivision

View of the subject parcel near Regent Street looking south

File: 780-6/23002 Photography: March 20, 2024





Photo 2: Remington Road Subdivision

View of the subject parcel near Regent Street looking east toward Remington Road

File: 780-6/23002 Photography: March 20, 2024



Photo 3: Remington Road Subdivision

View of the subject parcel near Regent Street looking east toward west

File: 780-6/23002 Photography: March 20, 2024





Photo 4: Remington Road Subdivision

View of the entrance to the subject lands from Algonquin Road

File: 780-6/23002 Photography: March 20, 2024



Photo 5: Remington Road Subdivision

View of the subject lands near Algonquin Road looking southeast

File: 780-6/23002 Photography: March 20, 2024





Photo 6: Remington Road Subdivision

View of the subject lands near Algonquin Road looking west

File: 780-6/23002 Photography: March 20, 2024



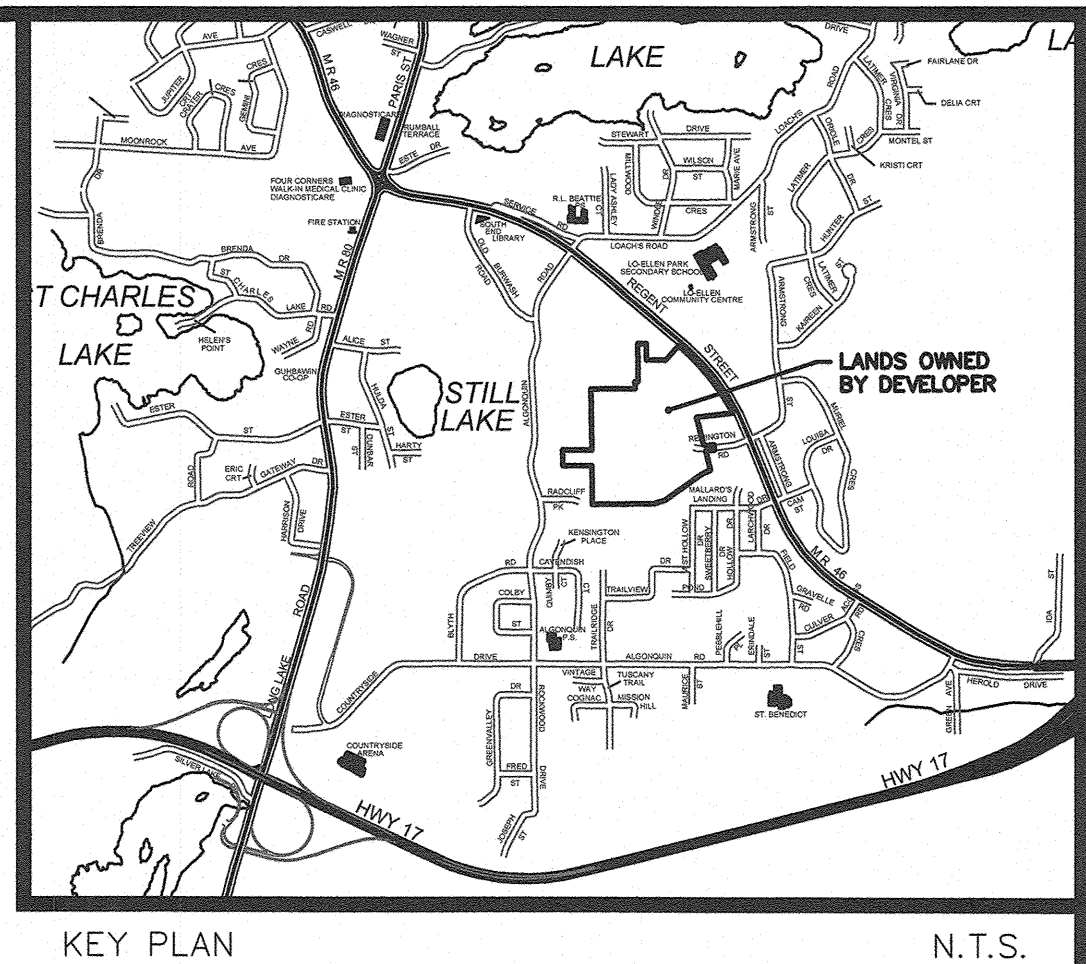
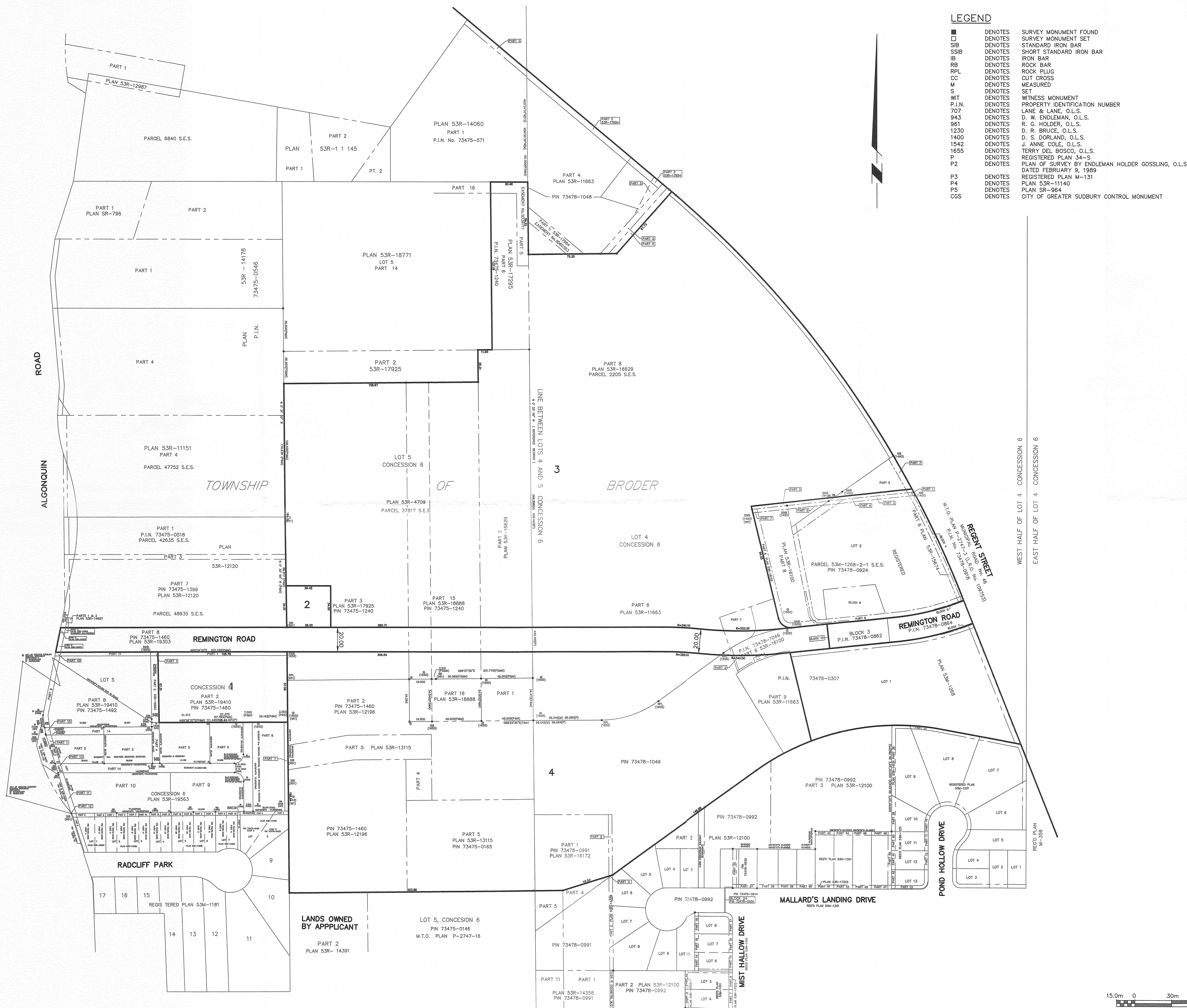


Photo 7: Remington Road Subdivision

View of the subject lands near Algonquin Road looking north

File: 780-6/23002 Photography: March 20, 2024





**DRAFT PLAN**  
OF PROPOSED SUBDIVISION OF  
PIN 73478-1049, PIN 73475-1506, PIN 73478-1179,  
PIN 73475-1240, PIN 73475-0518  
**PART OF LOTS 4 & 5 CONCESSION 6**  
**GEOGRAPHIC TOWNSHIP OF BRODER**  
**CITY OF GREATER SUDBURY**  
  
SCALE 1:1500

**OWNER**  
DALRON CONSTRUCTION LIMITED  
RON ARNOLD, PRESIDENT  
130 ELM STREET  
SUDBURY, ONTARIO  
P3C 1T6

**OWNER'S CERTIFICATE**  
I HEREBY APPROVE OF THE MANNER IN WHICH THE LAND SHOWN ON THIS  
PLAN IS PROPOSED TO BE SUBDIVIDED AND REQUEST THE APPROVAL OF  
THE CITY OF GREATER SUDBURY.

DATE                      KRISTI ARNOLD - DALRON CONSTRUCTION LIMITED

PREPARED BY  
R.V. ANDERSON ASSOCIATES LIMITED  
436 WESTMOUNT AVENUE  
SUDBURY, ONTARIO  
P3A 5Z8

ONTARIO LAND SURVEYOR  
TULLOCH GEOMATICS INC.  
1942 REGENT STREET A  
SUDBURY, ONTARIO  
P3E 5V5

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN ON THIS PLAN.

DATE \_\_\_\_\_ TERRY DEL BOSCO, ONTARIO LAND SURVEYOR

## ADDITIONAL INFORMATION

AS REQUIRED BY SECTION 51(17) OF THE PLANNING ACT

- A) AS SHOWN
- B) AS SHOWN
- C) AS SHOWN
- D) LOT 1: MULTI-RESIDENTIAL (R3)  
LOT 2: STORMWATER MANAGEMENT
- E) LOTS 3 AND 4: LIGHT INDUSTRIAL (M2)  
NORTH - COMMERCIAL, LIGHT INDUSTRIAL  
SOUTH - MEDIUM DENSITY (R3-1), LOW DENSITY RESIDENTIAL TWO (R2-2), PARKLAND & FUTURE DEVELOPMENT  
EAST - MIXED LIGHT INDUSTRIAL/SERVICE COMMERCIAL (M1), GENERAL COMMERCIAL (C2)  
WEST - MEDIUM DENSITY (R3-1), LOW DENSITY RESIDENTIAL TWO (R2-2), INSTITUTIONAL (I) & FUTURE DEVELOPMENT
- F) DIMENSIONS OF PROPOSED PROPERTIES AS SHOWN
- G) ARTIFICIAL FEATURES AS SHOWN
- H) WATER FROM EXISTING MUNICIPAL SUPPLY
- I) GENERALLY SHALLOW OVERBURDEN OVER BEDROCK
- J) CONTOURS AS SHOWN
- K) MUNICIPAL SERVICES TO BE AVAILABLE, INCLUDES WATER, SEWER, HYDRO, BELL, GAS, GARBAGE COLLECTION, POLICE, FIRE, AMBULANCE
- L) AS SHOWN

NOTE: RADIAL DISTANCES AT 6m SETBACK ARE CHORD DISTANCES, UNLESS OTHERWISE NOTED.

AREA OF APPLICATION = 20.69 ha.

**TULLOCH**

1942 REGENT STREET  
UNIT L P3E 5V5

SUDBURY, ONTARIO  
705-671-2295

PREPARED BY TDB



R.V. Anderson Associates Limited  
436 Westmount Avenue, Unit 6  
Sudbury ON P3A 5Z8 Canada  
T 705 560 5555 F 855 833 4022  
rvanderson.com



RVA 236856

December 15, 2023

City of Greater Sudbury  
P.O. Box 5000, Station A  
Sudbury, ON  
P3A 5P3

**Attention:** Linda Harnish

Dear Linda:

Re: Dalron-Remington Commercial  
Sewer/ Water Capacity Request

RVA and Dalron are planning to proceed with the development of the M2 zoned lands between Algonquin and Regent Street with the master planned Remington Road.

RVA has reviewed the master servicing for the site and are proposing to drain approximately two thirds of the land's sanitary sewer flow to Algonquin and one third of the land's sanitary sewer flow to Regent Street. At this time, the specific land use is unknown, therefore RVA based the sanitary sewer flows on the City of Greater Sudbury and MCEP Design Manual Section 2.1.4 which notes that "where industrial flows are unavailable, an average flow of 0.2 - 0.5 L/s/ha can be used". RVA has presented a range of flows into each sewer for the City's capacity review.

We are proposing connecting the westerly development sewage flow to an existing sanitary manhole located on Algonquin Road, structure SAN MH 3-207. We have calculated the flow generated by the overall development to be within the range of 12 L/s – 14.3 L/s, which includes infiltration. We are proposing a second sewage flow from the development easterly lands to an existing manhole located on Regent Street, SAN MH 3-295. We have calculated a flow generated by the overall development to be within the range of 2.5 L/s – 4.3 L/s, which includes infiltration.

RVA is requesting the City confirm if there is sufficient capacity in the existing downstream sanitary sewer systems to handle this additional flow. If not, could we get a list of the infrastructure that would require upgrading to accommodate growth in the area. Since there has been a range given, It would also be helpful to identify if there is a point within the provided range that triggers the downstream upgrades, to assist Dalron in evaluating the project.

Additionally, RVA is requesting the City provide information on the water capacity at Valve 3-006 (Algonquin) and Valve 3-159 (Regent). The project would involve connecting these two lines together, creating a loop. RVA asks the City to also review the impacts of this looping.



If there are any questions or comments, we would be happy to discuss them.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**



Digitally signed by Andrea Penny, P.Eng.,  
M.A.Sc.,  
DN: cn=Andrea Penny, P.Eng., M.A.Sc.,  
c=CA, o=R.V. Anderson Associates Limited,  
ou=Sturby Office,  
email=apenny@rvanderson.com  
Reason: I am the author of this document  
Date: 2023.12.15 09:22:17 -05'00'

Andrea Penny, P.Eng., M.A.Sc., ENV SP  
Associate/ Project Manager

Encls.

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To: Kristi Arnold, Dalron Construction Ltd.

From: Rebecca Geauvreau, FRi Ecological Services

December 11, 2023

Re: Remington Arms; Eastern Whip-poor-will (*Antrostomus vociferus*) Habitat, Updated Opinion, Part of Lot 4, Concession 6, Geographic Township of Broder, City of Greater Sudbury

FRi Ecological Services was retained to provide an updated opinion on the presence of and potential for Eastern Whip-poor-will and habitat for a property in the City of Greater Sudbury known as Remington Arms. The subject property is accessed by Regent Street (Regional Road 46) to the east and Algonquin Road to the west.

To provide an informed, updated opinion on the potential presence of whip-poor-wills on the subject property, FRi reviewed previous original work and all available background information. This included a search of the NHIC database for the overlapping 1km square, iNaturalist and eBird. None of these databases return a confirmed presence result for Eastern Whip-poor-will for the Remington Arms property.

FRi completed Eastern Whip-poor-will surveys on the subject property in May, June and July 2014 and additional work in 2016, following the approved draft survey protocol at that time.<sup>1</sup> The survey protocol was in draft form in 2014; presently, the same draft protocol provides the most up-to-date direction.<sup>2</sup> Despite appropriate survey conditions, no whip-poor-wills were heard or observed during the night surveys. Whip-poor-wills were heard on the same survey nights at other locations in the City of Greater Sudbury, further confirming the absence of breeding whip-poor-wills on the subject property.

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<sup>1</sup> Ontario Ministry of Natural Resources. Draft Survey Protocol for Eastern Whip-poor-will (*Camprimulgus vociferus*) in Ontario. 2012.

<sup>2</sup> Ontario Ministry of Natural Resources. Species at Risk Branch. Survey Protocol for Eastern Whip-poor-will (*Camprimulgus vociferus*). 2013.

The subject property offers a few small areas of potentially suitable habitat for Eastern Whip-poor-will, but they are not large enough to support a single territory, nor do they provide a suitable mosaic of open and semi-open habitat that is preferred. Generally, it is too heavily vegetated with both ground and overhead cover to provide the open and semi-open habitats preferred by whip-poor-wills.

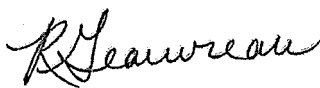
The areas to the north, south, east and west of the subject property are built up with a mix of commercial, industrial and residential developments. This disconnection from other undeveloped habitats further supports the assumption that breeding whip-poor-wills are absent.

Considering the available information, including appropriately completed surveys (2014), updated absence information (NHIC, iNaturalist and eBird) and professional experience and knowledge of the site, it is our opinion that a confirmation of probable absence of breeding whip-poor-wills on the subject property is supported.

It is our opinion that the Remington Arms property does not support breeding Eastern whip-poor-wills and any proposed development at this site will not affect whip-poor-wills or their habitat. Based on the noted sources, the site does not support protected habitat for Eastern whip-poor-will as described under the *Endangered Species Act*, 2007.

I trust this addresses any questions or concerns respecting Eastern whip-poor-will and compliance with the Endangered Species Act.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'R. Geauvreau', written in a cursive style.

Rebecca Geauvreau  
Species at Risk Biologist

## 1876,1882, 1890, Bancroft Drive, Sudbury

Presented To:	Planning Committee
Meeting Date:	April 29, 2024
Type:	Public Hearing
Prepared by:	Eric Taylor Planning Services
Recommended by:	General Manager of Growth and Infrastructure
File Number:	751-6/22-12

## Report Summary

This report provides a recommendation regarding an application for rezoning to “R3(S)” Medium Density Residential Special, to permit forty row dwelling units.

This report is presented by Stephanie Poirier, Senior Planner.

- Letter(s) of concern by a concerned citizen(s) has been received.

## Resolution

THAT the City of Greater Sudbury approves the application by 2828566 Ontario Inc. and Barron West Inc. to amend By-law 2010-100Z by changing the zoning classification from “R1” Low Density Residential One and R2-2 Low Density Residential Two to “R3(S)”, Medium Density Residential Special, on lands described as Part of PINs 73578-0065 and 73578-0273 and PIN 73578-0577, Parcels 14730 & 8651, Part 1, Plan 53R-4659, Lot 12, Concession 3, Township of Neelon, as outlined in the report entitled “1876, 1882 and 1890 Bancroft Drive, Sudbury”, from the General Manager of Growth and Infrastructure, presented at the Planning Committee meeting on April 29, 2024, subject to the following conditions:

1. That prior to the enactment of the amending zoning by-law the owner shall submit a registered survey plan describing the lands to be rezoned to the satisfaction of the Director of Planning Services;
2. That the amending zoning by-law include the following site-specific provisions:
  - a. That the only permitted use shall be row dwellings with a maximum of 40 dwelling units;
  - b. That a minimum lot frontage of 13.5 m shall be permitted;
  - c. That planting strips shall only be required along that portion of the westerly interior lot line of the subject lands abutting Parcel 6853, Lot 12, Concession 3, Township of Neelon and shall only be required along that portion of the easterly interior lot line of the subject lands abutting the retained portions of Parcels 14730 and 8651.
3. That conditional approval shall lapse on April 30, 2026, unless Condition #1 above has been met or an extension has been granted by Council.

## **Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans**

The application to amend the Zoning By-law is an operational matter under the Planning Act to which the City is responding. The application contributes to the 2019-2027 City of Greater Sudbury Strategic Plan goals related to housing by adding to the range and mix of housing available in this area. The application aligns with the Community Energy and Emissions Plan by supporting the strategy of creating compact, complete communities.

## **Financial Implications**

If approved, staff estimates approximately \$165,000 in taxation revenue, based on the assumption of 40 row dwelling units based on an estimated assessed value of \$275,000 at the 2023 property tax rates.

If there is additional taxation revenue, it will only occur in the supplemental tax year. Any taxation revenue generated from new development is part of the supplemental taxation in its first year. Therefore, the City does not receive additional taxation revenue in future years from new development, as the tax levy amount to be collected as determined from the budget process, is spread out over all properties within the City.

The amount of development charges will be based on final review of the property by the Building Services department.

## **Report Overview:**

An application for rezoning has been submitted to permit forty row dwelling units. The subject lands are designated as Living Area 1 in the Official Plan and are currently zoned "R1-5" Low Density Residential One and R2-2 Low Density Residential Two.

Staff recommends approval of the application as described in the Resolution section on the basis that it is consistent with the Provincial Policy Statement, conforms to the Growth Plan for Northern Ontario, the Official Plan for the City of Greater Sudbury, has regard for matters of provincial interest and represents good planning.



# Staff Report

## Proposal:

The application proposes to amend By-law 2010-100Z being the Zoning By-law for the City of Greater Sudbury to permit forty row dwelling units to the north side of Bancroft Drive, in Sudbury.

The applicant's concept plan illustrates the proposed row dwellings, parking spaces, driveway, and landscaping areas.

## **Existing Zoning:** "R1-5", Low Density Residential One and "R2-2", Low Density Residential Two

The R1-5 zone permits a single detached dwelling, a home daycare, group home (type 1), and a bed and breakfast establishment. The R2-2 Zone permits all of the uses in the R1-5 zone plus semi-detached and duplex dwellings.

## **Requested Zoning:** R3(S), Medium Density Residential Special

The R3 zone permits all the uses in the R2-2 zone, as well as a multiple dwelling, row dwelling, and street townhouse dwelling units. The R3 zone requires a minimum of 150 m<sup>2</sup> lot area/unit, minimum lot frontage of 18 m, minimum front yard of 6 m, minimum rear yard of 7.5 m and maximum lot coverage of 40 percent, minimum landscaped open space of 30 percent and maximum building height of 11 m. A minimum privacy yard depth of 7.5 m is also required abutting the full length of at least one exterior wall of each unit.

Through City staff's review of the application, it has been determined that site specific relief is required for a minimum lot frontage of 13.5 m whereas the Zoning By-law requires a minimum of 18 m frontage in the R3 Zone. An exception to the planting strip requirements of the Zoning By-law is also discussed in this report and is included in the resolution section of the report.

## **Location and Site Description:**

The subject properties are described as Part of PINs 73578-0065 and 73578-0273 and PIN 73578-0577, Parcels 14730 & 8651, Part 1, Plan 53R-4659, Lot 12, Concession 3, Township of Neelon,

The subject lands are located within the Ramsey Lake watershed and comprised of all of property at 1876 Bancroft Drive and most of the properties at 1882 and 1890 Bancroft Drive. The property at 1876 Bancroft Drive is currently vacant. The southerly portions of the properties at 1882 and 1890 Bancroft Drive comprise the retained lots in consent applications B0008/2023 and B0007/2023 and are to remain as separate lots with the current R2-2 and R1-5 zoning. The combined area of the land to be rezoned comprises approximately 1.79 ha (4.4 acres) with approximately 13.8 m (45.5 ft) of frontage on the north side of Bancroft Drive. The subject lands generally slope down from north to south. A small wetland, (less than 0.03 ha) is located in the northwest corner of the property. A small existing drainage feature traverses the middle and southerly portions of the site exiting onto the property to the east where the feature enters into the drainage system on the north side of Bancroft Drive. Sanitary sewers and municipal water are present on Bancroft Drive.

GOVA Transit Route 10 Minnow Lake, is located along Bancroft Drive with the nearest transit stop located approximately 40 m to the west of the subject lands on the north side of Bancroft Drive. GOVA Transit Route 10 provides a direct connection to the downtown transit hub.

### **Surrounding Land Uses:**

The area surrounding the site comprise a mix of land uses including low density residential uses, vacant treed lands to the east and north and residential and institutional uses to the south.

North: vacant lands zoned “FD” Future Development

East: vacant lands zoned “R1-5” Low Density Residential, owned by the City

South: Bancroft Drive, a mix of R1-5 and R2-2 zoned lots and institutional uses (Holy Redeemer Church)

West: Lands zoned R1-5, Low Density Residential

The existing zoning & location map indicates the location of the subject lands to be rezoned and the zoning in the immediate area.

Site photos show the uses in this area and portions of the subject lands.

### **Public Consultation:**

The statutory notice of the application was provided by newspaper on February 26, 2024, along with a courtesy mail-out to surrounding property owners and tenants within 122 m of the property on January 24, 2024. The statutory notice of the public hearing was provided by newspaper on April 6, 2024, and courtesy mail-out on April 4, 2024. The owner was advised of the City’s policy recommending that applicants consult with their neighbours, Ward Councillor and key stakeholders to inform area residents on the application prior to the public hearing. The owner had originally indicated on their rezoning application form that they would be conducting a neighbourhood meeting, however they later advised that given the response from the public to the City’s notice of application, they had decided not to host a meeting. At the time of writing this report, one phone call and one written submission with respect to this application have been received by the Planning Services Division. The comment received expressed concerns regarding the loss of trees and the number of units being proposed.

### **Policy & Regulatory Framework:**

The property is subject to the following policy and regulatory framework:

- [2020 Provincial Policy Statement](#)
- [2011 Growth Plan for Northern Ontario](#)
- [Official Plan for the City of Greater Sudbury, 2006](#)
- [Zoning By-law 2010-100Z](#)

Provincial Policy Statements and geographically specific Provincial Plans, along with municipal Official Plans, provide a policy framework for planning and development in the Province. This framework is implemented through a range of land use controls such as zoning by-laws, plans of subdivision and site plans.

### **Provincial Policy Statement:**

Municipalities in the Province of Ontario are required under Section 3 of the Planning Act to ensure that decisions affecting planning matters are consistent with the Provincial Policy Statement (PPS).

Several sections of the PPS are relevant to the application.

Policy 1.1.3.1 identifies that settlement areas are to be the focus of growth and their vitality and regeneration is to be promoted, and policy 1.1.3.2 requires densities which efficiently use land, resources and

infrastructure and avoid the need for their unjustified and/or uneconomical expansion. Development in this manner is intended to minimize impacts to air quality and climate change and promote energy efficiency, while supporting the use of active transportation and public transit.

Policy 1.1.3.4 states that appropriate development standards should be promoted which facilitate intensification and compact form, and policy 1.4.3(f) directs the establishment of development standards for residential intensification which minimize the cost of housing and facility compact form while maintaining appropriate levels of public health and safety.

Section 1.4.1 requires municipalities to provide an appropriate range and mix of housing types and densities to meet the needs of current and future residents. Forms of housing which meet social, health and well-being needs are to be encouraged.

### **Growth Plan for Northern Ontario:**

Municipalities in the Province of Ontario are required under Section 3 of the Planning Act to ensure that decisions affecting planning matters conform with the Growth Plan for Northern Ontario. Staff is satisfied that the application conforms to the Growth Plan.

### **Official Plan for the City of Greater Sudbury:**

The subject property is designated as Living Area 1 in the City of Greater Sudbury Official Plan.

Section 2.3 of the Official Plan regarding reinforcement of the urban structure states that growth must continue to be directed to capitalize on existing investments, make the most efficient use of existing infrastructure and public service facilities, protect our rural and agricultural assets and preserve our natural features and areas. Reinforcing the urban structure also creates a more energy efficient land use pattern and supports climate change mitigation. Section 2.3.2 directs that settlement area land use patterns will be based on densities and land uses that make the most efficient use of land, resources, infrastructure and public service facilities, minimize negative impacts on air quality and climate change, promote energy efficiency and support public transit, active transportation and the efficient movement of goods.

Section 2.3.3 encourages all forms of intensification and establishes a 20% residential intensification target. Intensification applications are to be evaluated with respect to criteria including site suitability, compatibility with neighbourhood character and proposed mitigation measures, availability of infrastructure and public service facilities, and traffic impacts.

Policies 3.2(3) and 3.2.1(5) state that sites should be of a suitable size to provide adequate landscaping and amenity features, and that new residential development must be compatible with the existing physical character of established neighbourhoods, with consideration given to the size and configuration of lots, predominant built form, building setbacks, building heights and other provisions applied to nearby properties under the Zoning By-law.

Policy 3.2.1(6) establishes the following criteria to be considered when rezoning lands in the Living Area 1 designation:

- a) the site is suitable in terms of size and shape to accommodate the proposed density and building form;
- b) the proposed development is compatible with the surrounding neighbourhood in terms of scale, massing, height, siting, setbacks, and the location of parking and amenity areas;
- c) adequate on-site parking, lighting, landscaping and amenity areas are provided; and,
- d) the impact of traffic on local streets is minimal.

Section 17 identifies a key housing goal is to maintain a balanced mix of ownership and rental housing, and to encourage a greater mix of housing types and tenure, including encouraging the production of smaller (one and two bedroom) units to accommodate the growing number of smaller households. The Official Plan

is intended to provide direction as to how housing needs and issues can be addressed in concert with the CGS Housing and Homelessness Plan.

### **Zoning By-law 2010-100Z:**

The development standards for the requested “R3” Medium Density Residential zone permit a maximum height of 11.0 m. The minimum required lot area per row dwelling unit is 150 m<sup>2</sup>. The minimum required front yard is 6.0 m, rear yard is 7.5 m and interior side yard is 1.2 m (one-storey) plus 0.6 m for each additional storey above the first. The maximum lot coverage is 40%. A privacy yard with a minimum depth of 7.5 m is required abutting one exterior wall of each row dwelling unit. Where there are no balconies or windows into habitable rooms on opposing walls of row dwellings on the same lot, the minimum required court is equivalent to 50 percent of the height of the higher of such walls but not less than 3 m. The general provisions of the zoning by-law require a minimum of 30% of the lot area to be maintained as landscaped open space. Parking provisions for the proposed row dwellings require 1.5 spaces per unit with a ten percent reduction in the required parking as the property abuts a GOVA Transit route. Required parking is not permitted in the required front yard. A 3 m wide planting strip is required to be provided along the easterly, westerly and southerly lot lines where they abut the “R1-5”, Low Density Residential One and “R2-2”, Low Density Residential Two zones. The planting strip may be reduced to 1.8 m in width where an opaque wall or fence with a minimum height of 1.5 m is provided. Refuse storage is permitted in an interior yard only, and no encroachment into the required front yard is permitted.

### **Site Plan Control:**

A Site Plan Control Application is required for this development.

### **Department/Agency Review:**

The application has been circulated to all appropriate agencies and City divisions. Responses received have been used to assist in evaluating the application and to formulate appropriate zoning by-law standards. Comments have been addressed to the satisfaction of reviewing department and agencies.

No concerns were raised by Roads, Transportation and Innovation, Active Transportation, Roads Operations and Drainage.

The City’s Source Water Protection Risk Management Official has reviewed the application and has advised that no activity or activities engaged in or proposed to be engaged in on the property are considered to be a significant drinking water threat.

Conservation Sudbury has advised that the geotechnical report prepared by exp., dated September 28, 2021, sufficiently addresses Conservation Sudbury’s concerns regarding hazardous soils within the identified wetland area located in the northwesterly corner of the property. Conservation Sudbury notes that review and permission under Section 28 of the Conservation Authorities Act, will be required for realignment of the watercourse. It is recommended that this application be initiated following receipt of the first round of site plan comments.

Strategic and Environmental Planning has advised that the application involves development that does not pose an elevated risk to species protected by the Endangered Species Act or to their habitat. The proposed development is anticipated to either have only minor negative effects on the overall natural environment or to have potential negative effects that are adequately mitigated as indicated on the relevant site plans and sketches. As such, specific environmental studies are not required beyond those that may have been requested previously. For the owners’ benefit it is noted that the owners are solely responsible for ensuring that vegetation removal, site alteration, and development undertaken on the subject lands do not result in a contravention of the provincial Endangered Species Act and the federal Migratory Birds Convention Act.

Development Engineering advises that the area is serviced with municipal water and sanitary sewer within the Bancroft Drive road allowance. A water and sewer connection permit will be required at the building permit stage of this development. Development Engineering has confirmed that sufficient water and sewer capacities are available for the proposed development.

Building Services has advised that they have no concerns with the application. The applicant is advised of the following:

1. The minimum lot frontage for an R3 zone is 18 m. Relief from this standard will be required.
2. The minimum court between opposing walls for row dwellings to comply with is set out on Table 6.5 of the Zoning By-law, Special provision #10.
3. Planting strips in accordance with Section 4.15 of the Zoning By-law are required between the proposed R3 zone abutting R1 and R2 zones.
4. The development may be subject to further variance requirements once a complete site plan is submitted for permit.

### **Planning Analysis:**

Planning staff circulated the development application to internal departments and external agencies. The PPS (2020), the Growth Plan (2011), and Greater Sudbury Official Plan, and other relevant policies and supporting guidelines were reviewed. The following section provides a planning analysis of the application in respect of the applicable policies, including issues raised through agency circulation.

The subject lands include all of the property known as 1870 Bancroft Drive, and the rear portions of the properties known as 1882 and 1890 Bancroft Drive. The City's Consent Official granted provisional approval to Consent application B0007/2023 on February 13, 2023 for the severance of approximately 0.93 ha at 1890 Bancroft Drive to be added to the property at 1870 Bancroft Drive. The Consent Official also approved consent application B0008/2023 on February 20, 2024 to sever 529.7 m<sup>2</sup> to be severed from the rear of 1882 Bancroft Drive to be added to the property at 1870 Bancroft Drive which included a condition that the by-law associated with rezoning file 751-6/22-12 be in full force and effect.

The application proposes forty row dwelling units located in eleven one-storey buildings with seven buildings each containing 4 units and 4 buildings each containing three units facing onto a 6 m wide private driveway accessing onto Bancroft Drive. An exception to the R3 zone minimum 18 m lot frontage standard is required to reflect the 13.8 m frontage that the development will have onto Bancroft Drive. Planning staff is satisfied that the proposed frontage is sufficient to accommodate the proposed driveway accessing the development and also provide for landscaping between the driveway and the adjacent lots.

The lot area provided per dwelling unit is 449 m<sup>2</sup>, exceeding the minimum 150 m<sup>2</sup> as set out in the Zoning By-law for row dwellings. The proposed lot coverage of 30.4 percent complies with the maximum 40 percent lot coverage in the R3 Medium Density Residential Zone. The court (distance between opposing walls) between all of the multiple dwellings is shown as 3.6 m which complies with the required minimum 3 m, where no balconies or windows into habitable rooms are located on the opposing walls.

The proposed landscaped area of 37.8 percent exceeds the minimum 30 percent By-law standard. Privacy yards with depths of 7.5 m are shown adjacent to each unit in accordance with the Zoning By-law standard for row dwellings. A 1.8 m high chain link fence is shown on the Concept Plan along the property boundary next the amenity areas. A planting strip as required by the Zoning By-law, abutting the R1 and R2 zones to the east, west and south has not been provided and is discussed later in this report. Each unit is to include an attached garage and driveways. A waste collection area is shown at the north end of the site adjacent to an emergency services turn around area. Two storm water management areas are shown on the southerly portion of the site.

Staff recommends that the application is consistent with and conforms to the PPS and Official Plan direction to direct development to fully serviced settlement areas, and to enable densities that make the most efficient



use of land, resources, infrastructure and public service facilities, minimize negative impacts on air quality and climate change, promote energy efficiency and support public transit, active transportation and the efficient movement of goods. The Official Plan encourages all forms of intensification and approval of this application will help to achieve the City's 20% intensification target.

Both the PPS and the Official Plan encourage municipalities to provide a range and mix of housing types and densities. The Official Plan identifies a key housing goal is to maintain a balanced mix of ownership and rental housing, and to encourage a greater mix of housing types and tenure. The proposal represents an opportunity to provide additional rental units, and staff recommends that this proposal is consistent with and conforms to these policies. Further, this proposal supports the City's Municipal Housing Pledge to achieve the target of 3800 new homes constructed by 2031. The City's [Housing Supply and Demand Analysis](#) (N. Barry Lyon Consultants Ltd., 2023) identified the most significant housing gaps are observed in the rental market. There is an immediate need for 470 additional rental units to achieve a vacancy rate of 5%, and an average of 66 additional rental units per year for the next 30 years to meet anticipated demand. The City's [Populations Projections Report](#) (Hemson, 2023) forecasts that over the next 30 years, over 10% of all housing unit growth will be in the form of row housing. This is a significant shift; in the last 15 years row housing growth accounted for less than 5% of all new units.

The Official Plan requires consideration of infrastructure, services, and amenities that are available to future residents. There are full municipal services with adequate capacity available on the Bancroft Drive road allowance. Employment opportunities, commercial areas, and community services are available nearby at the commercial area surrounding the intersection of Second Avenue and Bancroft Drive, (approximately 200 m to the east), being less than a 5 minute walk from the subject lands. In addition, GOVA Transit Route 10 Minnow Lake, is located along Bancroft Drive and provides a direct connection to the downtown transit hub. Adamsdale Park and Heritage Field are located approximately 500 m to the northeast. Adamsdale Public School, Pius XII Catholic School and École Séparée Saint-Pierre, are all located within 700 m of the subject lands. Staff recommends the subject property is an appropriate location for the proposed row dwellings.

The proposed forty units would result in a net density of approximately 22.8 units per hectare which is within the range for low density development of up to 36 units/ha as set out in the Official Plan. The rezoning will enable the row dwelling built form, which is not permitted in the R1-5 and R2-2 zones. The Official Plan requires consideration of the compatibility of the proposal with the surrounding residential neighbourhood which is comprised of a mix of singles, duplexes and multiple dwellings. The maximum height permitted in the requested R3 zone is the same as the current R1-5 and R2-2 zones in the area, being 11 m. Given the uses in the area and the existing physical character, staff is of the opinion that the proposed building's scale, massing, height, siting and setbacks are similar to and compatible with the surrounding neighbourhood. Staff has not recommended restricting building height nor built form through the site-specific zoning, which will enable future flexibility in the development of the site.

The PPS states that development standards to promote intensification are to be encouraged. The Official Plan establishes criteria for intensification and for rezoning lands within the Living Area 1 designation, including site suitability. In terms of the suitability of the site to accommodate the additional density and built form, the applicant's concept plan demonstrates that the development standards applicable to row dwellings can mostly be satisfied.

### Planting Strips

Section 4.15 of the Zoning By-law requires that a planting strip with a width of 3 m be provided along the full length of the lot line of lots zoned R3 abutting R1 and R2 zoned lots. Where the planting strip contains an opaque wall or opaque fence with a minimum height of 1.5 m the width of the planting strip may be reduced to 1.8 m width. The concept plan shows a 1.8 m high chain link fence along the easterly and westly lot lines. The abutting vacant R1-5 zoned lands to the east are owned by the City of Greater Sudbury having recently been purchased from the Sudbury Catholic District School Board as part of the City's Affordable Housing Land Banking Strategy. Although there are no immediate plans for the property, it will be available for future affordable housing opportunities should they arise. Given that the abutting lands to the east are currently vacant and have been acquired by the City for the purposes of an affordable housing project, which would

typically include medium or higher density forms of housing, it would appear to be unnecessary in this case to require the planting strip abutting the easterly lot line. The abutting property to the west at 1838 Bancroft Drive is an approximate 1.8 ha (4.4 acre) property with the dwelling located more than 30 m from the common lot line with the subject lands.

The intervening area between the house on 1838 Bancroft Drive and the subject lands is largely forested. Given the nature of the lands to the west and distance to the dwelling at 1838 Bancroft Drive, a planting strip on the subject lands is not warranted abutting the property at 1838 Bancroft Drive.

Planning Staff is of the opinion that planting strips should be provided along the lot lines abutting the R2-2 zoned lots at 1870 Bancroft Drive and the retained portions of 1882 Bancroft Drive zoned R2-2 and 1890 Bancroft Drive, zoned R1-5, as these lots are adjacent to the main access driveway just north of Bancroft Drive and will experience increased levels of pedestrian and vehicular traffic and associated noise and lighting adjacent to their rear yard amenity areas that should be buffered by a continuous row of planting material and or opaque fencing. The final design of the buffer strip in these areas can be addressed through the site plan review process.

Planning Staff recommends that the opportunity for a pedestrian connection to the City owned lands to the east be provided in order facilitate pedestrian movement in the area as it develops. A potential pedestrian connection could be located to the east at the north end of the site on which an easement is already registered on title to Sudbury Hydro for an overhead hydro line. It is noted that an informal path already exists in this area that residents in the area are using. This detail can be reviewed further and finalized as part of the site plan control agreement.

### Parking

Planning Staff is satisfied that sufficient parking has been provided to meet the needs of the development. The Zoning By-law requires 1.5 parking spaces per row dwelling unit. Based on 40 row dwelling units, 60 parking spaces are required. As the subject lands abuts a GOVA route a 10 percent reduction in parking is provided reducing the requirement to 54 parking spaces. The applicant's plans include 2 parking spaces for each unit with one parking space in an attached garage and driveways wide enough to park a second vehicle, while still allowing vehicular access to the parking space in the garage. A total of 12 parking spaces are shown in three common parking areas, two being located at the south end of the development and a third at the north end. A total 92 parking spaces are proposed on the site. Planning staff notes that the four parking spaces shown at the north end of the site will need to be assessed at the site plan stage as they may interfere with providing a hammer-head turn around for emergency services vehicles.

A total of 20 bicycle parking spaces are required for the 40 unit development which the owner has indicated on their concept plan as being provided in the garages attached to each unit.

### Geotechnical Report

As noted in the comments from Conservation Sudbury, a geotechnical report had been prepared by exp. for the owner. The geotechnical report assessed the soils in the northwest corner of the site in the area of proposed units 22 and 23 on the Concept Plan. Based on the four test pits that were conducted the report identified that the soil composition consisted of a thin layer of topsoil/organics overlaying native soils consisting of sand to sandy silt. The report concluded that the development of the proposed dwellings is anticipated to be relatively straight forward as no unstable soils were encountered. The report also states that it is assumed that the 75 mm to 150 mm of topsoil/organics will be stripped from any development locations as is typical construction practice and that the soils are suitable to support the proposed development with no mitigation measures required.

## Conclusion:

The Planning Division undertook a circulation of the application to ensure that all technical and planning matters have been satisfactorily addressed.

The following are the principles of the proposed site-specific zoning by-law:

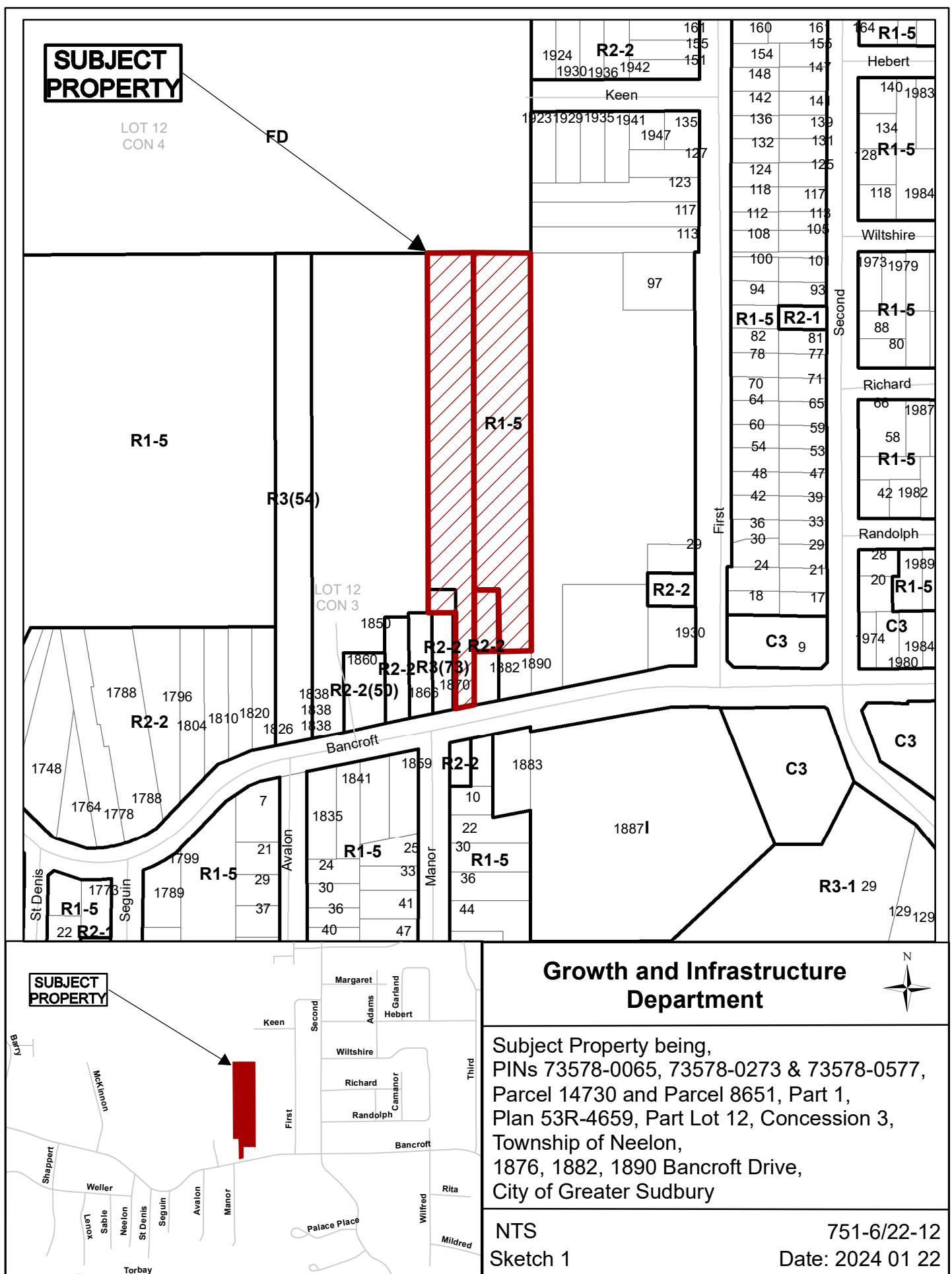
- To rezone the lands from R1-5 and R2-2 to R3(S) to permit 40 row dwelling units.

The development of the subject lands achieves a number of policy directives related to intensification and the provision of a range and mix of housing types. Staff has considered, amongst other matters, a full range of factors through a detailed review when forming the recommendation of approval for this application.

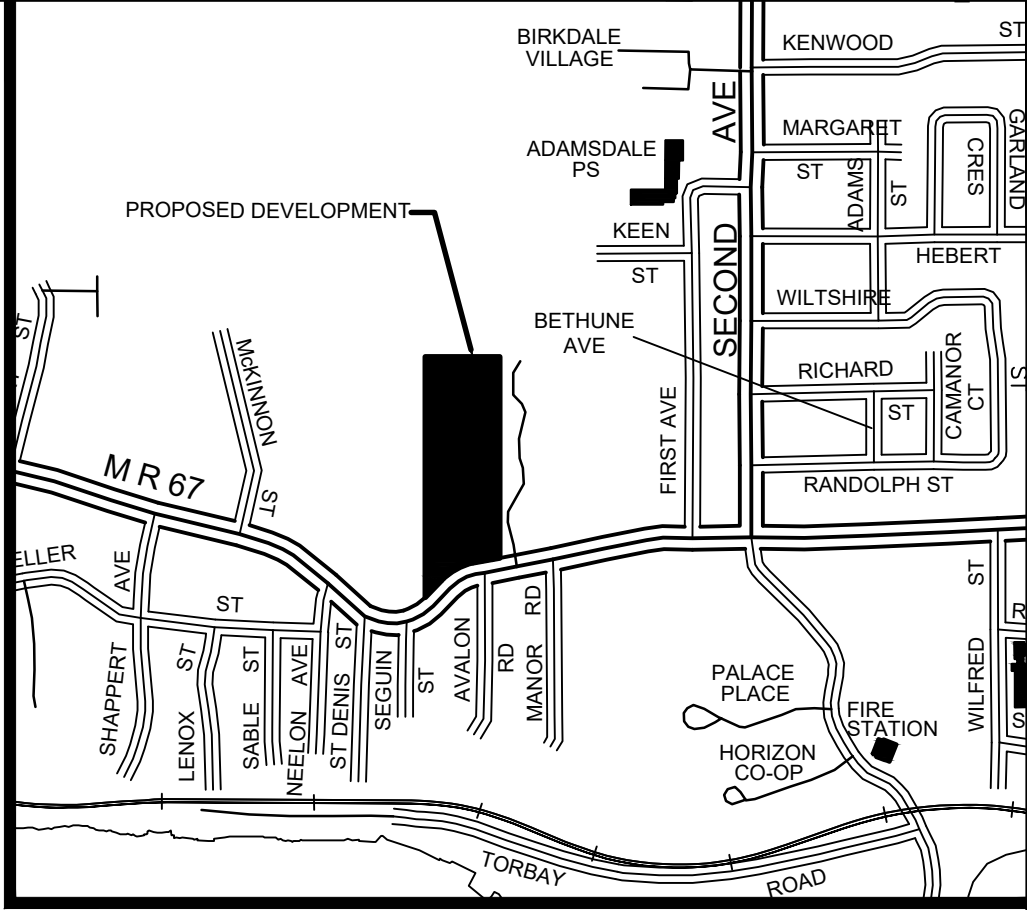
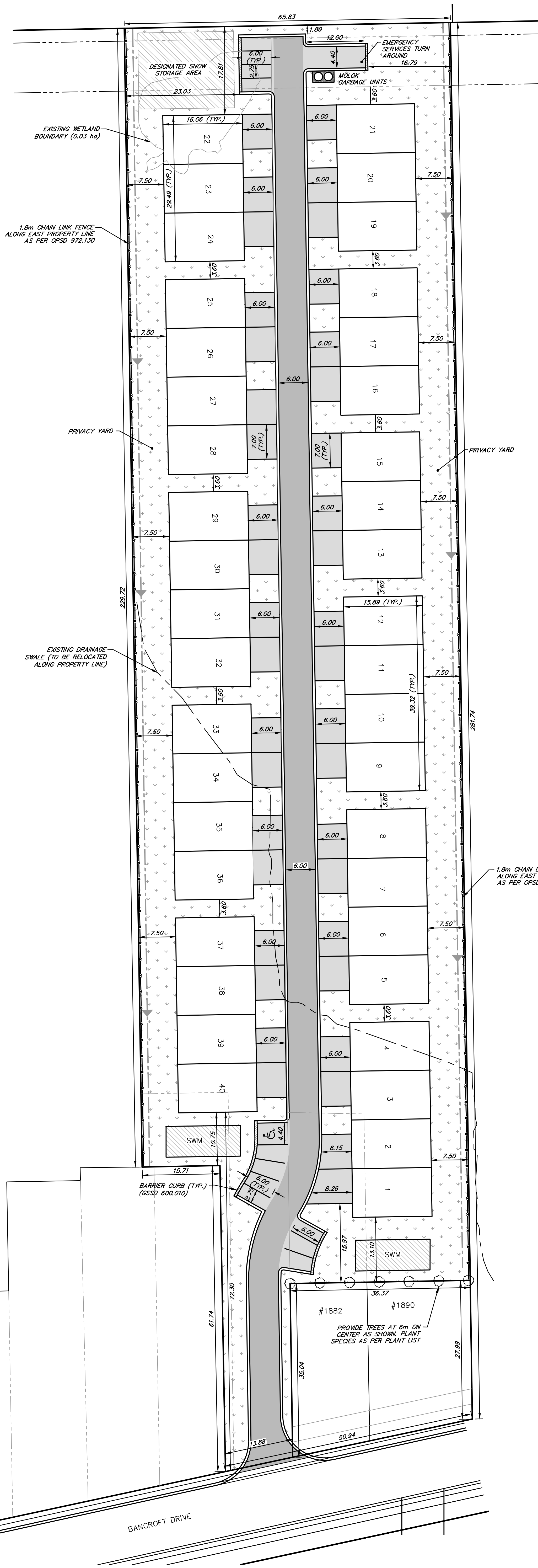
Staff is satisfied that the application is consistent with the PPS and conforms to the Growth Plan and the Official Plan. Staff is of the opinion that the proposed zoning by-law amendment is appropriate based on the following:

- The proposed row dwellings will contribute to the range and mix of housing available in the area, support the achievement of the Municipal Housing Pledge, and the demand identified in the Housing Supply and Demand Analysis, and Population Projections Report.
- The sites are suitable for the proposed density and building form.
- The proposal has been evaluated in the context of the surrounding and future land uses and is considered appropriate.
- Adequate parking, landscaping and amenity areas can be provided.
- The impact on local streets will be minimal.
- The sewer and water services are adequate for the site.

Staff recommends approval of the application as described in the Resolution section on the basis that it is consistent with the Provincial Policy Statement, conforms to the Growth Plan for Northern Ontario, the Official Plan for the City of Greater Sudbury, has regard for matters of provincial interest and represents good planning.







KEY PLAN 1:10,000

SITE PLAN DATA:

1876,1882, 1890 BANCROFT DRIVE  
LOT 12, CONCESSION 4  
GEOGRAPHIC TOWNSHIP OF MCKIM  
CITY OF GREATER SUDBURY


SURVEY INFORMATION BY ADRIAN BORTOLUSSI DATED XXXX

ZONING	R1-5 - LOW DENSITY RESIDENTIAL
USE OF BUILDING	RESIDENTIAL DEVELOPMENT (40 NEW UNITS, 1 EXISTING)
DENSITY	22.8 units/HA
PROPERTY AREA	TOTAL 17,970.8 sq.m.
BUILDING COVERAGE	5,465.5 sq.m. (30.4%)
GROSS FLOOR AREA	5,465.5 sq.m.
PAVED AREA	3,772.5 sq.m.
GRAVEL AREA	0 sq.m.
BUILDING HEIGHT	1 STOREY
LANDSCAPED AREA	6,794.9 sq.m. (37.8%)
FRONT YARD SETBACK	6.0 m
SIDE YARD SETBACK	3.6 m
REAR YARD SETBACK	7.5 m
PARKING CALCULATION	1.5 SPACE PER UNIT
SPACES	91
BARRIER FREE SPACES	1
SNOW REMOVAL:	TO BE PROVIDED BY PRIVATE SERVICES
GARBAGE REMOVAL:	TO BE PROVIDED BY PRIVATE SERVICES
BICYCLE PARKING:	GARAGE UNITS
LOADING SPACES:	N/A

LEGEND

PROPOSED	DENOTES PROPOSED WORKS
EXISTING	DENOTES EXISTING INFORMATION
	DENOTES EXISTING UTILITY POLE LOCATION
	DENOTES EXISTING ELEVATION
	DENOTES PROPOSED FINISHED GRADE ELEVATION
	DENOTES ENTRY/EXIT POINT
	FIRE ROUTE = CENTERLINE
	PROPOSED DITCH
	1.8m CHAINLINK FENCE
	HEAVY DUTY ASPHALT
	LIGHT DUTY ASPHALT
	DENOTES PROPOSED DIRECTION OF SURFACE DRAINAGE
	SOD AREA

NOTE: EACH UNIT TO INCLUDE GARAGE WITH PARKING SPACE



R.V. ANDERSON ASSOCIATES LIMITED  
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BANCROFT AVALON  
CONCEPTUAL PLAN

SCALE: 1:400	DATE: JUNE 2023
DRAWN: L.Z.	JOB NUMBER: 153200



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JAN 15 2024

PLANNING SERVICES



## Geotechnical Investigation and Design Report

*Barry Kindrat*

**Type of Document:**

Report

**Project Name:**

Proposed Re-Zoning of 1876 and 1890 Bancroft Drive  
Sudbury, Ontario

**Project Number:**

SUD-21017389-A0

**Prepared By:**

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**Date Submitted:**

2021-09-28

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Further to our Proposal No. 21/135/GP\_rev, dated August 19, 2021 and your subsequent authorization to proceed, EXP Services Inc. (EXP) has completed the field investigation and geotechnical engineering evaluation for the proposed re-zoning at 1876 and 1890 Bancroft Drive in Sudbury, Ontario. Our comments and recommendations, based on the results of the field investigation and our understanding of the project scope, are provided in this report.

## 1. Introduction

It is understood by EXP that a multi-unit residential development is proposed at 1876 and 1890 Bancroft Drive in Sudbury, Ontario. For the development, re-zoning of the subject properties is required from R1-5, low density residential to R3, medium density residential. As part of the re-zoning process, Conservation Sudbury has indicated in a letter dated June 29, 2021 (copy provided to EXP) that “mapped wetlands” are present at the rear (north) of the subject properties, which are often associated with unstable, organic soils. As such, Conservation Sudbury indicated that a geotechnical investigation is required to establish the soil composition and determine the presence of organic (unstable) soils, along with acceptable mitigation measured.

EXP has completed a geotechnical investigation at the rear of the subject properties at the identified “mapped wetland” areas in order to satisfy Conservation Sudbury’s requirements. The results of our investigation are included herein.

## 2. Field Investigation

The field investigation for this project consisted of the advancement of four (4) sampled test pits at the sites, at accessible locations within the areas identified as potential wetland. The test pits were completed on September 15, 2021 at the locations shown on Dwg. No. A-1 included in Appendix A.

Each test pit was advanced to the depths shown on the attached test pits logs, Figs. B-2 to B-5 in Appendix B, using a rubber tire backhoe. Grab samples were obtained at each general change in stratigraphy. The retained samples were logged in the field and then carefully packaged and transported to our Sudbury laboratory for detailed examination and testing. The test pits were backfilled with excavated soils, which were compacted in place as best as possible using the bucket of the backhoe.

The advancement of the test pits was supervised on a full-time basis by a geotechnical representative from EXP.

The test pit locations and elevations were surveyed in the field using a handheld GPS. The locations and elevations should be considered accurate only to the degree implied by the method used.

## 3. Laboratory Testing

A geotechnical laboratory testing program was performed on representative soil samples and consisted of moisture content tests and grain size analyses. The laboratory test results are summarized on the test pit logs in Appendix B, with detailed results included in Appendix C.

## 4. Subsurface Conditions

Details of the soils encountered during the field investigation are summarized on the attached logs in Appendix B. The logs include textural descriptions of the subsoil and indicate the soil boundaries inferred from non-continuous sampling and observations during the field investigation. These boundaries reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change. When reading this report, the explanatory notes and definitions provided in Figures B-1A and B-1B in Appendix B should be referenced.

In general, the test pits encountered a thin layer of topsoil/organics overlying native cohesionless soils.

Topsoil/organics was encountered at the surface of each test pit and ranged in thickness from 75 to 150 mm. Measured moisture contents within the topsoil ranged from 18.4 to 226.1%.

Underlying the topsoil/organics was native sand. The sand extended to 0.6 to 2.0 m depth. At Test Pit TP-2, the sand extended to the test pit termination depth of 2.0 m. The sand was brown to grey in colour, moist, and contained trace to some silt and trace to some organics. Measured moisture contents within the sand ranged from 17.5 to 69.9%.

Underlying the sand at TP-1, TP-3, and TP-4 was native sandy silt that extended to the test pit termination depths of 1.5 to 3.0 m. The sandy silt was brown to grey in colour, and moist to wet. Measured moisture contents within the sandy silt ranged from 27.1 to 36.0%.

Groundwater was not encountered within the test pits upon completion.

## 5. Discussion

Based on the completed test pits, the soil composition at the rear of the subject properties consists of a thin layer of topsoil/organics overlying native cohesionless soils consisting of sand to sandy silt. As such, other than the thin layer of topsoil/organics, unstable soils do not appear to be present at the rear (north) of the subject properties.

Development of the properties for the proposed multi-unit residential dwellings are anticipated to be relatively straight forward as there were no unstable soils encountered. It is assumed that the encountered 75 to 150 mm of topsoil/organics will be stripped from any development locations (buildings locations, pavement areas, etc.) as is typical construction practice. The encountered cohesionless soils are suitable to support the proposed development and no mitigation measures would be required.

## 6. Limitations

A subsurface investigation is a limited sampling of a site. Should any conditions at the site be encountered that differ from those reported at the test locations, we require that we be notified immediately in order to allow reassessment of our recommendations.

Virtually no scope of work, no matter how exhaustive, can identify all contaminants or all conditions above or below ground. For example, conditions elsewhere on the property may differ from those encountered, and conditions may change with time. Therefore, no warranty is provided that the entire site condition is represented by those identified at specific test hole locations.

This report in no way reflects any on-site environmental considerations.





*Project Number: SUD-21013287-A0**Date: September 28, 2021*

## 7. Closure

We trust that these comments provide you with sufficient information to proceed with design. Should you have any questions, please do not hesitate to contact this office.

Yours truly,

EXP Services Inc.



Ian MacMillan, P.Eng.  
Project Manager, Earth & Environmental Services  
Northeastern Ontario



Yves Beauparlant, P.Eng.  
Manager, Earth & Environmental Services  
Northeastern Ontario



*Project Number: SUD-21013287-A0*

*Date: September 28, 2021*

## Appendix A – Drawing



*Project Number: SUD-21013287-A0*

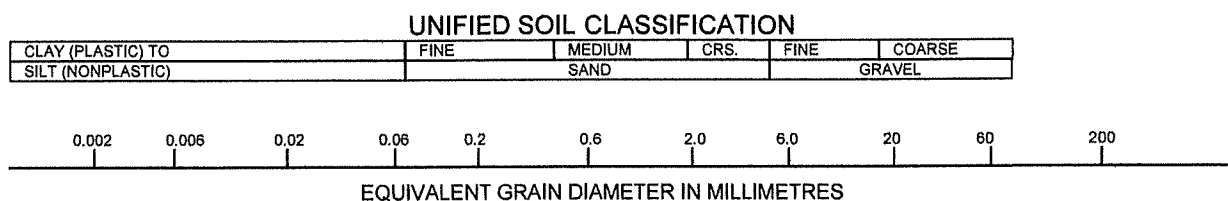
*Date: September 28, 2021*

## Appendix B – Test Pit Logs



## Notes on Sample Descriptions

1. All sample descriptions included in this report follow the International Society for Soil Mechanics and Foundation Engineering (ISSMFE), as outlined in the Canadian Foundation Engineering Manual. Note, however, that behavioral properties (i.e. plasticity, permeability) take precedence over particle gradation when classifying soil. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.



**ISSMFE SOIL CLASSIFICATION**

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		

2. **Fill:** Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.
3. **Till:** The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (75 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

## Notes On Soil Descriptions

4. The following table gives a description of the soil based on particle sizes. With the exception of those samples where grain size analyses have been performed, all samples are classified visually. The accuracy of visual examination is not sufficient to differentiate between this classification system or exact grain size.

Soil Classification		Terminology	Proportion
Clay and Silt	<0.060 mm	"trace" (e.g. Trace sand)	1% to 10%
Sand	0.060 to 2.0 mm	"some" (e.g. Some sand)	10% to 20%
Gravel	2.0 to 75 mm	adjective (e.g. sandy, silty)	20% to 35%
Cobbles	75 to 200 mm	"and" (e.g. and sand)	35% to 50%
Boulders	>200 mm		

The compactness of Cohesionless soils and the consistency of the cohesive soils are defined by the following:

Cohesionless Soil		Cohesive Soil		
Compactness	Standard Penetration Resistance "N" Blows / 0.3 m	Consistency	Undrained Shear Strength (kPa)	Standard Penetration Resistance "N" Blows / 0.3 m
Very Loose	0 to 4	Very soft	<12	<2
Loose	4 to 10	Soft	12 to 25	2 to 4
Compact	10 to 30	Firm	25 to 50	4 to 8
Dense	30 to 50	Stiff	50 to 100	8 to 15
Very Dense	Over 50	Very Stiff	100 to 200	15 to 30
		Hard	>200	>30

### 5. ROCK CORING

Where rock drilling was carried out, the term RQD (Rock Quality Designation) is used. The RQD is an indirect measure of the number of fractures and soundness of the rock mass. It is obtained from the rock cores by summing the length of the core covered, counting only those pieces of sound core that are 100 mm or more length. The RQD value is expressed as a percentage and is the ratio of the summed core lengths to the total length of core run. The classification based on the RQD value is given below.

RQD Classification	RQD (%)
Very Poor Quality	<25
Poor Quality	25 to 50
Fair Quality	50 to 75
Good Quality	75 to 90
Excellent Quality	90 to 100

$$\text{Recovery Designation \% Recovery} = \frac{\text{Length of Core Per Run}}{\text{Total Length of Run}} \times 100$$



# Log of Test Pit TP-1

Project No. SUD-21017389-A0

Figure No. B-2

Project: Proposed Rezoning of 1876 and 1890 Bancroft Drive

Sheet No. 1 of 1

Location: Sudbury, Ontario

Date Excavated: September 15, 2021

Excavator Type: Backhoe

Datum: Geodetic (hand-held GPS)

Grab Sample  
Penetrometer  
Field Vane Test

Combustible Vapour Reading ☐  
Natural Moisture ☒  
Plastic and Liquid Limit ☐  
Undrained Triaxial at ☐  
% Strain at Failure ☐

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH m	N Value				Combustible Vapour Reading (ppm)			SAMPLE COMMENTS	Sample Number
					20	40	60	80	25	50	75		
					Shear Strength kPa				Natural Moisture Content % Atterberg Limits (% Dry Weight)				
				0	50	100			10	20	30	128.8	GS1
		TOPSOIL/ORGANICS (~ 75 mm thick) SAND, some silt, brown, moist	272.00 271.9										
				1						X			GS2
			270.0	2									
		SANDY SILT, grey, moist to wet									X		GS3
			269.0	3									
		TEST PIT TERMINATED AT ~ 3.0 m DEPTH											



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Test Pit data requires  
interpretation assistance from  
EXP before use by others.

See Figures B-1A and B-1B for  
Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	

# Log of Test Pit TP-2

Project No. SUD-21017389-A0

Figure No. B-3

Project: Proposed Rezoning of 1876 and 1890 Bancroft Drive

Sheet No. 1 of 1

Location: Sudbury, Ontario

Date Excavated: September 15, 2021

Excavator Type: Backhoe

Datum: Geodetic (hand-held GPS)

Grab Sample  
Penetrometer  
Field Vane Test

Combustible Vapour Reading ☐  
Natural Moisture ☒  
Plastic and Liquid Limit ☐  
Undrained Triaxial at ☐  
% Strain at Failure ☐

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH m	N Value				Combustible Vapour Reading (ppm)			SAMPLES	Sample Number
					20	40	60	80	25	50	75		
					Shear Strength kPa				Natural Moisture Content % Atterberg Limits (% Dry Weight)				
					50		100		10	20	30		
		TOPSOIL/ORGANICS (~ 150 mm thick)	272.00	0									GS1
		SAND, trace to some silt, trace organics, grey, moist to wet	271.9										
				1									GS2
		TEST PIT TERMINATED AT ~ 1.5 m DEPTH	270.5										

TESTPIT (GEO) SUD-21017389-A0 - BANCROFT RE-ZONING.GPJ NEW.GDT 9/29/21



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Test Pit data requires  
interpretation assistance from  
EXP before use by others.

See Figures B-1A and B-1B for  
Notes on Sample Description

Time	Water Level (m)	Depth to Cave (m)
Upon Completion	Dry	







## Appendix C – Laboratory Testing



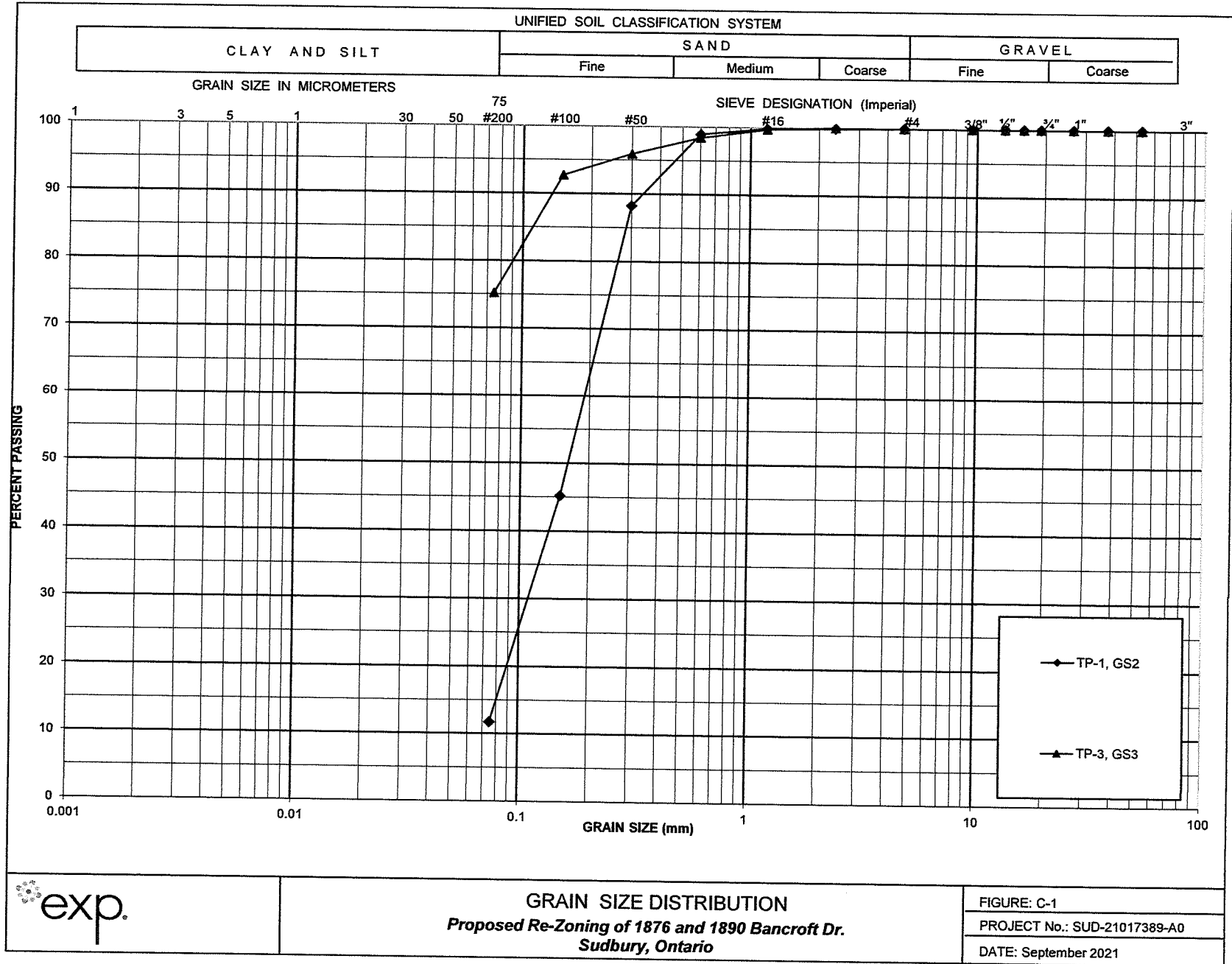




Photo 1: 1876, 1882 & 1890 Bancroft Drive, Sudbury

View of area where proposed driveway to be located, facing north from Bancroft Drive.

File 751-6/22-12 Photography March 7, 2024



Photo 2: 1876, 1882 & 1890 Bancroft Drive, Sudbury

View of water feature traversing property facing northwest on-site.

File 751-6/22-12 Photography March 7, 2024





Photo 3: 1876, 1882 & 1890 Bancroft Drive, Sudbury

View of the Overhead hydro corridor on north portion of property, facing east on-site.

File 751-6/22-12 Photography March 7, 2024



Photo 4: 1876, 1882 & 1890 Bancroft Drive, Sudbury

View of the wetland feature on northwest portion of property, facing south on-site.

File 751-6/22-12 Photography March 7, 2024





Photo 5: 1876, 1882 & 1890 Bancroft Drive, Sudbury

View of the dwelling at 1882 Bancroft Drive, facing north from Bancroft Drive.

File 751-6/22-12 Photography March 7, 2024



Photo 6: 1876, 1882 & 1890 Bancroft Drive, Sudbury

View of the dwelling at 1890 Bancroft Drive, facing north from Bancroft Drive.

File 751-6/22-12 Photography March 7, 2024



Photo 7: 1876, 1882 & 1890 Bancroft Drive, Sudbury

View of the Holy Redeemer Church on the south side of Bancroft Drive, facing southeast from Bancroft Drive.

File 751-6/22-12 Photography March 7, 2024



Photo 8: 1876, 1882 & 1890 Bancroft Drive, Sudbury

View of dwellings on the south side of Bancroft Drive, (1879, 1873 & 1859 Bancroft Drive), facing southwest from Bancroft Drive.

File 751-6/22-12 Photography March 7, 2024



Yvonne Marrello  
165 First Ave  
Sudbury Ontario  
P3B 3L3

**RECEIVED**

MARCH 04 2024

PLANNING SERVICES

To Alex Singush,

March 4, 2024

I am reaching out today in regards to the follow:

File: 751-6122-12

In the matter of an application under section 34 of the planning Act. R.S.O 1900 chapter P-13

Applicant: 2828566 Ontario INC & Barron West INC

I spoke with Eric Taylor last Friday. I would like to make note that I would like to be notified of any more notices regarding this matter. They can be mailed to me at the above address or emailed to me at [REDACTED]. My father in-law would also like to be notified. His name is John Larmer and he resides at 155 First Ave, Sudbury On, P3B 3L3.

My comments regarding the by-law change are the following:

- In order to build in this lot, bulldozing of trees and blasting of rocks will need happen to make this section of land buildable
- The number of units suggested for the lot size is too many. Considering parking per unit, total members dwelling in a residence and the congestion with the small access road, perhaps less units would make for an appropriate housing community.
- Are the builders prepared to re-pave Bancroft?
- Are the builders prepared to improve water distribution and waste water at the Bancroft intersection with such a high demand of units?
- Are the builders going to add in a traffic light at Bancroft to slow traffic and allow movement of pedestrians and cars on an already busy street?

There are several unutilized buildings in Sudbury. The old hospital and the brewery on Lorne have been waiting years for by-law approvals in order to repurpose old buildings. My concern with this proposed by-law change is that they intend to clear cut a neighbourhood in order to build 40 units when there are many buildings that are just laying vacant.

I will admit there is a housing/apartment shortage in Sudbury. Yes, we do require more units. Perhaps we should look at what we have already built and what we can repurpose to densify Sudbury before creating something new.

Thank you for your time.

Regards,  
Yvonne Marrello

## Parkland Standards

Presented To:	Planning Committee
Meeting Date:	April 29, 2024
Type:	Correspondence for Information Only
Prepared by:	Ed Landry Planning Services
Recommended by:	General Manager of Growth and Infrastructure
File Number:	N/A

## Report Summary

This report provides information regarding the new Parkland Standards Development Review Manual, funded by the Province's Streamline Development Approvals Fund.

## Relationship to the Strategic Plan, Health Impact Assessment and Community Energy & Emissions Plan (CEEP)

This report is most closely aligned with Section 1.5 of Council's Strategic Plan, which strives to demonstrate innovation and cost-effective service delivery. It is anticipated that the Parkland Standards Development Review Manual will help streamline residential development approvals.

This report refers to operational matters and has no direct connection to the Community Energy & Emissions Plan.

## Financial Implications

Costs associated with developing the Parkland Standards Development Review Manual were funded through the Streamline Development Approvals Fund.

## Background

In 2022, the City of Greater Sudbury successfully applied to the Province's Streamline Development Approvals Fund (SDAF). The fund was geared towards improving development approval processes. The SDAF parameters specified that the funding be used for eligible projects generally within four streams:

- 1) consulting fees related to process and/or policy improvements targeting residential development approvals and as of right residential zoning,
- 2) costs associated with implementing E-permitting systems, including software and hardware,
- 3) improving data, workflow or online guidelines that help streamline residential development approvals,

and

- 4) diversity internships in building and planning departments.

The City received \$1.75 million and used the funds on a variety of initiatives including:

- 1) the housing as-of-right zoning review,
- 2) the population, household and employment projections (to 2051),
- 3) the housing supply and demand analysis,
- 4) species at risk area scoping, and
- 5) hardware upgrades to support e-permitting implementation (See References 1 and 2).

Another project funded by the SDAF was the Parkland Standards Development Review Manual. The Parkland Development Standards Review Manual was developed to define, standardize, and improve the park development process for both City-built and Developer-built projects in the City of Greater Sudbury, as a complement to the City's Subdivision Guide. This manual serves as a reference tool to guide City staff, external stakeholders, the development community and their consultants in the development of parks and provides details of the park delivery process.

The document was developed through workshops and input from City departments (e.g., Leisure Services Division and Parks Services staff, Planning staff, Drainage Engineering staff, Environmental Planning staff) and external stakeholders, including the City's Accessibility Advisory Panel, Older Adults Advisory Panel, Development Liaison Advisory Panel, and Rainbow Routes Association. Following the engagement session with the Development Liaison Advisory Panel, City staff initiated several one-on-one interviews with representatives of the development community. The feedback from the various groups was incorporated in the Parkland Standards Development Review Manual.

The Parkland Standards Development Review Manual is intended to aid internal and external stakeholders in identifying:

- How much parkland should be pursued based on the context of development, the existing supply of parkland found in the area, and the City's service standards,
- Where to distribute parkland, trails, and public open space within subdivisions, based on existing context, servicing potential, and site conditions,
- The type(s) of parks that would be most appropriate for the subdivision based on parkland dedication requirements, the surrounding context, and the natural topography and features of the site, and
- How to design neighbourhood, community, and linear parks and open spaces, creating new standards for smaller, more urban linear parks.

The Parkland Development Standards document will act as a primary tool in the subdivision review process, with guidelines and conceptual examples for design and implementation.

## Summary and Next Steps

The City successfully applied to the Province's Streamline Development Approvals Fund and used the funds to undertake projects that would improve development review processes. The work on the Parkland Standards Development Review Manual is now complete and will improve the park development process for both City-built and Developer-built projects in the City of Greater Sudbury.

### Parkland Dedication By-law

Currently, the City's parkland dedication requirements are established in the Official Plan. Other municipalities have established a separate Parkland Dedication By-law for this purpose as it allows changes to the requirements to be made without the need for an Official Plan Amendment. On June 26<sup>th</sup>, 2023 Planning Committee passed motion PL2023-106 directing staff to develop a Parkland Dedication By-law

which will include exemptions for situations where lots have “merged on title” and require a consent.

Staff will return in late Q3, 2024 with a draft Parkland Dedication By-law for the Committee’s review. The intent of the by-law would be to enable the conveyance of parkland or cash-in-lieu as part of development or redevelopment applications. The by-law would also establish a framework for when and how the City accepts parkland conveyance. This framework is currently in the City’s Official Plan. As mentioned, moving the framework to a by-law would facilitate and expedite future reviews or required modifications of the by-law.

## **Resources Cited**

1. “Streamline Development Approvals Fund”, report presented at the March 29, 2022 Finance and Administration Committee Meeting,  
<https://pub-greatersudbury.escribemeetings.com/filestream.ashx?DocumentId=43654>
2. “Streamline Development Approvals Fund Update”, report presented at the July 10, 2023 Finance and Administration Committee Meeting,  
<https://pub-greatersudbury.escribemeetings.com/filestream.ashx?DocumentId=50011>

**DRAFT**  
**Parkland Standards**  
**Development Review Manual**

**City of Greater Sudbury**





# Parkland Standards Development Review Manual

## City of Greater Sudbury

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### 1.0 Executive Summary

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The City is home to an abundance of parks and open space across its various communities. According to the 2021 Municipal Benchmarking Network of Canada Performance Report, the City has a vastly higher proportion of hectares of maintained and natural parkland per 100,000 population when compared to similarly sized municipalities in southern Ontario and the median of all municipalities sampled.

The Parkland Development Standards Review Manual was developed to define, standardize, and improve the park development process for both City-built and Developer-built projects in the City of Greater Sudbury, as a complement to the City's Subdivision Guide. This manual serves as a reference tool to guide City staff, external stakeholders, the development community and their consultants in the development of parks and provides details of the park delivery process.

The Parkland Development Standards Review Manual is intended to aid internal and external stakeholders in identifying:



- How much parkland should be pursued based on the context of development, the existing supply of parkland found in the area, and the City's service standards;



- Where to distribute parkland, trails, and public open space within subdivisions, based on existing context, servicing potential, and site conditions;



- The type(s) of parks that would be most appropriate for the subdivision based on parkland dedication requirements, the surrounding context, and the natural topography and features of the site; and



- How to design neighbourhood, community, and linear parks and open spaces, creating new standards for smaller, more urban linear parks.

The Parkland Development Standards document will act as a primary tool in the subdivision review process, with guidelines and conceptual examples for design and implementation.

# Parkland Standards Development Review Manual

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The Parkland Standards Development Review Manual is organized into the following sections, for ease of reference:

- ✓ Section 2 provides an overview of the background information that may be relevant to consider when using this manual, and provides an introduction as to how to use the manual.
- ✓ Section 3 provides a high-level summary of the legislative context for parkland development, including the relevant policy and provisions within the *Planning Act*, the Provincial Policy Statement (2020), the City's Official Plan, and the City's Parks, Open Space and Leisure Master Plan.
- ✓ Section 4 outlines the existing gaps in the City's current supply of parkland, as per the Official Plan proximity standards for neighbourhood parks, community parks, and linear parks, and highlights priority areas for future park development.
- ✓ Section 5 contains the development standards for future park development and breaks these standards down by parkland classification, with standards for neighbourhood parks, community parks, and linear parks.
- ✓ Section 6 provides an overview of design considerations for all park types, as informed by the Accessibility for Ontarians with Disabilities Act, Crime Prevention through Environmental Design (CPTED), and Age-Friendly Community Planning.
- ✓ Section 7 outlines further design considerations with respect to the dual role that parks can play by incorporating naturalized stormwater management features and features of low-impact development. This section includes discussion of the various sub-watershed plans in the City of Greater Sudbury and contains engineering guidelines for stormwater management facilities incorporated into future park development.
- ✓ Section 8 outlines the park development process for two scenarios: (1) where City staff lead the planning, design, and development of the park as part of the subdivision approvals process, and (2) where the Developer leads the planning, design, and development of the park, with City staff providing review and approval at key milestones throughout.
- ✓ Section 9 provides guidance on the park document submission procedures, and includes two (2) sample concept plans for each park type: neighbourhood parks, community parks, and linear parks, as illustrative examples of how these standards could be implemented.
- ✓ Section 10 provides an overview of the roles and responsibilities for internal and external stakeholders in the parks development process and is meant for internal use only.

## 2.0 Background and Structure

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Parks, open space, and leisure services and facilities are vital to our community's health, vibrancy, and identity as residents of the City of Greater Sudbury (the "City"). Each provides meaningful opportunities for social engagement and physical activity to residents and tourists, individuals and groups, young and old, and people of all abilities.<sup>1</sup>

Individuals, households, and entire communities all benefit greatly from universal access to quality parks and leisure facilities and services. Examples include:



### Physical Benefits

- health and wellness from participating in active endeavours



### Intellectual Benefits

- access to information resources and lifelong learning opportunities



### Social Benefits

- opportunities to be engaged in meaningful community activities



### Environmental Benefits

- protection of natural features and open spaces



### Economic Benefits

- made possible through the attraction of sport tourism and new residents due to the high quality of leisure services provided

The City is home to an abundance of parks and open space across its various communities. According to the 2021 Municipal Benchmarking Network of Canada Performance Report, the City has a vastly higher proportion of hectares of maintained and natural parkland per 100,000 population when compared to similarly sized municipalities in southern Ontario and the median of all municipalities sampled.<sup>2</sup> Whereas similarly sized municipalities in southern Ontario (e.g., Hamilton, London, Windsor) have approximately 200-400 hectares of maintained parkland per 100,000 population and less than 300 hectares of natural parkland per 100,000 population, the City of Greater Sudbury has nearly 1,000 hectares of maintained parkland and over 1,500 hectares of natural parkland per 100,000 population. Looking at the sample as a whole, the City of Greater Sudbury has nearly four times the median of maintained parkland of 265 hectares per 100,000 population and almost eight times the median of natural parkland of 200 hectares per 100,000. Given this abundance of parkland across the various communities in the City, it is of the

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<sup>1</sup> City of Greater Sudbury. (2014, June). Parks, Open Space & Leisure Master Plan Review. <https://overtoyou.greatersudbury.ca/parks-open-space-and-leisure-master-plan-review>

<sup>2</sup> Municipal Benchmarking Network of Canada. (2021). MBN Canada Performance Report. <http://mbncanada.ca/app/uploads/2022/10/2021-Parks.pdf>

# Parkland Standards Development Review Manual

## City of Greater Sudbury

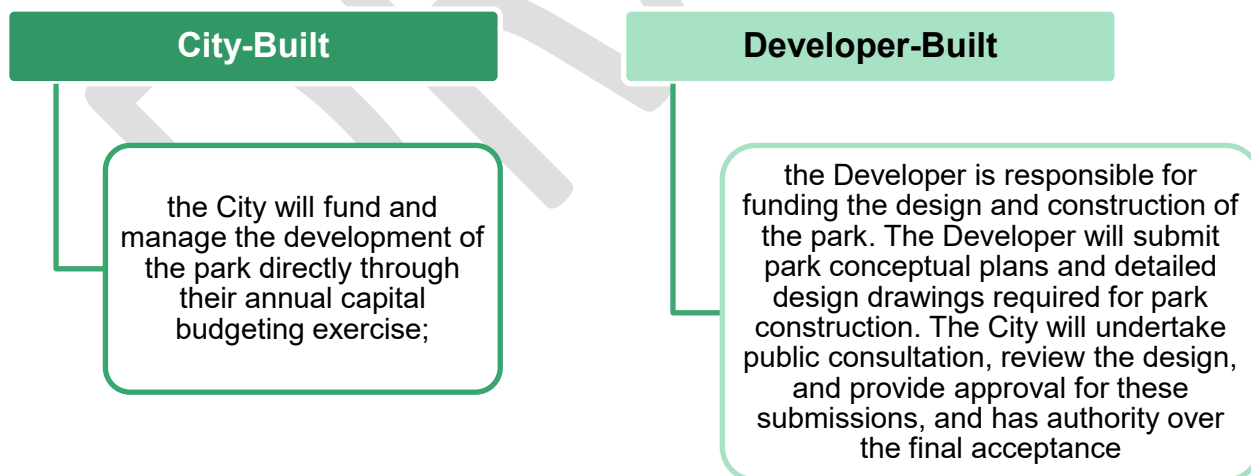
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utmost importance to ensure that planning for the future acquisition of parks as these communities develop take into consideration the existing supply of parkland, the gaps where parks are needed to serve residents of Greater Sudbury, and the types of parks that are most needed in each community.

The acquisition of parkland commonly takes place through the development review process. Under the *Planning Act*, the City may take 5 percent of land in a residential subdivision and 2 percent in an industrial or commercial subdivision as parkland. The City also has the option of taking cash-in-lieu of land being conveyed, or a combination of land and cash-in-lieu. The City seeks to acquire functional lands for active and passive recreational needs for the community. The Official Plan contains policies regulating parkland dedication, as detailed in Policy 7 of Section 7.3.1.

The *Planning Act* also enables the City to require that land be conveyed to the City as a condition of the development or redevelopment of land, to a maximum of 2 percent in the case of development or redevelopment for commercial purposes and to a maximum five percent in all other cases, to be used for park or other public recreational purposes. This authority is conditional upon the City passing a parkland dedication by-law to enable the dedication. Should the City require parkland dedication for development applications that propose intensification at the rezoning, site plan, or building permit stages of the approval process, this document should be updated to define the business process that will be followed in such instances. The success of new parks begins in the early stages of community planning, during the pre-application consultation stage and throughout the entire development review process, when park blocks are selected and acquired. The size and shape of a park block defines which facilities can be accommodated within the park.

In order to ensure a timely delivery of parks, the City has two options for developing parks, which includes the 'City-built' option and the 'Developer-built' option, as follows:



This manual is intended to serve as a reference tool to guide City staff, the development community, and their consultants in the development of parks in the City. It is also intended to assist park planners and other City staff in guiding applicants through the review and approvals process for park development.



### 3.0 Legislative Context for Parkland Development

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#### 3.1 Planning Act

The [\*Planning Act, R.S.O. 1990, c. P.13\*](#) ('the Act') regulates land use planning and development in the Province of Ontario. In carrying out their responsibilities under the Act, the council of a municipality shall have regard to matters of provincial interest, which include the following of relevance to parkland development:

- The protection of ecological systems, including natural areas, features and functions;
- The orderly development of safe and healthy communities;
- The accessibility for persons with disabilities to all facilities, services, and matters to which the Act applies;
- The adequate provision and distribution of educational, health, social, cultural, and recreational facilities;
- The promotion of development that is designed to be sustainable, to support public transit and to be oriented to pedestrians; and
- The promotion of the built form that is well-designed, encourages a sense of place, and provides for public spaces that are of high quality, safe, accessible, attractive and vibrant.

Section 42 of the Act gives municipalities the authority to impose as a condition of the development or redevelopment of land, requiring that land in an amount not exceeding, in the case of land proposed for development or redevelopment for commercial or industrial purposes, 2 per cent and in all other cases 5 per cent of the land be conveyed to the municipality for park or other public recreational purposes.

Section 51.1 of the Act further gives municipalities the authority to impose as a condition to the approval of a plan of subdivision that land in an amount not exceeding, in the case of a subdivision proposed for commercial or industrial purposes, 2 percent and in all other cases 5 percent of the land included in the plan be conveyed to the municipality for park or other public recreational purposes. The City may also leverage parkland dedication as a condition of approval for applications for consent, at a rate of 5 percent, or the equivalent contribution as cash in lieu of land conveyance.

#### 3.2 Provincial Policy Statement (2020)

The [\*Provincial Policy Statement \(PPS\)\*](#) is issued under Section 3 of the *Planning Act* and provides policy direction on matters of provincial interest related to land use planning and development. The PPS provides for appropriate development while protecting resources of provincial interest, public health and safety, and the quality of the natural and built environment. In respect of the exercise of any authority that affects a planning matter, Section 3 of the *Planning Act* requires that decisions affecting planning matters "shall be consistent with" policy statements issued under the Act.

Section 1.1 of the PPS states that healthy, liveable and safe communities are sustained by accommodating an appropriate affordable and market-based range and mix of residential types, employment, institutional, recreation, park and open space, and other uses to meet long-term needs, as well as improving accessibility for person with disabilities and older persons by addressing land use barriers which restrict their full participation in society, promoting

# Parkland Standards Development Review Manual

## City of Greater Sudbury

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development and land use patterns that conserve biodiversity, and preparing for the regional and local impacts of a changing climate. The PPS further states that healthy, active communities should be promoted by:

- Planning public streets, spaces, and facilities to be safe, meet the needs of pedestrians, foster social interaction and facilitate active transportation and community connectivity;
- Planning and providing for a full range and equitable distribution of publicly accessible built and natural settings for recreation, including facilities, parklands, public spaces, open space areas, trails and linkages, and, where practical, water-based resources;
- Providing opportunities for public access to shorelines; and
- Recognizing provincial parks, conservation reserves, and other protected areas, and minimizing negative impacts on these areas.

### 3.3 Official Plan for the City of Greater Sudbury

Section 7.1 of the [Official Plan for the City of Greater Sudbury](#) includes the following objectives of the parks and open space policies, as follows.



Develop and maintain a balanced distribution of public spaces, parks, recreation facilities, trails, linkages and open space and Conservation Areas that are publicly accessible and safe;



Recognize the importance of these areas to the ecosystem and assist in protecting areas comprised of unique or environmentally sensitive natural heritage features;



Facilitate the preservation of natural habitats through the formation of parklands, greenbelts, and Conservation Areas;



Incorporate school lands and facilities into community parks and recreation programs, wherever possible;



Provide parks, trails and leisure facilities that are aesthetically pleasing, multi-purpose, multi-season and appeal to all ages and skill levels in order to attract and retain residents, especially young adults and families, and to enhance local tourism development;



Promote the naturalization of City-owned spaces;



Support the formation of partnerships with the public, non-profit and/or private sectors in the provision and operation of recreation facilities and playgrounds, where a benefit to the community can be achieved;



Capitalize on the location and number of lakes within the City by retaining and acquiring waterfront property to provide public access to area lakes;



Enable the expansion of recreational trails and active transportation routes; and,



Recognize and minimize negative impacts on provincial parks, conservation Reserves and other protected areas.

# Parkland Standards Development Review Manual

## City of Greater Sudbury

As previously discussed, the City will require the dedication of land for park or other recreational purposes in accordance with the provisions of Section 42 of the *Planning Act*. Policy 7 of Section 7.3.1 of the OP concerns parkland dedication and includes the following:<sup>3</sup>

The dedication of parkland will be calculated as follows:	For commercial or industrial purposes	2%
	For residential developments with a density less than or equal to 36 units/hectare and residential development in the Downtown	5%
	For residential developments greater than 36 units/hectare	1 hectare per 500 dwelling units
The City may consider requiring payment-in-lieu of the parkland dedication in the following cases:	<ul style="list-style-type: none"> <li>✓ There is no land that is either usable or functional on the site for parkland or recreational purposes;</li> <li>✓ The required land dedication fails to provide an area of suitable shape, size, or location for public parkland;</li> <li>✓ The area being developed is already well-served by existing active parkland and open space areas;</li> <li>✓ Such contributions may be more effective in achieving local parkland targets and the objectives of the Parks, Open Space &amp; Leisure Master Plan, or other guiding documents.</li> </ul>	
All lands conveyed as part of parkland dedication must:	<ul style="list-style-type: none"> <li>✓ Be conveyed in a condition satisfactory to the City, free and clear of all encumbrances unless otherwise agreed to by the City, and meeting minimum standards in terms of drainage, grading and site conditions;</li> <li>✓ Be highly visible with prominent street frontage. Parks are encouraged to be located adjacent to compatible uses (such as schools) and should be in close proximity to the area to be served. Connections to other parks, open spaces and destinations through a trail network are strongly encouraged;</li> <li>✓ Be designed to accommodate a diverse range of passive and active recreational activities and have flexibility to accommodate new uses or interests;</li> <li>✓ Incorporate best practice principles of sustainable design, including natural heritage enhancement, naturalized stormwater</li> </ul>	

<sup>3</sup> Recent changes to the *Planning Act* have introduced new subsections under Sections 42 and 51 with respect to the land identified for parkland conveyance, which gives authority to the owner of land proposed for development or redevelopment or included in a proposed plan of subdivision, to identify a part of land which may be conveyed to the City. Land that is identified may include land that is subject to an easement or other restriction or is encumbered by below-grade infrastructure, or an interest in land other than the fee which is sufficient to allow the land to be used for park or other public recreation use. Further amendments to the *Planning Act* include changes to the alternative rate of parkland conveyance, which is now 1 hectare per 600 dwelling units. This and other sections of the Official Plan may be amended on a periodic basis pending these and other legislative changes made to the *Planning Act*. Please refer to the most up-to-date version of the Official Plan when preparing an application for a plan of subdivision.

# Parkland Standards Development Review Manual

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- management features, use of native plant species, incorporation of environmental education features and use of low-maintenance and energy efficient facilities and landscapes; and,
- ✓ In cases where development is proposed adjacent to parks and open spaces, be sited and designed to minimize rear lotting and to maximize public access and visibility.

The City may require the conveyance of land for pedestrian and bicycle pathways in accordance with Section 51 of the *Planning Act*.

Further, the City may consider accepting a lesser parkland dedication in consideration of improvements made by the developer to the parkland transferred to the City. At the discretion of the City, where land in excess of the amount of land required for dedication has been conveyed to the City for park purposes in association with a development proposal, the excess may be applied as a credit to future development by the same proponent.

The City will ensure that public access is available on waterbodies in the City. In this regard, subdividers of shoreline property will be required to convey lands which encompass not only five percent of the land being developed, but which also encompass at least five percent of the usable shoreline. Lands thus conveyed must be suitable for public purposes. Special consideration will be given to those developments that convey more than five percent of the shoreline for public use.

Waterfront properties owned by the municipality will generally not be offered for sale or disposal; however, other surplus parks and open space lands may be considered for sale subject to the City's [Park Land Disposal Policy](#).

Section 7.2 of the City's OP includes a classification system, an important tool for organizing, evaluating, and managing the City's parks and open spaces. The classification system separates parks into Active Parkland and Open Space and defines a number of park classifications that encompass a range of needs, uses and functions of parkland.

To guide the development of a parks system, the Official Plan for the City of Greater Sudbury includes the following active parkland targets:

- Neighbourhood Parks: 1.0 hectare per 1,000 residents
- Community Parks: 1.25 hectare per 1,000 residents
- Regional Parks: 1.75 hectare per 1,000 residents
- Total Active Parkland: 4.0 hectare per 1,000 residents

Active Parkland	Neighbourhood Park	<ul style="list-style-type: none"> <li>Primary purpose is to meet the recreational needs of the immediate neighbourhood. Neighbourhood Parks should be within a 10-minute walk (800 metres) of residential areas without crossing major barriers.</li> </ul>
	Community Park	<ul style="list-style-type: none"> <li>Primary purpose is to provide the space and supportive facilities needed for active recreation in the community. Community Parks should be within a 20-minute walk (1600 metres) of residential areas without crossing a major barrier.</li> </ul>
	Regional Park	<ul style="list-style-type: none"> <li>Primary purpose is to be a focal point for the City as a whole, due to their unique attributes, function and size. Regional Parks can also be a tourist attraction.</li> </ul>
Open Space	Linear Park	<ul style="list-style-type: none"> <li>Primary purpose is to be a connector linking different areas of the City. Linear Parks should be within a 10-minute walk (800 metres) of residential areas without crossing a major barrier.</li> </ul>
	Natural Park	<ul style="list-style-type: none"> <li>Primary purpose is the protection of a natural area while meeting residents needs for passive recreation. Natural Parks should be within a 10-minute walk (800 metres) of residential areas without crossing a major barrier.</li> </ul>
	Cultural/ Historical Special Purpose Park	<ul style="list-style-type: none"> <li>Primary purpose is to protect sites with historic, scientific, cultural, social, or spiritual importance. These parks can also serve a special recreational purpose.</li> </ul>
	Ecological Reserve	<ul style="list-style-type: none"> <li>Primary purpose is to protect significant natural areas with ecological and/or geological importance, or that capture a characteristic natural feature of the City.</li> </ul>



# Parkland Standards Development Review Manual

## City of Greater Sudbury

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Section 7.3.1 of the City's Official Plan contains policies concerning parks and open space. Policy 3 contains objectives for park design and Policy 7 contains criteria that apply to lands conveyed as part of parkland dedication. Together, these form the considerations that shall be applied in the design of new parks.



Incorporate spaces and amenities encouraging physical activity, wellness, and informal use opportunities.



Follow accessibility legislation and guidelines to accommodate persons with disabilities.



Consider the needs of a diverse and aging population through the provision of washrooms, seating, shade/shelter, community gardens, drinking fountains, pathways, and picnic areas.



Seek innovative and engaging initiatives that encourage environmental stewardship, such as recycling bins, rain gardens, green infrastructure, and rain capture.



Apply Crime Prevention through Environmental Design (CPTED) principles.



Promote designs that encourage sustainable maintenance practices.



Incorporate native and drought-resistant vegetative features.



Utilize materials that are robust, durable, and mindful of future maintenance requirements.



Encourage public art.



Encourage transit and active transportation connections and a linked open space system.



Choose a location with high visibility and prominent public street frontage. Connections to other parks, open spaces, and destinations through a trail network are strongly encouraged.



Ensure land is in a clean state. Any required remediation of lands is the responsibility of the owner and must be completed prior to the transfer of the lands to the City.



Ensure land is in a condition satisfactory to the City, free and clear of all encumbrances unless otherwise agreed to by the City, and meeting minimum standards in terms of drainage, grading, and site conditions.



Where development is proposed adjacent to parks and open spaces, it should be sited and designed to minimize rear lotting and to maximize public access and visibility.



Where appropriate, parks should incorporate best practice principles of sustainable design, including natural heritage enhancement, naturalized stormwater management features, use of native plant species, incorporation of environmental education features, use of low maintenance furnishings and equipment, and consideration of energy efficient facilities.

The standards enclosed in this document focus primarily on neighbourhood parks, community parks, and linear parks. Additional standards may complement those contained within this

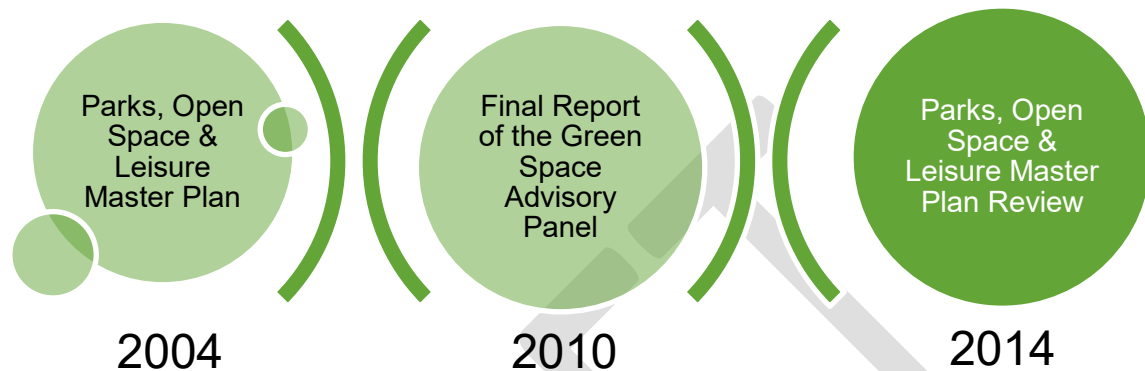
# Parkland Standards Development Review Manual

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document as they pertain to other parkland typologies, including regional parks, natural parks, cultural/historical or special purpose parks, and ecological reserves, as defined above.

### 3.4 Parks, Open Space & Leisure Master Plan



The City prepared its first Parks, Open Space & Leisure Master Plan in 2004, which established guidelines for the provision of parks, recreation, and leisure services and facilities based on an extensive needs assessment process. This version of the Master Plan was to provide direction for the following ten years (up to 2014). Since then, many of its higher priority recommendations have been or continue to be implemented across the City.

In 2014, the City reassessed needs and strategies through a Parks, Open Space & Leisure Master Plan Review upon successfully implementing much of its 2004 Master Plan, building on the City's Strategic Plan, the Leisure Services Strategic Plan, the Final Report of the Green Space Advisory Panel, and the Healthy Communities Strategic Plan, and in coordination with the five-year review of the City's Official Plan. The Parks, Open Space & Leisure Master Plan serves as the basis for the Official Plan policies referenced above.

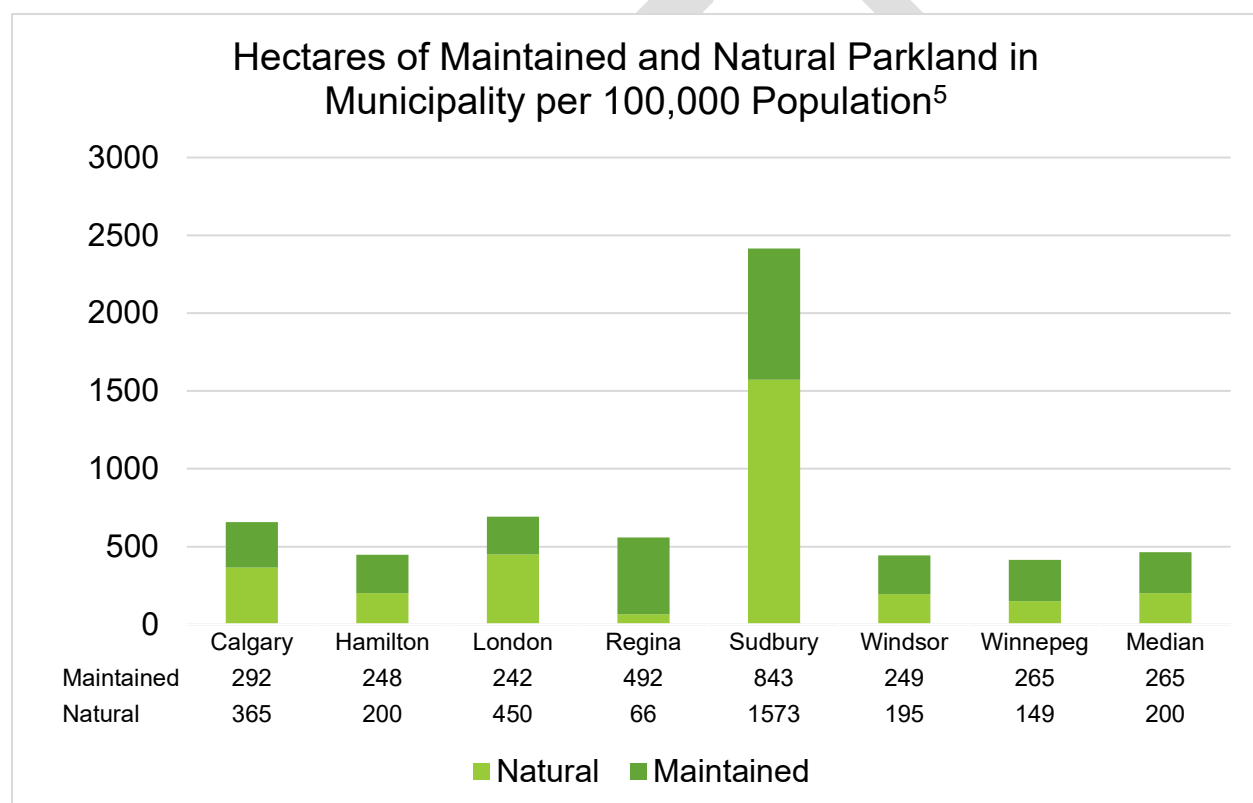
The Parks, Open Space & Leisure Master Plan provides a strategic framework, including guiding principles for parks, open space, and leisure facilities, and provides an overview of accomplishments and ongoing initiatives since the 2004 Master Plan. The Master Plan further outlines key parks, open space, and leisure trends, and provides a community profile and population forecasts. The Master Plan also details the results of the City's public engagement program and details the status of leisure facilities, parkland and trails, and the delivery of services and programs, providing recommendations within for each. Finally, the Master Plan provides an implementation strategy as well as a process for monitoring and updating the Master Plan. Readers should make reference to the Parks, Open Space & Leisure Master Plan<sup>4</sup> for additional context when using this manual.

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<sup>4</sup> City of Greater Sudbury. (2014, June). Parks, Open Space & Leisure Master Plan Review. <https://overtoyou.greatersudbury.ca/parks-open-space-and-leisure-master-plan-review>

### 4.0 Gaps in Existing Parkland Provision by Service Area

The City is home to an abundance of parks and open space across its various communities. According to the 2021 Municipal Benchmarking Network of Canada Performance Report, the City has a vastly higher proportion of hectares of maintained and natural parkland per 100,000 population when compared to similarly sized municipalities in southern Ontario, across Canada, and the median of all municipalities sampled.<sup>5</sup> However, when it comes to the location of existing parks, there are fewer parks that are located within a five or ten-minute walk of existing residential neighbourhoods where residents can access the park on foot without crossing major barriers, such as crossing a highway or busy arterial street. Given the abundant supply of parkland across the City as a whole, it is of the utmost importance to ensure that planning for the future acquisition of parks take into consideration the existing supply of parkland, the gaps where parks are needed to serve residents of Greater Sudbury, and the types of parks that are most needed in each community.



Using available geographic data from the City of Greater Sudbury on the location of existing parks, a gap analysis was conducted to highlight areas within the City's urban fabric that are underserved by parks. These areas represent priorities for the City to acquire parkland rather than cash-in-lieu as part of the subdivision process. Areas were identified as gaps using the location of existing parks in the City and the Official Plan's proximity standards for each parkland typology:

<sup>5</sup> Municipal Benchmark Network of Canada Performance Report. (2021).  
<https://mbncanada.ca/app/uploads/2022/10/2021-Parks.pdf>

# Parkland Standards Development Review Manual

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- **Neighbourhood Parks:** within a 10-minute walk (800 metres) of residential areas without crossing major barriers



- **Linear Parks:** within a 10-minute walk (800 metres) of residential areas without crossing major barriers



- **Community Parks:** within a 20-minute walk (1600 metres) of residential areas without crossing major barriers

To capture the areas served by existing parks within the City, 800 metre or 1,600 metre buffers are calculated around the locations of existing parks (i.e., an 800-metre buffer for neighbourhood and linear parks and a 1,600-metre buffer for community parks). These buffers can then be further refined using the City's zoning fabric to isolate residential areas and network analysis to consider major barriers, such as crossing a highway to access the park. The areas that are within or outside of these proximity standards are mapped on an online, interactive GIS platform that can be referenced to identify the types of parks that may be missing from an area of the City where a proposed subdivision may be located. For the most up-to-date information on the provision of parkland within the City, please visit the interactive online mapping available on the City's website.

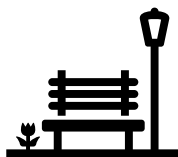
### Targets for All Communities



Increased provision of linear parks, which serve as a connector linking different areas of the City, for passive or active recreational purposes

### Targets for Select Communities

Increased provision of parks of any type (in no particular order of priority):



- Azilda
- Coniston
- Copper Cliff
- Dowling
- Falconbridge
- Garson
- Whitefish

In the initial concept planning phases of a proposed application, consideration should be given to the type of park that is most needed in the community where the proposed subdivision is located. Applicants should reference the online mapping of this gap analysis to consider the most up to date information.

## 5.0 Development Standards by Parkland Classification

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### 5.1 Neighbourhood Parks



Simon Lake Park (Source: [City of Greater Sudbury](#))

#### 5.1.1 Purpose of Neighbourhood Parks

A neighborhood park's primary purpose is to meet the recreational needs of its immediate neighborhood. This could include a playground, passive space with benches, paths, informal natural areas, or other options. By nature, a neighborhood park's use is fluid and should change over time to adapt to neighborhood growth.

**Additional Characteristics:** Limited non-organized sport group activities are encouraged where various age groups can play simultaneously, with emphasis on the youth. A neighborhood park is built and designed typically for 20-minute to one-hour experience.

Examples of Neighbourhood Parks:

- Simon Lake Park
- Autumnwood Playground
- McFarlane Playground
- Ravine Park

#### Facilities and Features:

- Safe pedestrian access.
- May contain play equipment, room for casual play, shaded rest areas.
- May also contain open space, natural areas, walking paths and other features
- Planting (tree, shrubs, grasses) comprises of diverse species tolerant of urban conditions, with an emphasis on native species.



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East Street Playground (Source: [Greater Sudbury](#))



Selkirk Park (Source: [Greater Sudbury](#))

**Service Standard:** 0.25 ha per 1000 residents, within 800m without crossing a major barrier

**Size:** Typically, 0.2 to 1 hectare

**Location:** Generally located along local roads and linked to the existing parks network. May be located adjacent to other open space lands, such as conservation lands, valleys, and stormwater management facilities.

### 5.1.2 Planning Guidelines for Neighbourhood Parks

#### General Guidelines

- Designed to be a neighbourhood focal point, with a central green space allowing for a range of passive and active recreational uses
- Used to address gaps in the existing parks system and provide connections to facilities not in the network
- Designed with safety in mind, adhering to Crime Prevention through Environmental Design (CPTED) principles.
- Designed with consideration to near neighbours, including consideration for light and noise pollution.
- Incorporate visually attractive edges and clear views into the park
- Include public art or architectural landscape features that enhance the character
- Preserve mature and existing trees and existing natural features, where appropriate
- Plant deciduous trees in group for shade and canopy cover
- Incorporate stormwater management facilities within the proposed park design, as described in Section 7.0 of this manual

#### Access

- Pedestrians, especially those vulnerable, such as children, older adults, and those with disabilities, should not have to cross a major barrier (e.g., arterial road, railway, etc.) to access a neighbourhood park.
- Limited parking is recommended due to proximity to residential neighbourhoods. Depending on location, one or two off-road parking spots is strongly encouraged for accessibility reasons, but is not required.
- Bike racks should be provided to encourage an alternative to vehicular travel and to encourage active means of transportation.
- Neighbourhood parks should be linked to the municipal trail and sidewalk systems where provided, with sidewalks provided along street frontages
- Use surfacing that accommodates anyone using a mobility device (e.g., cane, walker, wheelchair, scooter) and minimizes injury from falls.

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- Pathways to and throughout the play space should provide circulation/access to all spaces/equipment.
- Pathways should be wide enough for two people using wheelchairs to travel side-by-side (minimum clearance of 1.5 m).



Outdoor fitness equipment  
(Source: [Bryan Cooper](#))



Adventure-based play equipment  
(Source: [Northern Ontario Travel](#))



Independent playground equipment  
(Source: [Sudbury.com](#))

### Playground Equipment

- Ideally, playground equipment is installed within a play area a minimum size of 20' x 60', with a ground surface of sand, or if the budget allows wood chips or engineered wood fibre.
- Ground surface should be firm and stable to accommodate users with mobility devices, yet resilient enough to absorb impact for injury prevention in the area around the play equipment.
- Provide sufficient clearance in and around the play space to allow children with various disabilities and their caregivers room to move around the space.
- There should be a focus on independent playground equipment that is geared for ages 2 to 12, which at a minimum includes one slide.
- Equipment should encourage adventure and fitness, while incorporating and blending into the park's natural setting.
- Accessibility features, such as active play and sensory components, are to be incorporated.
- A minimum of one swing bay is recommended, with a minimum of one belt swing and one infant swing. Considerations should be made for accessible and intergenerational swings, pending the availability of these types of swings at other parks in the area.



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Picnic table seating  
(Source: [Greater Sudbury](#))



Example of park signage  
(Source: [Marianne Giordano](#))



Bench seating at Howard Armstrong  
Recreation Centre  
(Source: [Greater Sudbury](#))

### Amenities

- **Seating:** A combination of seating should be provided, with a minimum of two of the following units, in any combination:
  - 6' perforated metal benches anchored to 4' wide concrete slabs
  - 6' picnic tables anchored to 5' concrete slabs
- **Shade Structures:** Where suitable, small, covered shelters, such as 10' x 20' wood or metal gazebos, either on 7'6" footings or a 5" tapered, brush finished concrete slab, can be provided
- **Servicing:** Typically, neighbourhood parks are not serviced for wastewater/water. As neighborhood parks exist adjacent to residential homes with intended stays of 20 minutes to an hour, provision of water source and washroom facilities is not recommended.
- **Waste Receptacles:** Seasonal waste receptacles are recommended as the probability of food and drink consumption during winter is limited. Seasonal receptacles should be portable in nature, light weight and stackable for maximum efficiency of travel. Portable waste receptacles could potentially match the inserts of their permanent counterparts. Pet waste dispensers should be considered.
- **Signage:** Parks signage should be clearly placed at all entrances/exits to the park and should be consistent with the City's visual identity program, describe the park name, its available amenities, contact for repairs and prohibited activities.
- **Fencing:** Where CSA guidelines require the use of fencing to separate play areas from adjacent roads, a 4' chain link fence is to be installed. Where hard fencing is not a requirement, vegetative buffers (e.g., a hedge) should be considered to separate areas.
- **Stormwater Management:** Some neighbourhood parks may be able to incorporate low-impact development stormwater management features.

### 5.2 Community Parks



Twin Forks Playground (Source: [Alana Pickrell](#))

#### 5.2.1 Purpose of Community Parks

A community park's primary purpose is to provide the space and supportive facilities needed for active recreation in the community. A community park is characterized by sports fields and/or other sports facilities, but often includes opportunities for other uses such as play equipment, paths, picnic areas, or natural areas. A community park will often meet nearby residents' needs for a park in their neighborhood (and so is understood to play a dual role as a neighborhood park for that area). However, distinct from a neighborhood park, a community park is designed to serve the active recreational needs of the wider community.

**Additional Characteristics:** A community park would service various ages, with emphasis on organized sport group activities and potential protection of natural areas. Community parks are built and designed typically for a two-to-three-hour experience.

Examples of Community Parks:

- Twin Forks Playground
- Delki Dozzi Complex
- Lorne Brady Park
- Countryside Arena
- Copper Cliff Playground

#### Facilities and Features:

- Facilities for active recreation such as sports fields, hard courts, outdoor rinks, field houses, beaches, picnic areas, paths, natural areas. May contain play equipment, room for casual play, shaded rest areas.
- Safe pedestrian and bicycle access, access by public transit, and sufficient parking.

# Parkland Standards Development Review Manual

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**Service Standard:** 1.5 ha per 1000 residents, within 1600m without crossing a major barrier

**Size:** Typically, 2 to 10 hectares

**Location:** Located along collector roads, generally at major intersections. May be located adjacent to other open space lands.

### 5.2.2 *Planning Guidelines for Community Parks*

#### **General Guidelines**

- A focal point, unique to the community in which they are located
- Located within the existing parks network
- Designed with safety in mind, adhering to CPTED principles
- Programmed and lit to minimize disturbance to nearby residents
- Incorporate visually attractive edges and clear views into the park
- Include public art or architectural landscape features that enhance the character
- Preserve mature and existing trees and existing natural features, where appropriate
- Incorporate stormwater management facilities within the proposed park design, as described in Section 7.0 of this manual

#### **Access**

- Pedestrians, especially those vulnerable, such as children, older adults, and those with disabilities, should not have to cross a major barrier (e.g., arterial road, railway, etc.) to access a community park.
- Medium sized parking lot (approximately 10 spots with dedicated accessible parking) is required as the community parks services more than the neighbourhood and residents can be expected to drive to this location for organized events.
- Bike racks should be provided to encourage an alternative to vehicular travel and to encourage active means of transportation.
- Use surfacing that accommodates anyone using a mobility device (e.g., cane, walker, wheelchair, scooter) and minimizes injury from falls.
- Pathways to and throughout the play space should provide circulation/access to all spaces/equipment.
- Pathways should be wide enough for two people using wheelchairs to travel side-by-side (minimum clearance of 1.5 m).



# Parkland Standards Development Review Manual

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Incorporating sensory features  
(Source: [City of Greater Sudbury](#))



Incorporating universal design  
(Source: [American Society of Landscape Architects](#))

### Playground Equipment

- Ideally, playground equipment is installed within a play area a minimum size of 50 x 100', with a ground surface of chips or engineered wood fibre as the preferred treatment, or sand, which may be considered at the discretion of the City.
- Ground surface should be firm and stable to accommodate users with mobility devices, yet resilient enough to absorb impact for injury prevention in the area around the play equipment.
- Provide sufficient clearance in and around the play space to allow children with various disabilities and their caregivers room to move around the space.
- There should be combination of play structures and independent equipment that is geared to ages 2 to 12, with a minimum of two slides.
- Equipment should encourage adventure and fitness, while incorporating and blending into the park's natural setting.
- Accessibility features, such as active play and sensory components, are to be incorporated. Play structures must include accessibility features. Themed playgrounds are to be considered where suitable to the local area/community.
- Opportunities for adult fitness equipment should be considered.
- A minimum of two swing bays recommended with a minimum of one belt swing and one infant swing. Accessible and/or intergenerational swings are to be included.

# Parkland Standards Development Review Manual

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### Amenities

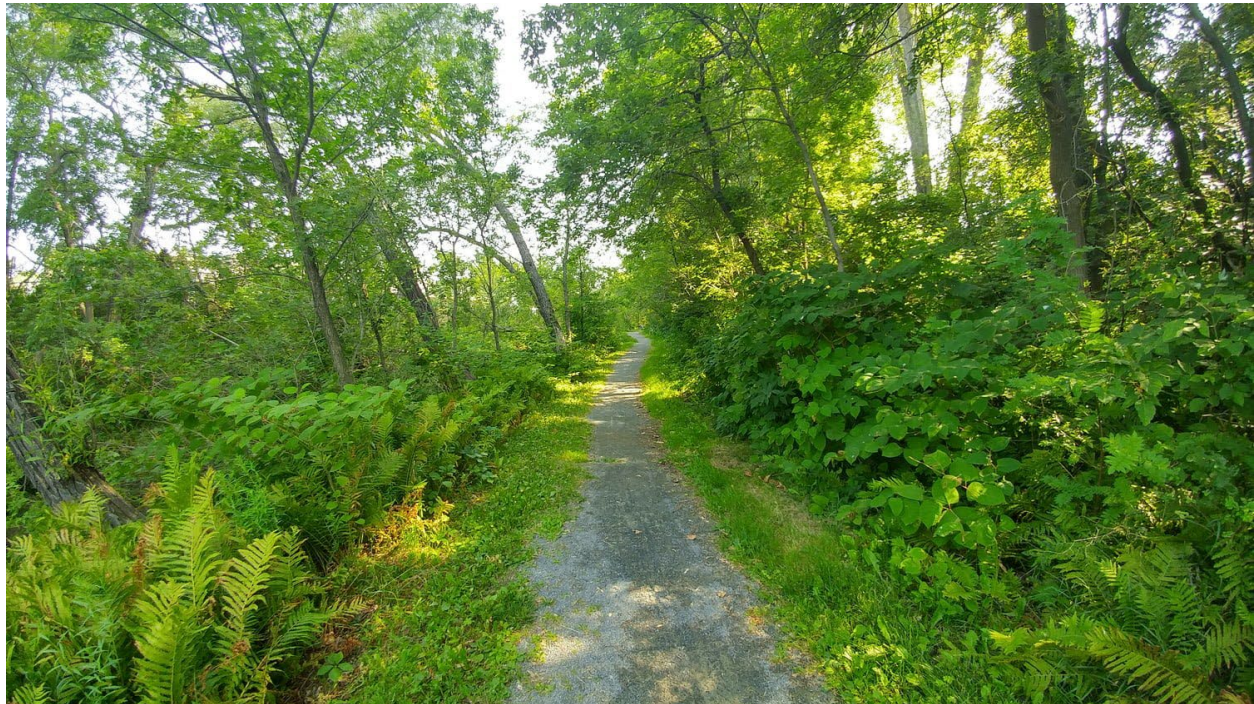


Sports field lighting (Source: [City of Greater Sudbury](#))

- A combination of seating should be provided, with a minimum of two of the following units, in any combination:
  - 6' perforated metal benches anchored to 4' wide concrete slabs
  - 6' picnic tables anchored to 5' concrete slabs
- Additional bleacher seating may be required to support organized play surfaces/courts
- Community parks are suitable locations for small to medium covered shelters (10' x 20' to 20' x 40'), ideally made of metal materials
- Exterior water fountains should be made available at community parks, attached to existing building structures (e.g., canteens, field houses, maintenance buildings)
- Portable washroom facilities to be considered for community parks as the parks serve as a hub for more than the immediate neighborhoods' use. Typical stays of two or more hours would necessitate facilities for multiple segments of the population that would require the use of a washroom. Seasonal rental, not permanent installation, should match Park usage programs for organized sporting events.
- Permanently installed waste receptacles are recommended based the probability of food and drink consumption over the two-to-three-hour site visit. Permanent receptacles should sit on a 3' x 3' concrete pad and be anchored into it. Receptacles should consist of a perforated metal outer sleeve of a 30" diameter that is anchored to the slab with a removable insert that can be replaced as needed. Planned provision of additional portable waste receptacles for organized sporting events should be accounted for as well. Portable waste receptacles could potentially match the inserts of their permanent counterparts. Pet waste dispensers are recommended for community parks.
- Community park lighting is designed to facilitate active recreation use and as such would match the appropriate criteria for rink, court or field lighting, as per the Parks Design Guidelines. Lighting should be controlled to enable organized sporting event use only. Parking lot lighting should be permanent for safety reasons.
- Parks signage should be clearly placed at all entrances/exits to the park and should be consistent with the City's visual identity program, describe the park name, its available amenities, contact for repairs and prohibited activities.
- Where CSA guidelines require the use of fencing to separate play areas from adjacent roads, a 4' chain link fence is to be installed. Where hard fencing is not a requirement, vegetative buffers (e.g., hedge) should be considered to separate areas. Sport specific fencing should exist that compliments the use of the court, field or rink and match the guidelines for each.



### 5.3 Linear Parks



**Junction Creek Waterway Park** (Source: [Junction Creek Stewardship Committee](#))

#### 5.3.1 Purpose of Linear Parks

Linear parks provide open space connections within and between communities through a formal pathway network. They should accommodate a regional pathway or perform a linear recreation function for the community as a whole by providing local or regional pathway links to education, recreational, and open space features.

Example Linear Parks:

- Roxborough Greenbelt
- Junction Creek Waterway
- Beatty Municipal Park
- Mallard's Landing

**Service Standard:** Linear parks should be within a 10-minute walk (800 m) of residential areas without crossing a major barrier.

**Size:** A minimum width of 10 m and a maximum width of 20 m

### 5.3.2 Guidelines for Linear Parks

- Linear parks should be designed to promote pedestrian access while protecting the surrounding natural context in which the park is located and should follow the “path of least resistance”.
  - Bridges or boardwalks may be required where soils are waterlogged or susceptible to compaction or erosion.
  - Where possible, locate linear parks outside of the critical root zone of mature trees to prevent root-zone compaction.
  - Vista locations may be incorporated at points of interest along the path, where park users can access and experience natural areas while minimizing interference with natural functions.
- Linear parks must be designed to adhere to best practices for accessible design and requirements in the [\*Accessibility for Ontarians with Disabilities Act\*](#), such as:
  - Meet minimum clear width (1 m) and height (2.1 m) specifications.
  - Have a firm and stable surface.
  - Meet restrictions on the size of surface openings (must not allow passage of an object that has a diameter of more than 20 mm), and orient elongated openings perpendicular to the direction of travel.
  - Meet specifications on edge protection (50 mm) when located beside water or a drop-off, except where a protective barrier already exists.
  - Provide minimum clear width at its opening (0.85 m to 1 m), regardless of entrance design (e.g., gate, bollard, etc.).
- Bilingual signage or marking indicating pedestrian and/or cycling use provided in high-use situations. All signage must contain information about the physical characteristics of the trail, including:
  - Length of trail
  - Type of surface of which the trail is constructed
  - Average and minimum trail width
  - Average and maximum running slope and cross slope
  - Location of amenities, where provided
  - Regulatory signage (e.g., no motor vehicles) used where necessary.
- Safe pedestrian and cyclist connections shall be provided between the park, street, and sidewalk systems.
  - The intersections of linear parks with street rights-of-way shall be designed as path entrances and may include site furniture and features consistent with the streetscape design.
  - Entry markers shall be provided at park entrance locations to make points of entry more identifiable.
  - Pedestrian lighting shall be considered within park paths and at path entrances on a site-specific basis.
- Waste receptacles shall be located at accessible key points along pathways designed to accommodate maintenance vehicles.
- Incorporate stormwater management facilities within the proposed park design, as described in Section 7.0 of this manual.

## 6.0 Park Design Considerations

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### 6.1 Accessibility for Ontarians with Disabilities Act (AODA)

Recreation Services of the City is committed to the development of an inclusive, healthy and safe community by providing accessible programs, services, and facilities for everyone to enjoy, and to preventing, identifying, and removing barriers that impede the ability of people with disabilities from accessing those programs, services, and facilities. All parks shall meet the [Accessibility for Ontarians with a Disability Act \(AODA\)](#) requirements.

The City recently adopted the [2022-2027 Multi-Year Accessibility Plan](#), which outlines the strategic choices that the City will prioritize through initiatives and goals that target the assurance that its citizens will have access to an inclusive and equitable community free of barriers. The Plan establishes five key priorities that the City can use as foundations to ensure it reaches its goals of

<b>Accessible Communication</b>	<ul style="list-style-type: none"><li>• Improving and standardizing wayfinding strategies and the technology which supports these through city services, programs, and facilities.</li><li>• Increasing the number of accessible documents, forms, and presentations available to the public.</li></ul>
<b>Accessible Education &amp; Awareness</b>	<ul style="list-style-type: none"><li>• Placing accessibility at the forefront of any initiatives, decisions, and projects.</li></ul>
<b>Accessibility by Design</b>	<ul style="list-style-type: none"><li>• Continuing to improve on standardizing accessible requirements in new projects and renovations of facilities.</li><li>• Continuing to increase the number of accessible event spaces available throughout the city.</li></ul>
<b>Accessible Community Mobility</b>	<ul style="list-style-type: none"><li>• Improving wayfinding, maps, and technology that assist residents with navigation.</li><li>• Continue to consult the public, persons with disabilities and Accessibility Advisory Panel on best practices for community mobility.</li></ul>
<b>Access to Recreation</b>	<ul style="list-style-type: none"><li>• Improve the city's numerous walking and trail paths.</li><li>• Increased provision of accessible green space throughout the city.</li><li>• Continuing to improve/increase accessible parking at recreational facilities.</li><li>• Improve/increase signage and wayfinding for outdoor recreational services.</li></ul>

becoming a more diverse and accessible city, as shown below.<sup>6</sup>

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<sup>6</sup> City of Greater Sudbury. (2022). 2022-2027 Multi-Year Accessibility Plan. <https://www.greatersudbury.ca/city-hall/accessibility/accessibility-plans-policies-and-reports/accessibility-plans/city-of-greater-sudbury-2022-2027-multi-year-accessibility-plan/>



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### 6.2 Crime Prevention through Environmental Design Principles

Crime Prevention through Environmental Design (CPTED) principles include the concept that the physical environment can be manipulated for the purpose of influencing certain desired human behaviour. CPTED design strategies which can reduce the fear and incidence of crime and improve the quality of life include the following strategies <sup>7</sup>



#### Natural Surveillance

- Design strategy directed at keeping intruders under observation by other users of the space or from surrounding areas
- Example: providing clear sightlines between public and private spaces



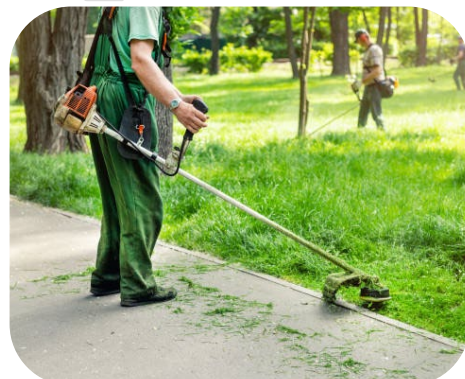
#### Natural Access Control

- Design strategy directed at decreasing crime opportunities by denying access to a crime target and creating a perception of risk for potential offenders
- Example: Designing public spaces that attract rather than discourage people from gathering



#### Territorial Reinforcement

- Design strategy that realizes that physical design can create or extend a sphere of influence so that users of the property develop a sense of proprietorship
- Example: having distinct transitions/boundaries between public and private areas



#### Space Management

- Creating a cared for image through proper maintenance regime and encouraging design that promotes pride and a sense of place for the community
- Example: quickly removing graffiti

<sup>7</sup> Crime Prevention Through Environmental Design Principles. (2023). CPTED Canada.  
<https://cptedcanada.com/cpted-principles/>

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### 6.3 Age-Friendly Community Planning

The World Health Organization (WHO)<sup>8</sup>, in their [Global Age-Friendly Cities Guide](#), proposes an “age-friendly cities” framework, which includes eight interconnected domains that can help to identify and address barriers to the well-being and participation of older people.



Community and Health Care



Transportation



Housing



Social Participation



Outdoor Spaces & Buildings



Respect & Social Inclusion



Civic Participation & Employment



Communication & Information

### WHO Age Friendly Checklist for Outdoor Spaces & Buildings<sup>5</sup>

#### *Green Spaces and Walkways*

- ✓ There are well-maintained and safe green spaces, with adequate shelter, toilet facilities and seating that can be easily accessed.
- ✓ Pedestrian-friendly walkways are free from obstructions, have a smooth surface, have public toilets and can be easily accessed.

#### *Outdoor Seating*

- ✓ Outdoor seating is available, particularly in parks, transport stops and public spaces, and spaced at regular intervals; the seating is well-maintained and patrolled to ensure safe access by all.

#### *Pavements*

- ✓ Pavements are well-maintained, smooth, level, non-slip and wide enough to accommodate wheelchairs with low curbs that taper off to the road.
- ✓ Pavements are clear of any obstructions (e.g., street vendors, parked cars, trees, dog droppings, snow) and pedestrians have priority of use.

<sup>8</sup> World Health Organization. (2007). Global Age-friendly Cities: A Guide.  
<https://apps.who.int/iris/handle/10665/43755>

### 7.0 Parks and Stormwater Management Facilities

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Stormwater management (SWM) refers to a set of design principles and techniques to mitigate the effects of the increased quantity and quality of runoff, in line with the following objectives:



Ensure that the constraints and opportunities associated with urban drainage are properly recognized and are integrated into community plans and designs;



Reduce, to acceptable levels, the potential risk of health hazards, loss of life and property damage from flooding;



Reduce, to acceptable levels, the incidence of inconvenience caused by surface ponding and flooding;



Ensure that the quality of stormwater reaching outlet-receiving lakes and rivers meets provincially accepted criteria;



Ensure that any development or redevelopment utilizes best management practices such as low impact development, minimizes the impact of change to the groundwater regime, increased pollution, increased erosion, or increased sediment transport, especially during construction;



Maintain the natural stream channel geometry, insofar as it is feasible while achieving the above objectives; and,



Build resilience to climate change.

As part of the application process for a draft plan of subdivision, the applicant will generally be required to prepare a SWM report to demonstrate how the proposed development will manage stormwater. For developments in Greater Sudbury this analysis will typically be guided by an overarching watershed study (e.g., Junction Creek Watershed Study) that outlines particular requirements and SWM objectives within the area of the subject site – refer to Section 7.2 of these standards. The SWM report will include the following items:

- ✓ The overall drainage plan for the site, indicating upstream drainage areas conveyed across the site and the ultimate outlet (major overland flow route) from the site to the municipal drainage system;
- ✓ A plan of proposed on-site stormwater quantity control measures that will satisfy downstream capacity issues. Post-development peak flow rates from the site will be limited to pre-development peak flow rates, unless detailed analysis shows that such storage is not required;
- ✓ A plan for erosion control;
- ✓ A description of the measures proposed to control stormwater quality on-site. In particular, special measures must be proposed where a site is intended for industrial development; and,
- ✓ A general grading plan, illustrating conformance with the City's overall stormwater management objectives.

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### 7.1 Low Impact Development & Green Infrastructure

Parks and open spaces can play a vital role in providing stormwater management facilities in subdivision developments. The provision of green infrastructure has numerous benefits to the natural environment (e.g., water quality, flood control, improved infiltration, increased groundwater recharge and cleaning, improved biodiversity), to the built environment (e.g., protection of infrastructure, enables smart growth development), and to the community as a whole (e.g., engaging community members in environmental education and stewardship opportunities, aesthetic improvements to landscapes, and overall cost savings).

Best management practices for stormwater management through the use of green infrastructure may include rain gardens, porous pavement, vegetated swales, naturalized infiltration basins, streambank and/or floodplain restoration, and stormwater runoff capture and/or reuse. Low impact development practices are to be designed in accordance with Ministry of Environment, Conservation, and Parks (MECP) guidelines and the Toronto and Region Conservation Authority (TRCA) Low Impact Development guidelines as an interim guideline. As of 2023, the MECP has published the [Low Impact Development Stormwater Management Guidance Manual \(2022\)](#) in draft format for public review. In the interim, applicants are to consult the [Low Impact Development Stormwater Management Planning and Design Guide](#) published by the TRCA in partnership with Credit Valley Conservation and the Lake Simcoe Conservation Authority, as well as the previous [Stormwater Management Planning and Design Manual \(2003\)](#) developed by the MECP. Low-impact development and green infrastructure practices must be matched to the natural and operational constraints found throughout the City of Greater Sudbury, as there is not a one-size-fits-all approach to naturalized stormwater management.

#### Best management practices for green infrastructure

<b>Rain Gardens</b>	<ul style="list-style-type: none"><li>• Shallow depressions in the ground planted with various native plants to treat and capture stormwater runoff</li></ul>
<b>Porous Pavement</b>	<ul style="list-style-type: none"><li>• Allows precipitation to soak into the ground rather than allowing water to quickly run off, as with regular paving</li></ul>
<b>Naturalized Infiltration Basins</b>	<ul style="list-style-type: none"><li>• Depressions in the ground that provide temporary storage and infiltration of runoff</li></ul>
<b>Streambank and/or Floodplain Restoration</b>	<ul style="list-style-type: none"><li>• Grading streambanks to make them less steep, planting trees and other native vegetation, creating pools and meandering channels in the stream, and restoring wetlands</li></ul>
<b>Stormwater Runoff Capture and/or Reuse</b>	<ul style="list-style-type: none"><li>• May consist of a simple rain barrel attached to the gutter downspout on a visitor center building to more complex underground storage tanks or cisterns</li></ul>



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### 7.2 Subwatershed Planning

The City of Greater Sudbury is home to 330 lakes within 25 watersheds that drain into Lake Huron and as such, watershed protection is an important priority, as highlighted in the City's Official Plan.

As such, the City has completed the following watershed studies to be consulted where appropriate to the proposed development. These plans identify measures for stormwater quantity and quality at a subwatershed scale in order to provide a coordinated strategy for stormwater management for all development within individual subwatershed. Applicants are to consult the applicable subwatershed plans where relevant to the location of any proposed development in their design of stormwater management facilities within park blocks.

#### 7.2.1 Ramsey Lake Subwatershed Study and Master Plan

The [Ramsey Lake Subwatershed Study and Master Plan](#) was completed in February 2022 in recognition of the lake's importance as a municipal drinking water source as well as its unique geological features. This Subwatershed Study and Master Plan assessed the sensitive environmental features and functions within the Ramsey Lake subwatershed and identified constraints, opportunities, and environmental impacts associated with existing urban development as well as proposed future land use changes.

#### 7.2.2 Algonquin Road Watershed Stormwater Management

The [Algonquin Road Watershed Stormwater Management Class Environmental Assessment](#) was completed in 2004 to identify ways and means to control quantity and address quality of stormwater within the Algonquin Road Watershed during minor and major rainfall/snowmelt events for both pre-development and post-development conditions.

#### 7.2.3 Junction Creek Watershed Study

The [Junction Creek Watershed Study](#) was completed in 2019 to establish measures to protect, maintain, and enhance surface and groundwater quantity and quality through the implementation of integrated strategies and policies to support the realization of a practical and executable management plan. The Junction Creek Subwatershed consists of an area of 320 square kilometres, the majority of which lies within the City of Greater Sudbury.

### 7.3 Engineering Guidelines for Stormwater Management

Applicants are advised to reference the City's [Stormwater Management Design Guide](#) for engineering guidelines for stormwater management, which include reference guides for low impact development. The Stormwater Management Design Guide provides guidance to City staff, the development community, and their consultants regarding stormwater management and erosion/sediment control requirements for the City of Greater Sudbury.



## 8.0 Park Development Process

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The park development process described in this document is designed to ‘front end’ the parkland dedication discussion to the draft plan of subdivision approval stage in the land development process to give Council, City staff, the Developer, and residents greater certainty on the type, location and design features that will be constructed as early as possible in the process.

Traditionally, the City has implemented the parkland dedication provisions of the *Planning Act* through the land division process, including subdivisions, condominiums, and consents. This document describes the two main methods that the City has traditionally used to create new parks in the City: city-built park development and developer-built park development. Both options assume that the developer has decided to ‘pre-service’ the subdivision instead of ‘pre-register’.

The City has the ability to require parkland dedication outside of the land division process as intensification occurs in the community. This authority is conditional upon the City passing a parkland dedication by-law to enable the dedication. Should the City require parkland dedication for development applications that propose intensification at the rezoning, site plan, or building permit stages of the approval process, this document should be updated to define the business process that will be followed in such instances.

Depending on the location of the proposed subdivision and the supply of existing parkland in the service area in which the proposed subdivision is located, the City may choose to require cash in lieu of parkland contribution. The choice between parkland dedication and cash in lieu will be made at the pre-consultation stage of the application and ratified by Council at the draft plan of subdivision approval stage of the application.

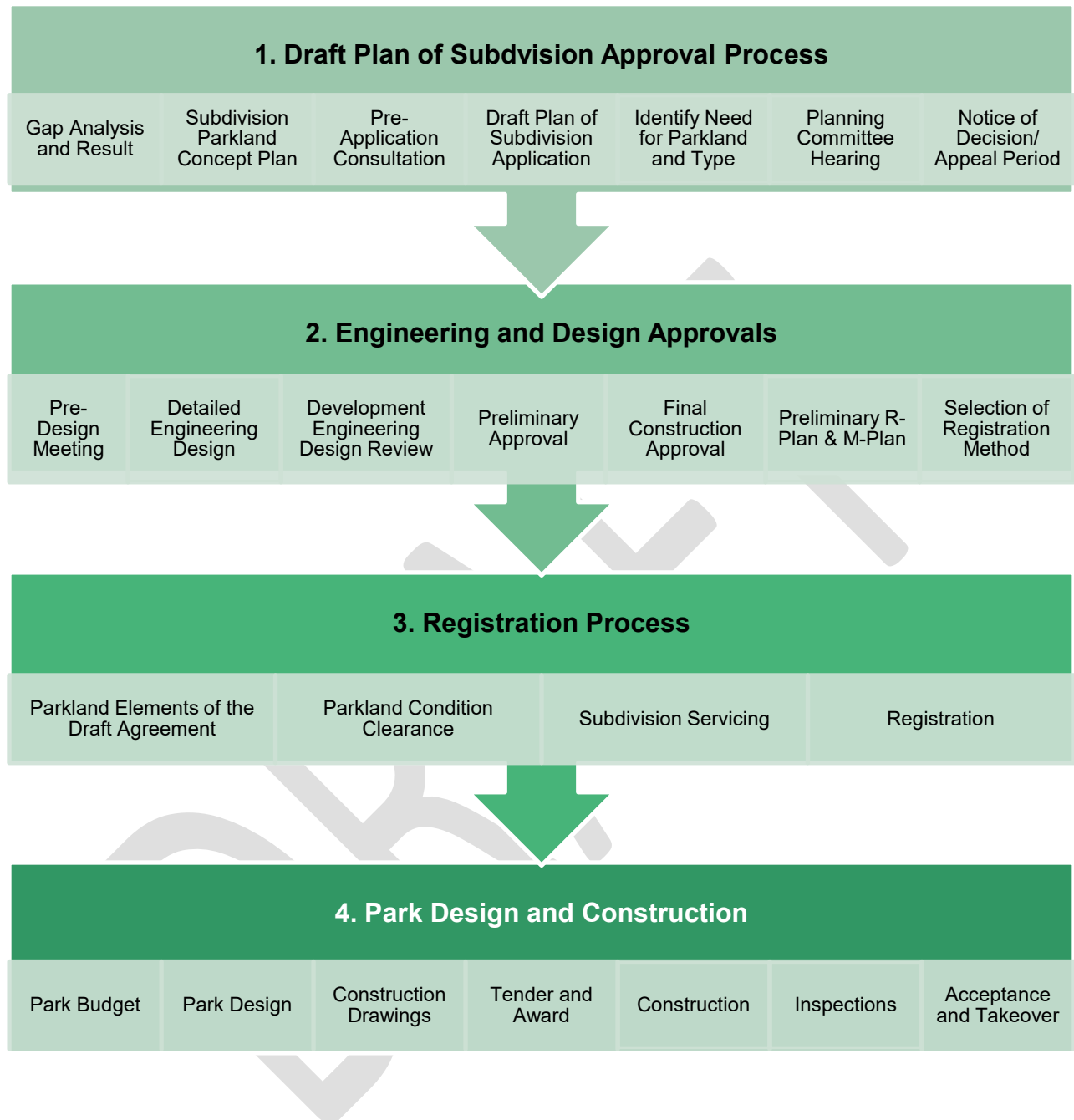
### 8.1 Process for City-Built Park Development

This section describes the process for the development of City-built parks. In this option, the park location and design are established through the draft approval process. The conditions of draft approval require that the Developer completes the requirements for park block preparation based upon specific needs established by Leisure Services (e.g. grading, servicing). The park block is conveyed to the City upon registration of the first phase of the subdivision. The City is responsible for designing and constructing the new park, which would occur at the same time as the homes in the subdivision are constructed.

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### 1. Draft Plan of Subdivision Approval Process

Gap Analysis and Result	The Developer works with their qualified professional (e.g., professional planners, GIS technologists) to (1) assess the gaps in current parkland provision within the Service Area and adjacent lands to the subject property proposed for development and (2) identify the appropriate type and location for future park development as part of the subdivision approval process.
Subdivision Concept Plan	The Developer works with their qualified professional (e.g., professional planners, civil engineers) to develop a concept plan for the subdivision. The developer and/or their qualified professional pre-consults with City staff (e.g., Leisure Services, Planning) to discuss the City's parkland requirements in the Service Area and options for the Concept Plan to address these requirements. If a land dedication is required (versus cash in lieu), the Concept Plan will illustrate the location of the proposed park block and park type (e.g., neighbourhood, linear, etc.).
Pre-Application Consultation	The Developer and/or their agent will prepare and submit a formal pre-consultation application form to the City. During the pre-consultation phase, City staff will review and confirm the proposed park type, block location and size and identify requirements to be addressed through the subdivision engineering design process (e.g., location along proposed roadway frontage, site grading, servicing, stormwater management) to enable the lands to be transferred to the City upon registration of the first phase of the subdivision. These requirements will be included in the pre-consultation Memorandum of Understanding provided to the Developer and/or their agent. Some of these requirements are to be addressed by the Developer's Professional Engineer (such as location, service connections to mains, and overall grading), and other items will be addressed by the City's park designer (details of park block, routing of site services, storm water management, detailed grading, access, landscaping, etc.).
Draft Plan of Subdivision Application	The Developer and/or their agent submits a complete subdivision application to the City, as required by the <i>Planning Act</i> . City staff review the application to ensure completeness, deems the application complete, issues notice of same, and circulates the application to internal and external departments/agencies.

In considering a draft plan of subdivision application, the City evaluates the merits of the proposal against criteria such as:

- conformity with provincial legislation including the criteria set out in section 53 of the *Planning Act*;
- Consistency with the Provincial Policy Statement;

# Parkland Standards Development Review Manual

## City of Greater Sudbury

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- Conformity with the Official Plan; and,
- Compliance with the Zoning By-laws.

Once the review and evaluation is complete, City staff prepare a report on the application to Planning Committee/City Council for consideration.

### Identify Need for Parkland and Type

As part of this process, City staff will confirm the park type, location, and specifications are in alignment with the requirements provided by Leisure Services in the Memorandum of Understanding, and that there are no issues associated with the conveyance of the block to the City for design and development as part of the first phase of the subdivision.

### Planning Committee Hearing

City staff will issue a Notice of Public Hearing before Planning Committee, in accordance with the *Planning Act*. At this hearing City staff will present their report on the application. The Developer and/or their agent may attend the hearing to present the proposed development and application. The public is invited to submit comments or speak at the public hearing. Once the public hearing is concluded, Planning Committee will make a decision on staff's recommendations, including conditions of draft approval. Planning Committee's decision is considered and ratified by Council. The conditions of draft approval define the requirements that need to be met to obtain final approval and registration, including parkland dedication requirements. Typically, draft approval is given for three years, which may be renewed, upon application of the Developer and/or their agent.

### Notice of Decision/Appeal Period

City staff will issue notice of Council's decision in accordance with the *Planning Act*, after which a 20-day appeal period begins. If no appeals are made, Council's decision is final. If appeals are submitted, the matter is referred to the Ontario Land Tribunal for determination.

## 2. Engineering and Design Approvals

### Pre-Design Meeting

The Developer and/or their consulting qualified professional (e.g., Professional Engineer) requests a pre-design meeting with City Staff to discuss the project, review Council's conditions of draft approval, and confirm the next steps for the project. The City retains the park designer, who attends the pre-design meeting to discuss the proposed park design and coordinates with the Developer's retained Professional Engineer.

### Detailed Engineering Design

The Developer's retained Professional Engineer prepares the detailed engineering design for the subdivision. The City's park designer prepares the conceptual design for the proposed park. The detailed engineering of the subdivision by the Developer's

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retained Professional Engineer is coordinated with the conceptual park design and includes details regarding block size and location, easements, grading, stormwater management, servicing, etc. Requirements for these features are provided by Leisure Services to the Developer's retained Professional Engineer such that they can be incorporated into the subdivision design.

### Development Engineering Design Review

The Developer and/or their agent submits the detailed engineering design package to the City for review. City staff circulate the detailed engineering design package to internal and external departments and agencies for review and comment, including the park designer. City staff compile these comments on the detailed engineering design and shared them with the Developer and/or their retained Professional Engineer. The Developer and their retained Professional Engineer update the detailed engineering design drawings, specifications and/or reports to address the City and other public agency comments. The detailed engineering design review and resubmission process can take one or multiple rounds to complete.

### Preliminary Approval

Once comments are addressed, City staff will issue preliminary approval of the detailed subdivision design including those aspects of the City-built park that are to be addressed in the overall subdivision design drawings. Note that site-specific items by the City's park designer will not necessarily be shown.

### Preliminary M-Plan and R-Plan

The Developer and/or their agent submits the preliminary Plan of Subdivision (M-Plan) and Reference Plan (R-Plan) to City staff for review and approval. The Draft Plan of Subdivision and Draft Reference Plan is to specify the proposed location, size, and frontage for the proposed park. City staff provide comment on the preliminary M and R Plans. The Developer and/or their agent revise the M and R Plans to address City staff comments.

### Selection of Registration Method

The Developer and/or their agent selects the method of registration (i.e., either conventional or pre-servicing registration) for the Plan of Subdivision.

## 3. Registration

### Parkland Elements of the Draft Agreement

City staff draft the subdivision agreement for the project and sends the draft agreement to the Developer and/or their agent for review. The Developer and/or their agent comments on the draft agreement. City staff finalize the agreement and forwards the agreement to the Developer and/or their agent for execution. As part of this process, City staff in the Development Engineering and Leisure Services departments are to specify any conditions



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## City of Greater Sudbury

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	specific to the parkland development that are to be included in the draft agreement.
Parkland Condition Clearance	The Developer and/or their agent satisfy all relevant conditions of draft approval as they relate to parkland development and provide evidence of same to City staff for confirmation.
Subdivision Servicing	As part of this process, the Developer constructs the works in the rights of way for the first phase of the subdivision and the proposed park block (i.e., grading, service connections to the block, stormwater management within the block). This work is done in accordance with the City's Certification Requirements for Subdivisions (as amended from time to time). <sup>9</sup>
Registration	Once all relevant conditions have been satisfied, the subdivision (or phase in the subdivision) is approved for registration. At this stage, the park block will be transferred to the City.

#### 4. Park Design and Construction

Park Budget	City staff meet with the park designer to review and confirm the scope based on the Conceptual Park Design prepared by City staff, as well as the schedule and budget for the proposed park design and construction.
Park Design	City staff and the park designer prepare a detailed plan for the park, including site and landscape design, access, site stormwater management features, routing of services, integration with surrounding natural and proposed features (e.g., adjacent proposed roads and lots, natural areas, proposed sidewalks, bike trails) and park amenities (e.g., buildings or structures, active sport fields, seating, and lighting). The detailed plan will be supported by a design brief that addresses community energy emissions, climate change adaptation, accessibility, and Crime Prevention Through Environmental Design (CPTED). The detailed plan is coordinated with the Developer's agent, as necessary.
Construction Drawings	Once the park design is finalized, City staff and the park designer prepare the construction drawings for the proposed park.
Tender & Award	City staff tenders and awards the park construction project in accordance with its purchasing requirements.

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<sup>9</sup> City of Greater Sudbury. (February 22, 2018). Subdivision and Off-Site Servicing Certification Requirements. <https://www.grandsudbury.ca/faire-des-affaires/planification-et-developpement/planning-pdf-documents/appendix-f-certification-requirements-subdivision-and-offsite-servicing-2018-02-22-pdf/>

# Parkland Standards Development Review Manual

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Construction	The successful constructor builds the park in accordance with the approved construction drawings. The constructor coordinates their work with the Developer and/or their agent and constructors, as necessary.
Inspections	Once park construction is substantially complete, City staff and the park designer inspect the park and identify any deficiencies, which are rectified by the constructor.
Acceptance & Takeover	Once all deficiencies are rectified, the City accepts the works and formally takes over the park for operations.

### 8.2 Process for Developer-Built Park Development

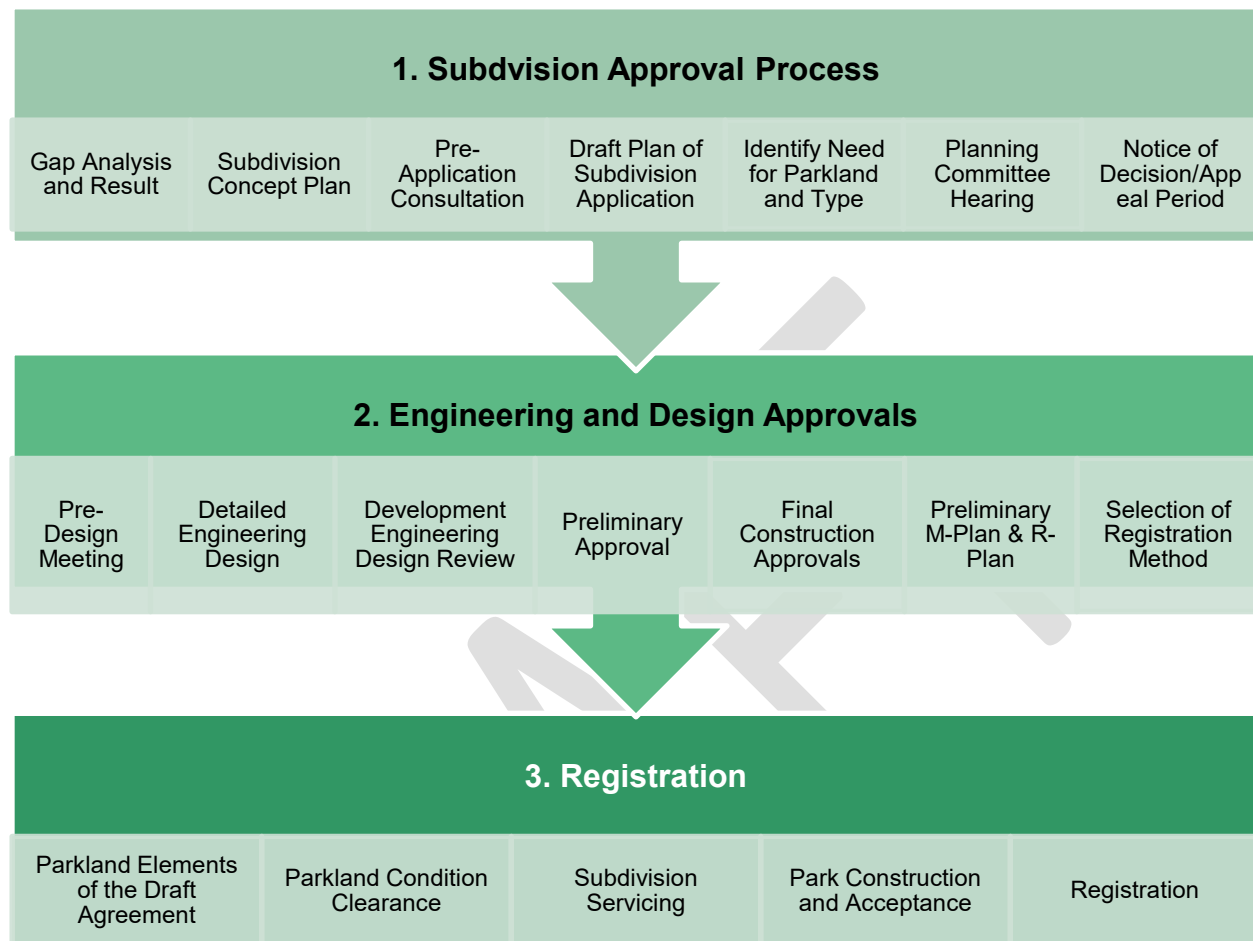
This section describes the process for the development of developer-built parks. Similar to the city-built option, in this option, the park location and design are established through the draft approval process. The conditions of draft approval require that the Developer completes the requirements for park block preparation and constructs the park, based on City of Greater Sudbury Standards (including park equipment suppliers) and in accordance with the City's Certification Requirements for Subdivisions, similar to linear and stormwater management infrastructure.

Once a concept plan is agreed upon by the Developer and City staff, the park plan and working drawings can be included in the Developer's submission of the subdivision design package for approval. Typically, the Developer is required to use pre-specified park suppliers and park systems. This timing will allow the Developer's retained Professional Engineer to prepare the design details of the park (e.g., equipment and park features, grading, servicing, drainage, landscaping, etc.) in parallel with the subdivision lot grading and servicing plans. This will result in common lot lines that work both for the park's functions and the adjacent homeowner and a park that will not require major cutting or filling to provide a neighbourhood or community park. The intent of this process is that the park is constructed prior to the homes in the subdivision being constructed.

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### 1. Draft Plan of Subdivision Approval Process

**Gap Analysis and Result** The Developer works with their qualified professional (e.g., professional planners, GIS technologists) to (1) assess the gaps in current parkland provision within the Service Area and adjacent lands to the subject property proposed for development and (2) identify the appropriate type and location for future park development as part of the subdivision approval process.

**Subdivision Concept Plan** The Developer works with their qualified professional (e.g., professional planners, civil engineers) to develop a concept plan for the subdivision. The developer and/or their agent pre-consults with City staff (e.g., Leisure Services, Planning, and others) to discuss the City's parkland design requirements and specifications in the Service Area and options for the Concept Plan to address these requirements. If a land dedication is required (versus cash in lieu), the Concept Plan will illustrate the extent (size) and location of the proposed park block and park type (e.g., neighbourhood, linear, etc.).

**Pre-Application Consultation** The Developer and/or their agent will prepare and submit a formal pre-consultation application form to the City. During the pre-consultation phase, City staff will review and confirm the proposed park type, block location and size and identify requirements to be addressed through the subdivision engineering design process (e.g. specific design standards and specifications, park themes, location along proposed roadway frontage, site, grading, servicing, stormwater management, buildings or structures, active sport fields, seating and lighting, active and passive transportation, etc.) to enable the park to be designed and constructed and lands to be transferred to the City upon registration of the first phase of the subdivision. These requirements will be included in the pre-consultation Memorandum of Understanding provided to the Developer and/or their agent.

**Draft Plan of Subdivision Application** The Developer and/or their agent submits a complete subdivision application to the City, as required by the Planning Act. City Planning Staff, reviews the application to ensure completeness, deems the application complete, issues notice of same, and circulates the application to internal and external departments/agencies.

In considering a draft plan of subdivision application, the City evaluates the merits of the proposal against criteria such as:

- conformity with provincial legislation including the criteria set out in section 53 of the Planning Act;

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- Consistency with the Provincial Policy Statement;
- Conformity with the Official Plan; and,
- Compliance with the Zoning By-laws.

Once the review and evaluation is complete, City Planning Staff prepare a report on the application to Planning Committee/City Council for consideration.

### Identify Need for Parkland and Type

As part of this process, City Staff will confirm the park type, location and specifications are in alignment with the requirements provided by Leisure Services in the Memorandum of Understanding and that there will be no issues associated with the conveyance of land to the City after the park has been built as part of the first phase of the subdivision.

### Planning Committee Hearing

City staff will issue Notice of Public Hearing before Planning Committee, in accordance with the Planning Act. At this hearing City staff will present their report on the application. The Developer and/or their agent may attend the hearing to present the proposed development and application. The public is invited to submit comments or speak at the public hearing. Once the public hearing is concluded, Planning Committee will make a decision based on City staff's recommendations, including conditions of draft approval. Planning Committee's decision is considered and ratified by Council. The conditions of draft approval define the requirements that need to be met to obtain final approval and registration, including parkland dedication requirements. Typically, draft approval is given for three years, which may be renewed, upon application of the Developer and/or their agent.

### Notice of Decision/Appeal Period

City staff will issue notice of Council's decision in accordance with the *Planning Act*, after which a 20-day appeal period begins. If no appeals are made, Council's decision is final. If appeals are submitted, the matter is referred to the Ontario Land Tribunal for determination.

## 2. Engineering and Design Approvals

### Pre-Design Meeting

The Developer and/or their retained qualified professional (e.g., Professional Engineer, park designer, etc.) requests a pre-design meeting with City Staff to discuss the project, review Council's conditions of draft approval and confirm the next steps for the project. In addition to the standard subdivision infrastructure items, discussion will include the design of the proposed park, in alignment with the requirements provided by Leisure Services in the Memorandum of Understanding.



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Detailed Engineering Design	<p>The Developer's Professional Engineer and park designer prepare the detailed engineering design for the subdivision, including the park to be dedicated as part of the first phase of the subdivision.</p> <p>The park design includes site and landscape design, vehicular and pedestrian access, stormwater management features, municipal services and connections, integration with surrounding natural and proposed features (e.g., adjacent proposed roads and lots, natural areas, proposed sidewalks, bike trails) and park amenities (e.g., buildings or structures, active sport fields, seating, and lighting). The park design plan will be supported by a design brief that addresses community energy emissions, climate change adaptation, accessibility, Crime Prevention Through Environmental Design (CPTED).</p>
Development Engineering Design Review	<p>The Developer and/or their agent submits the detailed engineering design package to City staff for review. City Staff circulate the detailed engineering design package to internal and external departments and agencies for review and comment. City staff compile comments on the detailed engineering design and share these with the Developer and/or their agent. The Developer and their retained Professional Engineer update the detailed engineering design drawings, specifications and/or reports (including park design plan) to address the City and other public agency comments. The detailed engineering design review and resubmission process can take one or multiple rounds to complete. At this stage, the budget for the park is reviewed to ensure that it aligns with the legislative requirements as approved by Council at the draft approval stage (e.g., 2 percent of the land to be developed for a commercial or industrial plan of subdivision and 5 percent of the land to be development in all other cases).</p>
Preliminary Approval	<p>Once comments are addressed, City staff will issue preliminary approval of the detailed subdivision design, including the park design plan.</p>
Preliminary M-Plan & R-Plan	<p>The Developer and/or their agent submits the preliminary Plan of Subdivision (M-Plan) and Reference Plan (R-Plan) to City staff for review and approval. The Draft Plan of Subdivision and Draft Reference Plan is to specify the proposed location, size, and frontage for the proposed park. City staff provide comment on the preliminary M and R Plans. The Developer and/or their agent revise the M and R Plans to address City staff's comments.</p>
Selection of Registration Method	<p>The Developer and/or their agent selects the method of registration (i.e. either conventional or pre-servicing registration) for the Plan of Subdivision.</p>

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### 3. Registration

Parkland Elements of the Draft Agreement	City staff draft the subdivision agreement for the project and sends the draft agreement to the Developer and/or their agent for review. The Developer and/or their agent comments on the draft agreement. City staff finalize the agreement and forward the agreement to the Developer and/or their agent for execution. As part of this process, City staff in the Development Engineering and Leisure Services departments specify any conditions specific to the parkland development that are to be included in the draft agreement.
Parkland Condition Clearance	The Developer and/or their agent satisfy all relevant conditions of draft approval as they relate to parkland development and provide evidence of same to City staff for confirmation.
Subdivision Servicing	As part of this process, the Developer constructs the works in the rights of way for the first phase of the subdivision and the proposed park block (i.e., grading, service connections to the block, stormwater management within the block). This work is done in accordance with the City's Certification Requirements for Subdivisions (as amended from time to time). <sup>10</sup>
Registration	Once all relevant conditions have been satisfied, the subdivision (or phase in the subdivision) is approved for registration.

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<sup>10</sup> City of Greater Sudbury. (February 22, 2018). Subdivision and Off-Site Servicing Certification Requirements. <https://www.grandsudbury.ca/faire-des-affaires/planification-et-developpement/planning-pdf-documents/appendix-f-certification-requirements-subdivision-and-offsite-servicing-2018-02-22-pdf/>

### 9.0 Park Document Submission Procedures

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This section outlines design document standards and submission requirements for all stages of park development.

This section also provides concept plans that provide a snapshot of typical parks in the City. Concept plans are provided as examples for six hypothetical parks: two neighbourhood parks, two community parks, and two linear parks.

Design principles are based on:

- Parks, Open Space and Leisure Master Plan Review (2014)
- Final Report of the Green Space Advisory Panel (June 2010)
- Canadian Standards Association (CSA) guidelines
- Crime Prevention Through Environmental Design (CPTED) Principles
- World Health Organization (WHO) Age Friendly Cities Framework
- Accessibility for Ontarians with Disabilities Act, 2005 (AODA)
- Pathways to Recreation: Learning about Ontario's Accessibility Standard for the Design of Public Spaces (Parks and Recreation Ontario)
- Industry trends and best practices
- Input received from the Playground Revitalization community consultation process
- Input received from internal and external stakeholders in the development of these standards

Sample Concept Plan for a Neighbourhood Park



Sample Concept Plan for a Neighbourhood Park





Sample Concept Plan for a Community Park



Sample Concept Plan for a Community Park



Sample Concept Plan for a Linear Park





Sample Concept Plan for a Linear Park



## **10.0 Roles and Responsibilities for City Staff**

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This section provides a RACI matrix outlining the roles and responsibilities for City staff in the parkland development process as part of applications for draft plan of subdivision.

<b>RACI Role</b>	<b>Definition</b>	<b>Number to Assign</b>
<b>Responsible</b>	Does the work to complete the task	At least 1 per task
<b>Accountable</b>	Delegates the work and is the last one to review the task or deliverable before it's deemed complete	Limit to 1 per task
<b>Consulted</b>	Provides input based on how it will impact their work or their domain of expertise on the deliverable itself	No maximum or minimum
<b>Informed</b>	Needs to be kept in the loop on progress, rather than informed of details of every deliverable	No maximum or minimum



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10.1 RACI Matrix for City-Built Scenario – Parkland Development

Process	Development Team			City of Greater Sudbury							
	Developer	Engineer	Landscape Architect	City Council	Development Approvals	Development Engineering	Linear Infrastructure	Operations	Leisure Services	Real Estate	Legal Services
1. Subdivision Approval Process											
Gap Analysis and Result											
Subdivision Concept Plan											
Pre-Application Consultation											
Draft Plan of Subdivision Application											
Identify Need for Parkland and Type											
Planning Committee Hearing											
Notice of Decision/Appeal Period											
2. Engineering and Design Approvals											
Pre-Design Meeting											
Detailed Engineering Design											
Development Engineering Design Review											
Preliminary Approval											
Final Construction Approvals											
Preliminary M-Plan & R-Plan											
Selection of Registration Method											
3. Registration Process											
Parkland Elements of the Draft Agreement											
Parkland Condition Clearance											
Subdivision Servicing											
Registration											
4. Park Design and Construction											
Park Budget											
Park Design											
Construction Drawings											
Tender and Award											
Construction											
Inspections											
Acceptance and Takeover											

10.2 RACI Matrix for Developer-Built Scenario – Parkland Development

Process	Development Team			City of Greater Sudbury							
	Developer	Engineer	Landscape Architect	City Council	Development Approvals	Development Engineering	Linear Infrastructure	Operations	Leisure Services	Real Estate	Legal Services
1. Subdivision Approval Process											
Gap Analysis and Result											
Subdivision Concept Plan											
Pre-Application Consultation											
Draft Plan of Subdivision Application											
Identify Need for Parkland and Type											
Planning Committee Hearing											
Notice of Decision/Appeal Period											
2. Engineering and Design Approvals											
Pre-Design Meeting											
Detailed Engineering Design											
Development Engineering Design Review											
Preliminary Approval											
Final Construction Approvals											
Preliminary M-Plan & R-Plan											
Selection of Registration Method											
3. Registration Process											
Parkland Elements of the Draft Agreement											
Parkland Condition Clearance											
Subdivision Servicing											
Registration											

DRAFT

This report has been prepared by J.L. Richards & Associates Limited for the City of Greater Sudbury's exclusive use. Its discussions and conclusions are summary in nature and cannot properly be used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report is based on information, drawings, data, or reports provided by the named client, its agents, and certain other suppliers or third parties, as applicable, and relies upon the accuracy and completeness of such information. Any inaccuracy or omissions in information provided, or changes to applications, designs, or materials may have a significant impact on the accuracy, reliability, findings, or conclusions of this report.

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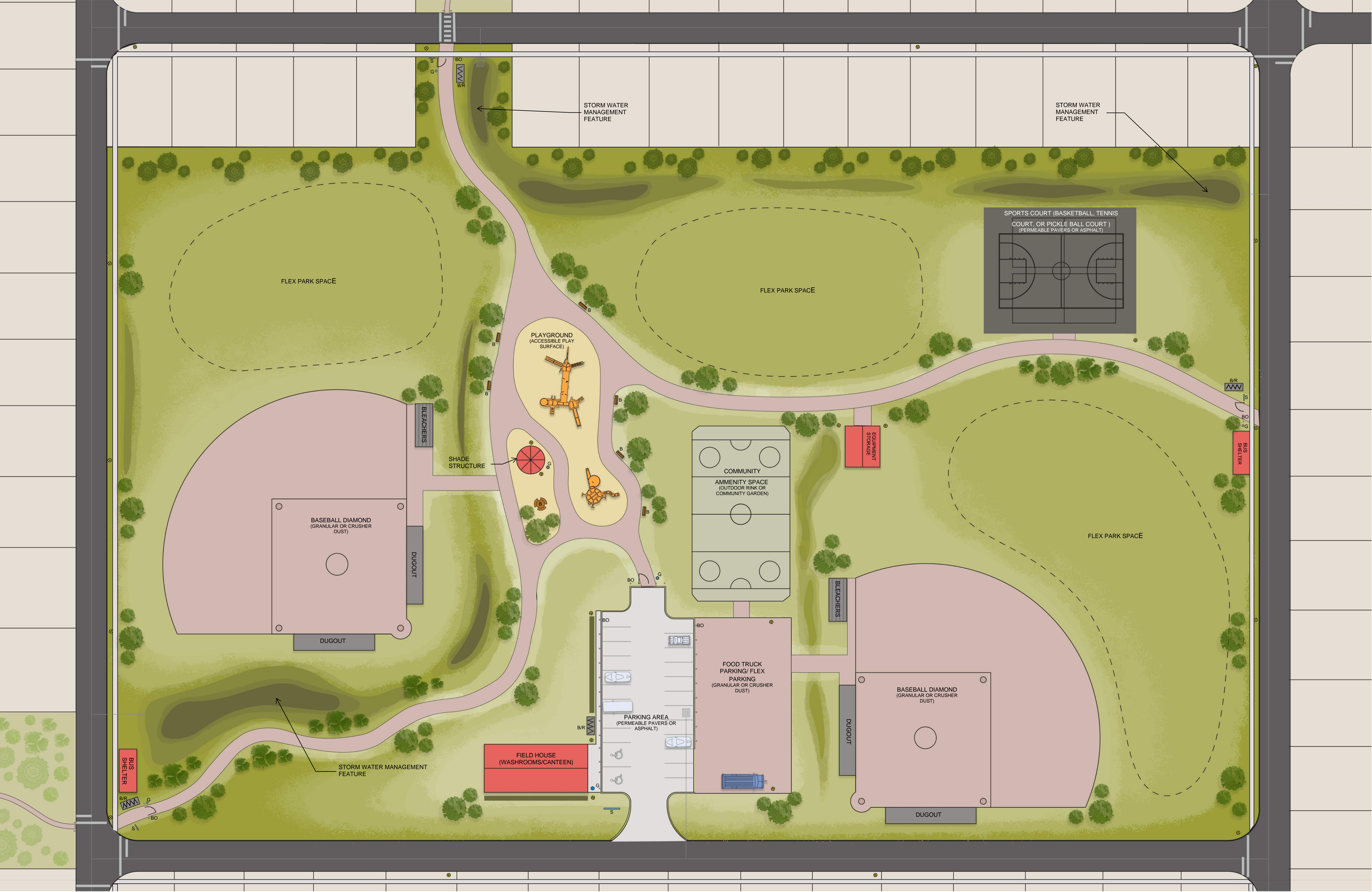








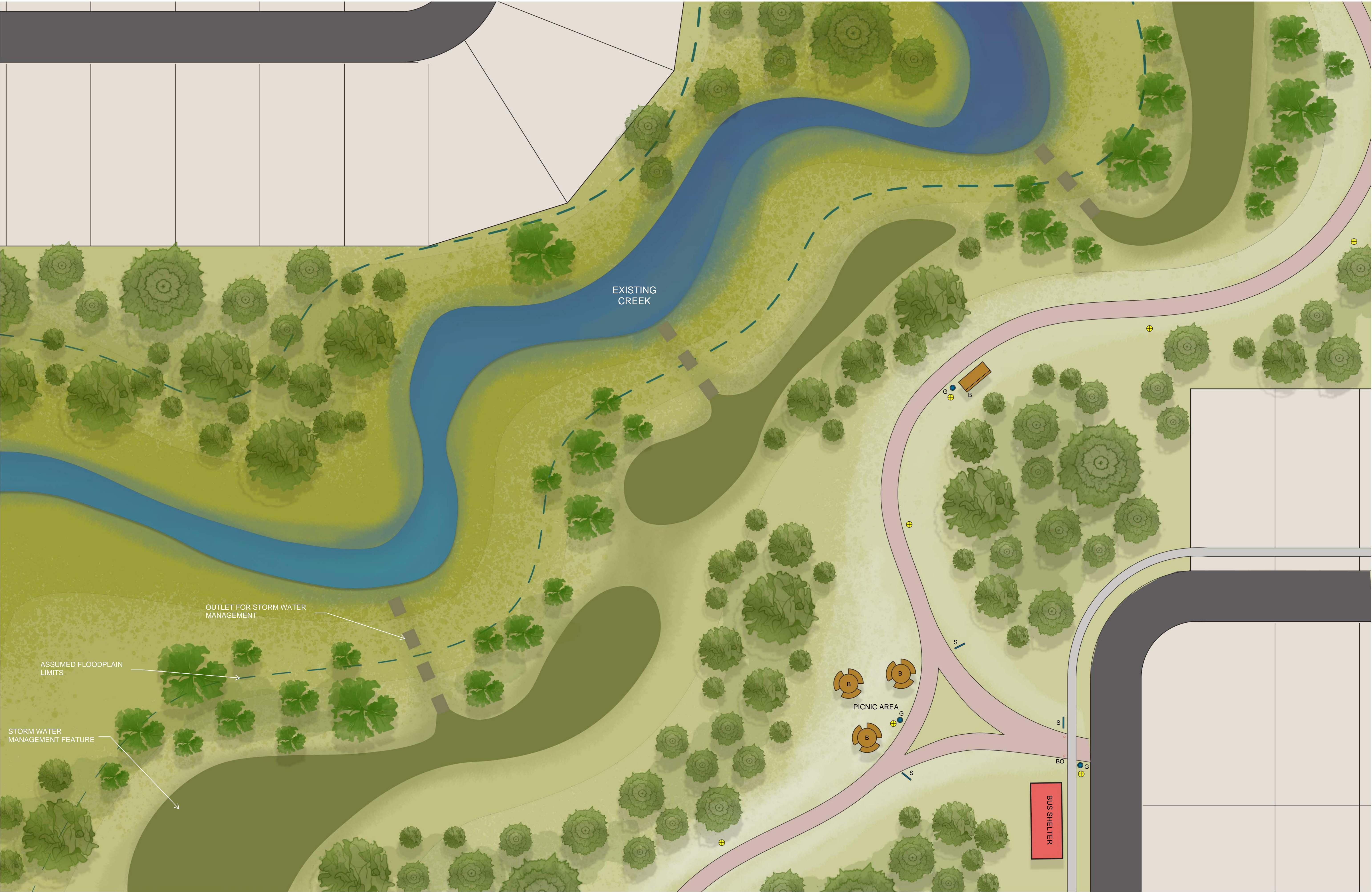


















## Updates regarding the Housing Supply and Demand Analysis and Provincial Housing Target

Presented To:	Planning Committee
Meeting Date:	April 29, 2024
Type:	Correspondence for Information Only
Prepared by:	Melissa Riou Planning Services
Recommended by:	General Manager of Growth and Infrastructure
File Number:	N/A

## Report Summary

This report provides an update to the Housing Supply and Demand Analysis of Greater Sudbury’s housing needs across the housing continuum that is used to develop targets and inform proposed policies and incentives that will form part of the City of Greater Sudbury Housing Supply Strategy as well as an update on progress towards achieving the Provincial Housing Target.

## Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans

The Housing Supply and Demand Analysis aligns with Council’s Strategic Priorities including “Expand Affordable and Attainable Housing Options” and “Develop and Promote Solutions to Support Existing Housing Choices”. The Supply and Demand Analysis is one of a series of reports that will inform the development of the Housing Supply Strategy which will address the actions outlined in the Housing goal of the Strategic Plan, which reflect Council’s desire for all citizens, especially vulnerable populations, to have access to safe, affordable, attainable and suitable housing option in the City of Greater Sudbury.

The Housing Supply and Demand Analysis provides the City with a strong foundation of data to guide the creation of compact, complete communities, Goal 1 of the CEEP.

## Financial Implications

There are no financial implications associated with this report.

## Background

On August 15, 2023, a Housing Supply and Demand Analysis was presented to Council. The Housing Supply and Demand Analysis provides an assessment of affordability thresholds based on income levels; describes the current housing market in Greater Sudbury (Ownership resale housing, ownership new sale housing, and rental housing); characterizes the housing supply and needs; provides an affordability gap

analysis; and describes the types of households facing affordability challenges. This study was funded through the 'Consulting Fees for Policy and Process Improvements Stream' of the Province's Streamline Development Approvals Fund and provides a foundation of housing related data that will assist in the development of a policy framework supportive of residential growth targeting gaps in the current housing supply. This report is one of a series of background reports that informed the development of the Housing Supply Strategy and the next update to the Housing and Homelessness Plan.

The report has been updated to incorporate newly available 2021 Census data and population projections that were presented to Council on July 10, 2023.

## **Supply and Demand Analysis Updates**

The Housing Supply and Demand Analysis presented in August 2023, utilized population, household and employment projections to 2046 based on data available to the consultant at the time of writing the report. The consultant has now updated certain sections of the report to reflect population projections to 2051. The following paragraphs summarize the sections of the report that were amended based on the updated projections.

### **Average Household Incomes (Page 10)**

Renter household income grew more than owner households. This trend, however, does not signal improving affordability. Inflation combined with rapid price appreciation in both rental and ownership markets continue to put downward pressure on affordability thresholds despite income growth.

### **Projections and Growth Outlook (page 43)**

Tables have been updated to reflect the Reference Scenario of the Population Projections Report, which provides projections to 2051. The previous version of the Supply and Demand Analysis report utilized growth projections to 2046.

### **Core Housing Need (page 50)**

In 2021, almost 18% of all renter households in Greater Sudbury were in core housing need, meaning their housing was either unaffordable, inadequate or unsuitable. In comparison, only 3% of all owner households experienced core housing need. These are reductions from the 2016 data, which showed 30% of renter households and 4% of all owner households as being in core housing need.

### **Need for Rental Units (page 55)**

The previous report identified an immediate need for 470 additional rental units to achieve a healthy vacancy rate of 5% and an average of 66 additional rental units per year for the next 30 year to meet anticipated demand. The updated report identifies the need for an additional 113 rental units per year for the next 30 years (total of 3,400 additional rental units required). The gaps exist across all rental typologies (purpose built rental, townhomes, privately leased homes, etc) and unit type (Bachelor, 1-bedroom, 2-bedroom and 3-bedroom).

## **Provincial Housing Target**

On August 21<sup>st</sup>, 2023, the Province established Greater Sudbury's housing target at 3,800 new homes by 2031. The housing target aligns with the Province's identified need to create 1.5M new homes in Ontario by 2031. In addition to the 10-year housing target, the Province has assigned targets for 2023, 2024 and 2025. Greater Sudbury exceeded the assigned 2023 target of 279, achieving 436 housing starts or 156% of the target.

## Housing Targets under the Build Fast Fund

Target	2023	2024	2025
Provincial	110,000	125,000	150,000
City of Greater Sudbury	279	317	380

Performance against this target is evaluated based on housing starts, as defined by CMHC's Starts and Completions Survey, as well as Additions Residential Units (Secondary Dwellings Units) and Long-Term Care Facilities.

The Province encourages municipalities to meet their targets through the \$1.2 billion Building Faster Fund, which rewards municipalities that reach at least 80% of their annual target with funding, with bonus funding for municipalities that have exceeded their target. Greater Sudbury is eligible for the bonus funding.

### Projecting and Tracking Housing Creation in Greater Sudbury

The City regularly tracks and reports on the number of building permits issued to create new residential units in the City. During the previous 10-year period from 2012-2022 the City issued permits to create 4,076 new homes in Greater Sudbury for an average of just over 400 per year.

Since 2020 the City has seen an increase in new home creation with an average of 450 permits for new residential units issued per year over the last 3 years. From January 1<sup>st</sup>, 2022 to the end of December 2023 Greater Sudbury issued permits that would result in the creation of 1,132 units or 30% of the overall Provincial Target.

In July of this year the City released its updated Population Projections Report to 2051. The report projected that the City would grow by 4,180 new households between 2021 and 2031 under the reference scenario, which would exceed the Provincial target.

### Conclusion and Next Steps

The Housing Supply and Demand Analysis will support the development of the Housing Supply Strategy and the update to the Housing and Homelessness Plan and is directly linked to items 2.a. (recommendations to enhance current initiatives), 2.d. iv. (ensuring the right mix of housing stock), and 2.f. (reporting metrics), of resolution CC2023-26.

The table below provides an outline of the Housing Supply Strategy project stages and anticipated timing.

Project Stage	Timeline
Phase 1 Consultation	complete
Series 1 - Background Reports	complete
Draft Housing Supply Strategy	Complete
Phase 2 Consultation	Complete
Series 2 – Implementation Reports	Q1-Q2 2024
Final Housing Supply Strategy	Late Q2 2024
Implementation, Monitoring and Evaluation	Ongoing

## Resources Cited

1. "Streamline Development Approvals Fund", report presented at the March 29, 2022 Finance and Administration Committee Meeting, <https://pub-greatersudbury.escribemeetings.com/filestream.ashx?DocumentId=43654>
2. "Request for the Development of a Housing Supply Strategy", Motion presented at the February 7, 2023, Council meeting <https://pub-greatersudbury.escribemeetings.com/Meeting.aspx?Id=45cb9903-efa8-4dbc-8754-c95b1dd1773c&Agenda=Agenda&lang=English&Item=50&Tab=attachments>
3. Housing Supply Strategy – Over To You Website, <https://overtoyou.greatersudbury.ca/housing-supply-strategy>
4. City of Greater Sudbury Social Housing Revitalization Plan, 2018, <https://pub-greatersudbury.escribemeetings.com/filestream.ashx?documentid=3279>
5. Housing and Homelessness Plan, Annual Update Reports, Community Housing Website, <https://www.greatersudbury.ca/live/community-housing/housing-services/ten-year-housing-and-homelessness-plan/>
6. Population Projections Report, July 10, 2023, <https://pub-greatersudbury.escribemeetings.com/filestream.ashx?DocumentId=50009>
7. Supply and Demand Analysis, August 15, 2023 <https://pub-greatersudbury.escribemeetings.com/Meeting.aspx?Id=7560e0ec-ac6f-4e90-8d13-07fc3f5d8662&Agenda=Agenda&lang=English&Item=46&Tab=attachments>
8. Draft Housing Supply Strategy, January 16, 2024 <https://pub-greatersudbury.escribemeetings.com/Meeting.aspx?Id=77573625-8334-46bf-aea7-7c84ca6d58f3&Agenda=Agenda&lang=English&Item=43&Tab=attachments>
9. Municipal Housing Pledge, December 5, 2023 <https://pub-greatersudbury.escribemeetings.com/Meeting.aspx?Id=3a56ac39-a82f-4a67-8091-56e43a7868b9&Agenda=Agenda&lang=English&Item=39&Tab=attachments>
10. Provincial Housing Supply Progress Tracker <https://www.ontario.ca/page/tracking-housing-supply-progress>
11. Development Tracking Dashboard <https://experience.arcgis.com/experience/260802f3ba514cf28247e7c82c65a66d?org=Sudbury>

# City of Greater Sudbury

## Housing Supply and Demand Analysis

February 2024



**nblc**  
N. Barry Lyon Consultants Ltd.



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## Geographic Boundaries

The analysis provides market information for the following geographies:

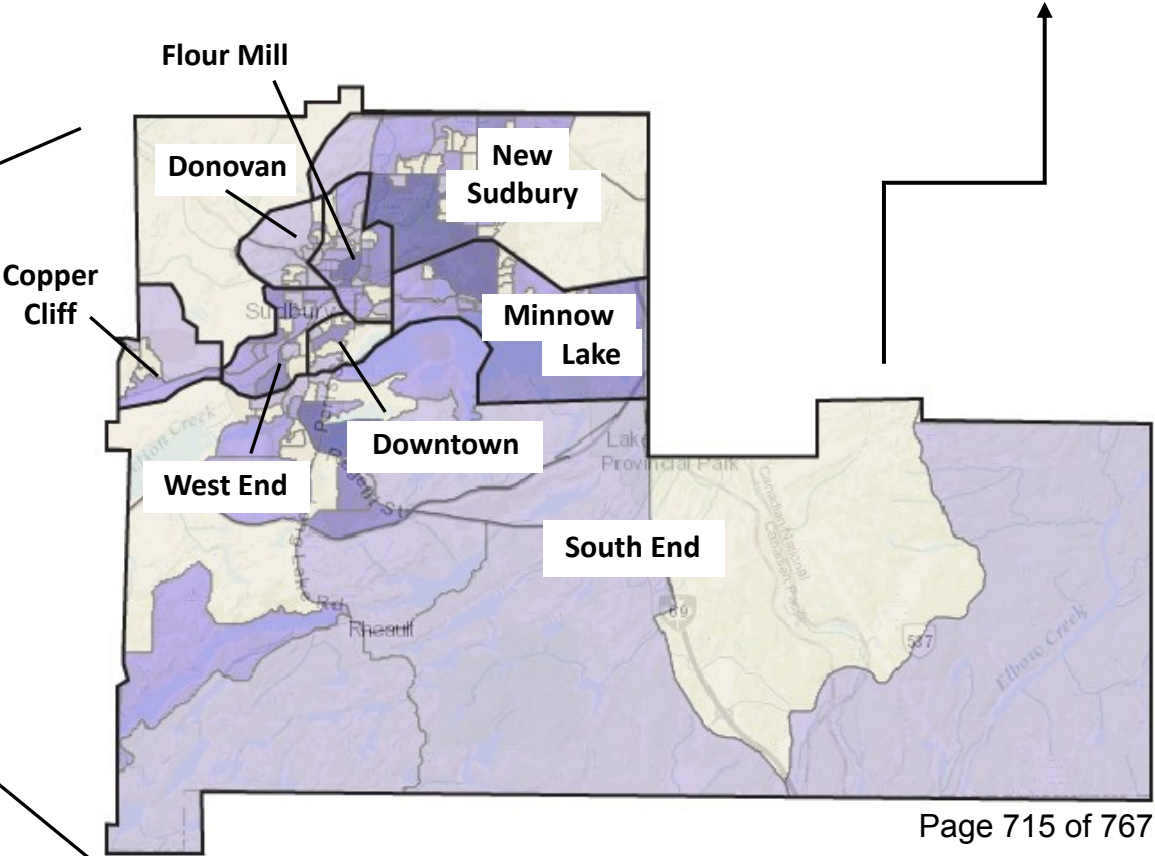
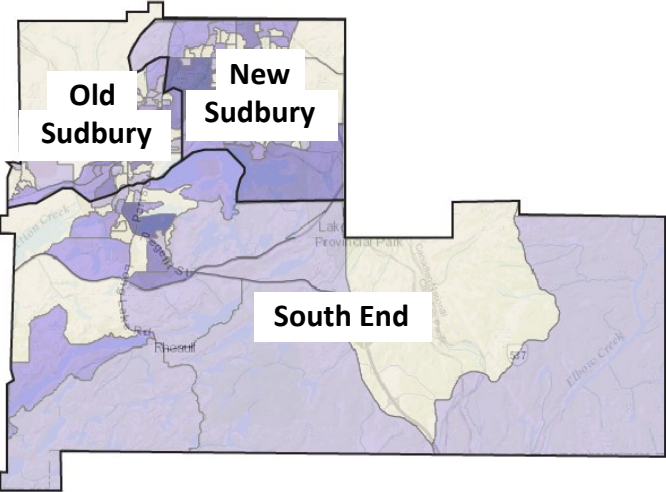
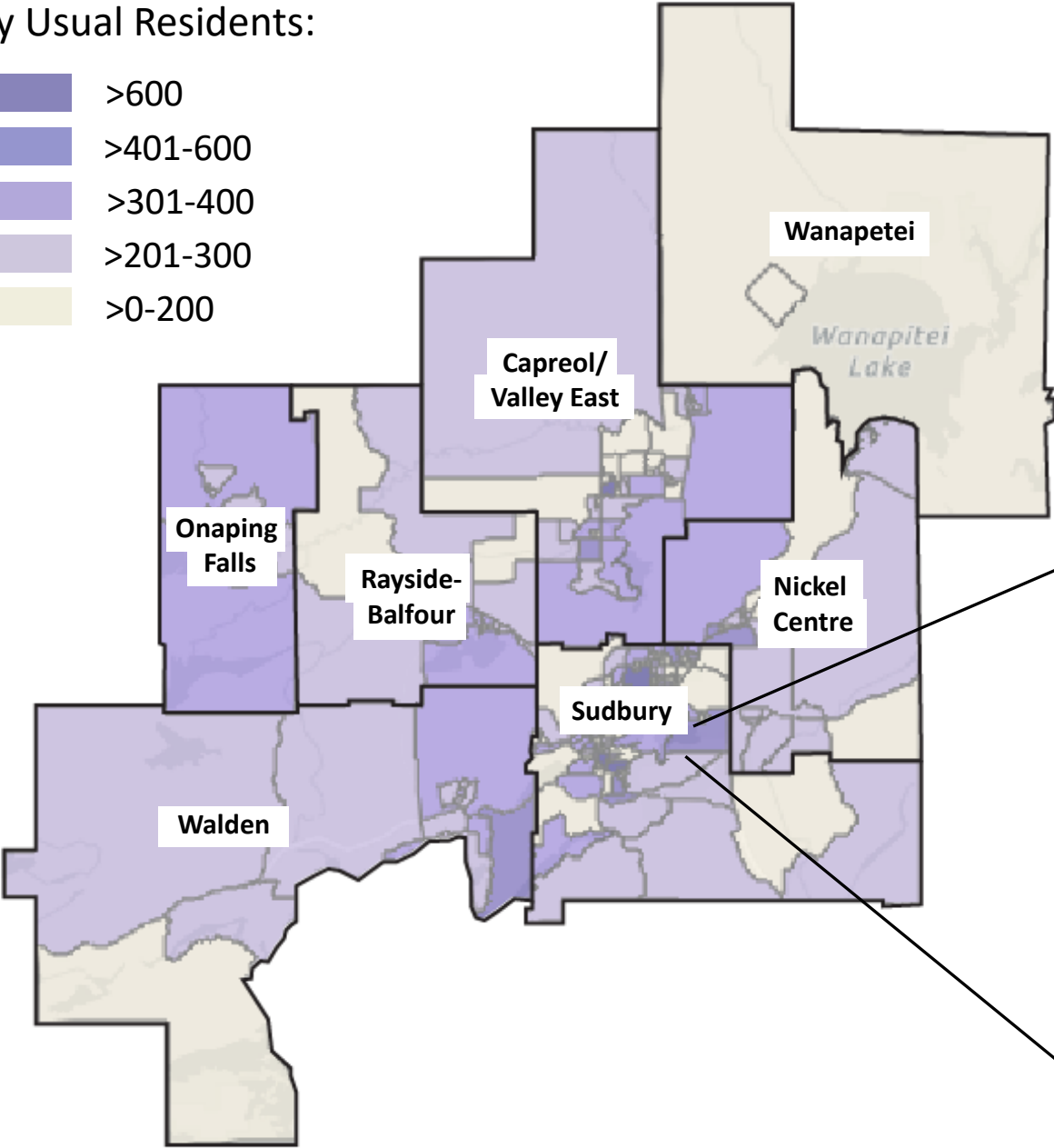
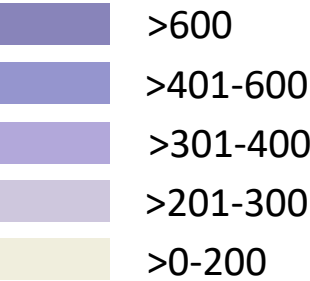
- **The City of Greater Sudbury (“Greater Sudbury”)**, which is further broken down into seven former municipalities and one reserve: **Walden, Onaping Falls, Rayside-Balfour, Valley East and Capreol, Wanapitei, Nickel Centre and City of Sudbury.**

The report additionally focuses on the former **City of Sudbury (“City of Sudbury”, “Sudbury”)** consisting of eight neighbourhoods: **South End, Minnow Lake, New Sudbury, Flour Mill, Donovan, Downtown, West End and Copper Cliff.**

Where possible, the analysis focuses on the smallest geographic level – neighbourhoods in the City of Sudbury and former municipalities within the City of Greater Sudbury, in addition to providing city- and region-wide statistics. However, when there is no or insufficient available data, these smaller geographies are either combined or aggregated into the following CMHC zones: **Old Sudbury**, which includes the neighbourhoods of Flour Mill, Donovan, Downtown, West End and Copper Cliff, **New Sudbury**, consisting of the neighbourhoods of New Sudbury and Minnow Lake, and **South End.**

Maps illustrating these market areas are provided on the following page.

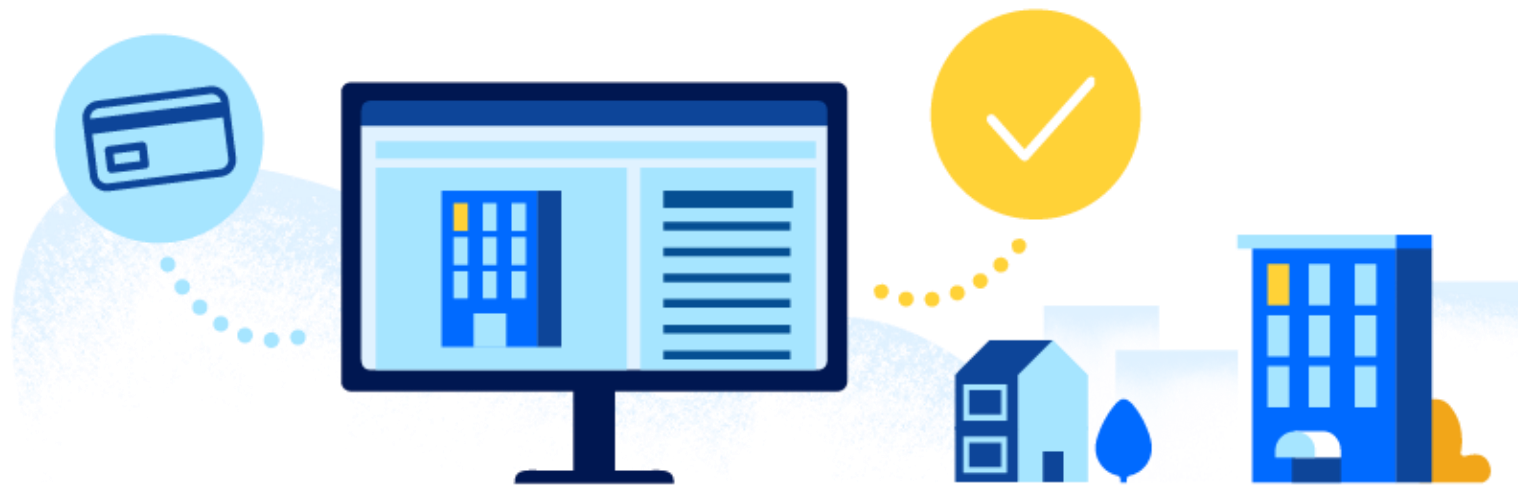
Private Dwellings Occupied  
by Usual Residents:



## Executive Summary – Key Findings

- Incomes in Greater Sudbury have been increasing, but the increase is primarily attributed to growth among high-income households. Owner households also earn significantly more than renters, on average and broadly across all decile groups.
- Renter households are far more likely to be in core housing need (i.e., living in unaffordable, unsuitable, and/or inadequate housing), particularly for older and senior households, lone-parents, one-person households, immigrant households, and households with activity limitations. It is also very likely that the proportion of households in core housing need has increased since the 2016 census given shifts in the market over this period.
- In the ownership market, resale pricing has been increasing rapidly in recent years and is quickly becoming out of reach for many middle-income households. New housing development focuses on large single-detached homes that primarily target upper-middle and high-income households. While townhomes are beginning to become a more common development choice for builders, single-detached homes remain the predominant housing typology delivered historically and in recent years. Other affordable ownership options such as condominium apartments have been non-existent.
- Population growth and eroding affordability in the ownership market are driving rental demand across Greater Sudbury, resulting in low vacancy and strong increases in rental rates. The supply of new rental housing has been modest and is not keeping pace with demand, causing low vacancy, long wait-lists, and rising rents. As a result, the vast majority of rental and ownership housing is becoming unaffordable to low- and moderate-income households.
- The City also has a significant wait list for community housing of nearly 850 households. Demand for community housing (i.e., RGI), and particularly one-bedroom units, is expected to remain strong given deteriorating affordability levels and the current wait list composition. Many households may wait over four years prior to being housed in the City's community housing stock.
- There is also sizeable demand for Low End of Market and rental housing at a proportion of the CMHC AMR.
- Sudbury is expected to continue to grow looking forward to 2046, with the majority of growth expected in low-density forms and within the former City of Sudbury. It is vital that the City ensures housing supply is able to meet the current unmet demand as well as the needs of future residents.
- The results of this analysis indicate that the City should find ways to encourage more rental housing broadly across the housing continuum and affordability depths (e.g., RGI to market-rates). The City should also be encouraging a greater supply of ownership housing, as well as broader supply characteristics including lower-cost product types such as townhomes, compact semi-detached, and condominium apartments.

## 1.0 Income and Affordability Thresholds





The **Provincial Policy Statement (PPS)** provides the following definitions of affordable housing:

**Affordable Ownership Housing** is the least expensive of:

- housing for which the purchase price results in annual accommodation costs which do not exceed 30 percent of gross annual household income for low and moderate income households; or
- housing for which the purchase price is at least 10% below the average purchase price of a resale unit in the regional market area;

**Affordable Rental Housing** is the least expensive of:

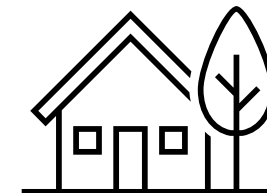
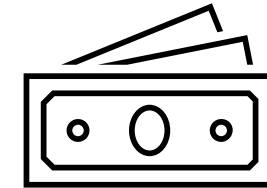
- a unit for which the rent does not exceed 30 percent of gross annual household income for low and moderate income households; or
- a unit for which the rent is at or below the average market rent of a unit in the regional market area.

**Low and Moderate Income Households:**

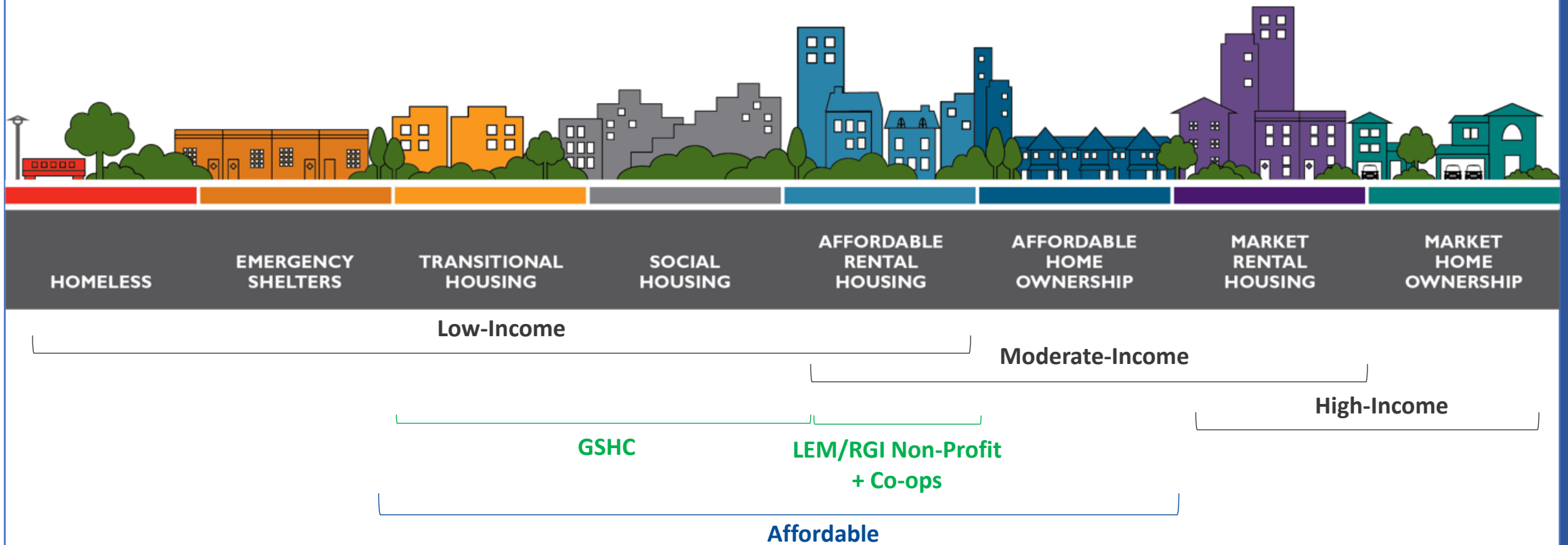
- Low Income: Households below the 3<sup>rd</sup> income decile.
- Moderate Income: Households between the 4<sup>th</sup> and 6<sup>th</sup> income decile.
- Ownership Housing: All Household income distribution.
- Rental Housing: Renter Household income distribution.

**Greater Sudbury Official Plan:**

- Official Plan definition matches the PPS definition.



## Typical Income Distribution Along The Housing Continuum



## Income Distribution: Greater Sudbury

- As of 2016, households in Greater Sudbury on average earned **\$89,941** before taxes. The average gross income of owner households was more than two times higher than the average renter income - **\$112,037** compared to **\$46,886**.
- Donovan/Flour Mill had the lowest average owner and renter incomes across Greater Sudbury. Owners and renters in South End earned the highest average incomes, followed closely by Valley East/Capreol and Walden/Onaping Falls.
- The majority of renter households in Greater Sudbury earn between \$20,000 and \$40,000 before taxes, with only 15% of households earning more than \$80,000. Renter income distribution was mostly concentrated in the bottom three income groups that account for incomes below \$60,000.
- The opposite was true for owner households. Nearly 75% of owners were in the top three income brackets earning above \$60,000 before taxes. Households making over \$100,000 accounted for 47% of all owner households. Only 3% of owners earned less than \$20,000 compared to 24% of renters.
- The 2021 census indicates that the average gross household income in Greater Sudbury is now **\$103,000**, however income distribution data by tenure has not been yet released (see following page).

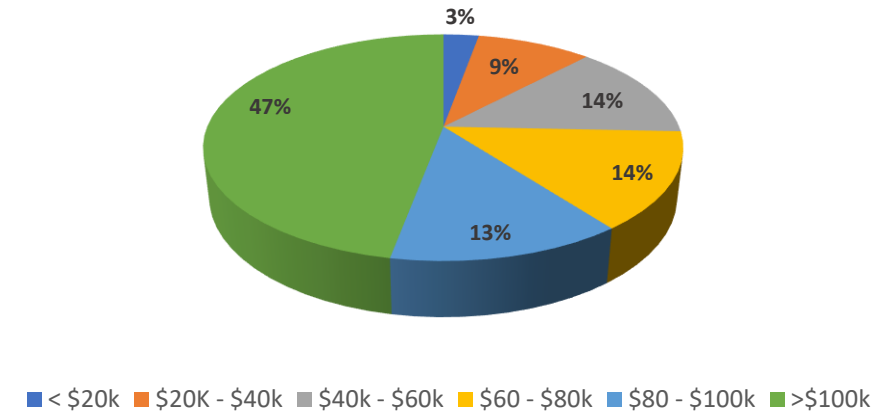
### Average Household Income Before Taxes, Greater Sudbury

As of 2016

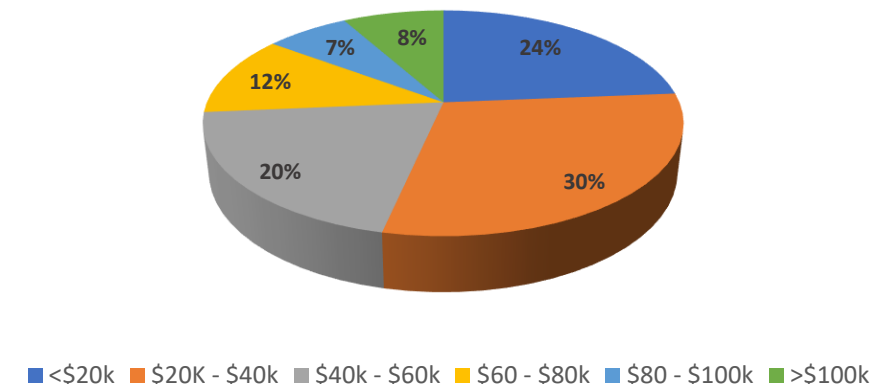
Tenure	Donovan Flour Mill	Downtown	Minnow Lake	New Sudbury	Nickel Centre	Rayside-Balfour	South End	Valley East Capreol	Walden Onaping Falls	West End Copper Cliff	Greater Sudbury
Owner	77,299	116,144	\$109,599	\$105,604	\$106,528	\$109,096	\$151,010	\$110,024	\$111,407	\$92,184	\$112,037
Renter	36,414	38,777	\$42,480	\$50,788	\$51,329	\$53,194	\$54,237	\$53,373	\$51,496	\$48,491	\$46,886
Total	49,716	73,699	\$84,987	\$86,665	\$96,276	\$93,106	\$114,568	\$101,411	\$103,730	\$70,355	\$89,941

Source: CMHC and Statistics Canada

### Owner Income Distribution, Greater Sudbury (2016 – CMHC)



### Renter Income Distribution, Greater Sudbury (2016 - CMHC)

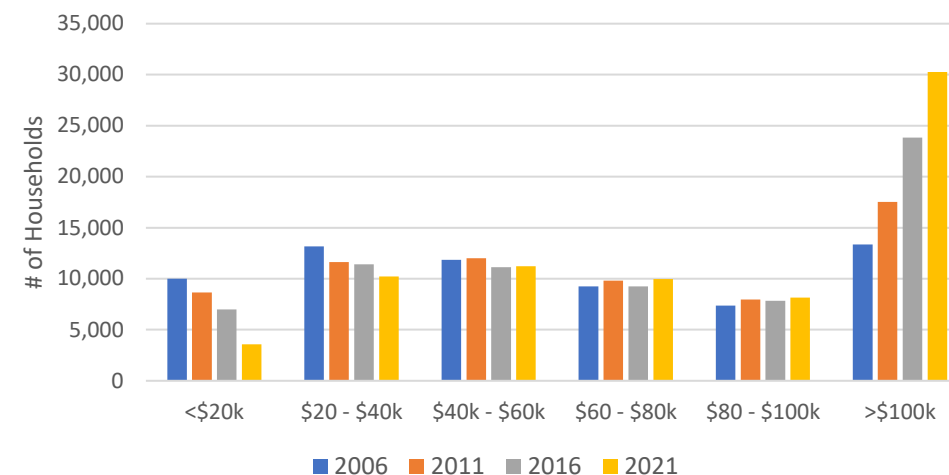


## Income Growth: Greater Sudbury

- Between 2006 and 2016, the average household income in Greater Sudbury increased by 32% from \$68,126 to \$89,941. Incomes increased at a slightly faster pace between 2011 and 2016 (17%) compared to the 2006 – 2011 census period (13%). Between 2016 and 2021, incomes grew by almost 15% to an average \$103,000 before taxes.
- Most of this growth can be attributed to the increasing share of high-income households, particularly those earning above \$100,000. The proportion of these households increased from 21% in 2006 to 34% in 2016. As of 2021, 41% of households in Greater Sudbury had an average income of over \$100,000.
- The share of households earning below \$20,000, on the other hand, has been steadily decreasing over each census period. The proportion of these households decreased from 15% in 2006 to 10% in 2016. In 2021, only about 5% of all households earned less than \$20,000.
- The share of households earning between \$20,000 and \$40,000 has been also shrinking while other middle-income groups remained mostly unchanged.
- These trends, however, do not signal improving affordability. Inflation, combined with rapid price appreciation in both rental and ownership markets continue to put downward pressure on affordability thresholds despite income growth.
- Proportional growth in income for both renters and owners was similar between 2006 and 2011.

Average Household Income Before Taxes, Greater Sudbury			
Year	Income	% Change	% Change '06 - '21
All Households			
2006	\$68,126	-	51.2%
2011	\$76,772	12.7%	
2016	\$89,941	17.2%	
2021	\$103,000	14.5%	
Source: Statistics Canada			

Income Distribution, All Households  
Greater Sudbury (Statistics Canada)



Average Household Income Before Taxes, Greater Sudbury			
Census Year	Income	% Change	% Change ('06 - '21)
Owner Households			
2006	\$84,081	-	51.5%
2011	\$93,408	11.1%	
2016	\$112,037	19.9%	
2021	\$127,400	13.7%	
Renter Households			
2006	\$35,774	-	69.4%
2011	\$41,484	16.0%	
2016	\$46,886	13.0%	
2021	\$60,600	29.2%	
Source: Statistics Canada			

## Income by Decile Group: Greater Sudbury

- The data displayed to the right sorts the income of **All Households** and **Renter Households** by income deciles. The data is based on the 2021 census that represents 2020 incomes, which are then inflated using the Consumer Price Index (CPI) to estimate current income levels.
- These estimates, however, do not account for income changes caused by in- and out-migration and overall socioeconomic changes of households in the municipality since 2020.
- The data further exemplifies that owner households earn significantly more than renters in each decile. When looking at all households, incomes range from \$29,820 in the bottom decile to \$220,891 in the top decile. Renter incomes range from \$21,426 to \$123,699.
- Based on these income levels, we have estimated the maximum purchase price (based on all household incomes) and maximum monthly rental rate (based on renter income) that each decile can afford to pay based on the PPS definition (shelter costs not exceeding 30% of gross annual household income) and standard ownership costs.
- These thresholds, however, do not account for any additional factors that further erode affordability, such as mortgage and down payment structure, closing costs, and security deposits. Availability of units at these price points is another major limiting factor for both owner and renter households.
- Additionally, those who already own a home and have experienced strong equity gains or those gaining from intergenerational wealth transfer would be able to afford a higher purchase price compared to first-time buyers.

### Household Incomes by Decile, Greater Sudbury

Income Group	Decile Group	All Households Income (2022 estimate)*	Renter Income (2022 estimate)*
Low Income	1st	\$29,820	\$21,426
	2nd	\$45,945	\$28,716
	3rd	\$60,966	\$37,551
Moderate Income	4th	\$75,655	\$45,945
	5th	\$92,774	\$55,665
	6th	\$112,654	\$66,709
High Income	7th	\$138,057	\$78,969
	8th	\$168,982	\$97,192
	9th	\$220,891	\$123,699

\*Incomes based on 2021 Census of Canada, inflated using CPI (Ontario) to estimate 2022 incomes.

### Affordability Thresholds, Greater Sudbury

Income Group	Decile Group	Affordable Purchase Price*	Affordable Monthly Rental Rate**
Low Income	1st	\$97,546	\$536
	2nd	\$150,293	\$718
	3rd	\$199,428	\$939
Moderate Income	4th	\$247,478	\$1,149
	5th	\$303,477	\$1,392
	6th	\$368,508	\$1,668
High Income	7th	\$451,603	\$1,974
	8th	\$555,178	\$2,430
	9th	\$732,755	\$3,092

\*Assumes shelter costs do not exceed 30% of gross household income. Accommodation costs include mortgage (25 years, 6.5% fixed 5-year rate, minimum 5% down payment, 1.38% property tax payment, 4.0% of loan amount for CMHC mortgage insurance).

\*\*Assumes shelter costs do not exceed 30% of gross household income.



## Affordability by Decile: Greater Sudbury

- As per the PPS, affordable *Ownership* housing is defined as the least expensive of:
  - Housing, for which mortgage costs do not exceed 30% of gross household income for households below the 6<sup>th</sup> income decile.
  - Housing, which is 10% below the average resale home.
- As reported by MMAH, the average resale price in Greater Sudbury in 2021 was \$357,535, which translates into an affordable purchase price of **\$321,782**.
- Notwithstanding the above, we note the average resale price has increased since this figure was released as assessed later in this report. For 2022, Re/Max reported an average resale price of \$473,586, translating into a \$426,227 affordable purchase price after a 10% discount. The affordable purchase price for the 6<sup>th</sup> decile is \$368,508. It is the least expensive of the two measures and therefore is the limiting factor.
- Affordable *Rental* Housing is the least expensive of:
  - Housing with a rental rate not exceeding 30% of gross household income below the 6<sup>th</sup> income decile.
  - Housing that is rented at or below the average market rent in the region.
- The Average Market Rents (AMR) determined by CMHC are identified below. Aside from three-bedroom units, AMR is below the rent affordable to those in the 6<sup>th</sup> income decile.

### Average Apartment Rental Rates, Greater Sudbury (2022)

Bachelor	One-Bedroom	Two-Bedroom	Three-Bedroom	Total
\$796	\$931	\$1,248	\$1,359	\$1,145

Source: CMHC

### Affordability Thresholds, Greater Sudbury

Income Group	Decile Group	All Households Income (2022 estimate)*	Affordable Purchase Price**
Low Income	1st	\$29,820	\$97,546
	2nd	\$45,945	\$150,293
	3rd	\$60,966	\$199,428
Moderate Income	4th	\$75,655	\$247,478
	5th	\$92,774	\$303,477
	6th	\$112,654	\$368,508
High Income	7th	\$138,057	\$451,603
	8th	\$168,982	\$555,178
	9th	\$220,891	\$732,755

\*Incomes based on 2021 Census of Canada, inflated using Consumer Price Index (Ontario) to estimate 2022 incomes.

\*\*Assumes shelter costs do not exceed 30% of gross household income. Accommodation costs include mortgage (25 years, 6.5% fixed 5-year rate, minimum 5% down payment, 1.38% property tax payment, 4.0% CMHC mortgage insurance).

Source: Provincial Policy Statement.

Limiting Factor and Greater Sudbury Affordable Purchase Price Threshold

### Affordability Thresholds, Greater Sudbury

Income Group	Decile Group	Renter Income (2022 estimate)*	Affordable Monthly Rental Rate**
Low Income	1st	\$21,426	\$536
	2nd	\$28,716	\$718
	3rd	\$37,551	\$939
Moderate Income	4th	\$45,945	\$1,149
	5th	\$55,665	\$1,392
	6th	\$66,709	\$1,668
High Income	7th	\$78,969	\$1,974
	8th	\$97,192	\$2,430
	9th	\$123,699	\$3,092

\*Incomes based on 2021 Census of Canada, inflated using Consumer Price Index (Ontario) to estimate 2022 incomes.

\*\*Assumes shelter costs do not exceed 30% of gross household income.

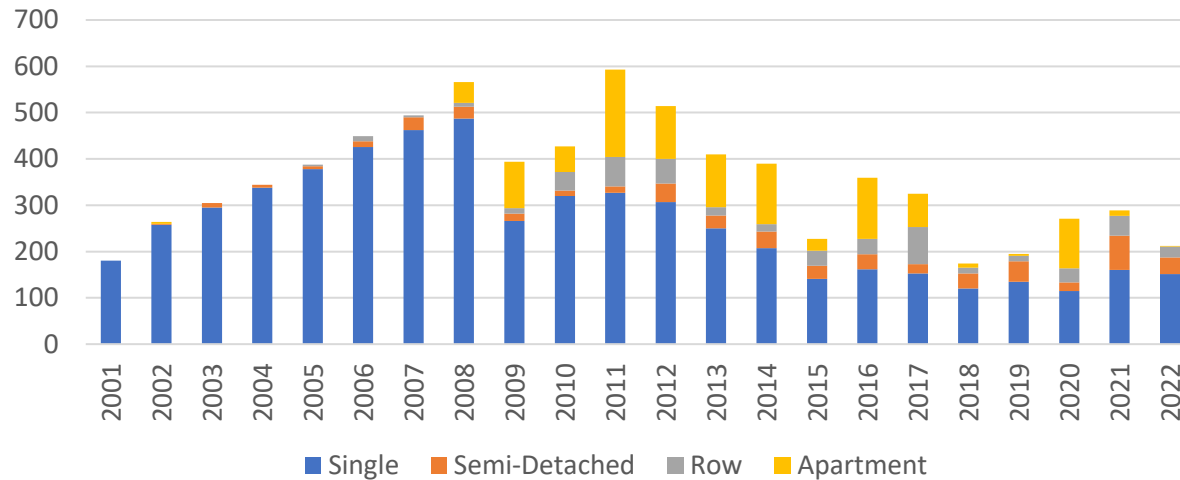
Source: Provincial Policy Statement.

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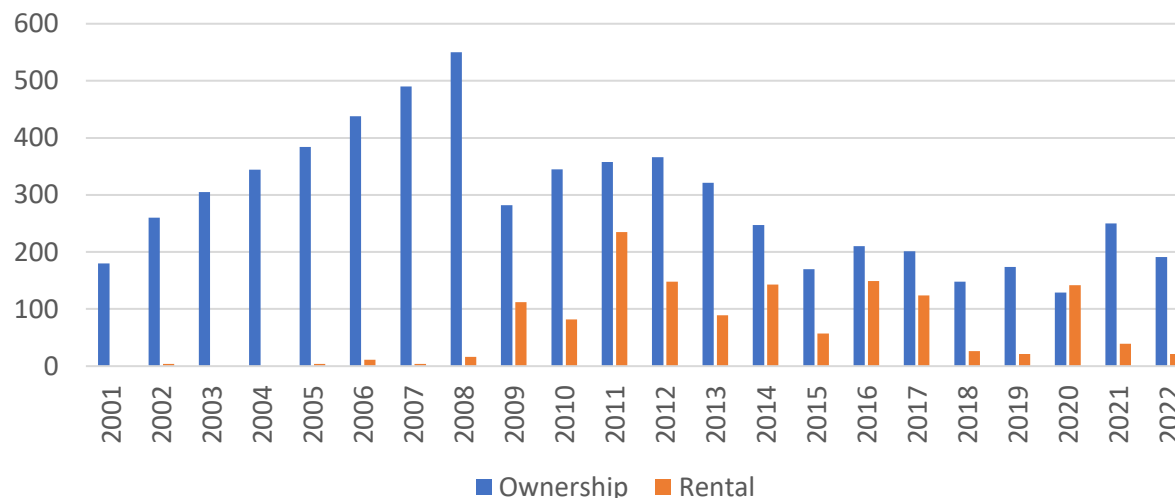
## 2.0 Greater Sudbury Housing Market



**Greater Sudbury Housing Completions by Housing Type (CMHC)**



**Greater Sudbury Housing Completions by Tenure (CMHC)**



- Housing completions in Greater Sudbury have been trending downward since it accommodated a high of almost 600 homes in 2011. Between 2005 and 2011, the City accommodated an annual average of 475 new homes, which decreased to an average of 305 new homes since 2012, and only 225 new homes over the past five years.
- While single-detached homes have historically accommodated the majority of new housing completions, Greater Sudbury has seen more semi-detached, row, and apartment completions in recent years.
- The number of more compact housing types like semi-detached and townhomes has been modest, even in recent years.
- As illustrated to the left, the vast majority of housing completions (~82%) in Greater Sudbury have been ownership tenure. However, rental activity has accelerated in recent years, accounting for 30% of housing activity since 2011.
- Nearly 98% of all apartment completions in Greater Sudbury have been rental.
- CMHC defines a completion as: the stage at which all the proposed construction work on a dwelling unit has been performed. A dwelling unit is defined as: structurally separate set of self-contained living premises and therefore excludes trailers, conversions or alterations within an existing structure, seasonal dwellings, hotels, etc.
  - The City of Greater Sudbury also reports on housing activity using building permits. This permit data may not exactly match the CMHC completion data due to differences in definitions, lag time between a building permit being issued and the unit being complete, whether the newly created unit is listed for rent through a public advertisement, and other similar considerations.

## 2.1 Ownership Resale\* Market

\*Existing homes being purchased in Greater Sudbury.  
This existing housing stock is referred to as Resale Housing.



## Resale Price Growth: Greater Sudbury

- Like many municipalities in Ontario, average resale pricing in Greater Sudbury has been rapidly increasing since 2020. Where Greater Sudbury housing has typically increased modestly (~5%), average prices increased by 11% in 2020 and over 20% in both 2021 and 2022. The average residential resale price in Greater Sudbury is now **\$452,500** as of July 2022, compared to \$138,900 in 2005.
- While varied, significant price appreciation has occurred across Greater Sudbury over the past 10 years. All of the local communities have experienced strong price gains over this period, ranging from 88.5% to 103.6%.
- Currently, Capreol and Onaping Falls have the most affordable residential prices of around \$300,000, while the former City of Sudbury remains the most expensive with an average price of \$488,500 (8% higher than the Regional average). Valley East and Rayside-Balfour follow closely behind with residential prices also above the average for Greater Sudbury.
- Rapid price appreciation across Ontario since 2017 is observed for a variety of factors including a sustained low-interest rate environment, historically low levels of housing supply relative to demand, strong annual immigration to Canada, the financialization of housing, and other similar factors.
- The impact of COVID-19 and emergence of work from home models is also having an impact, where higher income households in the Greater Toronto Area are moving to lower cost municipalities such as Sudbury, Kingston, Oxford County, and Windsor in search of affordable family homes – a trend often noted by local real estate agents.

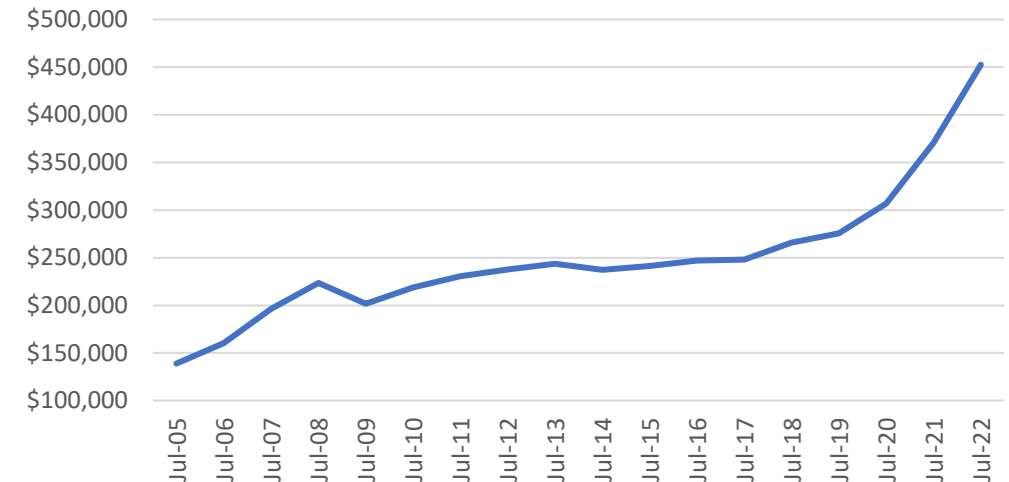
### Residential Price Growth Rate, Greater Sudbury

July 2012 - July 2022

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
3.1%	2.6%	-2.7%	1.7%	2.4%	0.5%	7.2%	3.6%	11.4%	20.7%	22.1%

Source: Sudbury Real Estate Board

### Residential Price Growth, Greater Sudbury (MLS)



### Residential Price Growth, Greater Sudbury July 2012 – July 2022

Location	July 2012	July 2022	Change
Capreol	\$151,700	\$286,800	89.1%
Onaping Falls	\$148,900	\$303,200	103.6%
Nickel Centre	\$223,300	\$439,600	96.9%
Rayside-Balfour	\$247,000	\$465,500	88.5%
City of Sudbury*	\$260,400	\$488,500	87.6%
Valley East	\$247,400	\$476,700	92.7%
Walden	\$234,200	\$451,500	92.8%
<b>Greater Sudbury</b>	<b>\$237,700</b>	<b>\$452,500</b>	<b>90.4%</b>

\*Residential price growth data by neighbourhood was unavailable.

Source: Sudbury Real Estate Board



## Resale Market: Greater Sudbury

- The Bank of Canada began raising interest rates at a historical pace in February of this year, which has had immediate cooling effects for Ontario's housing market. Between February and August 2022, the average resale price decreased by 7.8% as a result of these unprecedented rate hikes. However, despite this decrease, home prices are still 12.7% higher than they were in August 2021 and appear to be increasing again.
- In addition to the above noted price correction, sales and listings also decreased as a result of these rate hikes: sales in Greater Sudbury decreased 11.1% in August 2022 compared to the same time last year.
- The above is due to interest rates and stress testing putting downward pressure on what purchasers can afford to pay as well as contributing to consumer confidence and market uncertainty.
- In the second quarter of 2022, resale homes also spent the shortest median days on market ever recorded in any quarter. During this period, single-detached homes spent a median of **8 days** on the market, down from 10 in the second quarter of 2021.
- The number of home sales under \$400,000 has declined rapidly since 2021, while the number of sales above \$500,000 has been rapidly increasing. Properties priced between \$400,000 and \$500,000 also spent the least days on market, indicating strong market demand for homes in this affordable price range.
- These market trends suggest that, even with more balanced market conditions brought about by rising interest rates, the resale market in Greater Sudbury appears to be strong with demand for housing significantly outpacing the supply of homes (evidenced by strong price growth, low months of inventory, and quick pace of sales).
- Local households will therefore likely continue to face affordability challenges in the ownership market. Limited new and resale housing supply will continue to put upward pressure on prices as population grows while higher mortgage rates and stricter qualification requirements will pose barriers for many potential buyers, particularly those entering the market for the first time.

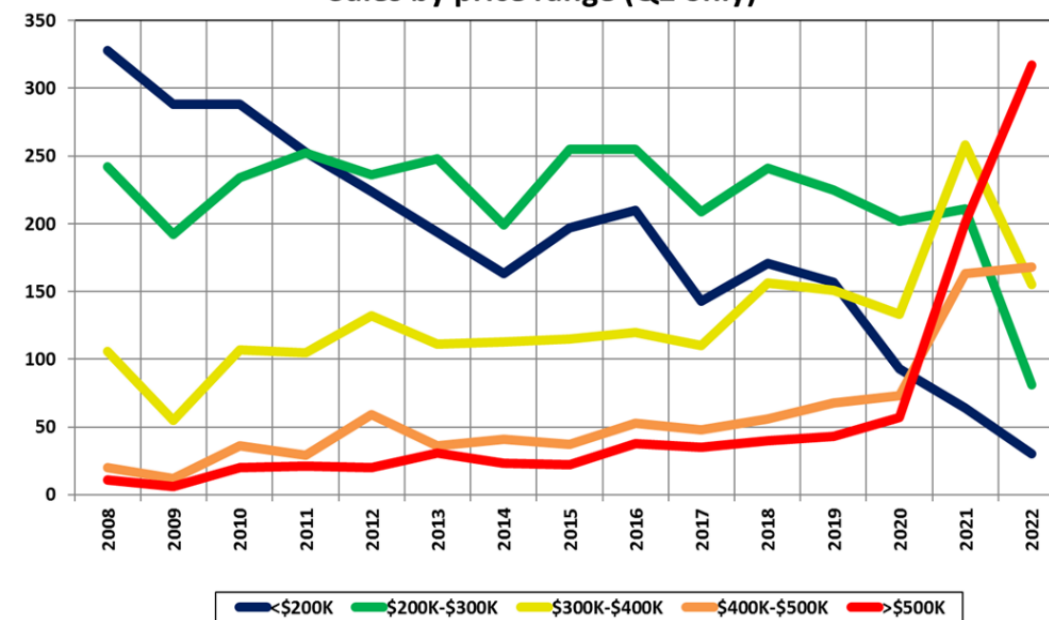
*\*Months of inventory indicate the amount of time it would take to sell current inventories at the current rate of sales activity.*

### Average Residential Sale Price, Greater Sudbury

Aug '22	Jul '22	May '22	Feb '22	Aug '21	Aug '19	Aug '17
\$428,700	\$452,500	\$470,500	\$464,900	\$380,500	\$271,700	\$246,800
Change:	-5.2%	-8.9%	-7.8%	12.7%	57.8%	73.7%

Source: Greater Sudbury Real Estate Board

### MLS® Single Detached Homes Sales by price range (Q2 only)



### Sales by Price Range, Year-over-Year Percentage Change

Time Period	<200K	\$200K-\$300K	\$300K-\$400K	\$400K-\$500K	>500K
Q2 '21 - Q2 '22	-53.1%	-61.6%	-39.9%	3.1%	57.7%

Source: Canadian Real Estate Association

## Available Resale Listings: Greater Sudbury

- As of September 2022, a little over 200 properties were listed for sale in Greater Sudbury. Available pricing ranged from \$149,900 to \$949,900 for single detached homes and from \$1,200,000 to \$7,800,000 for cottages and lakefront properties. These vacation homes were excluded from the average resale pricing summarized in the tables on the right due to the disproportional effect they would have within the sample.
- Capreol/Valley East, Onaping Falls and Rayside-Balfour had the most expensive listings across all former municipalities, on average exceeding \$500,000. These properties typically had much bigger lots and larger square footage.
- In the former City of Sudbury, the highest average list price was found in Downtown, South End and New Sudbury. These neighbourhoods had an average list price between \$508,928 and \$580,357. Copper Cliff and Donovan, on the other hand, both had an average list price of under \$300,000.
- Overall, pricing ranged from an average of around \$400,000 for a two-bedroom home to about \$565,000 for five bedrooms.
- Almost all properties listed for sale were single-detached homes, with just 10 listings available for higher-density housing types, such as semis, duplexes, townhomes and condominium apartments, which tend to offer a greater depth of affordability.
- Although over the past 12 months homes in Greater Sudbury on average sold 10% over asking, it is unclear whether or not this trend will prevail across all price ranges and unit types as the market continues to shift towards more balanced conditions.

### Average Resale List Price by Location, Greater Sudbury

As of September 2022

Capreol/ Valley East	Onaping Falls	Nickel Centre	Rayside- Balfour	Sudbury	Walden	Total
\$543,022	\$519,920	\$461,736	\$522,800	\$468,059	\$425,156	\$485,426

Source: Realtor.ca

### Average Resale List Price by Location, City of Sudbury

As of September 2022

Copper Cliff	Donovan	Downtown	Flour Mill	Minnow Lake	New Sudbury	South End	West End
\$261,600	\$275,588	\$580,357	\$389,767	\$461,021	\$508,928	\$551,704	\$396,633

Source: Realtor.ca

### Average Resale List Price by Bedroom Type, Greater Sudbury

As of September 2022

Two-Bedroom	Three-Bedroom	Four-Bedroom	Five-Bedroom and Up
\$399,541	\$461,913	\$552,243	\$564,632

Source: Realtor.ca

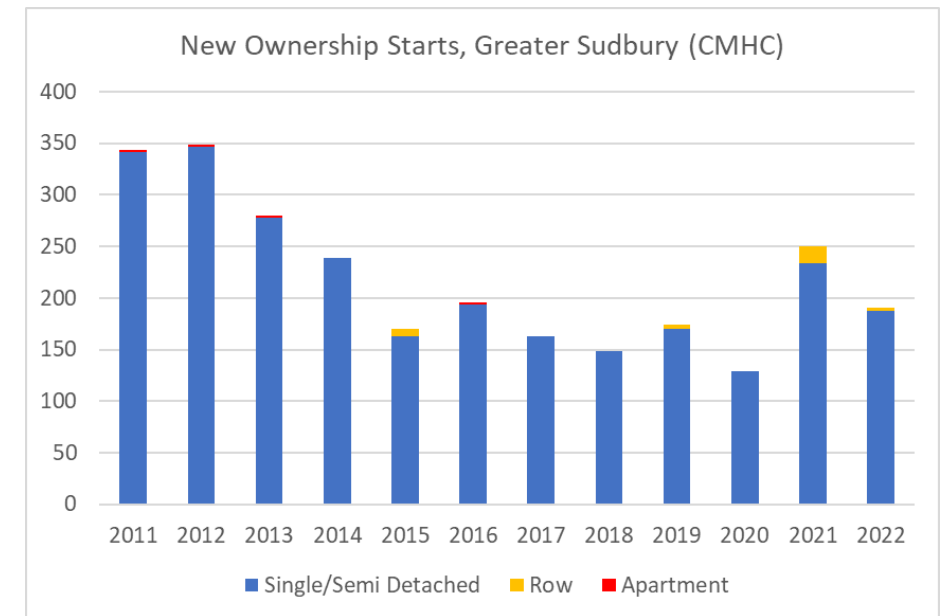
## 2.2 Ownership New Sale\* Market

\*New homes being purchased from actively marketing pre-construction projects across Greater Sudbury. These include new subdivisions, new condominium buildings, and other similar new housing projects. This 'under development' housing stock is referred to as New Sale Housing.



## New Ownership Housing: Greater Sudbury

- Rapid price growth in the resale market is largely driven by insufficient inventories that fall short of rising demand. A lack of new housing construction is further putting strain on the existing housing stock, pushing prices upward at an unprecedented rate. Up until recently, high construction costs coupled with relatively moderate resale prices and economic growth made it harder for new construction projects to compete in the market.
- Between 2012 and 2017, the number of new ownership starts in Greater Sudbury was consistently declining year over year, corresponding with modest population and economic growth. Starting in 2018, when residential prices increased at its highest rate in over five years, new housing starts began trending upward. The next few years of rapid price growth resulted in 288 new ownership housing starts in 2021 – the highest level of new construction in almost 10 years. Over this period, new construction has been largely concentrated in South End, Rayside-Balfour, New Sudbury (including Minnow Lake), and Capreol/Valley East.
- Currently, new single-detached homes in Greater Sudbury are on average priced at \$518,219 – 14% above the average resale price in the Region. Pricing ranges from an average of \$435,900 for a two-bedroom home to an average of \$663,233 for a four-bedroom unit. The cheapest available single-family home was listed for \$339,900 with pricing going up to \$1,299,900.
- Semi-detached homes are the most affordable form of low-density housing, currently priced 30% below the average residential sale price. These homes, however, tend to be smaller in size offering mainly two- and three-bedroom layouts. New semi-detached pricing in Greater Sudbury ranges from an average of \$334,275 for two bedrooms to \$354,515 for three bedrooms. The cheapest available new semi-detached home was listed for \$299,900 with the most expensive unit priced at \$589,900.
- New low-density projects in Greater Sudbury typically range between 20 and 45 units and often advertise custom design and high-end finishes. These homes are usually located in newer family-oriented neighbourhoods and cater to middle and upper-middle households. At the time of the survey, there were no available townhomes or condominium apartments.



### New Ownership Starts by Location, Greater Sudbury

Year	Onaping Falls Walden	Old Sudbury	New Sudbury	Nickel Centre	Rayside- Balfour	South End	Valley East Capreol
2017- 2021	10.7%	5.7%	18.5%	9.8%	20.4%	22.2%	16.7%
2011- 2021	9.8%	9.5%	20.3%	9.1%	16.2%	24.8%	18.2%

Source: CMHC

### New Home Pricing, Greater Sudbury As of August 2022

Unit Type	Detached	Semi-Detached
Two-Bedroom	\$435,900	\$334,275
Three-Bedroom	\$476,811	\$354,515
Four-Bedroom	\$663,233	-
Five-Bedroom	\$1,199,950	-
<b>Average:</b>	<b>\$518,219</b>	<b>\$346,805</b>

Source: Marketing Materials



## New Ownership Housing Price Growth: Greater Sudbury

- According to CMHC, new single- and semi-detached prices increased by 42.5% from \$372,831 in 2011 to \$531,176 in 2021. Most of this growth occurred between 2011 and 2017 when there was a larger number of units absorbed in the market each year and a smaller share of semi-detached homes, which are typically priced more competitively.
- When looking at single-detached homes alone, there still was a considerable amount of growth between 2017 and 2021. During that period prices increased by nearly 15% from an average \$524,800 to \$596,477. Between 2011 and 2021, price growth for new single-detached homes totaled 60%.
- Given a small number of new housing completions, these rates are also subject to each project's market positioning and pricing strategy that could cause significant price variation year over year.

### New Single- and Semi-Detached Price Growth, Greater Sudbury

Average Price			Price Growth	
2011	2017	2021	2011-2017	2011-2021
\$372,831	\$524,800	\$531,176	40.8%	42.5%

Source: CMHC

### New Single-Detached Price Growth, Greater Sudbury

Average Price			Price Growth	
2011	2017	2021	2011-2017	2011-2021
\$372,831	\$524,800	\$596,477	40.8%	60.0%

Source: CMHC

## Sample of Available New Ownership Housing: Greater Sudbury

### Moonglo, South End

Single-Detached  
\$709,900 – \$1,299,900



### Applewood, Garson

Single- and Semi-Detached  
\$299,900 - \$699,900



### New Holland, New Sudbury/Minnow Lake

Single- and Semi-Detached  
\$589,900 - \$799,900





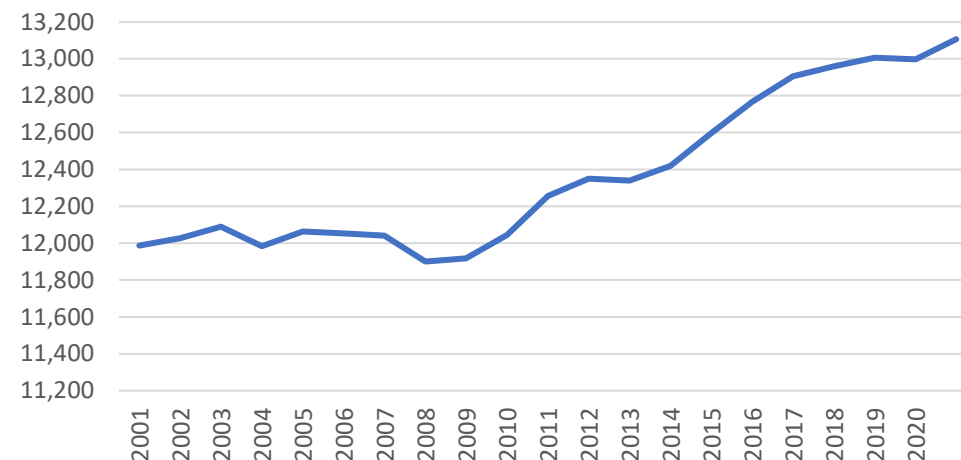
## 2.3 Rental Market



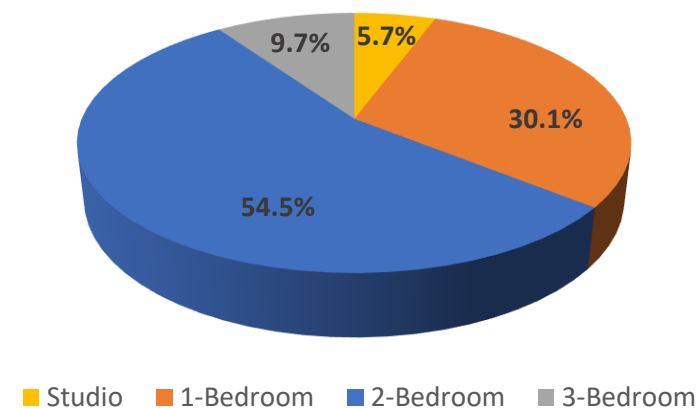
## Greater Sudbury Purpose-Built Rental Inventory

- Currently, there are 13,107 purpose-built rental units in Greater Sudbury – 11,760 apartments (89.7%) and 1,347 townhouses (10.3%). As opposed to many urban centers in Ontario, the inventory of purpose-built rental units in Greater Sudbury has been steadily increasing over the past 10 years. However, the increase has been modest, with a net average of just 85 new units added each year.
- In the past 10 years, out of all former municipalities, rental inventory has only declined in Nickel Centre (-17.8%), Walden (-5.8%) and Capreol/Valley East (-3.2%). Over the same period, all neighbourhoods in the former City of Sudbury had a positive net increase in rental inventory, ranging from 3.3% in Donovan to 21.5% in Minnow Lake.
- Two-bedroom units account for about 55% of the total rental stock in Greater Sudbury. Two-bedroom units are by far the most common apartment type, while the share of two- and three-bedroom townhomes is split more evenly (51.7% and 47.2% respectively). Another 30% of the total inventory consists of one-bedroom units, while studio and three-bedroom units each comprise less than 10% of the rental stock.
- Almost 85% of all rental units (11,108 units) are located in the City of Sudbury and the remaining 15% (1,999 units) are located in the other former municipalities.
- In Sudbury, rental inventory is largely concentrated in South End (27.5%), New Sudbury (20.6%) and Flour Mill (15.3%). Only about 10% of Sudbury's rental stock is located in Downtown. Of the 976 rental townhomes in Sudbury, 44% are located in New Sudbury, 23% in South End and 14% in Copper Cliff.
- Outside of the former City of Sudbury, 43% of all rental units are located in Rayside-Balfour, 20% in Nickle Centre and 15% in Capreol/Valley East. Rental townhomes are mainly located in Nickle Centre (40%) and Rayside-Balfour (39%).
- See following page for data tables.

**Greater Sudbury Purpose-Built Rental Inventory (CMHC)**



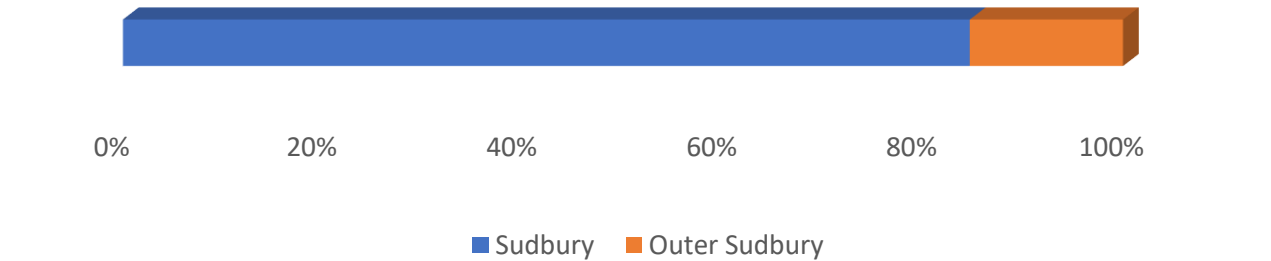
**Greater Sudbury Rental Inventory by Unit Type (CMHC)**



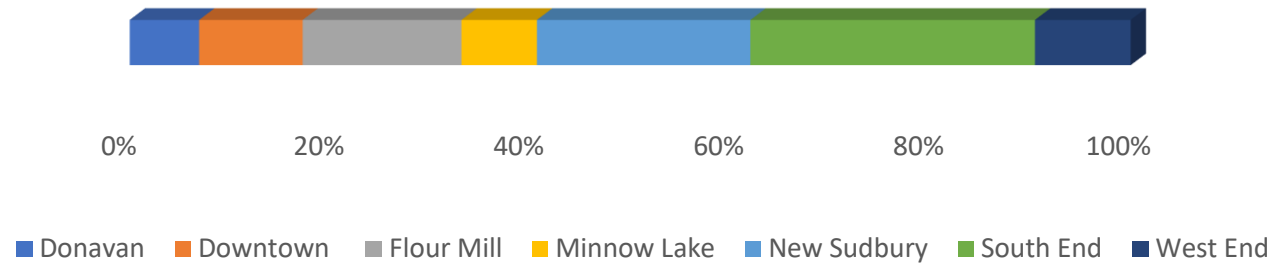
Greater Sudbury Purpose-Built Rental Inventory (October 2021)				
Location	Apartments	Townhouses	Total	Share
Copper Cliff	232	138	370	3.3%
Donovan	739	6	745	6.7%
Downtown	1,091	18	1,109	10.0%
Flour Mill	1,646	57	1,703	15.3%
Minnow Lake	786	23	809	7.3%
New Sudbury	1,857	432	2,289	20.6%
South End	2,832	223	3,055	27.5%
West End	949	79	1,028	9.3%
<b>Sudbury</b>	<b>10,132</b>	<b>976</b>	<b>11,108</b>	<b>84.7%</b>
Capreol/Valley East	244	54	298	14.9%
Nickel Cnetre	255	147	402	20.1%
Onaping Falls	145	11	156	7.8%
Rayside-Balfour	708	145	853	42.7%
Walden	192	4	196	9.8%
Wanapitei	84	10	94	4.7%
<b>Former Municipalities</b>	<b>1,628</b>	<b>371</b>	<b>1,999</b>	<b>15.3%</b>
<b>Greater Sudbury</b>	<b>11,760</b>	<b>1,347</b>	<b>13,107</b>	<b>100%</b>

Source: CMHC

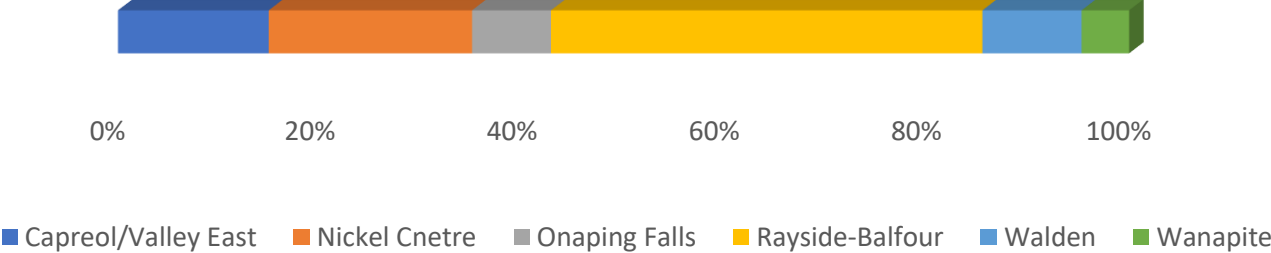
Greater Sudbury Rental Inventory (CMHC)



Sudbury Rental Inventory by Neighbourhood (CMHC)



Greater Sudbury Rental Inventory by Municipality (CMHC)



## Vacancy Rates and Rental Rate Growth: Greater Sudbury

- Over the past 10 years, the average vacancy rate in Greater Sudbury has generally stayed below 5%, indicating strong demand for rental housing. A vacancy rate below 5% usually means that market conditions are tight and that available supply is not keeping pace with demand.
- In 2021, the average vacancy rate in Greater Sudbury declined to 1.6%, reaching its lowest point in over 10 ten years. The vacancy rate began to decline below balanced conditions in 2016, corresponding with rapid rental rate growth over this period and growth in home prices. The vacancy rate was significantly lower for rental townhomes - 0.7% compared to 1.8% for rental apartments due to limited inventory.
- Rental rate growth varied year over year, but generally remained positive in the last 10 years. In 2021, rental rate growth reached its all-time peak of 11.6%, driven primarily by low vacancy rates and rising demand. The average rental rate recorded by CMHC in Greater Sudbury grew from \$982 in 2017 to \$1,195 in 2021 – a 22% increase.
- However, CMHC rental rates tend to be below market rates due to a large proportion of older rent-controlled units in the sample. According to CoStar Group, a real estate data and analytics platform, the average *asking market* rental rate in Q3 2021 was 35% higher than that recorded by CMHC - \$1,615 compared to \$1,195. The gap between market and CMHC rental rates exceeded 30% for all unit types and reached nearly 70% for studio apartments. The average *asking market rate* reflects what prospect renters could expect to pay if they were looking to rent a unit at the time of the survey.
- In August 2022, the average *market* rental rate in Greater Sudbury was \$1,646 – an 8% increase from \$1,568 in August 2021. That same month, CoStar Group also reported a vacancy rate of 0.5% based on a 30% sample of the total rental inventory. This vacancy rate translates into roughly 66 available units in the entire Region.

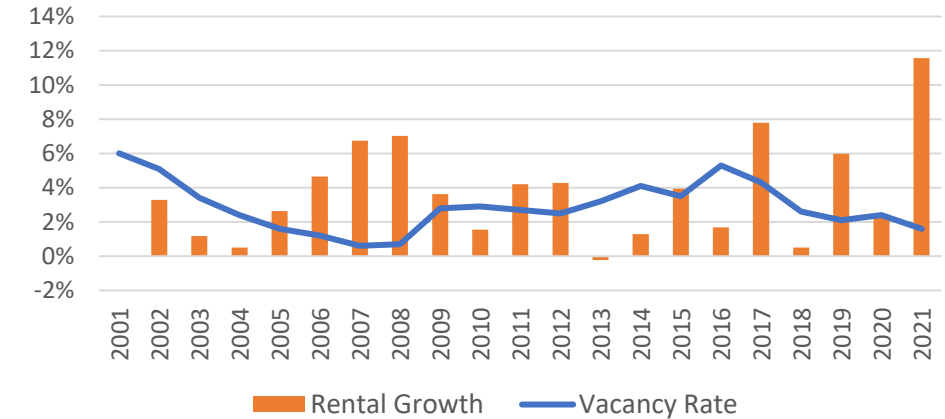
### Average Market Rental Rates, Greater Sudbury

As of August 2022

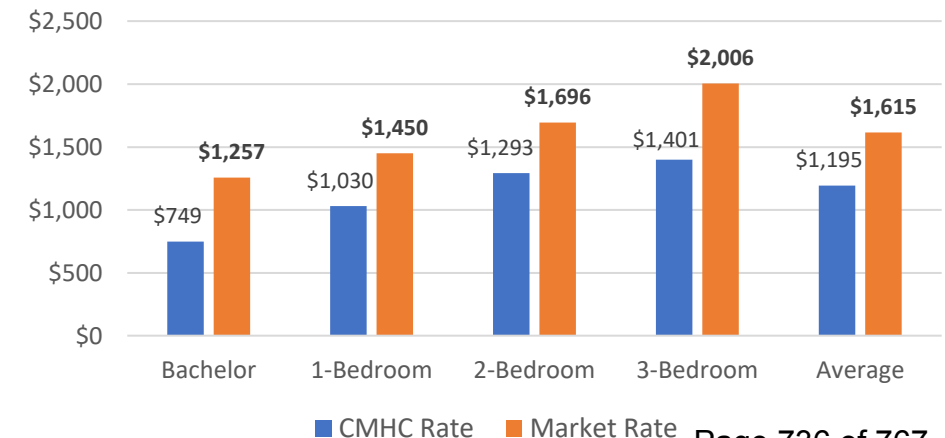
Bachelor	One-Bedroom	Two-Bedroom	Three-Bedroom	Average
\$1,284	\$1,481	\$1,731	\$2,049	\$1,646

\*Source: CoStar Group

### Vacancy Rates and Rental Growth, Greater Sudbury (CMHC)



### CMHC and Market Rental Rates, Greater Sudbury (Q3 2021 – CMHC and CoStar)



## Vacancy and Rents by Building Type, Size, and Price: Greater Sudbury

- As detailed on the previous slide, Greater Sudbury's vacancy rate is well below balanced conditions and has been trending downward for several years. At the same time, rental rates are growing rapidly.
- Looking at bedroom types, two-bedrooms units have a lower overall vacancy rate than one-bedroom units, which has also consistently been the case over the past ten years. Three-bedroom units (data suppressed in 2021 due to small sample size) has typically accommodated higher vacancy than both one and two-bedroom units historically.
- Evaluating vacancy and rental rates by building size, building age, and rent quartile reveals several interesting findings:
  - Vacancy is tighter for newer and more expensive housing. The vacancy of rental units in the highest quartiles is ~1%, and under 1% for apartments built after 1980. There is virtually no availability within the City's new rental stock constructed after 2000.
  - At the same time, vacancy rates shrink and rents increase as the size of apartment building increases. This indicates that demand appears strongest for large buildings that are likely professionally managed with building amenities.
- In expensive housing markets, we would expect to see tighter vacancy in the older and less expensive rental housing stock. However, in markets such as Greater Sudbury, moderate and high-income tenants often have significant choice when deciding where to live (e.g., new rental apartment, rental single-family homes, purchase a home or condominium).
- The above indicates that there is very strong demand for new market-rate apartments.
- While vacancy is higher for the older apartments, it still remains well below balanced conditions. This housing stock also provides lower cost accommodation to lower income households, which are in short supply across the City. It is likely that the small number of vacant/available units are also lower quality and in need of repair/investment.

### Vacancy and Average Rent by Bedroom Type

	1BR	2BR	3BR+	Total
Vacancy Rate	2.3%	1.0%	-	1.6%
Average Rent	\$1,030	\$1,293	\$1,401	\$1,195

Source: CMHC

### Vacancy Rate by Rent Quartile

	Q1	Q2	Q3	Q4
Vacancy Rate	-	2.8%	1.0%	1.2%

Source: CMHC

### Vacancy and Average Rent by Year of Construction

	Before 1960	1960-1979	1980-1999	2000+
Vacancy Rate	-	1.4%	0.5%	0.3%
Average Rent	\$923	\$1,220	\$1,194	\$1,539

Source: CMHC

### Vacancy and Average Rent by Structure Size

	3-5 units	6-19 units	20-49 units	50-199 units
Vacancy Rate	-	2.5%	0.8%	0.4%
Average Rent	\$956	\$1,038	\$1,181	\$1,414

Source: CMHC



## Vacancy and Rental Rates: City of Sudbury

- In Q3 2021, the average rental rate reported by CMHC for the City of Sudbury was 34% lower than the average *market* rent recorded by CoStar Group - \$1,203 compared to \$1,609. The gap ranged from 6.7% in South End to 54.6% in New Sudbury. Market rental rates for this period were unavailable in Minnow Lake, West End and Copper Cliff.
- The CMHC AMR is calculated by surveying all rents in a community, including vacant and occupied units. They therefore include the rent paid by long-term tenants living in rent controlled units, older building, new buildings, etc. They do not accurately represent the rent a prospective tenant would have to pay for a newly advertised unit. The rents reported by CoStar and in our primary survey only represent the rents currently advertised, which are therefore higher than the CMCH averages.
- The CMHC AMR is therefore often an affordable benchmark, and often used as a threshold for affordable rental housing (including the City's Affordable Housing CIP).
- From Q3 2021 to Q3 2022, the average asking *market* rental rate in the City of Sudbury increased by 3.8% from \$1,609 to \$1,670. Rents ranged from an average \$1,284 for a studio to an average \$2,049 for a three-bedroom apartment as summarized in the table below.
- New Sudbury and South End currently have the highest average rental rates, while Downtown remains the most affordable neighbourhood in the former City of Sudbury. However, it should be noted that limited available inventory (i.e., sample size) and a lack of variation in unit types within the sample might be skewing the rates presented in the table.
- In August 2022, vacancies ranged from 0.3% in New Sudbury and Flour Mill to 2.4% in Donovan for an overall **0.6%** across the City of Sudbury. Vacancy rates were unavailable in Minnow Lake and West End.
- The average vacancy rate in the City of Sudbury is consistent with the average vacancy rate in Greater Sudbury.

### Average Rental Rates by Bedroom Type, City of Sudbury

As of August 2022

Bachelor	One-Bedroom	Two-Bedroom	Three-Bedroom
\$1,284	\$1,490	\$1,785	\$2,049

Source: CoStar Group

### Average CMHC and Market Rental Rates, City of Sudbury Q3 2021

Neighbourhood	CMHC	Market	Gap
Donovan	\$1,126	\$1,503	33.5%
Flour Mill		\$1,227	9.0%
Downtown	\$993	\$1,095	10.3%
Minnow Lake	\$1,187	-	-
New Sudbury	\$1,211	\$1,872	54.6%
South End	\$1,483	\$1,583	6.7%
West End	\$937	-	-
Copper Cliff		-	-
<b>City of Sudbury</b>	<b>\$1,203</b>	<b>\$1,609</b>	<b>33.7%</b>

Source: CMHC, CoStar Group

### Vacancy and Market Rental Rates, City of Sudbury

As of August 2022

Neighbourhood	Rental Rate	YOY Increase	Vacancy Rate
Copper Cliff	\$1,486	-	2.1%
Donovan	\$1,549	3.1%	2.4%
Downtown	\$1,125	2.7%	0.5%
Flour Mill	\$1,261	2.8%	0.3%
Minnow Lake	\$1,523	-	-
New Sudbury	\$1,946	4.0%	0.3%
South End	\$1,645	3.9%	0.7%
West End	\$ 1,424	-	-
<b>City of Sudbury</b>	<b>\$1,670</b>	<b>3.8%</b>	<b>0.6%</b>

Source: CoStar Group, NBLC

## Typical Purpose-Built Rental Buildings: City of Sudbury

### 1140 Ramsey View Court

Offers Studio, One- and Two-Bedroom Units  
Average Asking Rent: \$1,620



### Mapleview Apartments

Offers One- and Two-Bedroom Units  
Average Asking Rent: \$1,426



### St. Raphael Apartments

Offers One-Bedroom Units  
Average Asking Rent: \$1,131



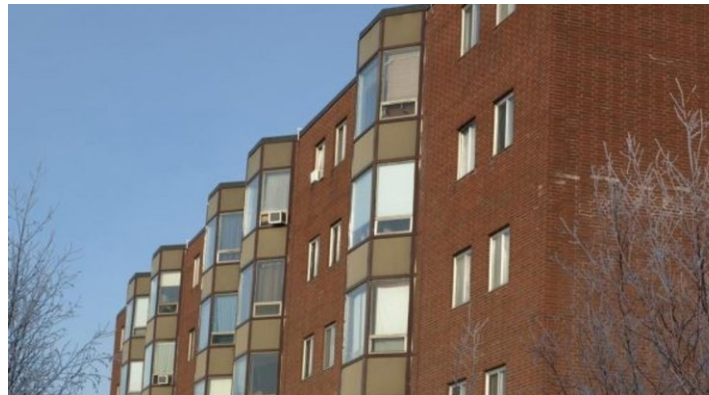
### Lakeshore Apartments

Offers Studio, One-, Two- and Three-Bedroom Units  
Average Asking Rent: \$1,614



### The Ultramod Apartments

Offers One- and Two-Bedroom Units  
Average Asking Rent: \$1,320



### 1310 Nesbitt Drive

Offers Studio, One- and Two-Bedroom Units  
Average Asking Rent: \$1,647



## Vacancy and Rental Rates: Former Municipality/Community

- Outside of the City of Sudbury, rents are typically 12% to 29% cheaper, however, the range of available unit types is much more limited. Rental buildings in former municipalities tend to be older, featuring fewer upgrades and amenities. There is also less availability outside of the City of Sudbury due to a smaller total inventory - 1,999 units compared to 11,108 in the City of Sudbury. For example, Lively Apartments – one of the few *high-rise* apartment buildings outside of the City of Sudbury, has a minimum waiting list of one and a half to two years, reaching three and a half years for their largest two-bedroom units with a balcony.

### Vacancy and Rental Rates, Former Municipality/Community As of August 2022

Municipality	Rental Rate	YOY Increase	Vacancy Rate
Onaping Falls/Walden	\$1,320	-	0%
Nickel Centre	\$1,292	-	2.8%
Rayside-Balfour	\$1,474	4.7%	0.1%
Valley East/Capreol	\$1,482	5.4%	0.2%

Source: CoStar Group, NBLC

#### Lively Apartments (Walden)

Offers One- and Two-Bedroom Units  
Average Asking Rent: \$1,320



#### Place Notre Dame (Rayside-Balfour)

Offers One- and Two-Bedroom Units  
Average Asking Rent: \$1,317



#### Garson Apartments (Nickel Centre)

Offers Two- and Three-Bedroom Units  
Average Asking Rent: \$1,400





## Rental Townhomes: Greater Sudbury

- In Greater Sudbury, there are 1,347 rental townhouse units, 72% of which are located in the former City of Sudbury. These units typically offer larger layouts primarily catering to families.
- In October 2021, CMHC recorded an average rent of \$1,338 and \$1,404 for two- and three-bedroom and above townhomes, respectively. The vacancy rate for two-bedroom units was slightly higher than three-bedrooms – 6.6% compared to 4%.
- As was previously mentioned, CMHC rates tend to be below market rates, and do not accurately represent what is currently available in the market. Our primary survey of 439 units across five projects in Greater Sudbury found an average starting rent of **\$2,046**. Out of the five surveyed projects, only one had upcoming availability for three-bedroom units, while others had a wait list of at least 60 days.

### Average CMHC Townhouse Rental Rates, Greater Sudbury October 2021

Two-Bedroom	Three-Bedroom	Total
\$1,338	\$1,404	\$1,355

Source: CMHC

### Starting Townhouse Market Rental Rates, Greater Sudbury As of August 2022

Two-Bedroom	Three-Bedroom	Four-Bedroom	Average
\$1,899 - \$2,299	\$1,785 - \$2,299	\$1,895	\$2,046

Source: NBLC

#### 1717 Lansing Ave (New Sudbury)

Offers Two- and Three-Bedroom Units

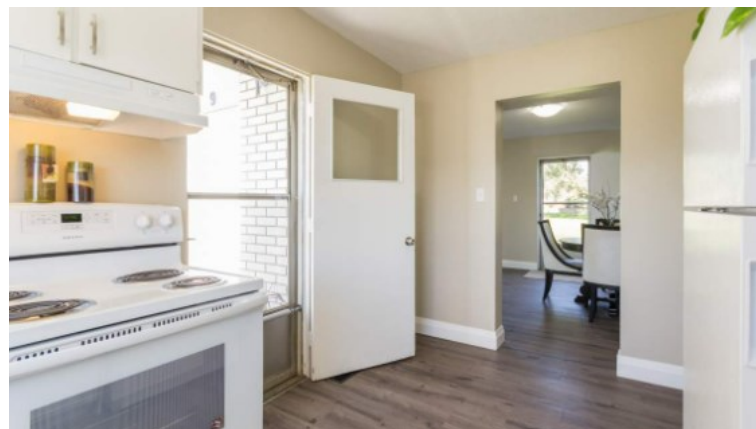
Average Asking Rent: \$2,249



#### West Side Village (Copper Cliff)

Offers Three- and Four-Bedroom Units

Average Asking Rent: \$1,840



#### 889 Chestnut (New Sudbury)

Offers Two-Bedroom Units

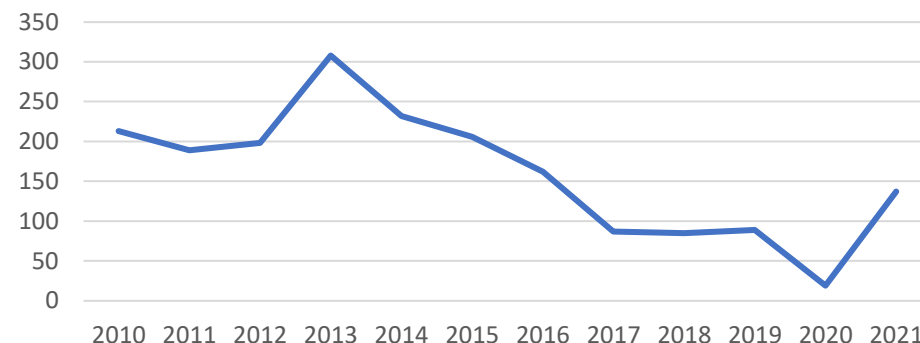
Average Asking Rent: \$2,199



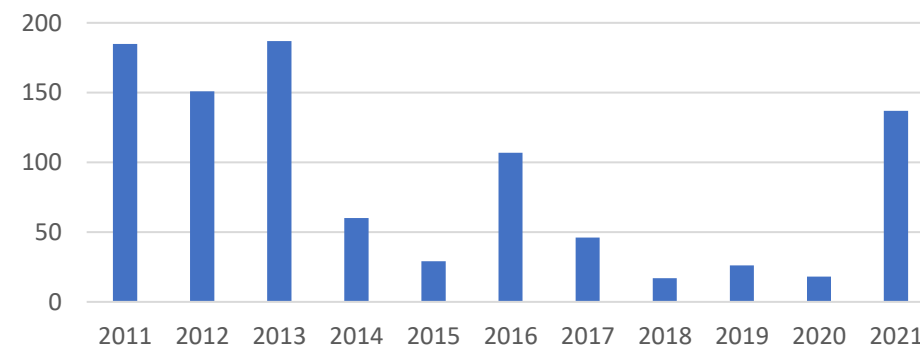
## New Purpose-Built Inventory: Greater Sudbury

- Despite low vacancy rates and rising rents, which indicate strong market demand for rental housing, new rental investment has been quite limited over the past five years. Between 2017 and 2021, Greater Sudbury had only 244 new rental starts compared to 534 new rental units between 2012 and 2017.
- All of the new under-construction inventory is currently located in Minnow Lake, where two new buildings totaling 140 units are being added to Waterview Apartments, an existing rental complex at 1290 Bancroft Drive.
- With limited new investment, Greater Sudbury's rental stock is getting quite dated. As of October 2021, almost 70% of the rental inventory was constructed before 1980 and less than 10% after 2000. Despite some common upgrades frequently found in local rental buildings, such as new kitchen and bathroom cabinets, hardwood floors and stainless steel appliances, many of these properties do not have enough structural capacity to support major upgrades such as central air conditioning or in-suite laundry, meaning that some potential renters might not be able to find suitable accommodations even with a bigger budget.
- Not surprisingly, newer rental buildings typically have a vacancy rate of 0% despite higher rents. For example, Churchill Residence, a 24-unit rental building completed in New Sudbury in 2017, currently has no upcoming availability and a waitlist of 25 people despite higher than average rental rates. Rents at Churchill Residence start at **\$2,000** plus utilities for two bedrooms – the only bedroom type offered at this project.
- 1351 Paris Street, a 65-unit rental project completed in South End in early 2020 also had no availability at the time of the survey. Consisting entirely of three-bedroom units, this project reached a 92% lease-up rate in the first month of occupancy. The starting rental rate at 1351 Paris Street is **\$3,400** a month.
- Similarly, Billiards Green, a new rental townhouse project in South End, already has a waitlist for its second phase planned for occupancy in 2023. Earlier this year, a three-bedroom plus den townhouse at this project was listed at **\$3,200** a month.

Under-Construction Rental Units, Greater Sudbury (CMHC)



Purpose-Built Rental Starts, Greater Sudbury (CMHC)



Rental Inventory by Construction Period, Greater Sudbury

Before 1960	1960 - 1979	1980 - 1999	2000 and Later
24.5%	44.4%	22.9%	8.2%

Source: CMHC



## New Purpose-Built Inventory: Greater Sudbury

- Both old and new rental stock in Greater Sudbury has very low vacancy rates, indicating that demand for rental housing is strong across all market segments. Recently renovated units offer mid-point pricing close to or slightly above the average rates in the Region. Older units with fewer upgrades typically rent below the market average, although pricing varies depending on location. Newer units rent significantly above the market average. Rents in these new projects are primarily influenced by in-suite amenities, such as ensuite laundry, brand new stainless steel appliances and self-controlled heating and cooling, as they typically do not offer any building amenities, often found in older buildings.
- With limited new investment in purpose-built rental and a tightening ownership market, demand for rental units will likely keep growing, further driving rental rate growth across the entire Region.

**Starting Rental Rates by Property Type, Greater Sudbury**

Type	Studio	One-Bedroom	Two-Bedroom	Three-Bedroom
Old Stock	\$1,000	\$1,250	\$1,400	\$1,450
Renovated Stock	\$1,300	\$1,450	\$1,650	\$1,900
New Stock	-	-	\$2,000	\$3,200

Source: CoStar, NBLC

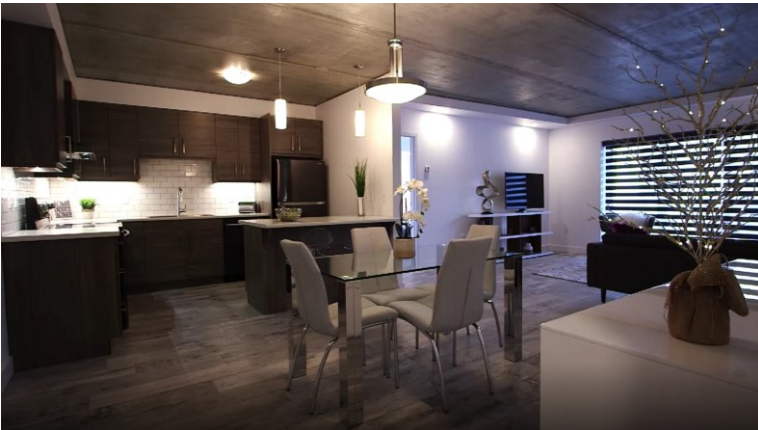
### 1351 Paris Street (South End)

Offers Three-Bedroom Units  
Starting Asking Rent: \$3,400



### Churchill Residence (New Sudbury)

Offers Two-Bedroom Units  
Starting Asking Rent: \$2,000



### Billiards Green (South End)

Offers Two- and Three-Bedroom Units  
Starting Asking Rent: \$3,200



## Secondary Rental Market: Greater Sudbury

- As in most Ontario markets, the gap between rental supply and demand in Greater Sudbury is partly filled through privately leased units. However, given the size of the secondary rental market in the Region, there is still insufficient inventory to address the shortage of rental units in Greater Sudbury. In 2021, less than 2% of all rental households lived in privately leased condominiums, and with less than 150 new condominium completions since 2011, the market share of these units likely has not changed. At the time of the report there were no condominium units available for lease.
- There were, however, nine single- and semi-detached homes and four multi-plex apartments listed for rent. Pricing ranged from \$1,650 to \$2,625 for an entire home and from \$1,495 to \$2,800 for an apartment (i.e., plex building). These listings averaged **\$2,296** and **\$2,049** respectively. The majority of listings were for two- and three-bedroom units. Additionally, nine rooms were available for an average of \$589 a month.

### Available Private Listings, Greater Sudbury

Type	One-Bedroom	Two-Bedroom	Three-Bedroom +
House	-	\$2,500	\$2,093
Apartment*	\$1,495	\$1,700	\$2,200
Single Room	\$589		

*Includes single-floor apartments and units in multi-plex buildings.  
Source: Realtor.ca, Kijiji*

#### Four-Bedroom Detached

List Price: \$1,995



#### Three-Bedroom Detached

List Price: \$1,650



#### Three-Bedroom Semi-Detached

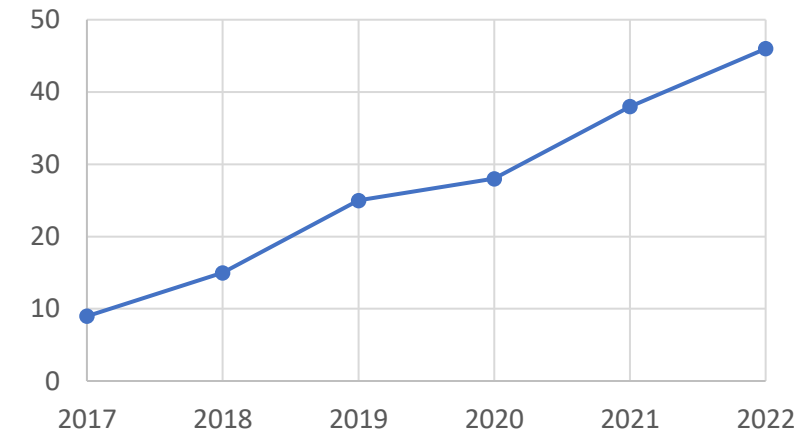
List Price: \$2,800



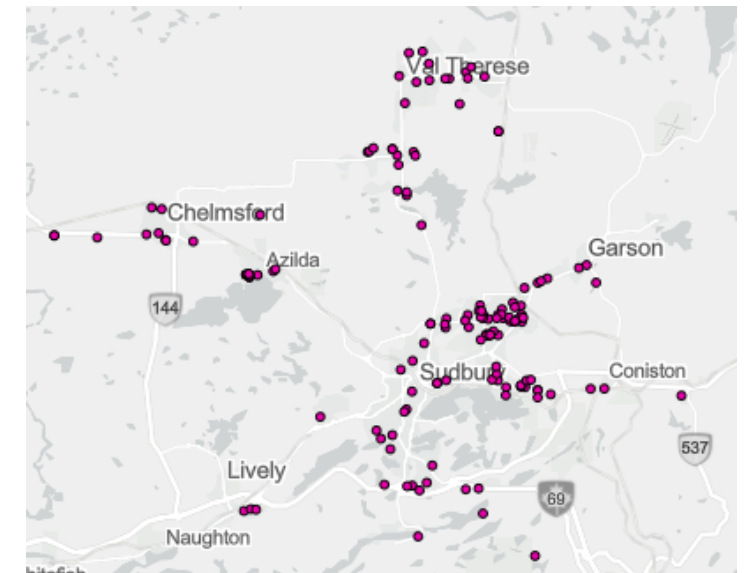
## Secondary Rental Market (Secondary Dwelling Units): Greater Sudbury

- Since 2017, 115 new secondary suites have been registered with the City. As illustrated to the right, the number of units has increased year-over-year, from 9 in 2017 to 38 in 2021. The increase in registered units is at least partly attributed to policy changes enacted by the City in 2017 and the removal of Development Charges for these units in 2019. Secondary dwelling units have also been widely distributed across the City of Greater Sudbury over this period, with the largest concentration observed within the Former Municipality of Sudbury.
- Currently, there are only seven basement apartments listed for lease in Greater Sudbury. Rents range from \$1,350 to \$2,200 for an average of \$1,593. However, within such a small sample size, factors such as location, unit size and quality of finishes have an outlying impact on pricing. Three of the listings were one-bedroom units with an average rent of \$1,483, three listings were for two-bedroom apartments averaging \$1,500, and one listing for a three-bedroom unit for \$2,200.

# of Registered Secondary Dwelling Units 2017-2022



Location of Registered Secondary Dwelling Units



Three-Bedroom Basement Apartment

List Price: \$2,200



One-Bedroom Basement Apartment

List Price: \$1,600



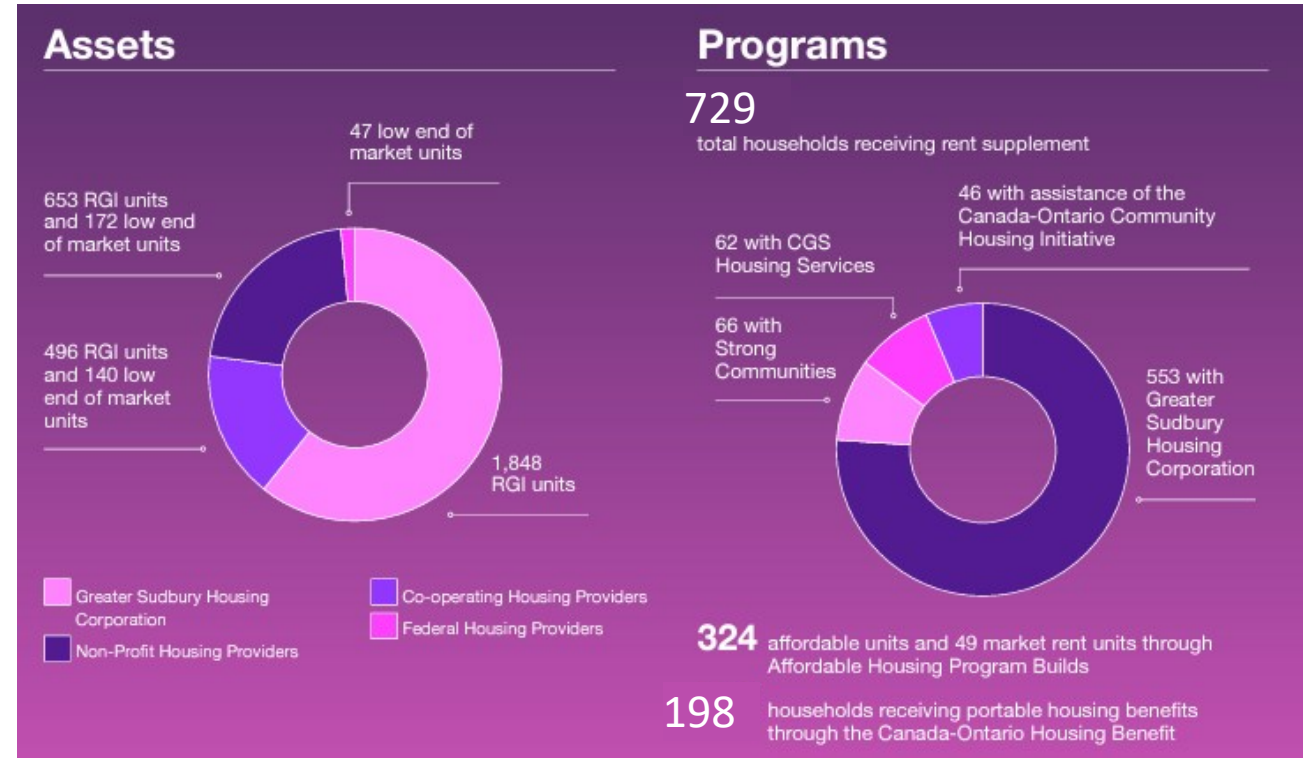
### 3.0 Community Housing Supply Characteristics, Needs, and Population/Housing Projections





## Community Housing Supply in Greater Sudbury

- As of July 11, 2022, Greater Sudbury has a community housing stock of 3,356 units. This includes 359 Low End of Market (“LEM”) units as well as 2,997 Rent Geared to Income (RGI) units.
- The City of Greater Sudbury Housing Corporation consists of 1,848 RGI units, representing over half of the total affordable housing stock in the City and 62% of all RGI units.
- The remaining RGI housing stock, and all of the LEM units, are supplied through Non-Profit and Co-operative housing providers.
- Most of this housing stock is old and was created through legacy government programs throughout the 1970s and 80s. This housing stock requires ongoing operating and capital subsidies. The housing stock is also in a varied state of condition, with some units/buildings requiring significant investment and repairs (source: housing homelessness plan, community housing revitalization study).
- A smaller proportion of the housing stock was constructed since the early 2000’s through government programs such as the Ontario Government Investment in Affordable Housing (IAH) incentive program and the National Housing Strategy.
- In addition to the physical building stock, there are 729 rent supplements available in the City in addition to 198 portable housing benefits (COHB + SHARP).
- The table to the right illustrates the typical rental rates associated with each affordable housing type.
- The tables/graphs to follow illustrate the location of the community housing stock across Greater Sudbury.



Typical Rental Rates for Community/Affordable Housing					
% AMR	Typical Program	Bachelor	One-Bedroom	Two-Bedroom	Three-Bedroom
100% AMR	New Affordable Housing/Housing Benefits/Rent Supplements	\$749	\$1,030	\$1,134	\$1,286
80% AMR		\$599	\$824	\$907	\$1,028
60% AMR	LEM	\$449	\$618	\$776	\$841
RGI	Community Housing	~\$350			

Source: City of Greater Sudbury





City of Greater Sudbury Community Housing Portfolio (as of September 2022)* - Continued															
Program	Unit Type	Capreol	Donovan	Downtown	Flour Mill	Minnow Lake	New Sudbury	Nickel Centre	Onaping Falls	Rayside-Balfour	South End	Valley East	Walden	West End	Total
Municipal Rent Supplement	One-Bedroom				35										35
	Total				35										35
SCRS Provincial	One-Bedroom			7		10	23				16				56
	Two-Bedroom			1											1
	Total			8		10	23				16				57
SCRS (RS-Supportive)	One-Bedroom		1	1		3	2				2	1			10
	Two-Bedroom										2				2
	Total		1	1		3	2				4	1			11
CGS Rent Supplement	One-Bedroom					19									19
	Two-Bedroom			2		1	3	1		1					8
	Three-Bedroom				3	5	15			2	1	3			29
	Four-Bedroom						2								2
	Total			2	3	25	20	1		3	1	3			58
Affordable Units	Bed			15											15
	Bachelor					6									6
	One-Bedroom	5			47	67					5		31		155
	Two-Bedroom	15			33						35		1	64	148
	Three-Bedroom														0
	Four-Bedroom														0
	Total	20		15	80	73					40		32	64	324
Total CGS Portfolio		40	191	335	1,111	493	623	64	20	311	729	146	89	207	4,359
% Share		0.9%	4.4%	7.7%	25.5%	11.3%	14.3%	1.5%	0.5%	7.1%	16.7%	3.3%	2.0%	4.7%	100%

\*Excludes 224 portable/non-fixed units.

Source: City of Greater Sudbury

## Community Housing Wait List Characteristics

- As of September 2022, there were 845 households on the subsidized housing centralized waitlist in the City of Greater Sudbury.
- Of this total, approximately 22% are already housed by a community housing provider and are seeking a transfer. However, the vast majority of these households (655 households) are not currently housed by a community housing provider and are therefore either living in unaffordable conditions, are homeless, are living in a temporary arrangement, or some other problematic situation.
- Special Priority and Urgent applicants (e.g., victims of domestic violence, homeless, and other vulnerable groups) are given priority status on the wait list and offered housing ahead of non-priority applicants.
- Non-priority applicants represent 88% of the wait list. This includes senior households (over 65) and non-senior households (referred to as chronological). Seniors represent 20% of the wait list.
- One-bedroom units have been the most in demand affordable housing type by a large margin since 2011. Currently, over 70% of the wait list are looking for a one-bedroom unit. As assessed through the GSHC Revitalization Study, demand is more balanced across unit types in the low end of market options operated by non-profits (this wait list is no longer maintained).
  - The above is not a surprising finding. We find that across Ontario, demand for RGI housing tends to be driven overwhelmingly by seniors and singles in need of a one-bedroom unit. Demand for housing types becomes more balanced for LEM and affordable housing (e.g., AMR) as demand is broader and includes families and larger households.
- 70% of the wait list is also from households without dependants, which explains why demand is so heavily weighted towards smaller units (i.e., one-two bedroom units).
- Given the size of the wait list, it can take over 4 years for a household to be housed, depending on the housing they require. Wait times can be lower for those seeking larger family size housing, if they qualify.

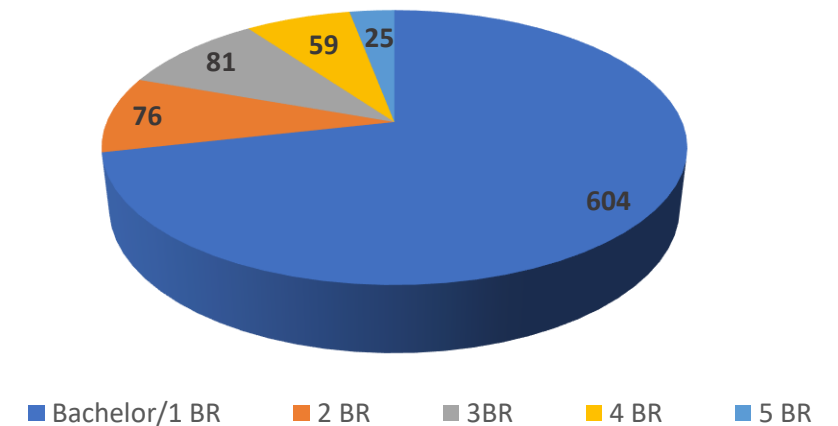
### Waitlist Characteristics

September 2022

Wait List Makeup	
Special Priority	7
Urgent	49
Refugees	48
Seniors	167
Chronological	574
Total	845
Household Characteristics	
Without Dependants	460
With Dependants	218
Modified Units	22
Applicant Type	
Overhoused	12
Seeking Transfer	190
True Need	655

Source: City of Greater Sudbury

### Wait List by Bedroom Type (September 2022)



## Community Housing Income Limits

- Income Limits are established for RGI housing in the Housing Services Act, 2011 (see Table below).
- The income limits for all unit types fall within the 2<sup>nd</sup> to 5<sup>th</sup> income decile, with all limits being below the 6<sup>th</sup> income decile. Given that these are maximum income limits, the range appears to be appropriate for the City. The actual affordability of RGI, LEM, and AMR relative to the City's income deciles will be explored later in this report.
- Of note, there are no income limits for the City's CIP.

**Household Income Limits for Community Housing (RGI), Greater Sudbury (Housing Services Act, 2011)**

Location	Bachelor	One-Bedroom	Two-Bedroom	Three-Bedroom	Four-Bedroom +
Greater Sudbury Service Area	\$32,000	\$41,500	\$49,000	\$58,000	\$74,500
Max Income Decile Served	3rd	4th	5th	6th	8th

## Recent Affordable Housing Activity

- Over the past five years, there have been three major affordable housing projects:
  - 15 congregate affordable housing units (transitional housing) through Home for Good Phase 1.
  - 12 affordable units (6 congregate and 6 one-bedroom units) for persons with brain injuries constructed by the March of Dimes funded through the Social Infrastructure Fund.
  - 40 affordable units (in addition to 25 market units) dedicated to seniors and funded through IAH.
- Following the recommendations of the Revitalization Strategy, the Greater Sudbury Housing Corporation is commencing with the sale of scattered housing units. Proceeds of the sale values will be used to invest in other housing and programs (see next page of this report).
- The City is also working on a number of strategies related to land banking, attainable housing, reduced parking standards, secondary dwelling units, zoning and Official Plan changes, small/tiny homes, and others.
- Other key items identified by the City's Housing and Homelessness Plan Update:
  - Continued operating and capital funding to the community housing portfolio, administered federal-provincial funding for new affordable housing, renewed operating agreements with non-profit housing providers, increasing the number of portable housing benefits, and improvements/efficiency in the development approvals process.

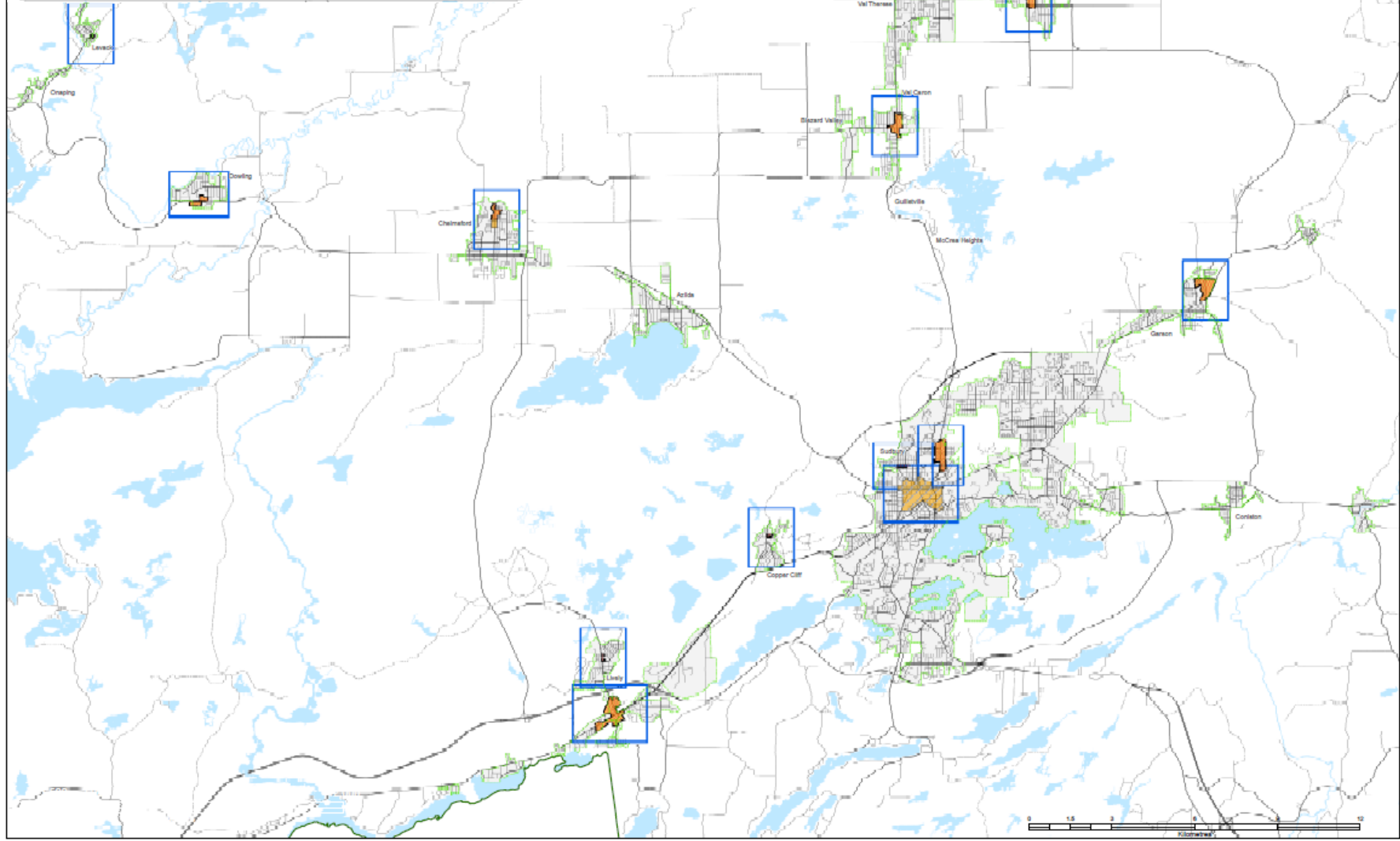
- The City launched the Affordable Housing Community Improvement Plan (CIP) in August of 2018.
- The CIP seeks to encourage affordable housing creation through the offering of incentives as well as a land banking program. Incentives offered include:
  - **Second Units:**
    - Rebate of planning and building fees
    - Second Unit Incentive Program (grant to cover 50% of project costs to a maximum of \$50k).
  - **New Development:**
    - Tax increment equivalent grant (scaling 5-year grant)
    - Rebate of planning and building fees
    - Feasibility grant (to offset feasibility studies up to \$5,000)
    - Residential Incentive Program (lesser of \$10 per square foot or \$20k per affordable unit, to a maximum of \$200k).
- Affordable rental is the target of the program, where rents must be at or below 100% of the CMHC Average Market Rent (AMR) for the City. The length of affordability is a minimum of 20 years. There are several location/project and design criteria required to be eligible for the program.
- There are no income limits associated with the CIP.
- The CIP is intended to be stacked with other sources of funding through Municipal, Provincial, and Federal sources. Where those programs have more onerous requirements (e.g., longer/deeper affordability) than required in this CIP, those requirements will prevail.

- To date, one project has been approved through the CIP.
  - Raising the Roof, a national non-profit organization, is proposing to acquire five of scattered units being sold by the Greater Sudbury Housing Corporation. The applicant will then use funding through the CIP to renovate the homes and create secondary dwellings in the basement (i.e., convert from a single-family home to a duplex with a rental unit on the main floor and basement). Construction has begun.
- There have been three other applications to the CIP, however none have advanced towards formal approval or consideration by Council.
- These results are not surprising, given that the City's CIP likely requires coordination and approval of other funding sources through senior levels of government to result in a viable affordable housing project, particularly for projects at a larger scale.
- The City also has a Municipal Capital Facility By-Law that can be used to provide financial support to affordable housing projects. This tool allows the City to be nimble as opportunities arise, where project might be able to receive funding outside of the CIP.
- The City also has a number of other incentive programs covered under the Strategic Core Areas CIP.



# Development Incentives Related to Housing

- Affordable Housing CIP
- Downtown Sudbury CIP
- Town Centre CIP
- Development Charges Exemption
- Click on Box for Detailed Map



## Projections and Growth Outlook (Reference Scenario)

- Looking forward, the City's population is projected to grow by 18,300 people between 2021 and 2051, reaching a population of 188,520.
- To accommodate this growth, a total of 10,330 homes will be required, which is driven by both population growth as well as socioeconomic factors such as an aging population and shrinking household sizes.
- The vast majority of this growth (~50%) is projected to occur in the City of Sudbury, followed by Valley East and Rayside Balfour.
- While single- and semi-detached homes are expected to remain the pre-dominant housing type delivered in Greater Sudbury, a larger share of townhomes are expected looking forward, which is a common trend across the Province. The share of apartments is expected to remain stable looking forward at around 1/3 of the City's new housing.
- Key factors influencing these results include:
  - The City of Greater Sudbury is the regional service centre for much of Northern Ontario, allowing it to be more diverse and accommodate modest growth that is expected to continue (relative to flat or negative growth experienced in other norther communities).
  - While mining and related employment can create long-term volatility, currently the industry is supporting growth.
  - Household sizes are decreasing due to an aging population, families delaying having children, couples having fewer children, and other similar factors. Declining household sizes will drive demand for housing above and beyond population growth.
  - An aging population will also drive demand for both condominium and rental apartments as they downsize and seek maintenance free housing. This will also drive demand for affordable housing for those on fixed incomes as well as seniors and long-term care homes.
  - While international and internal migration were mostly negative between 2011 and 2016, these trends reversed somewhat as of 2021, and are projected to remain positive looking forward, particularly for intraprovincial migration.
- There are also 4,003 international students attending the post-secondary institutions, with many living off-campus, fueling additional demand for housing across the City.

### Tables Prepared by Hemson Consulting

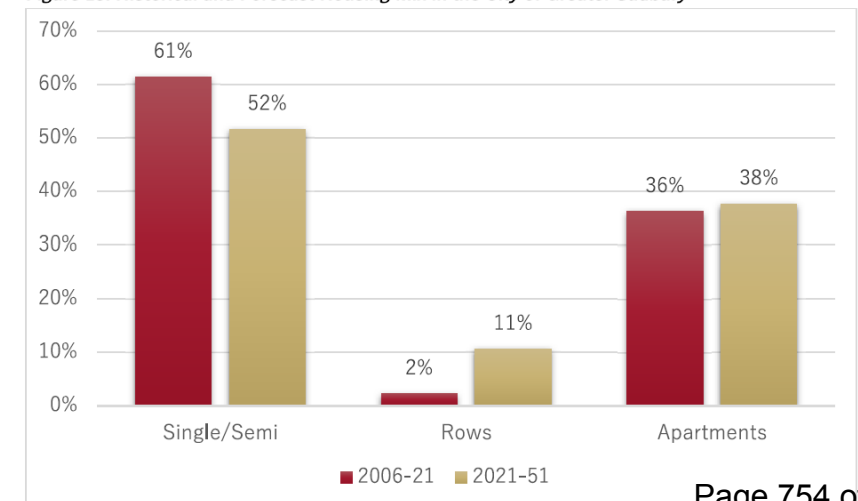
Total Population

Former Census Subdivision	2021	2026	2031	2036	2041	2046	2051
Capreol	3,400	3,450	3,500	3,540	3,580	3,620	3,680
Capreol NE Townships	170	190	190	220	220	240	230
New SE Townships	1,260	1,270	1,280	1,290	1,300	1,310	1,330
Nickel Centre	13,310	13,580	13,770	13,980	14,140	14,300	14,560
Onaping Falls	4,860	4,940	5,000	5,060	5,090	5,140	5,230
Rayside-Balfour	16,270	16,760	17,140	17,540	17,840	18,200	18,480
Sudbury	94,860	97,030	98,520	100,180	101,490	103,210	104,770
Valley East	24,840	25,450	25,930	26,360	27,050	27,380	27,800
Walden	11,300	11,540	11,740	11,950	12,080	12,270	12,440
<b>City of Greater Sudbury</b>	<b>170,270</b>	<b>174,210</b>	<b>177,070</b>	<b>180,120</b>	<b>182,790</b>	<b>185,670</b>	<b>188,520</b>

Occupied Households

Former Census Subdivision	2021	2026	2031	2036	2041	2046	2051
Capreol	1,420	1,450	1,480	1,500	1,530	1,550	1,570
Capreol NE Townships	70	90	90	100	110	110	110
New SE Townships	510	520	530	530	540	540	550
Nickel Centre	5,370	5,510	5,640	5,790	5,910	6,000	6,070
Onaping Falls	2,000	2,040	2,080	2,120	2,150	2,170	2,200
Rayside-Balfour	6,860	7,110	7,390	7,620	7,860	8,010	8,180
Sudbury	41,530	42,670	43,840	44,900	45,970	46,730	47,420
Valley East	9,390	9,690	10,000	10,230	10,450	10,590	10,720
Walden	4,400	4,530	4,640	4,760	4,870	4,930	5,010
<b>City of Greater Sudbury</b>	<b>71,550</b>	<b>73,610</b>	<b>75,690</b>	<b>77,550</b>	<b>79,390</b>	<b>80,630</b>	<b>81,830</b>

Figure 13: Historical and Forecast Housing Mix in the City of Greater Sudbury



## 4.0 Affordability Gap Analysis

- The following tables present the income deciles by tenure and affordability thresholds of each decile group demonstrated earlier in this report. It also illustrates the typical price/rent of housing options in Greater Sudbury.
- **Red** indicates the home is unaffordable and **Green** indicates the home is affordable to that decile group.
- As illustrated, most new and resale ownership homes are unaffordable to the majority of households across Greater Sudbury. Households in the three top income deciles (high-income households) can afford a greater range of housing, but even in this group, the 7<sup>th</sup> and 8<sup>th</sup> deciles still have some affordability constraints depending on location and housing type.
- Rental housing is almost entirely unaffordable to households below the 6<sup>th</sup> income decile. Between the 6<sup>th</sup> and 8<sup>th</sup> deciles, affordability is limited to smaller units or units in older buildings that typically rent slightly below the average rate. Based on starting rental rates for new purpose-built rentals, only the top decile can afford a two-bedroom unit, while new three-bedroom apartments are beyond the affordability thresholds of all households. Similarly, privately rented homes are largely unaffordable to people below the top income decile.
- Both ownership and rental affordability is therefore strained across Greater Sudbury.

Ownership Housing Affordability Gap Analysis, Greater Sudbury											
Income Decile			1	2	3	4	5	6	7	8	9
Affordability Threshold			\$97,546	\$150,293	\$199,428	\$247,478	\$303,477	\$368,508	\$451,603	\$555,178	\$732,755
Location/Housing Type		Average Sale Price									
Resale Housing*											
Capreol		\$286,800									
Onaping Falls		\$303,200									
Nickel Centre		\$439,600									
Rayside-Balfour		\$465,500									
City of Sudbury		\$488,500									
Valley East		\$476,700									
Walden		\$451,500									
Greater Sudbury		\$452,500									
New Housing											
Single-Detached	Two-Bedroom	\$435,900									
	Three-Bedroom	\$476,811									
	Four-Bedroom	\$663,233									
	Five-Bedroom	\$1,199,950									
Semi-Detached	Two-Bedroom	\$334,275									
	Three-Bedroom	\$354,515									
*Resale pricing by housing/bedroom type was unavailable.											
Source: Greater Sudbury Real Estate Board, NBLC.											

# Rental Housing Affordability Gaps, Greater Sudbury

## Rental Housing Affordability Gap Analysis, Greater Sudbury

Income Decile		1	2	3	4	5	6	7	8	9
Affordability Threshold		\$536	\$718	\$939	\$1,149	\$1,392	\$1,668	\$1,974	\$2,430	\$3,092
Unit Type	Average Rental Rate*									
Purpose-Built Rental Apartments										
Bachelor	\$1,280									
One-Bedroom	\$1,473									
Two-Bedroom	\$1,724									
Three-Bedroom	\$2,029									
New Purpose-Built Apartments										
Two-Bedroom	\$2,000									
Three-Bedroom	\$3,200									
Purpose-Built Townhomes										
Two-Bedroom	\$2,099									
Three-Bedroom	\$2,042									
Four-Bedroom	\$1,895									
Privately Leased Homes										
Two-Bedroom	\$2,500									
Three-Bedroom	\$2,093									
Privately Leased Apartments**										
One-Bedroom	\$1,495									
Two-Bedroom	\$1,700									
Three-Bedroom	\$2,200									
Privately Leased Secondary Units (Basement Apartments)										
One-Bedroom	\$1,483									
Two-Bedroom	\$1,500									
Three-Bedroom	\$2,200									
Privately Leased Rooms										
Single Room	\$589									

\*Due to limited availability, an average starting marker rent was used for rental townhomes and new purpose-built apartments.

\*\*Single-floor apartments (plex buildings). There were no condominium units listed for lease at the time of the survey.

Source: CoStar Group, Realtor.ca, Kijiji, NBLC



# Rental Housing Affordability Gaps, Greater Sudbury

Rental Housing Affordability Gap Analysis, Greater Sudbury										
Income Decile		1	2	3	4	5	6	7	8	9
Affordability Threshold		\$536	\$718	\$939	\$1,149	\$1,392	\$1,668	\$1,974	\$2,430	\$3,092
Location	Average Rental Rate*									
City of Sudbury										
Copper Cliff	\$1,486									
Donovan	\$1,549									
Flour Mill	\$1,125									
Downtown	\$1,261									
Minow Lake	\$1,523									
New Sudbury	\$1,946									
South End	\$1,645									
West End	\$1,424									
City of Sudbury	\$1,670									
Former Municipality/Community										
Onaping Falls/Walden	\$1,320									
Nickel Centre	\$1,292									
Rayside-Balfour	\$1,474									
Valley East/Capreol	\$1,482									
Former Municipality/Community	\$1,470									
Source: CoStar Group, NBLC										

Source: CoStar Group, NBLC

# Affordable Housing Affordability Gaps, Greater Sudbury

Community/Affordable Housing Affordability Gap Analysis, Greater Sudbury												
Income Decile				1	2	3	4	5	6	7	8	9
Income				\$21,426	\$28,716	\$37,551	\$45,945	\$55,665	\$66,709	\$78,969	\$97,192	\$123,699
Affordability Threshold				\$536	\$718	\$939	\$1,149	\$1,392	\$1,668	\$1,974	\$2,430	\$3,092
%AMR	Program	Unit Type	Average Rental Rate*									
100% AMR	New Affordable Housing/Housing Benefits/Rent Supplements	Bachelor	\$749									
		One-Bedroom	\$1,030									
		Two-Bedroom	\$1,134									
		Three-Bedroom	\$1,286									
80% AMR		Bachelor	\$599									
		One-Bedroom	\$824									
		Two-Bedroom	\$907									
		Three-Bedroom	\$1,028									
60% AMR	LEM	Bachelor	\$449									
		One-Bedroom	\$618									
		Two-Bedroom	\$776									
		Three-Bedroom	\$841									
RGI	Community Housing		~\$350									
Source: City of Greater Sudbury												

Source: City of Greater Sudbury

Household Income Limits for Community Housing (RGI), Greater Sudbury					
Location	Bachelor	One-Bedroom	Two-Bedroom	Three-Bedroom	Four-Bedroom +
Greater Sudbury Service Area	\$19,200	\$24,900	\$29,400	\$34,800	\$44,700
Max Income Decile Served	1st	1st	2nd	2nd	3rd

## 5.0 Who are the Households Facing Affordability Challenges

According to CMHC, a household is considered to be in Core Housing Need if its housing doesn't meet one or more of the following standards:

- Affordability – Household is spending more than 30% of gross income on shelter costs.
- Adequacy – Home requires major repairs.
- Suitability – Household lives in a home not suitable for its household size and composition (i.e., crowded).

AND if it is unable to afford housing in the local area that meets these standards.

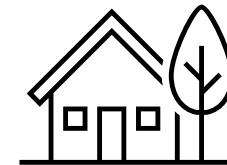
Housing is considered affordable when shelter costs do not exceed 30% of gross household income, adequate when it does not require any major repairs beyond regular maintenance, and suitable when it's sufficient for household size and composition.



- In 2021, almost 18% of all *renter* households in Greater Sudbury were in core housing need, meaning that their housing was either unaffordable, inadequate or unsuitable. In comparison, only 3% of all *owner* households experienced core housing need.
- The period between 2016 and 2021 saw a considerable drop in Core Housing Need, particularly among renter households, likely due to the income growth they experienced during this period. Considering the recent pace of housing price appreciation across the country, as well as high interest rates, this rate has likely only increased for both renter and owner households since then.
- One-parent and one-person households had significantly higher rates of core housing need compared to other household types (corresponding to demand profile observed in the Community Housing Wait List).
- Overall, incidents of core housing need were more frequent among households with the primary household maintainer aged 55 and over.
- Larger households, due to higher likelihood of multiple incomes, are considerably less likely to be in Core Housing Need compared to smaller households.
- Households living in denser housing forms, such as duplexes and apartments, are more likely to be in Core Housing Need than those living in detached and semi-detached housing.
- Households with recent immigrants who moved to Greater Sudbury since 2011 are unlikely to be in Core Housing Need – however, it should be noted that this group is very small (1.3% of all households) and rounded, so there likely may be some households that are in Need.
- Households Indigenous-led households are slightly more likely to be in Core Housing Need than non-Indigenous-led households. The same dynamic is found when comparing female-led households to male-led households.

### Who Are the Households in Core Housing Need?

- Renter Households
  - One-Person Households
- One-Parent Households
  - Indigenous-led Households
- Households led by persons over 55
  - Female-led Households
- Households living in Duplexes, Townhomes, and Apartments
  - Visible Minority-Led Households



## Core Housing Need: Household Characteristics

% of Households in Core Housing Need, Greater Sudbury		
Year	Owners	Renters
2006	2.7%	24.0%
2011	3.2%	22.6%
2016	4.0%	27.7%
2021	2.8%	17.9%

Source: CMHC, Statistics Canada.

Households in Core Housing Need, Greater Sudbury (2021)			
	Share of Total Households	Owner Households in Need	Renters Households in Need
# of Households in Core Housing Need	-	1,270	4,445
% of Households in Core Housing Need	-	2.8%	17.9%
Household Type			
Couples With Children	27.2%	0.8%	7.0%
Couples Without Children	23.3%	0.6%	6.1%
One-Parent Households	9.9%	7.6%	22.9%
Multifamily Households	5.1%	0.8%	7.5%
One-Person Households	30.2%	8.2%	24.4%
Other Non-Family	4.3%	3.6%	10.3%
Age of Primary Household Maintainer			
15-24	3.7%	0.0%	14.6%
25-34	13.8%	1.7%	12.5%
35-44	15.9%	1.6%	13.4%
45-54	16.6%	1.9%	18.0%
55-64	20.5%	3.7%	22.9%
65+	29.5%	3.7%	22.5%

Source: CMHC, Statistics Canada.

Households in Core Housing Need, Greater Sudbury (2021)			
	Share of Total Households	Owners	Renters
Household Size			
1 person	19.8%	8.2%	24.4%
2 persons	40.4%	1.8%	13.0%
3 persons	17.1%	1.5%	12.1%
4 persons	16.1%	0.7%	7.3%
5 persons	4.8%	1.4%	6.6%
6 or more persons	1.9%	0.0%	7.4%
Structural Type of Dwelling			
Single-detached house	61.0%	2.3%	13.1%
Semi-detached house	4.8%	3.5%	12.0%
Row house	4.2%	5.1%	11.0%
Apartment or flat in a duplex	5.9%	7.4%	15.6%
Apartment in a building that has 5+ storeys	6.6%	15.4%	20.1%
Apartment in a building that has <5 storeys	16.6%	8.6%	21.3%
Other households	99.1%	2.8%	18.0%
Primary Household Retainer - Immigrant Status			
Households led by persons with immigrants arriving between 2017-2021	0.6%	0.0%	0.0%
Households led by persons with immigrants arriving between 2011-2016	0.7%	0.0%	0.0%
Other households	98.7%	2.8%	18.4%
Primary Household Retainer - Visible Minority Identity			
Households led by Visible Minorities	4.7%	3.2%	10.2%
Other households	95.3%	2.8%	18.6%
Primary Household Retainer - Indigenous Identity			
Households led by persons with Indigenous Identity	9.9%	3.0%	19.7%
Other households	90.1%	2.8%	17.7%
Primary Household Retainer - Gender			
Female-led Households	45.1%	3.6%	20.0%
Male-led Households	54.9%	2.2%	15.4%

Source: CMHC, Statistics Canada.



## Shelter-Cost-to-Income-Ratio: City of Greater Sudbury

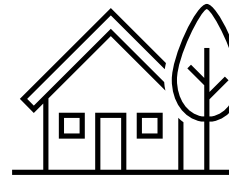
- In 2016, renter households in core housing need spent 47.8% of their gross income on shelter based on the average household income of \$21,800 before taxes and the average monthly shelter costs of \$817.
- Owner households in core housing need had slightly higher incomes than renters, but also higher monthly shelter costs. In 2016, these households had a Shelter-Cost-to-Income-Ratio of 48.6 based on the average gross household income of \$24,308 and the average monthly housing expenses of \$939.
- Most of these households fall in the bottom income decile, which has historically experienced very modest income growth. With rental rates and purchase prices increasing at unprecedented rates, it is unlikely that these ratios have gotten smaller over the most recent census period.

**Core Housing Need Households, Greater Sudbury (2016)**

Tenure	Average Gross HH Income	Average Monthly Shelter Costs	Average STIR* Before Taxes	Median Gross HH Income	Median Monthly Shelter Costs	Median STIR* Before Taxes
Owner	\$24,308	\$939	48.6	\$22,981	\$843	43.6
Renter	\$21,800	\$817	47.8	\$20,439	\$795	44.8

\*Shelter-Cost-to-Income-Ratio

Source: CMHC, Census Canada



## 6.0 Key Findings – High Level Themes

- Incomes in Greater Sudbury have been increasing, but the increase is primarily attributed to growth among high-income households. Owner households also earn significantly more than renters, on average and broadly across all decile groups.
- Renter households are far more likely to be in core housing need (i.e., living in unaffordable, unsuitable, and/or inadequate housing), particularly for older and senior households, lone-parents, one-person households, immigrant households, and households with activity limitations. It is also very likely that the proportion of households in core housing need has increased since the 2016 census given shifts in the market over this period.
- In the ownership market, resale pricing has been increasing rapidly in recent years and is quickly becoming out of reach for many middle-income households. New housing development focuses on large single-detached homes that primarily target upper-middle and high-income households. While townhomes are beginning to become a more common development choice for builders, single-detached homes remain the predominant housing typology delivered historically and in recent years. Other affordable ownership options such as condominium apartments have been non-existent.
- Population growth and eroding affordability in the ownership market are driving rental demand across Greater Sudbury, resulting in low vacancy and strong increases in rental rates. The supply of new rental housing has been modest and is not keeping pace with demand, causing low vacancy, long wait-lists, and rising rents. As a result, the vast majority of rental and ownership housing is becoming unaffordable to low- and moderate-income households.
- The City also has a significant wait list for community housing of nearly 850 households. Demand for community housing (i.e., RGI), and particularly one-bedroom units, is expected to remain strong given deteriorating affordability levels and the current wait list composition. Many households may wait over four years prior to being housed in the City's community housing stock.
- There is also sizeable demand for Low End of Market and rental housing at a proportion of the CMHC AMR.
- Sudbury is expected to continue to grow looking forward to 2046, with the majority of growth expected in low-density forms and within the former City of Sudbury. It is vital that the City ensures housing supply is able to meet the current unmet demand as well as the needs of future residents.
- The results of this analysis indicate that the City should find ways to encourage more rental housing broadly across the housing continuum and affordability depths (e.g., RGI to market-rates). The City should also be encouraging a greater supply of ownership housing, as well as broader supply characteristics including lower-cost product types such as townhomes, compact semi-detached, and condominium apartments.

- Greater Sudbury's ownership housing stock has experienced significant price growth in recent years. While overall pricing levels remain more affordable than many other communities in Ontario, many middle-income households may no longer be able to afford a home, particularly if they are a first-time purchaser. Historically, Greater Sudbury's resale market was affordable to a broader range of the population.
- It appears that the supply of housing is not meeting current or projected demand. The modest amount of new housing that is built targets a very narrow segment of the market (e.g., expensive single-family homes positioned towards the upper end of the market).
- As a result, demand is focused on existing homes, where these properties are experiencing strong price growth and selling very quickly.
- Despite cooling in the market as a result of rising interest rates, home prices remain well above pricing levels from last year. And despite home prices declining since interest rates began increasing in February, affordability has not improved as overall shelter costs for a household remain similar or higher (e.g., lower home price but similar mortgage payment due to higher interest rate).
- Local households will therefore likely continue to face affordability challenges in the ownership market. Limited new housing supply will continue to put upward pressure on prices as population grows while higher mortgage rates and stricter qualification requirements will pose barriers for many potential buyers, particularly those entering the market for the first time.
- These conditions will continue to drive increased demand for rental housing, as prospective purchasers who may no longer be able to afford a home turn to the rental market.
- While ownership housing needs appear to be less pressing than the rental market, affordability in the ownership market remains a challenge. As a result, the City of Greater Sudbury should be planning for and encouraging a greater supply of ownership housing as identified through the population and housing projections.
- The City should also encourage a broader supply of ownership housing, particularly more compact and lower-cost product types such as townhomes, semi-detached, and condominium apartments that would be more attainable to a wider range of households. As the City's population continues to age, demand for apartments and seniors housing will increase.
- Affordable ownership programs (i.e., 2<sup>nd</sup> mortgage programs, sale of Greater Sudbury Housing corporation scattered homes to qualified households, etc.) can also be investigated.

## Key Findings – Rental Market

- Greater Sudbury's most significant housing gaps are observed in the rental market. Vacancy in the City is very tight, with rental rates rapidly increasing.
- Rents are increasing broadly across the entire City for all housing types (e.g., townhomes, apartments, older stock, new stock). The City's newest and most expensive rental stock experiences the tightest vacancy with most buildings reporting long wait lists, despite the rent premium these buildings hold. This indicates that there is strong demand for new rental housing at full market rates.
- Given these market conditions, higher income rental households are forced to occupy older and less expensive rental units due to a lack of supply of higher end units. This is resulting in tight vacancy, higher rents, and an overall reduced inventory in lower cost housing that has historically been available to Greater Sudbury's moderate and low-income rental households.
- The following indicates the current unmet rental need in Sudbury based on current market conditions:
  - Rental Universe: 13,107 units
  - Vacancy and Vacant Units: 1.6% and 210 units
  - Demand at 1.6% Vacancy: 12,897 units
  - Rental Universe Required to Reach 5% Vacancy: 13,576
  - **Additional Units to achieve 5% Vacancy: 470 units**
- In addition to this unmet demand, Sudbury is projected to grow by 10,330 households between 2021 and 2051. If the current share of rental to ownership households continues (currently 33%), an additional **3,400 rental units** will be required over the next 30 years (average of **113 rental units per year** – slightly above recent trends over the past ten years that averaged ~85 new units).
- While demand for affordable rental is notable (see next page), the above figures largely represent market-rate rental housing. As more market-rate housing is added to the market, those with higher incomes are provided the choice to leave the older (and less expensive) accommodation they currently occupy in favour of new and modern rental apartments. This is referred to as the “filtering process”, where new and higher-priced properties entering the market allow those who can afford to do so to trade up. This frees up availability in the older properties for lower income households. Broader supply and choice in the rental market should also cause rental rates to stabilize.
- The low vacancy and long wait list for Greater Sudbury's new rental stock are major obstacles for this process currently.
- The City should investigate strategies to improve the supply of new rental housing by the private sector. Strategies can include incentive programs, advertising of government financing programs through the National Housing Strategy, providing as-of-right planning permissions for new rental supply, and other similar approaches.
- Of note, basement apartments and secondary suites are more affordable than the new purpose-built rental stock in the City (affordable to those in the 5<sup>th</sup> – 7<sup>th</sup> income decile). These units are easier to supply relative to large investments in purpose-built rental construction. While planning obstacles have largely been removed, which has resulted in the growing supply of these homes, the City could consider offering modest incentives/loans through the existing Affordable Housing CIP to further bolster the supply of this housing.

## Key Findings – Affordable Housing

- Greater Sudbury's supply of affordable housing is falling well short of demand. Currently, there is a deficit of at least:
  - **655 RGI units**
  - **301 LEM (as of 2017, wait list no longer maintained)** units rented between 60% and 100% of the CMHC AMR (affordability thresholds indicate depth of demand is greatest at 60% - 80% of AMR).
- The above wait-list indicators are likely to continue to increase looking forward as the population grows and affordability continues to erode across the ownership and rental markets.
- Demand for RGI housing is likely to continue to be focused on one-bedroom units, whereas demand appears more broad for LEM and higher depth affordability (e.g., singles and families requiring one, two, three, and four-bedroom homes).
- In addition to creating new supply, there is a need to reinvest and improve the existing community housing stock across the Greater Sudbury Housing Corporation (GSHC) and Non-Profit / Co-Operative portfolio as identified in the Greater Sudbury Housing Revitalization Plan and Housing and Homelessness Plan. These documents also recommend pairing new affordable housing, particularly new RGI housing, with social and health services.
- Overall, there is a significant need to expand community and affordable housing options in the City. Strategies that the City might consider include increasing the incentive package offered through the CIP, offering public land to the private sector in exchange for affordable housing, intensifying/redeveloping surplus institutional lands and GSHC properties in need of revitalization, exploring partnerships with the private sector, undertaking new development through the GSHC as recommended in the Revitalization Study, and other similar options.
- The City should also consider how the varying affordability thresholds (RGI, LEM, AMR) relate to the affordability profiles/incomes identified on page 47 of this report and the overall depth of demand for each segment. Targets for each affordability depth should be identified and aligned with strategies to promote supply for each. This will allow the City to develop strategies for each segment of the affordable housing supply continuum with clear targets and programs assigned to each. The City may also assign income limits / ranges for each program to ensure affordability is being targeted broadly across income deciles and specific programs/strategies are targeting different segments of the affordable housing need. This will also ensure that only eligible households occupy the units created through these programs (e.g., 80% AMR can only be occupied by households earning below the 5<sup>th</sup> income decile).
- For example:
  - RGI: GSHC (re)development, funding provision to non-profits, expand rent supplements for RGI, etc.
  - LEM / 60% - 100% AMR: Funding provision to non-profits, use of public land, acquisition of surplus institutional properties, partnerships with private sector to secure funding from the National Housing Strategy, use of Federal funding, expand rent supplements, bolster funding to the CIP, etc.