Appendices

A. Planning and Urban Design

B. Transportation

C. Servicing

Appendix A

A.1 Vision, Goals and Recommendations

VISION STATEMENT

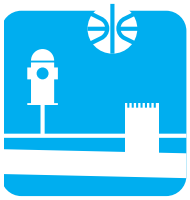
The Laird in Focus Study Area will integrate with Leaside. New forms of development will respect the character of the residential and business community, while evolving to meet the needs of future residents. The Study Area will be accessible to people of all ages, in all modes of travel. It will provide a diversity of uses and businesses set in a high quality public realm. Laird Drive will be a vibrant main street and pedestrian promenade. Development along Eglinton Avenue will have a connected public realm of streets, blocks, parks, and community amenities, and create a walkable, landscaped neighbourhood.

GOALS

1. **Create a vibrant and unifying main street** that integrates with the broader Leaside community and **is accessible to all people in all modes of travel.** This Plan shall ensure that new forms of compatible development will:
   - Accommodate a mix of uses, densities, and building heights to create a liveable, dynamic community; and,
   - Include animated street frontages in a mixed-use built form.

2. **Respect the historic character of Leaside,** while evolving to meet the needs of future residents and businesses. This plan shall ensure that new forms of compatible development will:
   - Transition appropriately to adjacent residential neighbourhoods; and,
   - Incorporate excellence in architecture and urban design.

3. **Establish a high quality and well-connected public realm,** contributing to a walkable, cycle-able, and beautifully landscaped neighbourhood. This Plan will ensure that the public realm will:
   - Be accessible to people of all ages and abilities;
   - Connect to adjacent ravines, parks, and open spaces; and,
   - Leverage under-used space and introduce new public spaces that can welcome and accommodate residents, workers, and visitors.



4. **Ensure there is an appropriate link between the consideration of development proposals and the required investments in service infrastructure and community facilities.** This Plan shall ensure that new forms of compatible development and investments in service infrastructure and community facilities will:
   - Optimize the use of existing infrastructure and facilities;
   - Provide new infrastructure and facilities that promote innovation and sustainability in a fiscally responsible manner; and,
   - Ensure that new infrastructure and facilities are planned to allow flexibility for the accommodation of future development potential.

5. **Support the investment in transit and ensure that the consideration of development proposals is linked to the ability of the transportation network to accommodate growth.** This Plan will ensure that the public realm and new and innovative transportation network investments will:
   - Seamlessly connect to, and integrate with, the Eglinton Crosstown LRT;
   - Implement the important elements of “complete streets”;
   - Promote a safe and accessible active transportation system; and,
   - Integrate new mobility strategies with the existing transportation network.

RELATED GOAL	RECOMMENDATIONS
	STUDY AREA A
	Streets and Blocks
	R1: All streets are to be designed as “Complete Streets” 1. Pedestrian connections, either separate or part of larger open spaces, are to connect key destinations within the new community.
	Parks and Open Spaces:
	R2: Provide a range of parks and open spaces that provides variety of functions and character through form, surface treatment, and programming while accommodating a range of uses and users.
	R3: Establish a common palette of materials, elements, and functions to be used throughout to integrate new parks and open spaces into Leaside and promote identity through lighting, seating, waste and recycling receptacles, bicycle facilities, paving materials, and wayfinding.
	R4: Provide public art within public parks and open spaces promoting a sense of place and identity while relating to the history of Leaside and commemorating its industrial legacy.
	Building Setbacks:
	R5: All buildings, including the first level of below-grade parking, will be set back from the property line: buildings along Eglinton Avenue E., Laird Drive, and Vanderhoof Avenue are to be set back 6 metres; along local streets, the setback of buildings is to be 3 metres.
	R6: The ensuing space between building face and property line will be designed as an enhanced extension of the streetscape.
	R7: Accommodating spillover activity from ground-related retail/commercial uses, or serve as a landscape transitional buffer between public sidewalks and private residential uses.
	Ground-related Uses:
	R8: Ground-related uses should provide clear glazing and entrances to promote spill-over from building interiors and interact with adjacent public spaces.
	R9: Ground-related family units should be located adjacent to park space or green courtyards and other open spaces.
	R10: The design of a new community facility should be visually iconic relating to both the square and the public park on either side visible from Laird Drive, Eglinton Avenue East, and the LRT station entrance.
	Transition in Height:
	R11: Tall buildings within the interior of large blocks will fit under the street proportion and guidelines for Laird Drive and Eglinton Avenue E.
	Step-backs and Heights:
	R12: Maximum building heights will be established based on their proximity to LRT station with no height exceeding 32 storeys, while also not exceeding a 45-degree angular plane ceiling taken from 80% of the street right-of-way as established from Eglinton Avenue E., Laird Drive, and Aerodrome Crescent .
	R13: All development will provide a primary façade of 6 storeys along Eglinton Avenue E. with additional floors stepped back within a 45-degree angular plane.
	R14: Minimum height for buildings along Laird Drive within the employment area will be 4 commercial storeys.
	Building Types:
	R15: All buildings will conform with the design guidelines and performance standards, with local modifications, as recommended in this study; Maximum height shall be determined according to a 45-degree angular plane taken from 80% of the street right-of-way to a maximum of 32 storeys.
	R16: Tall buildings whose presence will be seen from afar or form the terminus for a street view will be visually iconic and will contribute singularly and together to the skyline.
	R17: Building materials should be predominantly masonry and relate in quality and colour to employment and nearby residential brick buildings.
	Employment Lands:
	R18: Employment buildings will provide transition between the mixed-use community to the north and the employment lands to the south.
	R19: Parking to be provided below-grade.
	R20: Separation distance between employment and mixed-use buildings to be provided through a combination of shared service/access laneways.

RELATED GOAL	RECOMMENDATIONS
	STUDY AREA B Setbacks:
	R21: Set back all new development along Laird Drive from the front property line by 3 metres (including the first level of below-grade parking).
	R22: Parking for commercial/retail uses is to be located to the rear of the building with appropriate side yard pedestrian connection provided.
	R23: All primary entrances into the building are to be located directly accessible from Laird Drive.
	R24: Activate ground-related uses with enhanced streetscaping, provision of bicycle posts, and strategically located street furniture that creates an inviting public realm and convenient access to commercial/retail businesses.
	Transition in Scale and Setbacks:
	R25: All new developments are to be set back from the rear property line by 9 metres.
	R26: A 3-metre landscaped buffer and screening fence are to be provided along the shared property line in order to accommodate high branching trees through improved soil volumes and avoidance of compaction.
	R27: All developments taller than 4 residential storeys are to conform with the City's Mid-rise Building Performance Standards concerning rear yard angular plane and associated step-backs for shallow lots.
	R28: Along the Laird Drive frontage, provide a consistent façade height of 4 storeys with a stepback of 1.5 metres.
	Building Types: Low-rise & Mid-rise:
	R29: Mitigate against multiple driveway entrances off of Laird that impede pedestrian and cycling movements by providing rear lane access.
	Heritage:
	R30: The identified potential heritage properties located at 66, 68, 70, 72, 96 and 180 Laird Drive should be included on the City of Toronto's Heritage Register.
	R31: Any proposed alterations and/or development on potential heritage properties should meet the intent of the City of Toronto's Official Plan heritage policies and should conserve the cultural heritage values and attributes of these properties.
	R32: Any proposed alterations and/or development on sites adjacent to potential heritage properties should meet the intent of the City of Toronto's Official Plan heritage policies and complement adjacent heritage properties through compatible built form.
	R33: The City should require a Heritage Impact Assessment to describe and assess the impacts of proposed alterations and development on, or adjacent to potential heritage properties identified in the Laird in Focus Cultural Heritage Resource Assessment.
	R34: The City should explore opportunities to interpret and commemorate the history of Leaside, including the area's role as a rail and manufacturing hub, and the historic function of Laird Drive as the main connector and transition between the original eastern industrial and western residential portions of the neighbourhood. Such an interpretation strategy could be implemented through the proposed public realm and streetscape improvements contained in this study.
	Heritage Properties: General
	R35: Ensure high quality architecture in the design of alterations and/or new development on, or adjacent to heritage properties that is complementary to the identified heritage resource and in accordance with City of Toronto Official Plan heritage policies.
	R36: Recommend that any required accessibility upgrades to heritage buildings carefully consider, and have minimal impact on, the heritage property's cultural heritage values and attributes.
	R37: Require that any new development explore opportunities to interpret and commemorate the history of Leaside.
	STREETSCAPES AND GATEWAYS Gateways:
	R38: Primary gateways will signify arrival and departure for all modes of movement.
	R39: Commemoration of Leaside's history will form part of the gateway design.
	R40: Public art will be considered as part of the gateway design.
	R41: High quality landscape materials will be utilized with the objective of encouraging sitting and lingering.
	R42: Design considerations should include 4-season use.
	R43: Where appropriate, relate and extend the gateway treatment through open spaces and increased scale of area for landscaping and pedestrians
	Streetscapes:
	R44: The emerging street network will provide a safe and attractive environment for all ages and mobility users.
	R45: Utilities are to be relocated below-grade as part of the public realm improvements.
	R46: Street trees with appropriate soil volume and additional greening are to contribute to the enhancement of the boulevard.

RELATED GOAL	RECOMMENDATIONS
	TRANSPORTATION Pedestrian Network:
	R47: Implement recommendations along Eglinton Avenue as per EGLINTONconnects.
	R48: Implement a finer grain street network that includes generous sidewalks on both sides of new and existing streets.
	R49: Establish a new east-west mid-block green street that will act as a connector from residential areas to destinations.
	R50: Transform Vanderhoof Avenue into a greenway spine.
	R51: Incrementally enhance the pedestrian environment and safely connect to the enhanced pedestrian network within the employment lands as redevelopment occurs with the provision of sidewalks on both sides.
	R52: Implement the City of Toronto's Vision Zero road safety plan to improve safety for pedestrians.
	Cycling Network:
	R53: Implement grade-separated cycle track recommendations along Eglinton Avenue as per EGLINTONconnects.
	R54: Undertake a refinement to the City's 10-Year Cycling Network Plan, to include continuous, grade-separated cycling facilities along Laird Drive between Eglinton Avenue, Millwood Road, and Vanderhoof Avenue.
	R55: Provide public bicycle parking spaces along the key cycling routes and at key destinations.
	R56: Coordinate with the Toronto Parking Authority, developers and landowners to create a bike share system within the Study Area.
	R57: Encourage cycling usage through the development process by: a) securing above-minimum, long-term, on-site bike parking; b) providing development-related cycling benefits; c) promoting the implementation of cycling repair stations in the area; d) including educational training programs for all users and ages.
	R58: Implement the City of Toronto's Vision Zero road safety plan to improve safety for cyclists.
	Transit Infrastructure:
	R59: Co-ordinate with the Toronto Transit Commission regarding bus stop locations and associated design requirements.
	R60: Adopt consistent integrated bus stop treatments with planned cycle tracks.
	R61: Provide shelters at all bus stop locations, in addition to other amenities to improve passenger comfort.
	R62: Explore the introduction of transit priority measures for the local feeder bus network, particularly near the transit station or congested intersection, to provide a more reliable choice for transit users.
	R63: Improve active transportation connections to and from transit stations / stops, including wider crosswalks and cycling facilities at anticipated high passenger volume locations.
	R64: Encourage transit usage through the development process by providing development-related transit benefits such as transit passes, real-time arrival display boards, and direct connection to the station.
	R65: Provide proper integration of transit facilities with development where appropriate.
	TDM and Innovative Mobility Strategies:
	R66: Co-ordinate with the Metrolinx Smart Commute program, developers, businesses and related associations to incorporate a TDM plan to increase convenience and usage. Developers will be required to submit a comprehensive TDM plan and contribute to a TDM monitoring program.
	R67: Co-ordinate with local school boards and school trip planning programs to incorporate new development requirements.
	R68: Integrate publicly accessible parking infrastructure (i.e. the Toronto Parking Authority) near the transit station and the proposed community facility, control parking supply, and implement other innovative mobility plan elements, such as car-share and shared-bike facilities.
	R69: Secure TDM measures, electric vehicle charging infrastructure, and other Toronto Green Standard requirements in new developments through the development review process in order to reduce the number of trips by 5% or greater.
	Parking Strategies:
	R70: On-street parking along Laird Drive will not be permitted.
	R71: Parking for development along Laird Drive will be underground or rear of property that will be accessed from the local streets, not from Laird Drive.
	R72: On-street short-term parking will be provided along the new east-west mid-block street, and drop-off / pick-off locations will be provided near the transit station entrance and the proposed community facility.
	R73: Consideration for lower parking rates for new development in concert with TDM strategies.
	R74: Consideration for publicly accessible paid parking spaces for all new development on Laird Drive.

RELATED GOAL	RECOMMENDATIONS
	Goods Movement:
	R75: Support key truck / goods movement routes, consisting of arterial roadways to the Leaside Business Park (Eglinton Avenue, Laird Drive, Brentcliffe Road and Millwood Road), and internal roadway access via Commercial Road and Wicksteed Avenue, including the provision of truck turning radii and lanes where appropriate.
	R76: Goods servicing for the emerging new development along Eglinton Avenue will be accessed from the internal local roadways.
	R77: Goods servicing for development along Laird Drive will be in the rear of the property, accessed from the local streets.
	R78: Implement a left turn lane southbound along Laird Drive approaching Commercial Road to separate the primary truck entrance into the employment lands.
	R79: Minimize potential conflicts with pedestrians and cyclists through roadway / streetscape design and placement of utilities.
	R80: Incrementally enhance the pedestrian and cycling environment, and safely connecting to the enhanced transit and active transportation network within the employment lands as redevelopment occurs, to provide increased travel choice for employees and patrons.
	R81: Future consideration for Wicksteed Avenue improvements, to provide additional roadway capacity and to facilitate goods movement.
	Vehicular Network:
	R82: Development proponents must demonstrate to the City's satisfaction that the street network will function appropriately, and ensure capacity and access is available at time proposed development.
	R83: Laird Drive will be reconfigured between Eglinton Avenue and Millwood Road as a "Complete Street".
	R84: Vanderhoof Avenue roadway will introduce narrowed lanes and include a continuous left turn lane.
	R85: Improvements to Wicksteed Avenue at the railway crossing should be considered, subject to TDM effectiveness.
	SERVICING RECOMMENDATIONS Sanitary Sewers:
	R86: New development shall demonstrate that sufficient capacity is available to service future intensificaiton. Where new/upgraded infrastructrue has been identified as per Table 6 of this report, development proponents will be required to make satisfactory arrangements with the City of Toronto to design/constuct/fund the identified upgrades in order to attain a level of service acceptable to the City of Toronto.
	R87: An inflow/infiltration study for infrastructure within Study Area A should be conducted to identify the source of the unusually high inflow identified in the model. Removing the source of inflow/infiltration would further improve sewer capacity.
	Storm Sewers:
	R88: New developments shall comply with the TWWMFG and must achieve a minimum peak flow reduction of 50% or greater.
	Combined Sewers:
	R89: New developments shall comply with the TWWMFG and must achieve a minimum net combined (storm plus sanitary) peak flow reduction of 50%.
	R90: As future development along Laird Drive is serviced by combined sewers, a 'net reduction' in combined flows (sanitary effluent + storm run-off) is expected due to reductions in storm runoff from implemented lot-level controls. Since a net reduction is expected, no improvements to the combined sewers are recommended.
	R91: The City of Toronto should undertake a feasibility study for providing separated storm and sanitary sewers along Laird Drive. This should be coordinated with the recommended streetscape improvements of this plan.
	Water:
	R92: Development within the Study Area will trigger watermain upgrades, as identified in this section, to ensure an adequate water supply for long term growth in the area.

A.2 Evaluation Matrix

PRINCIPLE	CRITERION
1 Create a vibrant and accessible streets and pedestrian realm	A. Does the option provide for a mix of uses?
	B. Is there a mix of site-specific densities/building heights?
	C. Is there a variation of building types?
	D. Does the option accommodate commercial or residential activity that supports streets?
	D. Does the option accommodate commercial or residential activity that supports open spaces?
	E. Does the option define and support Eglinton Ave. E., Laird Dr., and Vanderhoof Avenue?
	PRINCIPLE 1: SUMMARY EVALUATION
2 Respect the historic character of Leaside while permitting its evolution	A. Does the option provide built form transition to adjacent neighbourhood to the North? to the East? to the West?
	Criterion 2A: Summary Evaluation
	B. Does the option demonstrate urban design excellence as determined by: Site Porosity?
	Built Form relationship to the public realm?
	Building Stepbacks?
	Scale of Building (i.e. height)?
	Scale of Building (i.e. coverage)?
	Criterion 2B: Summary Evaluation
	C. Does the option acknowledge the character of the community?
	D. Does the option promote a spacious landscape character that integrates with Leaside?
	E. Does the option promote new employment within lands designated for employment uses?
	F. Does the option's shadows impact adversely on adjacent neighbourhoods, parks, and open spaces?
	PRINCIPLE 2: SUMMARY EVALUATION
3 Establish a high quality, well-connected, safe and comfortable public realm	A. Is the option accessible to people of all ages and abilities?
	B. Does the option facilitate pedestrian and cycling movement within?
	C. Does the option facilitate pedestrian and cycling movement to adjacent destinations?
	D. Does the option provide for street trees and landscaped setbacks?
	E. Does the option provide/strengthen connectivity to adjacent ravines, parks, & open spaces?
	F. Does the option provide a variety of new parks and open spaces?
	H. Does the option meet the mid-rise and tall building guidelines in reducing shadow impat, allowing skyviews, and promoting pedestrian comfort in terms of scale and wind impact on city streets and open spaces?
	PRINCIPLE 3: SUMMARY EVALUATION
4 Ensure growth is co-ordinated with investments in infrastructure and community facilities	A. Does the option require new or significant improvements to existing capital infrastructure?
	B. Does the option provide necessary new infrastructure & facilities (as identified through Eglinton Connects)?
	C. Is new infrastructure provided in an innovative, sustainable, & resilient manner as measured by efficient use of space, required capital investment, storm water management potential, etc.?
	D. Does the option accommodate for future population and job growth?
	PRINCIPLE 4: SUMMARY EVALUATION
5 Support recent and continued investment in rapid transit	A. Does the option seamlessly connect to/integrate with the Eglinton Crosstown LRT?
	B. Does the option maximize the percentage of residents and employees with acceptable walking distance of rapid transit?
	C. Does the option demonstrate a "Complete Streets" approach?
	D. Does the option promote a multi-modal, innovative, safe, & accessible active transportation network?
	E. Does the option improve transportation network connectivity?
	F. Does the option reduce traffic pressure at Laird and McRae, and at Eglinton and Brentcliffe?
	G. Does the option minimize the share of single vehicular uses?
	H. Is the option supportive of/complementary to employment area uses?
	PRINCIPLE 5: SUMMARY EVALUATION

STUDY AREA A			COMMENTS
Option 1	Option 2	Option 3	
◐	●	○	Option 2 provides greatest mix with employment & mixed use
●	○	◐	Option 1 provides greatest range of heights; all 3 have similar densities
◐	●	○	Option 2 mix of building typologies distributed throughout
◐	●	○	Option 2 has active grade-related uses on along all major streets
◐	●	○	Active uses frame open space in Option 2
●	●	●	All 3 options similar
◐	●	○	Option 2 will best create vibrant and accessible streets & public realm
◐	○	●	Option 3 provides consistent mid-rise buildings; Options 1 and 2 have taller buildings closer to Eglinton
◐	◐	●	Option 3 provides parkland that serves to transition from existing townhouses to development to the west
●	○	◐	Option 1 provides least abrupt transition in heights adjacent to Laird Drive
◐	○	●	Option 3 provides best built form transition to surrounding neighbourhoods
○	◐	●	Option 3 provides greatest porosity with streets and pedestrian linkages (including park pathways); Option 1's larger building footprint impedes pedestrian movement between destinations as does Option 2's surface parking
◐	●	○	Option 2 frames open space with buildings on both sides
◐	○	●	Option 3 locates buildings and heights based on 45-degree angular plane from Eglinton Ave. & Laird Dr.
◐	○	●	Option 3 provides most consistent podium base and hence, consistent ground relationship
○	◐	◐	Option 1 provides greatest ground floor coverage
○	◐	◐	Options 2 and 3 demonstate similar equivalents of urban design excellence
○	○	◐	Options 1, 2 & 3 extend Don Avon Dr. southward; Option 3 extends Parklea Dr. to Aerodrome Cres.; none of the options have a built form and massing that is characteristic of the adjacent community
○	◐	●	Option 3 provides greatest potential for spacious landscape both in parkland and public streets
◐	●	○	Option 2 provides greatest quantum of employment uses
◐	○	●	Due to tall building proximity to Eglinton Avenue, Option 2 will have greatest shadow impacts to the north
○	◐	●	Option 3 will best respect the historic character of Leaside while permitting its evolution
●	●	●	All 3 options possess the potential for accessibiltiy
○	◐	●	Option 3 possesses the greatest potential to facilitate pedestrians and cyclists within through streets & park paths
◐	●	●	Options 2 & 3, through combined public street and park network, provide better links to adjacent destinations
◐	◐	●	Options 2 & 3 have greater, consistent setbacks along Eglinton Avenue E. and north/south streets; Option 3 will have greater and consistent setbacks along Vanderhoof Ave. followed by Option 1
●	●	●	All 3 options provide potential to link to adjacent and nearby open spaces
○	◐	●	Option 3, through the scale and continutiy of its open spaces, provides the greatest potential for variety
◐	○	●	Option 3, with a majority of its open space situated south of proposed taller buildings, will be least impacted by shadows and wind
○	◐	●	Option 3 best provides a high quality , well-connected, safe & comfortable public realm
○	○	○	All 3 options yield similar populations; hence all 3 will require similar infrastructrue upgrades
◐	○	●	Option 1 provides a moderately sized community facility; Option 3 provides a stand-alone facility
◐	○	●	Options 1 & 2 provide similar scaled open spaces and hence opportunities for passive storm water storage; however, Option 2 has larger surface run-off due to at-grade parking; Option 3 provides largest green areas to accommodate stormwater storage
◐	●	○	Option 2 provides opportunity for employment growth via re-use of surface parking areas
◐	○	●	Option 3 best provides investment in infrastructure and community facilities
○	●	●	Option 1 will require entry from south through private building
◐	●	○	All 3 options provide similar population yields; however, Option 2 provides a larger percentage of employment uses followed by Option 1
○	●	●	Option 1 reliant on private east-west streets for 815-845 and 939 Eglinton Avenue E.
●	●	●	Option 3 provides a cycle track along Vanderhoof Ave.
◐	●	○	Option 2 provides greatest porosity with maximum number of public streets
◐	●	○	Based on porosity Option 2 will dissipate traffic the most
◐	●	○	Option 2 provides best balance between uses: hence best live/work/shop opportunity
◐	●	○	Option 2 provides greatest quantum of employment uses
◐	●	○	Option 2 best provides support for recent and continued rapid transit investment

Key

● ● Good

◐ ◐ Moderate

○ ○ Poor

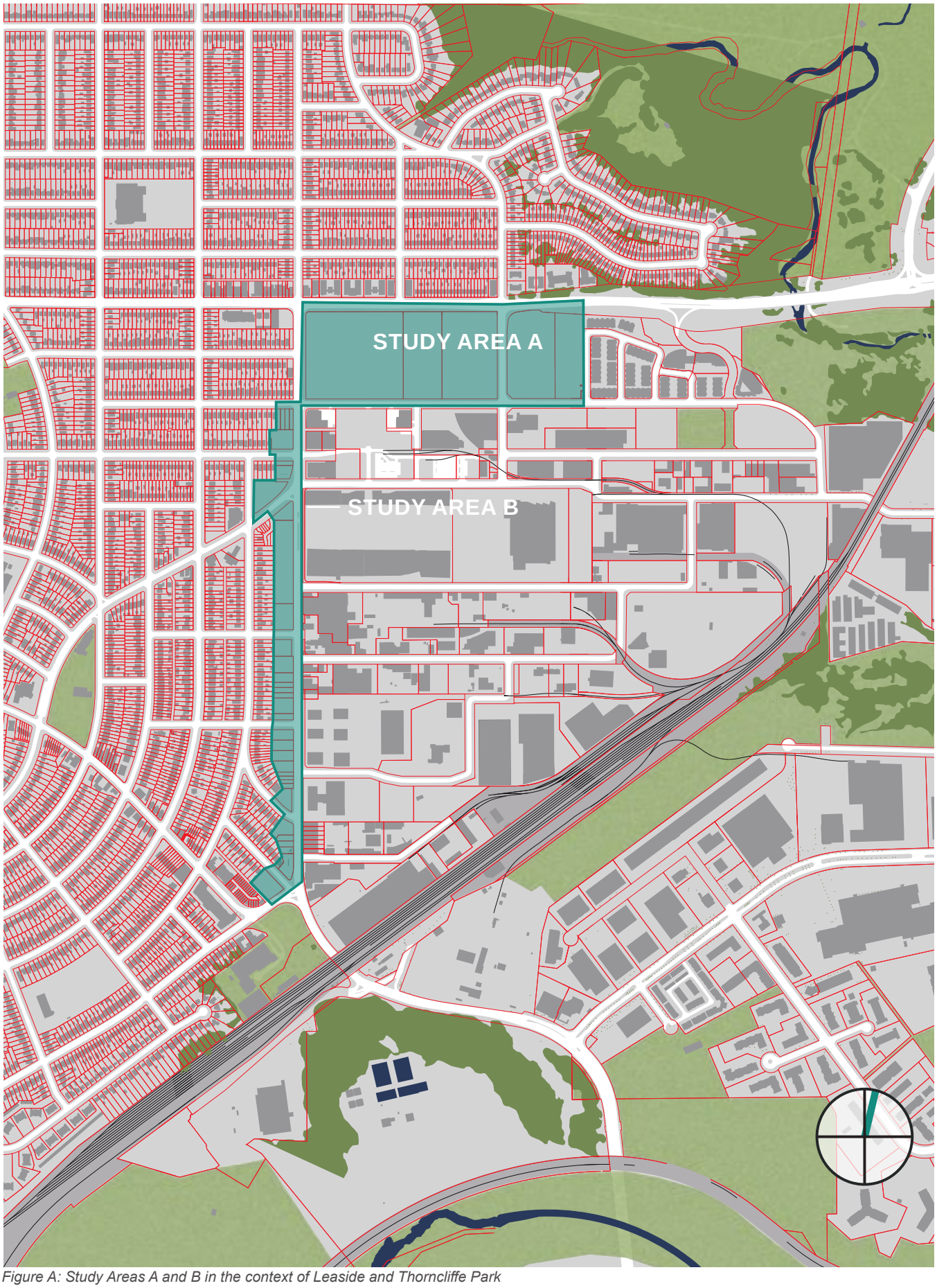


Figure A: Study Areas A and B in the context of Leaside and Thorncliffe Park

A.3 Development Details for Study Area A

A.3.1 Land use Designations

General Employment Area

a) General Employment, as identified on Figure B, is a place for business and economic activity. It is expected that the General Employment Areas will include clusters of business and economic activities including, but not limited to, small and modestly scaled office space users, and limited associated retail, service, and ancillary facilities. It is intended that development within the General Employment Area will exhibit a high standard of building design and landscaping.

b) Development within the General Employment Areas:
   - Must be compatible with residential and sensitive non-residential uses that are permitted in the adjacent Mixed-Use 1 designation and existing adjacent residential neighbourhoods;
   - Will contribute to the creation of a competitive, attractive, and highly functional Employment Area; and,
   - The uses permitted within the General Employment area are in accordance with the uses permitted under Employment Light, Section 60.10, Subsection 60.10.20 and Employment Office, Section 60.40 Subsection 60.40.20 of the City's Zoning By-law. Permitted retail and service commercial uses may be permitted only where the individual retail or service commercial business comprises less than 6,000 square metres of Gross Floor Area.

Mixed-Use 1 Area

c) The lands within the Mixed-Use 1 Areas, as shown on Figure B, are intended to provide opportunities for larger scale retail facilities in combination with service commercial, office, residential development and community facilities in mixed-use building formats.

d) The following uses may be permitted within the Mixed Use 1 Areas:
   - Residential in the form of low-rise, mid-rise and high-rise apartments;
   - Retail and service commercial with a Gross Floor Area of less than 6,000 square metres per individual retail or service commercial business;
   - Offices;
   - Parks and open spaces and Privately Owned Public Spaces (POPS);
   - Public and private utilities; and,
   - Community facilities.

e) At-grade uses shall include retail and service commercial uses, institutional uses, office uses, community facilities and/or other non-residential

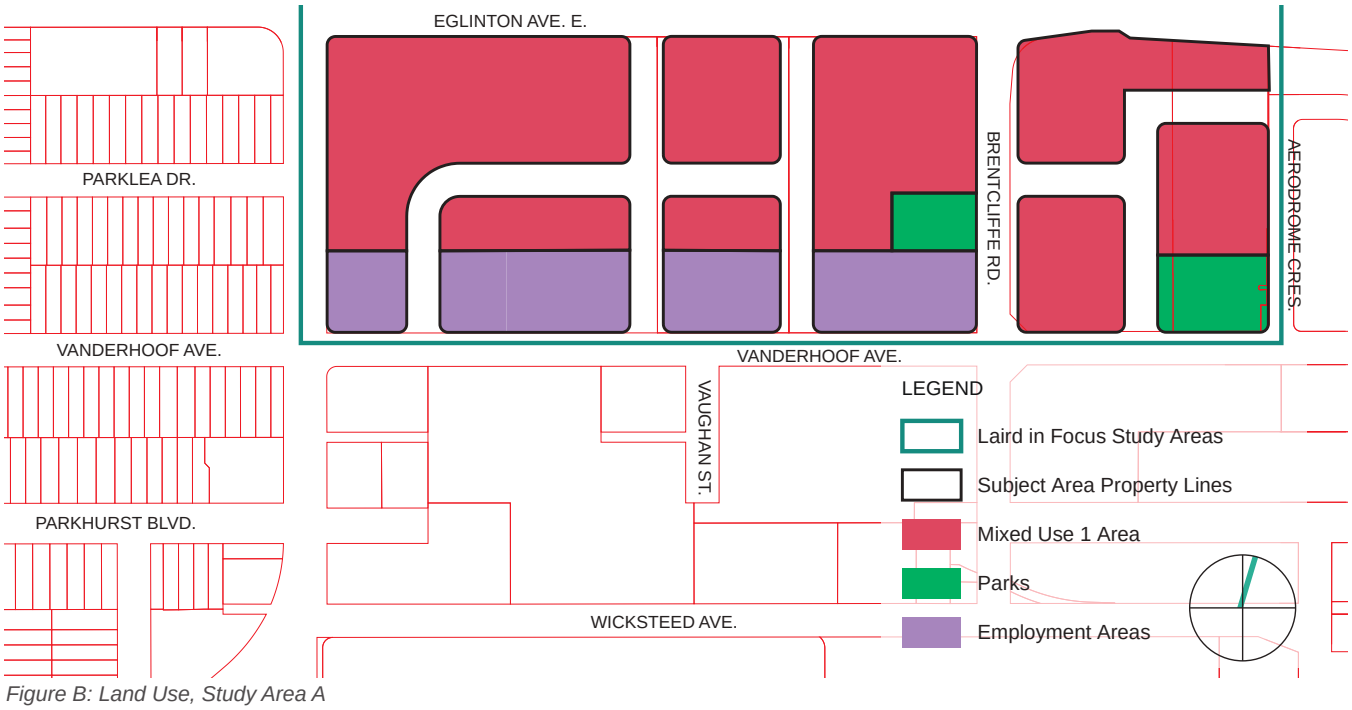


Figure B: Land Use, Study Area A

uses where the building abuts Eglinton Avenue or Laird Drive.

f) At-grade non-residential uses shall occupy a minimum of 60 percent of the at-grade Gross Floor Area. Residential and non-residential uses are permitted above the ground floor.

g) On the Local Road network within the Mixed Use 1 Areas, retail and service commercial uses, institutional uses, office uses, community facilities and/or other non-residential uses may be permitted at-grade in a mixed use building, or in a stand-alone, single use building.

h) Mixed-use development may include a mixture of uses on a site, or a mixture of uses within a building.

i) Development that includes residential units is required to increase the non-residential Gross Floor Area over what exists on the day of the passing of this Plan.

j) A study of noise, dust, odour and other related industrial related impacts is required prior to the approval of any residential development and/or other sensitive non-residential uses to ensure that appropriate design standards can be determined.

A.3.2 Built Form: Study Area A

A Sustainable and Resilient Community

a) All development in Study Area A shall be consistent with the following:

- Demonstrate leadership in resiliency and sustainability through the use of green building design and technology in accordance with approved City policies, by-laws and guidelines;
- Incorporate low impact design and other site design strategies to mitigate environmental impacts and to create a more comfortable urban environment;
- Accommodate all ages, income levels, and abilities; and,
- Require convenient access to higher order transit to reduce reliance on the automobile as the primary mode of transportation, and promote active transportation, such as walking and cycling.

Building Articulation

a) All new buildings shall:

- Have a maximum street wall length of 105.0 metres;
- Be articulated with vertical breaks at grade, at a minimum of every 6 metres and include expansive windows along the primary frontage;
- Discretely incorporate commercial signage into a consistent band running along the top of ground floor units;
- On corner sites, be further articulated in acknowledgment of the building's relationship to the street as seen from a distance;
- Cafe/Restaurant uses may extend into adjacent outdoor spaces by way of terraces, patios and informal outdoor seating; and,
- Incorporate primary entrances into the front building facade. Further, primary building entrances shall be clearly visible, located to front onto a street, be direct, and should be accessible to people of all ages and abilities;
- The building facade shall be Integrated as an extension of the public realm; and,
- At-grade residential uses shall have landscaped transition between the public and private realms.

Architectural Features

a) Employment buildings are envisaged to be characteristic of office or innovation-type development owing to their proximity to higher order transit. Buildings will be urban in form with transparent primary facades oriented towards their street frontages.

b) Due to high visibility of tall buildings, consideration shall be given to the profile, materiality, and skyline silhouette when designing these buildings mindful of the contribution they will make on the character image for the new community. Tall buildings whose presence will be seen from afar or from the terminus for a street view will be visually iconic and will contribute singularly and collectively to the skyline.

c) Building materials for all building types shall be predominantly masonry and relate in quality and colour to employment and nearby residential brick buildings.

Setbacks

a) All buildings that abut Vanderhoof Avenue, Eglinton Avenue East and Laird Drive shall have a 6.0 metre street facing setback. In addition, the setback of the 1st Level Below-grade Parking shall be 6.0 metres.

b) A 3.0 metre street facing setback shall be applied to street frontages within Study Area A along Brentcliffe Road and all Local Streets. In addition, the setback of the 1st Level Below-grade Parking shall be 3.0 metres.

c) There shall be no setback required for the west portion of he Local Street as it transitions through the Plaza Space/Forecourt identified on Figure E.

d) All street facing setbacks shall:

- Accommodate hard and soft landscape enhancements and transition zones between public and private realms, including specialty pavement, seating, decorative fencing, and other high quality furnishings.
- Include appropriate uses, such as raised private terraces and/or commercial patios complementary to the adjacent public realm; and,
- Include an enhanced front garden to screen at-grade street facing dwelling units from the street, while providing attractive front entrances. Any grade changes between the sidewalk and the building's front entrance shall be accommodated on private property.

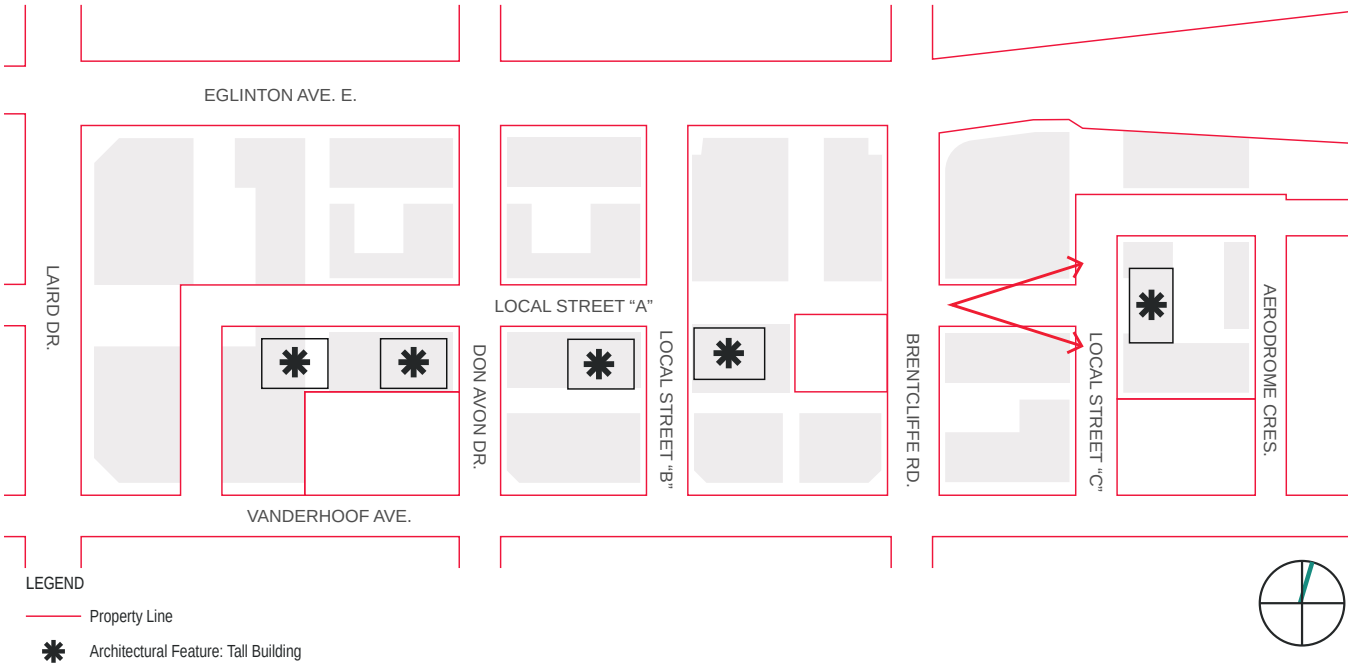


Figure C: Architectural Features

Building Height

e) The heights of buildings within Study Area A are variable and are defined on Figure E. In general:
   - Low-rise buildings are located along Aerodrome Crescent. Low-rise buildings will be primarily residential townhouses, with opportunities for live/work. The building typology provides opportunity for larger units that have access to nearby courtyard amenities and public parks;
   - Mid-rise buildings are located along Laird Drive and Eglinton Avenue East. Mid-rise buildings are the predominant built form. Opportunities for green roofs at lower levels will provide additional outdoor amenity space for residents. This building archetype also serves as the base for taller buildings that are centrally sited within Study Area A. All buildings between 3 and 9 storeys will conform to the City of Toronto mid-rise performance standards; and,
   - Taller buildings are located in the interior of the site fronting the internal public road. Tall buildings are defined as those structures whose height dimension exceeds the width of the road right-of-way. Thus, buildings associated with Eglinton Avenue that are taller than 31 metres (9 storeys) are classified as "tall". These buildings are primarily residential in use and their form is guided by the City's Tall Building Design Guidelines. A 45-degree angular plane shall determine maximum height adjacent to Eglinton Avenue East, Laird Drive and Aerodrome Crescent.

f) Building height shall be limited to 6 storeys along street frontages with the exception of street intersections identified as 'architectural elements' (see Figure E), which may include taller built form.

Building Step-backs

a) A building step-back shall be applied to development within Study Area A to avoid the 'canyon' effect with upper floors setback from the street wall permitting increased exposure to sunlight at the street level. The building step-backs (Figure F) are described as follows:
   - Abutting Eglinton Avenue East, and Laird Drive, building step backs are determined by extending a 45-degree angular plane from the top of the 6-storey building street wall, located at the 6.0 metre setback from the property line, as shown on Figure G;
   - Abutting Brentcliffe Road, building step backs are determined by extending a 45-degree angular plane from the top of the 3-storey building street wall, located at the 3.0 metre setback from the property line, as shown on Figure H; and,
   - Elsewhere, building step backs are typically 3.0 metres for each additional storey above 3 storeys, as measured from grade.

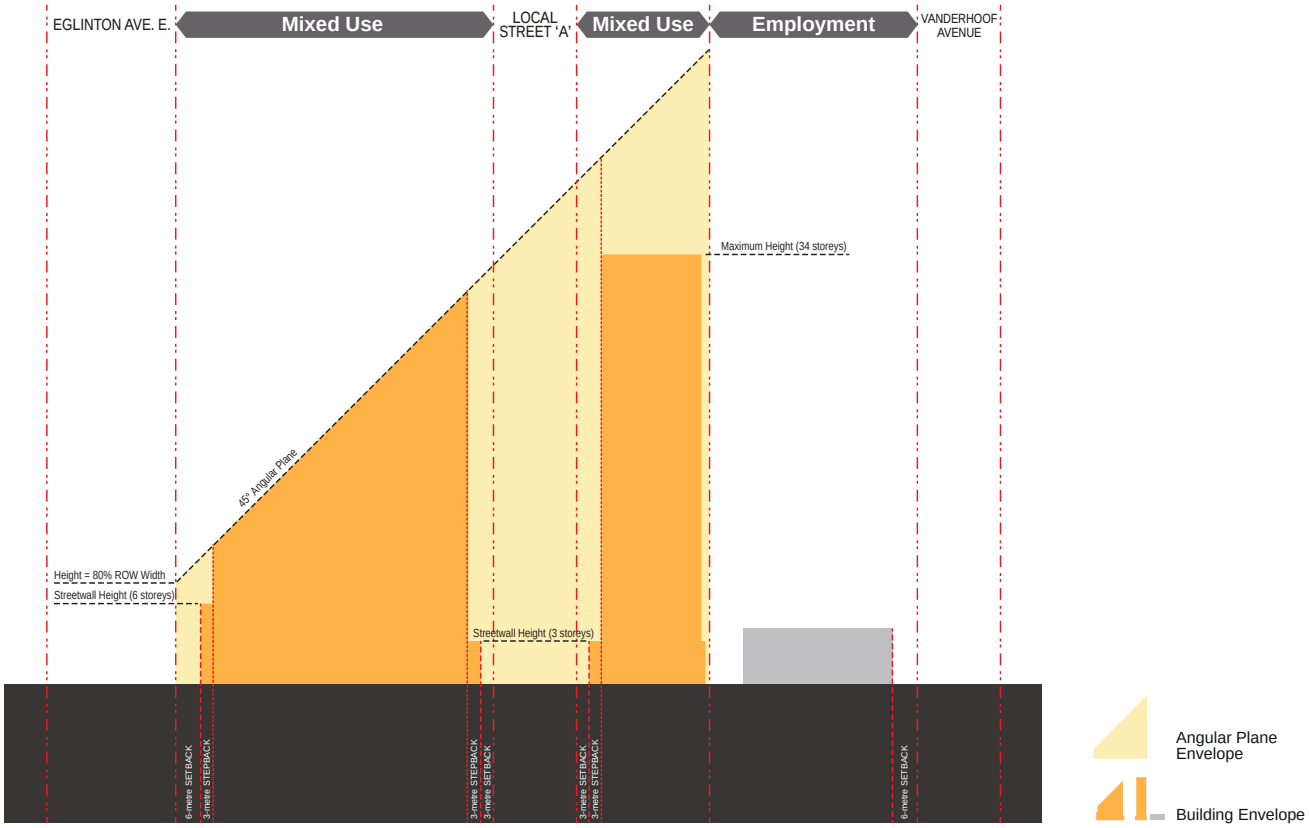


Figure G: Building Step-back and Angular Plane

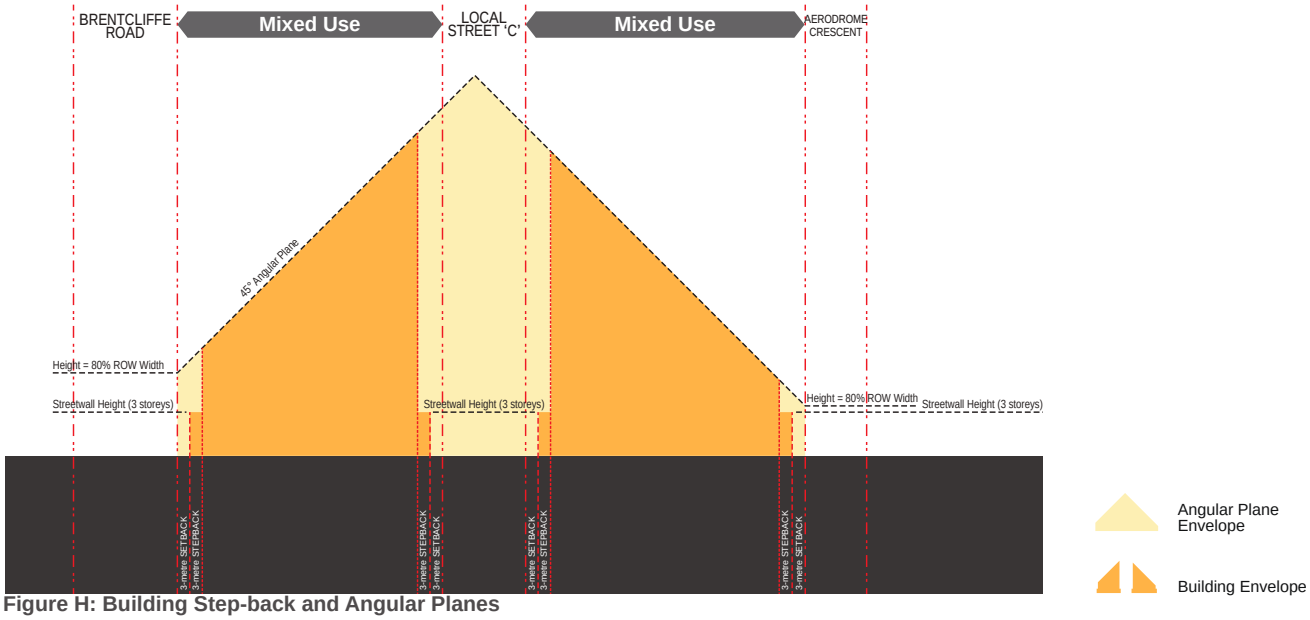


Figure H: Building Step-back and Angular Planes

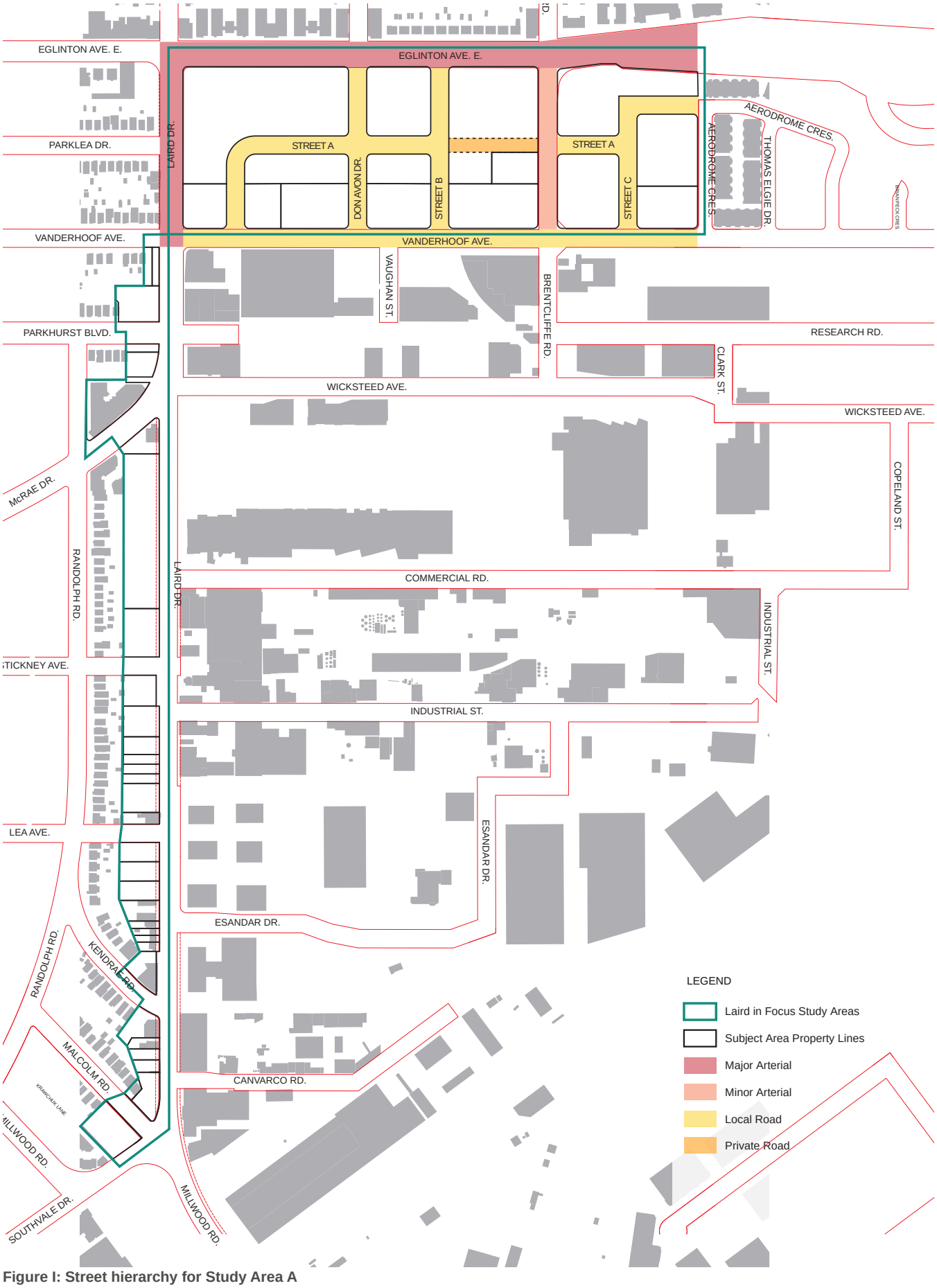


Figure I: Street hierarchy for Study Area A

A.3.3 The Public Realm: Study Area A

General

a) All development shall be set back from the property line to enable an extension of the public realm.
b) A unified streetscape shall be developed to will provide for a consistent street tree canopy and to accommodate a continuous, safe cycling link along Vanderhoof Avenue to the Don Valley.
c) There shall be a hierarchy of gateways and open spaces that are high quality, inviting and serve as formal and informal gathering places.

The Street Network

a) The street network within and surrounding Study Area A as shown on Figure I, shall be developed under the principles of "complete streets", with appropriate facilities provided for pedestrians, cyclists, transit, and vehicles. All roads within Study Area A are Public Roads, with the exception of one previously approved Private Road. The Street Network shall:
   - Connect to the surrounding road system;
   - Provide numerous, convenient, and safe pedestrian and cycling routes linking key destinations within and beyond the study area, with direct connections to the LRT Stations;
   - Provide a clear and direct movement system that extends from Laird Drive to Aerodrome Crescent and from Eglinton Avenue to Vanderhoof Avenue;
   - Provide bicycle facilities at LRT station entrances, as well as other major destinations;
   - Provide high quality streetscapes and linkages that enhance the pedestrian and cyclist experience;
   - Utilize key buildings and spaces to assist in orientation.

b) **Eglinton Avenue East and Laird Drive (north of Vanderhoof Avenue):** The Major Arterials within Study Area A are Eglinton Avenue East and Laird Drive (north of Vanderhoof Avenue), as shown on Figure I. Eglinton Avenue East shall have a right-of-way width of 31.0 metres. Laird Drive shall have a right-of-way width of 27.0 metres. These Major Arterials shall be designed to accommodate:
   - An enhanced public realm through street furniture and viable street tree planting at an appropriate spacing to ensure healthy growth and continuous canopy;
   - Outdoor café/restaurant seating;
   - Wider sidewalks in anticipation of higher volumes of pedestrian traffic;
   - Amenities for transit users and bus routes as a priority; and,
   - Amenities for cyclists and cycle lanes as a priority.

c) **Brentcliffe Road:** The Minor Arterial in Study Area A is Brentcliffe Road with a right-of-way width of 25.0 metres. The Minor Arterial shall be designed to accommodate:
   - An enhanced public realm through viable street tree planting at an appropriate spacing to ensure healthy growth and a continuous canopy;
   - A multi-use path and sidewalk (west side, south of Mid-block street) connecting Vanderhoof MUP to proposed park;
   - Sidewalks on both sides of the street with minimum width of 2.1 metres;
   - The provision of landscape buffer providing transition between public realm and private realm (ground-related residential units); and,
   - The movement of goods in support of the abutting employment area.

d) **Vanderhoof Avenue:** Vanderhoof Avenue is a Local Street with a right-of-way width of 20.0 metres. Vanderhoof Avenue shall be designed to accommodate:
   - An enhanced public realm with street furniture and double row of street tree planting at appropriate spacing to ensure healthy growth and continuous canopy;
   - A multi-use path and sidewalk (north side) that connects future identified public parks to the Don Valley Ravine system;
   - Sidewalks on both sides of the street with minimum width of 2.1 metres; and,
   - Provision of landscape buffer between public realm and private realm (ground-related employment uses).

e) **Mid-block Local Streets:** The Mid-block Local Streets within Study Area A (Local Streets A, B and C and including Don Avon Drive), all with right-of-way widths of 20.0 metres. All of these Mid-block Streets shall be designed to accommodate:
   - Enhanced public realm through viable street tree planting at an appropriate spacing to ensure healthy growth and a continuous canopy;
   - Sidewalks on both sides of the street with minimum width of 2.1 metres; and,
   - Provision of landscape buffer providing transition between public realm and private realm (ground-related residential units).

Gateways, Parks and Courtyards

a) **Gateway:** An opportunity exists to establish an attractive and functional Gateway feature at the intersection of Laird and Eglinton Avenue, as identified on Figure J. This Gateway feature shall be developed to achieve high quality public outdoor amenity space that includes street trees and overall greening.

b) **Parks and Open Spaces:** The parks and open spaces in Study Area A identified on Figure J shall be large public spaces comprised of hard and soft landscaping and include elements that accommodates park users of all ages and abilities. The lands designated Parks and Open Space and the identified Gateway feature shall be high quality spaces that include street trees and overall greening and shall:
   - Contribute to the identity of the community;
   - Be inviting and act as formal and informal gathering places; and,
   - Provide functional and aesthetic breaks in the built form.

Pedestrian Linkage

a) The pedestrian linkages identified in Study Area A as shown on Figure J shall be mid-block connections that will connect to public spaces and transit stations. The pedestrian linkages shall be of a high quality hard surface with pedestrian-scale lighting.

Mews/Laneway

a) The Mews/Laneway as shown on Figure J shall be multi-functional to allow for vehicular access, service vehicle access, and smaller scale residential access.

Plaza Space/Forecourt

a) The Plaza Space/Forecourt identified on Figure J shall have buildings with primary commercial/retail entrance ways and places for public gathering/ interaction.

Courtyards

a) Outdoor, identified conceptually on Figure J, at-grade amenity space for residents and businesses is required for all ground-related residential or live/ work units that are not adjacent to a public park. Courtyard spaces shall:
   - Be a combination of hard and soft landscape surfaces and should be no smaller than 25 square metres in area, per dwelling unit/per business; and,
   - Ensure adequate direct daylight of at minimum 4 continuous hours is achievable within courtyard.

Focal Points

a) Focal points shall be provided for at key locations within Study Area A, shown conceptually on Figure J, for public art, wayfinding elements and heritage commemoration features.

Community Facility

a) The Community Facility shall be located within Study Area A, as generally identified on Figure J, in proximity to the residential and worker populations it serves, be adjacent to a public park, and may accommodate any combination of recreational facilities, cultural facilities, library facilities and/ or day care facilities to serve both the emerging community, as well as adjacent neighbourhoods. In addition, it shall be:
   - Located in a highly visible and accessible location with strong pedestrian, cycling and transit connections;
   - Designed to provide flexible multi-purpose facilities that can adapt over time to meet the varied needs of the community;
   - Delivered in a timely manner to support residential and non-residential growth; and,
   - Incorporated with mixed-use buildings or as a stand-along facility.

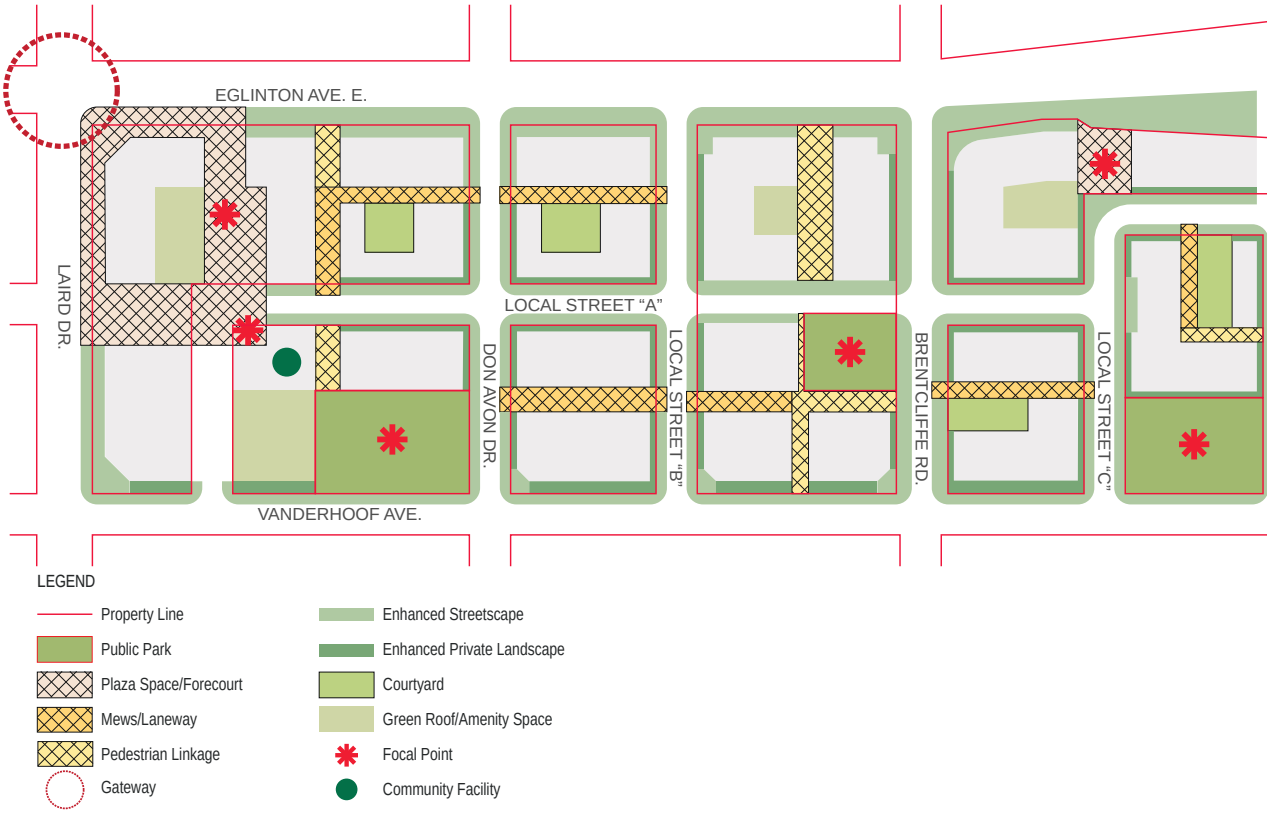


Figure J: Public Realm

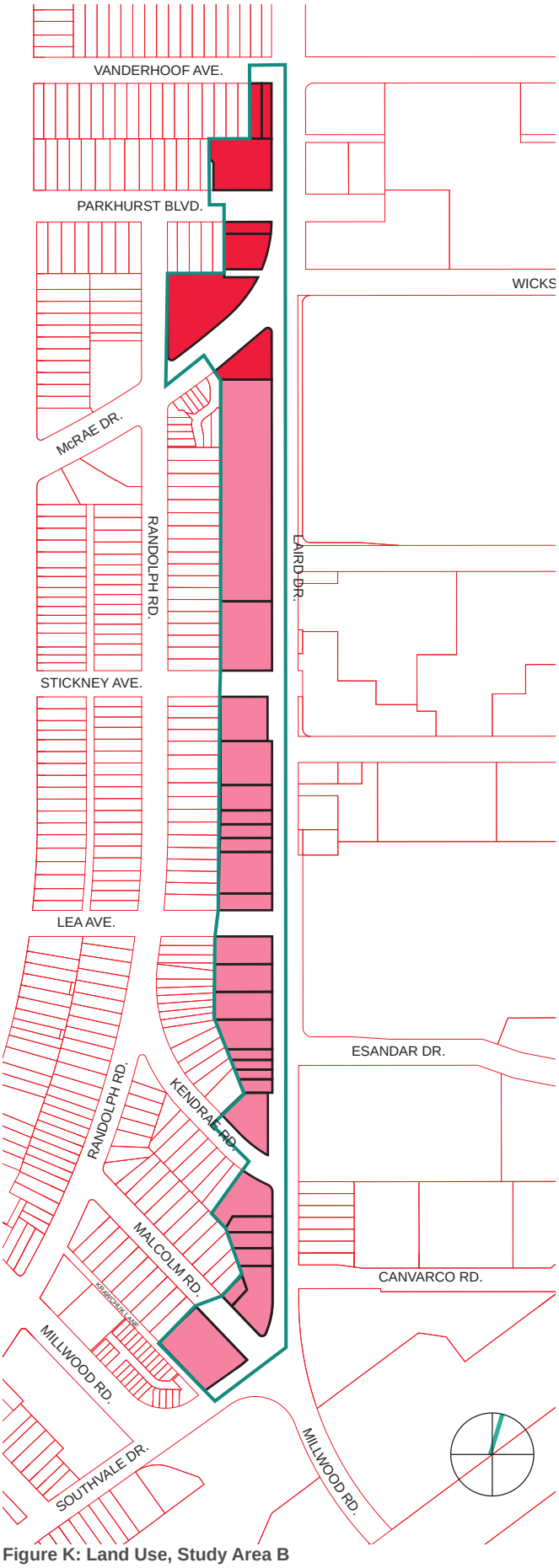


Figure K: Land Use, Study Area B

A.4 Development Details for Study Area B

A.4.1 Land Use

Character Area 2:

Within 500 metres of LRT Station

a) The lands within the Mixed Use 2 Areas designation, as shown on Figure K, are intended to provide opportunities for smaller scale retail facilities in combination with service commercial, office, residential development, and community facilities. The following uses may be permitted within the Mixed-Use 2 Designation:
   - Residential dwelling units in the form of mid-rise apartments. Townhouses may be permitted where incorporated in the base of a larger development;
   - Live-work units;
   - Retail and service commercial uses with a Gross Floor Area of less than 600 square metres, per individual retail or service commercial business;
   - Office uses;
   - Parks and open spaces and POPS;
   - Public and private utilities; and,
   - Community facilities.

b) Retail and service commercial, office, and other permitted non-residential uses are required at grade.

c) A minimum of 75 percent of the at-grade Gross Floor Area shall comprise permitted retail and service commercial uses, office uses or any other permitted non-residential use.

Character Area 3:

Beyond 500 metres of LRT Station

a) The lands within the Mixed Use 3 Areas designation, as shown on Figure K, are intended to provide opportunities for smaller scale retail facilities in combination with service commercial, office and residential development. The following uses may be permitted within the Mixed-Use 3 Designation:
   - Residential dwelling units in the form of mid-rise apartments and townhouses;
   - Live-work units;
   - Retail and service commercial located at-grade, with a Gross Floor Area of less than 600 square metres, per individual retail or service commercial business;
   - Office;
   - Parks and open spaces and POPS;
   - Public and private utilities; and,
   - Community facilities.

A.4.2 Built Form: Study Area B

A Sustainable and Resilient Community

a) All development in Study Area B shall be consistent with the following:
   - Demonstrate leadership in resiliency and sustainability through the use of green building design and technology in accordance with approved City policies, by-laws and guidelines;
   - Incorporate low impact design and other site design strategies to mitigate environmental impacts and to create a more comfortable urban environment;
   - Accommodate all ages, income levels, and abilities; and,
   - Require convenient access to higher order transit to reduce reliance on the automobile as the primary mode of transportation, and promote active transportation, such as walking and cycling.

Compatible Development

a) Compatible development shall be defined as development that is not necessarily the same as, or even similar to development in the vicinity, but is development that enhances the character of the area, without causing any undue adverse impacts on adjacent properties. In achieving compatible development, all proposed development shall:
   - Conform with applicable policies of the City's Official Plan;
   - Be consistent with and implement the applicable design guidelines approved by the City, to the satisfaction of the City; and,
   - Be subject to Site Plan Approval.

Building Articulation

a) All new buildings shall:
   - Have a maximum street wall length of 45.0 metres;
   - Be articulated with vertical breaks at a minimum of every 6 metres to avoid 'canyon' effect, and include expansive windows along the primary frontage;
   - Discretely incorporate commercial signage into a consistent band running along the top of ground floor units;
   - On corner sites, be further articulated in acknowledgment of the building's relationship to the street as seen from a distance;
   - Cafe/Restaurant uses may extend into exterior spaces by way of terraces, patios and informal outdoor seating;
   - Incorporate primary entrances into the front building facade. Further, primary building entrances shall be clearly visible, located to front onto a street, be direct, and should be accessible to people of all ages and abilities;
   - The building facade shall be Integrated as an extension of the public realm; and,
   - At-grade residential uses shall have landscaped transition between the public and private realms.

Setbacks

b) Front Yard Setback: For all new buildings, the front yard setback at-grade and for the 1st level of below-grade parking shall be a minimum of 3.0 metres from the edge of the right-of-way/property line, and shall:

- Include specialty pavement, seating, decorative fencing, and other high quality furnishing at-grade;
- Accommodate landscape enhancements and a transition zone between public and private realms;
- Include raised private terraces, commercial patios, planting complementary to the public realm; and,
- For ground-related residential units, utilize an enhanced front garden to screen units from the street while providing attractive front entrances. Ensure any grade changes between sidewalk and front entrance are accommodated on private property.

c) Rear Yard Setback: The rear yard setback of the 1st level below-grade parking shall be 3.0 metres from the rear property line. The rear yard setback at-grade for new buildings in Study Area B shall be a minimum 9.0 metres from the rear Property Line, as shown on Figure Iv, and shall:

- Include a minimum 3.0 metre landscaped strip along the rear property line to visually buffer development from adjacent residential properties; and,
- Where possible, provide rear laneway access;

d) Exterior Side Yard Setback: All exterior side yard setbacks in Study Area B are a minimum of 0.0 metres.

e) Interior Side Yard Setback: The interior side yard setback for new buildings in Study Area B may be a minimum of 0.0 metres except:

- Where a vehicular access to the rear yard is required, then the interior side yard shall be a minimum of 6.0 metres to facilitate the required vehicular access; or,
- Where the interior lot line abuts another interior lot line, and access to the rear yard is to be shared, then the interior side yard for both properties shall be a minimum of 3.0 metres on each property.

f) Where provided, interior side yards shall:

- Provide a direct vehicular connection between the rear yard parking and the primary entrances for ground floor commercial uses;
- Provide safe pedestrian connections between rear and front yards of new development; and,
- Provide access for cyclists to rear parking and storage facilities from the front yard.

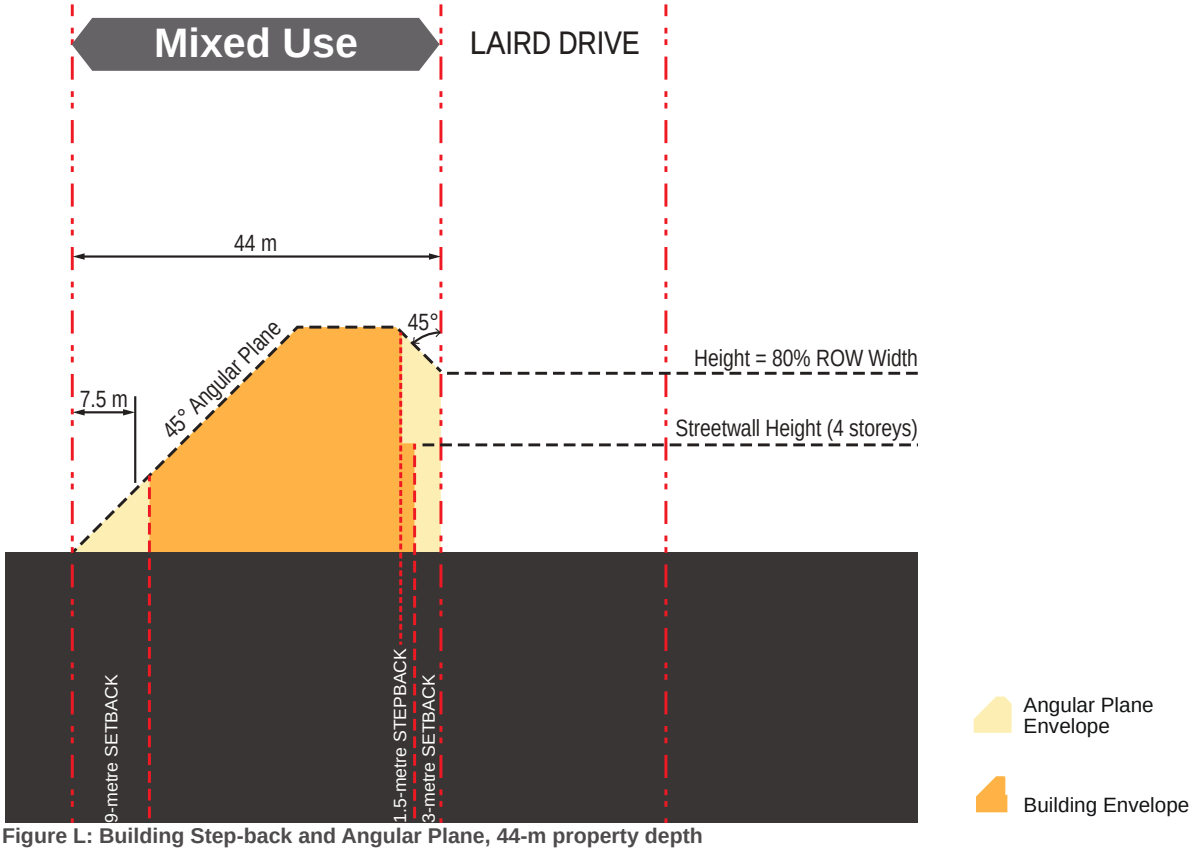


Figure L: Building Step-back and Angular Plane, 44-m property depth

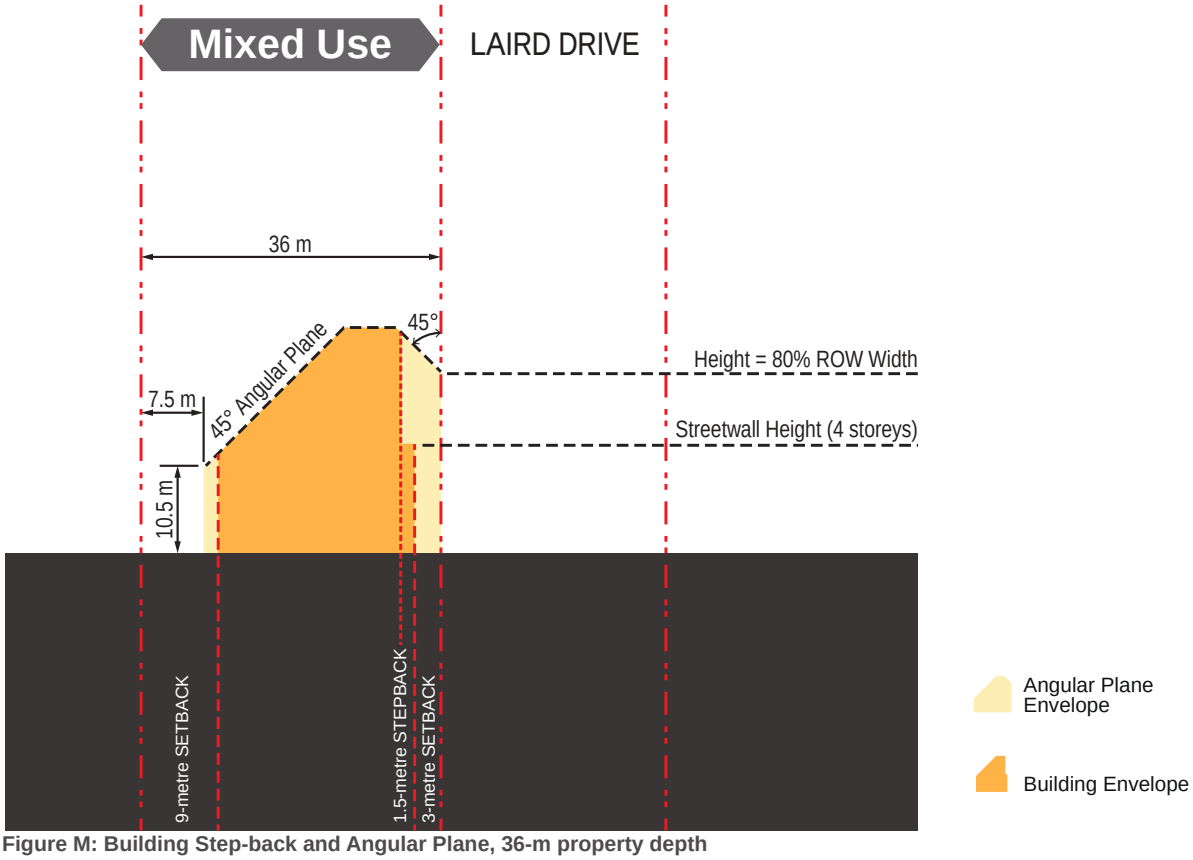


Figure M: Building Step-back and Angular Plane, 36-m property depth

Building Height

a) Low-rise buildings located within Study Area B shall have a maximum height of 3-storeys; and,
b) Mid-rise buildings located within Study Area B shall have a maximum height established as the width of the adjacent right-of-way or 27.0 metres, whichever is less. Building height will also be established through the application of angular planes, as shown on Figures L and M.

Building Step-Backs

a) In addition to the policies that apply to all new low-rise and mid-rise buildings in Study Area B, new mid-rise buildings shall accommodate step-backs for all built form above the 4th storey (as shown in Figures L and M). Step-backs shall:
    - Be a minimum of 1.5 metres from the building wall at the top of the 4th floor, where the building wall faces the front or side lot lines; and,
    - Be established by the application of the required angular plane, where the facade faces the rear lot line. Generally, the rear yard step-back shall be 3.0 metres for every additional storey above the 3rd floor.

Rear Facades

a) Where there are adjacent residential buildings and where the rear facade of new development will be visible the architectural treatment of the rear facade shall be enhanced. Enhancements shall include windows, appropriate facade materials and balconies.

Frontage

a) The minimum parcel frontage required for any new development within Study Area B shall be 18.0 metres for corner sites or mid-block sites that are serviced by laneway access.
b) The minimum parcel frontage shall be 24.0 metres for mid-block sites that are serviced by a driveway access. Mid-block sites that are served by a rear lane, may have a minimum frontage of 18.0 metres.

Rear Laneways

a) Wherever possible, development within a block in Study Area B shall be coordinated to accommodate rear lane access for below-grade parking and servicing.
b) All access to underground parking and loading facilities shall be provided from the rear yard.

A.4.3 Heritage Buildings

General

It is a goal of this Plan to conserve and enhance the legibility of the study area's historic urban fabric as a transition between the residential neighbourhood west of Laird and the industrial areas to the east. This Plan shall:

- Ensure high quality architecture in the design of the new development, additions and alterations that is complementary to on-site heritage resources and is in accordance with the intent of City of Toronto Official Plan heritage policies;
- Require that new development enhances and complements adjacent heritage properties, in accordance with the intent of City of Toronto Official Plan heritage policies;
- Require that new development, additions and alterations on or adjacent to heritage properties respond to existing heritage buildings through built form as opposed to materiality or articulation;
- Ensure that any required alterations to heritage buildings to satisfy accessibility requirements minimize impact on the building's heritage attributes and cultural heritage value.
- Encourage the City to initiate the process to designate 66, 68, 70, 72, 96 and 180 Laird Drive under Part IV of the Ontario Heritage Act; and,
- Require that new development explore opportunities to interpret and commemorate the history of Leaside.

Detached Main Street Commercial (180 Laird Drive):

a) Additions to Detached Main Street Commercial heritage buildings shall:
   - Conserve the heritage property's street-facing elevation(s) and substantial portions of return walls;
   - Enhance and complement the heritage building;
   - Provide additional height and density that is context-appropriate.

b) Rooftop additions to Detached Main Street Commercial heritage buildings shall:
   - Be set back from all street-facing elevations, with appropriate set-backs determined on a case-by-case basis; and,
   - Be no taller than 2/3 of the height of the heritage building.

Main Street Commercial Row (96 Laird Drive)

a) Additions to Main Street Commercial Row heritage buildings shall:
   - Conserve the heritage property's street-facing elevation(s) and substantial portions of return walls;
   - Conserve the roof profile of the heritage building, as viewed from the public realm;
   - Enhance and complement the heritage building; and,
   - Provide additional height and density that is context-appropriate.

Semi and Single House-Form (66, 68-70, 72 Laird Drive)

a) Additions to House-Form heritage buildings shall be located at the rear of the property.

b) Rear additions to house-form heritage buildings shall be located behind the building and be limited in height to the peak of the existing roofline.

A.4.4 The Public Realm: Study Area B

General

a) All development shall be set back from the property line to enable an extension of the public realm.
b) A unified streetscape shall be developed to will provide for a consistent street tree canopy and to accommodate a continuous, safe cycling link from Eglinton Avenue to Millwood Road.
c) There shall be a hierarchy of gateways and open spaces that are high quality, inviting and serve as formal and informal gathering places.

The Road Network

a) The street network within and surrounding Study Area B shall be developed under the principles of "complete streets", with appropriate facilities provided for pedestrians, cyclists, transit, and vehicles.
b) Laird Drive: Laird Drive, south of Vanderhoof Avenue shall have a right-of-way width of 27.0 metres and be designed to accommodate:
- Connections to the surrounding road system;
- Numerous, convenient, and safe pedestrian and cycling routes linking key destinations within and beyond the study area;
- An enhanced public realm through street furniture and viable street tree planting at an appropriate spacing to ensure healthy growth and continuous canopy;
- Outdoor café/restaurant seating where mixed use includes ground-related retail/commercial;
- Privately Owned Public Spaces (POPS);
- Wider sidewalks in anticipation of higher volume pedestrian traffic;
- Amenities for transit users and bus routes as a priority;
- Amenities for cyclists and cycle lanes as a priority; and,
- Where uses include ground-related residential include a landscape buffer to provide a transition between public and private realms (sidewalk to ground-related residential units).

Gateways and Parks

c) Gateways: Study Area B is constrained for the creation of typical park spaces given the size of the development parcels and ownership fragmentation. However, some opportunities exist within the existing public right-of-way to establish attractive and functional gateways, as identified on Figure O. These gateways shall be developed to achieve high quality public outdoor amenity spaces that include street trees and overall greening and shall:
- Contribute to the identity of the community;
- Be inviting and act as formal and informal gathering places;
- Provide functional and aesthetic breaks in the built form; and,
- Provide opportunities for public art, wayfinding elements and heritage commemoration features.

Appendix B

steer davies gleave

Laird in Focus – Final Mobility Report

Draft Report
June 2018

City of Toronto

23023501

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1 Executive Summary

The Laird Study Area and its surroundings were originally planned for cars and trucks. The major investment into the Eglinton Crosstown LRT (ECLRT) line will significantly improve regional and local mobility, directly with enhanced higher-order and feeder bus transit options, and indirectly with supportive multi-modal and shared mobility strategies. Corresponding City-building opportunities are emerging, allowing better integration of new residential and employment intensification, including an enhanced public realm.

This mobility plans supplements the overall planning study, in providing a multi-modal transportation approach that is sustainable and balanced. In embracing a multi-modal transportation approach that is sustainable and balanced, redefining the transportation mode structure is required. The following transportation mode hierarchy has been adopted, consistent with the City's policies:

- **Active transportation:** walking and cycling modes provide both health and infrastructure capital as well as operating cost benefits;
- **Transit network:** higher-order transit lines, such as the Eglinton Crosstown, provide significant opportunities to not only draw regional trip choices away from vehicles, but also to facilitate development that is supportive of active transportation. Furthermore, feeder bus networks can be effectively planned to connect higher-order transit lines with residential communities and employment districts;
- **Transportation demand management (TDM) and innovative mobility strategies:** adopting TDM and technological advances, accepting emerging governance structures, supporting shared arrangements, and encouraging/incentivizing modifications in societal behaviour leads directly to infrastructure cost benefits, while also fulfilling a need for non-peak travel periods;
- **Goods movement:** supporting the vitality of employment lands is critical to an economically sustainable city; and,
- **Vehicular movement and associated parking:** vehicles and parking will remain essential elements of the transportation network; however, major infrastructure costs and decisions affecting personal convenience will be required to accommodate future transportation demands. The shift away from vehicular trips is necessary in order to achieve a sustainable and balanced transportation system within a vibrant city.

Opportunities

Based on the identified key findings derived from the consultation activities, policy review, and a multi-modal analysis, opportunities to improve access to and mobility options have been outlined in this Phase 1 study. These mobility opportunities will be considered in the identification and assessment of land use / built form development scenarios (Phase 2) for Study Area A and Study Area B – and for guiding improvements / strategies for the overall transportation study area.

A summary of the major potential mobility opportunities is presented below.

- Despite a poor environment, physical barriers, and low connectivity to existing and future destinations, there are sufficient ROW spaces, growth potential, and land availability to create an attractive and safe pedestrian network.

- Despite a poor environment, physical barriers, and lack of a cycling network, opportunities to build on the latent demand and support new growth is demonstrated.

- ECLRT implementation will transform mobility access and options in the study area, it requires a balanced and coordinated plan to provide first and last mile solution by maximizing active transportation and transit connectivity, while maintaining vehicle access and goods movement in a balanced manner.
- With arterial and collector roadways experiencing capacity issues during peak hours capacity and significant portion of vehicle trips being made are a short distance within the study area. Travel demand management strategies, to reduce single occupancy vehicles and allow other mobility options to have the opportunity to flourish in this environment in the future. Significant potential presented given the size and intensity of mixed use development scenarios for carpooling, car-share, bike-share, variable parking strategies, and trip planning.

- A coordinated goods movement strategy is required to support the on-going vitality of the Leaside employment lands, while co-existing with the increasing mobility demand for transit and active transportation for employees and residents.

- Physical barriers and lack of grid street network contribute significantly to arterial and collector roadways operating at / near capacity, but perhaps most importantly to the significant queuing at key boundary locations of the study area.

- As future mobility continues to shift away from vehicular uses, opportunity for comprehensive parking strategies to create a balance environment to accommodate future vehicle demand with appropriate policies to control parking supplies in partnership with Toronto Parking Authority.

Preferred Mobility Plan

Once Eglinton Crosstown is operational, a transformation in travel modes will occur, locally and regionally. The degree to which future travel moves away from vehicles however, will be measured by how well a balanced and integrated multi-modal transportation network is achieved. Critical for success will be enhanced access and connections to Eglinton Crosstown. This includes reliable and convenient local transit as well as safe and comfortable walking and cycling facilities.

Based on multi-modal analysis and extensive consultation, a long list of mobility recommendations has been identified to transform the study area from car-dependent travel to transit and other modes. Central to most of the recommendations are a re-imagining of Laird Drive and guidance towards non-auto based new development.

Laird Drive will become a central spine in the area, unifying existing residential neighbourhoods, retail uses and employment areas with an attractive multi-modal transportation corridor. It will connect existing and planned community facilities, have major bus routes and provide access to the vital employment lands. Currently, cycling routes lack safe connectivity to the adjacent neighbourhoods and, beyond the Study Area, to the larger network. Furthermore, existing sidewalks and boulevards are generally unattractive, due to narrow widths, utility pole locations, numerous driveway depressions, and limited greenery and amenities.

The re-imagined Laird Drive is highlighted by implementing continuous, grade-separated cycle tracks and wide sidewalks on both sides of the street. Boulevards widths are optimized for streetscape greening and street furniture, with additional width generally provided along the west side to integrate with emerging mixed-use development. Another key design component is integrating the bus stops into the boulevards, ensuring that shelters, street furniture / seating, shade, lighting, and bike parking, are incorporated to enhance the comfort of transit patrons. This is being achieved while maintaining reasonable traffic operations, including goods movement via trucks, within the established right-of-way.

Guiding the emerging neighbourhood along Eglinton Avenue is largely founded on implementing a finer grain street network to provide choice for how people will move around and access to where they want to go. Additional safe and comfortable mid-block connections will be encouraged through the development blocks to improve permeability. With a green and attractive setting and a resulting lower speed environment the following attributes will be achieved:

- Increased pedestrian and cycling activity with safe, comfortable and attractive conditions;
- Enhanced and convenient access and connectivity to transit; and
- Alternative routing choices that connect to the surrounding street network, that will distribute vehicular trips within the study area.

The extent of a mode shift to active transportation and transit will be magnified by the success of a travel demand management (TDM) program and associated innovative mobility strategies. The recommended mobility plan promotes TDM to promote travel demand measures and technological advances that will ensure additional travel choice to single occupant vehicular travel, including adding capacity to the network without expansion. Smart Commute programs, school trip planning, parking maximums and development-related benefits should be the minimal expectations to provide modest reduction on vehicle trips. Enhanced and progressive TDM measures are continuously being advanced with technology, presenting significant opportunities. Monitoring of the transportation network as development occurs is critical, to ensure that trips are being diverted to transit and the effectiveness of the adopted TDM program, but also when / if further transportation infrastructure is required.

Recommendations

A multi-modal demand model generated trips for the area was developed considering each mode, each development block, each existing and planned land use and characteristics, provided mobility choice and quality (i.e. vehicle, transit, cycling and pedestrian networks), and existing mode splits, volumes and travel patterns. Given the area's presently limited existence of ride-sharing and other typical TDM measures and existing low-density residential characteristics, a modest trip reduction of 5% was adopted.

This multi-modal analysis was based on a modest 5% TDM-related trip reduction presenting in the AM peak hour 4,400 additional trips due to the planned development, with a corresponding modal split of 41% vehicles, 41% transit, and 18% active transportation (existing modal split of 69% vehicles, 10% transit, and 21% active transportation without the Eglinton Crosstown in operation). In addition, it was determined that approximately 80% of the development could be accommodated with the proposed transportation network.

Given that a relatively modest TDM-related trip reduction rate was adopted, potential for a higher rate is considered highly feasible with innovative technologies, evolving societal behaviour, and emerging programs supported by developing policies. As such, a higher trip reduction rate of 10% rate was tested, which is realistic given characteristics of similar transit corridors within the City. Based on these tests, a 10% reduction to peak hour total person trips, and an additional increase in transit mode share of 10%, would allow for the planned development to be built in full, and be supportable by existing infrastructure.

2 Introduction

The major investment into the Eglinton Crosstown LRT (ECLRT) line will significantly improve regional and local mobility, directly with enhanced higher-order and feeder bus transit options, and indirectly with supportive multi-modal and shared mobility strategies. Correspondingly, City-building opportunities will emerge, presenting opportunities to integrate new residential and employment intensification, including an enhanced public realm.

To manage this growth, the City of Toronto completed Eglinton Connects, a comprehensive planning study along the Eglinton Avenue corridor. Eglinton Connects focussed on planning for the future Eglinton Avenue and how to best leverage transit investment for the benefit of local communities and the City. In addition, the Eglinton Connects study identified Laird Drive and Eglinton Avenue area as one of six focus areas with larger parcels of land fronting Eglinton Avenue that could have greater opportunity to accommodate future population and employment growth.

City Council recommended the Laird Drive and Eglinton Avenue area as a specific Focus Area for intensification around the future LRT station through the adoption of the Eglinton Connects Implementation Report in 2014. This came with a direction to develop a Secondary Plan to implement site-specific planning objectives.

2.1 About Laird in Focus Study

As part of Eglinton Connects, a conceptual demonstration plan was developed for the Laird Drive and Eglinton Avenue area, referenced as the Laird Focus Area, showing the potential arrangement of streets, development blocks, building massing, and open spaces. Over-arching principles were also proposed that would guide the development of subsequent study and public consultation as shown in Figure 2-1.

This Laird Focus Area, identified as Study Area A for this study, would include the properties located on the south side of Eglinton Avenue between Vanderhoof Avenue, Laird Drive, and to the western limit of Aerodrome Crescent. Currently, this area consists of large lots with low-rise employment buildings with significant amount of surface parking.

Building on this Laird Focus Area opportunity, the City also included the properties located on the west side of Laird Drive that are designated Mixed Use Areas. These properties between Vanderhoof Avenue south to Millwood Road were identified as Study Area B for this study. These smaller properties consist of mostly commercial uses in 1-2 storey buildings.

Study Areas A and B includes an integrated planning process to support the development of a planning framework, including a transportation and servicing study, to guide future development.

To encompass Study Areas A and B and to address broader travel issues in the Leaside neighbourhood, both the residential and employment areas, a larger transportation study area extended the geographic area that includes Laird Drive on the west, the CPR tracks to the

south and east, and Eglinton Avenue to the north. The transportation study area will include the review of key intersections and corridors along Laird Drive and Eglinton Avenue.

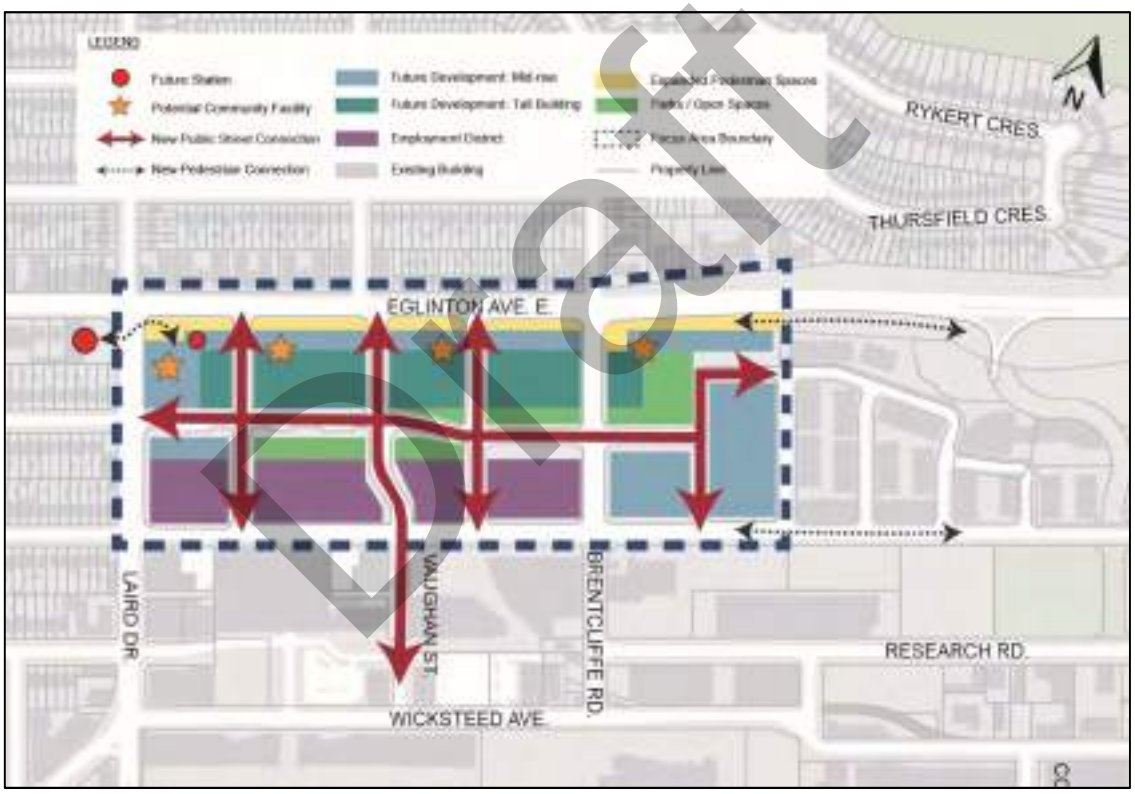
Together, Study Area A (original Laird Focus Area), Study Area B (Mixed Used Areas along the west side of Laird Drive), and the larger transportation study area form this study's overall Laird in Focus study area. For this Mobility Report, the term "study area" shall refer to the core transportation study area as shown in Figure 2-2.

To be noted, although a core transportation study area has been identified, for the purposes of transportation analysis, a larger area of influence was selected to investigate the Leaside community travel behaviours and trends. This is discussed later in the report.

The Laird in Focus study was conducted in three phases:

- Phase 1 – Study Initiation, Background Analysis, Consultation and Visioning
- Phase 2 – Design, Analysis, and Testing of Alternatives
- Phase 3 – Final Consultation Report and Plan Development.

Figure 2-1: Guiding Principles



The Laird in Focus study sets out a new planning framework to support residential intensification and continued employment investment. Multi-modal transportation strategies and key infrastructure improvements will be defined for the study area, as well as a street and block plan and integrated public realm improvements for Study Areas A and B. Implementation and phasing plans will be identified. The emphasis will be to develop a multi-modal transportation strategy / network to:

- support the long-term vitality of the Laird Employment District and residential growth;
- promote the use of the Eglinton Crosstown LRT; and

- improve overall transportation conditions.

This report documents the works completed through all three phases of the Laird in Focus Study.

Figure 2-2: Study Areas

2.2 Approach and Principles

In embracing a multi-modal transportation approach that is sustainable and balanced, redefining the transportation mode hierarchy is required. The following transportation mode hierarchy has been adopted, consistent with the City's policies:

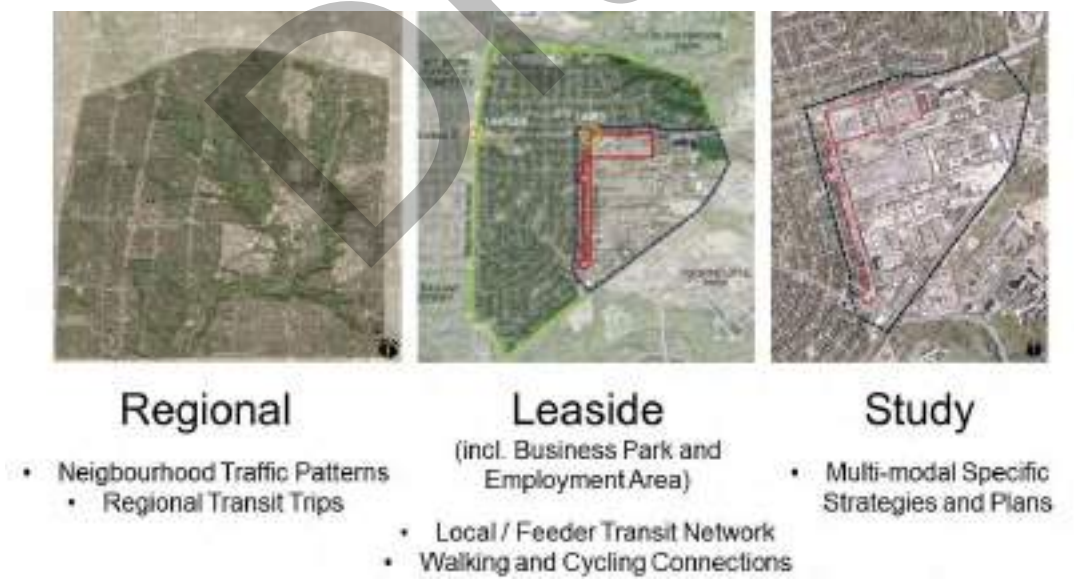
- **Active transportation** – walking and cycling modes provide both health and infrastructure capital and operating cost benefits.

- **Transit network** – higher-order transit lines, such as the Eglinton Crosstown, provide significant opportunities to not only impact regional trip choices away from vehicles, but also to facilitate development that is active transportation supportive. Further, feeder bus networks can be effectively planned to connect higher-order transit lines with residential communities and employment districts.
- **Transportation demand management and innovative mobility strategies** – adopting technological advances, accepting emerging governance structures, supporting shared arrangements, and encouraging / incentivizing societal behaviour changes directly present infrastructure cost benefits, but also fulfils a need for non-peak travel periods.
- **Goods movement** – supporting the vitality of employment lands is critical to an economically sustainable City.
- **Vehicular movement and associated parking** – it is recognized that vehicles and parking will remain important elements of a transportation network, however to accommodate future transportation demands, major infrastructure costs and quality of life impacts will be presented. Shifting away from vehicular trips is necessary for a sustainable and balanced transportation system within a vibrant City.

Recognizing the benefits of an integrated multi-modal transportation system, the future mobility framework should reinforce the low-carbon option while addressing environmental and health benefits, and societal equity in mobility planning for all users. Adopting this mobility framework, from planning through to implementation, will reallocate space and financial commitment to sustainable and shared mobility facilities, thereby improving the urban quality of life.

A hierarchical transportation approach was considered through three study lenses that will appropriately capture the broader area of influence, as depicted below.

Figure 2-3: Local and Regional Contexts



Based on established City policies and best practices (see Section 4), the following principles were adopted as the foundation for the integrated transportation planning framework:

Safety – promote a safety-first mindset that addresses all users of all ages and abilities, and the interaction between all modes with perquisite priority to those vulnerable modes.

Accessibility – ensure a range of mobility choices that work together to provide seamless mobility in keeping with the multi-modal policies in Toronto's Official Plan that ultimately improves the quality of life and success to desired destinations for area residents all ages and accessible users.

Connectivity – provide better connectivity as a key element component of good neighbourhood design, such as fine-grained grid network patterns, which support will multi-modal access (i.e. direct and shorter access for transit and active transportation users).

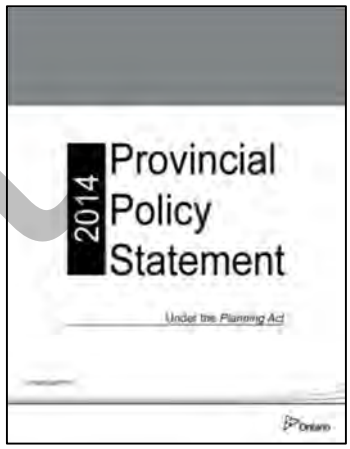
Complete Streets – promote a multi-modal solution that strives to balance the needs and priorities of various users, while reflecting local context and character.

3 Planning Policies and Guidance

There are numerous guiding principles and policies from the City and Provincial government that provide direction and guidance on the future mobility objectives in the study area. Below is a summary of the different background documents relevant to the Laird in Focus transportation study.

3.1 Provincial Planning Context

3.1.1 Provincial Policy Statement, 2014



The 2014 Provincial Policy Statement, was a province-wide vision for the province's land use vision. It develops landscapes, built environments, and manages resources over a long term, to achieve a liveable and resilient community. The directions include:

- Provide appropriate development while protecting resources, public health and safety, and the natural and built environments;
- Build strong, healthy communities by supporting density and land uses which support active transportation, are transit-supportive, and freight-supportive;
- Develop supporting land use patterns where transit is planned or expected;
- Safe, energy efficient, transportation systems that move people and goods;
- Integrated transportation and land use considerations at all stages of the planning process;
- Use of TDM strategies to maximize transportation network efficiency; and
- Land use pattern, density, and mix of uses to minimize length and number of vehicle trips, support current and future use of transit and active transportation.

3.1.2 Growth Plan for the Greater Golden Horseshoe, 2017

In the updated 2017 Growth Plan, some of the relevant guiding principles are:

- Design complete communities to meet people's needs for daily living throughout an entire lifetime;
- Prioritize intensification and higher densities to make efficient use of land and infrastructure and support transit viability;
- Offer multi-modal access to jobs, housing, schools, cultural and recreational opportunities, and goods and services;
- Provide for the safety of all system users; and
- Municipalities will develop and implement transportation demand management policies in official plans or other planned documents or programs.

3.1.3 The Big Move, 2008 (2017 Update)

GTHA's first Regional Transportation Plan (RTP), *The Big Move*, identifies a 25-year plan for the Regional Rapid Transit and Highway Network. The RTP provides policies, goals, and directions to support active transportation and safer environments for all mobility users. The focus of the RTP is to leverage transit investment and integrating all transit systems. One of the identified *Big Move* projects was the Crosstown Regional Rail line, which would utilize the existing CPR corridor that is along the east side of the study area,

The RTP is currently being reviewed and updated, with a draft report completed in 2017. The RTP update provides direction on advancing mobility including new opportunities such as, car-sharing, ride-sharing, bike-sharing, and autonomous vehicles.

3.1.4 #CycleON: Ontario's Cycling Strategy, 2013

Ontario's Cycling Strategy provides a route map to support and encourage this growth in cycling over the next 20 years. Key strategic directions include:

- Design healthy, active and prosperous communities;
- Improve cycling infrastructure;
- Make highways and streets safer;
- Promote cycling awareness and behavioral shifts; and
- Increase cycling tourism opportunities.

3.1.5 Ontario's Five Year: Climate Change Action Plan (2016-2020)

Ontario's Climate Change Action Plan is a five-year plan that will help Ontario fight climate change over the long term. The plan calls for a cleaner transportation system by:

- Increase the availability and use of lower-carbon fuel;
- Increase the use of electric vehicles;
- Support cycling and walking;
- Increase the use of low-carbon trucks and buses; and
- Support the accelerated construction of Go Regional Express Rail.

3.2 City of Toronto Context

3.2.1 Road Safety Plan (Vision Zero), 2017

The City of Toronto released it Road Safety Plan, based on Vision Zero principles, in 2017 for the next 5 years. The philosophy of Vision Zero is to eliminate fatalities and serious injuries within the transportation system in contrast to the traditional approach in reducing all collisions. Vision Zero is a long-term strategy, aimed at eliminating fatalities and serious injuries on city streets through:

- Engineered safety measures;

- Technological improvements;
- Education; and
- Enforcement.

3.2.2 Official Plan, 2015

The City of Toronto Official Plan provides new transportation policies (By-law No. 1009-2014) adopted by City Council that addresses developing mobility systems for the future. The key items include:

- Importance of transportation and land use that is mutually supportive and integrated;
- Mixed-use proximity to maximize accessibility;
- Reduced impact on public realm during development process;
- A new Complete Streets Framework, discussed further in Section 3.4.1;
- Supportive of expanding TDM initiatives; and
- Achieving a balanced and multi-modal network.

3.2.3 Cycling Network Plan, 2016

Toronto City Council approved the City's Cycling Network Ten Year Plan, serving as a roadmap and workplan for investments in cycling infrastructure over 2016-2025. The plan identified opportunities for cycling infrastructure investments throughout Toronto. This includes recommendations for cycle tracks, bike lanes, and cycling wayfinding signage.

3.3 Eglinton Crosstown

The Eglinton Crosstown LRT (ECLRT) is currently under construction. In 2014, the City of Toronto adopted the Eglinton Connects Planning Study, with the intent to leverage the major investment in higher order transit with redevelopment and city building opportunities along the corridor.

3.3.1 Eglinton Connects Planning Study, 2014

The Eglinton Connects Planning Study was initiated by the City of Toronto to examine the future land uses, built form, public realm and street layout on Eglinton Avenue in anticipation of the opening of the Eglinton Crosstown LRT in 2021.

Eglinton Avenue is identified as an intensification corridor in Metrolinx's Regional Transportation Plan. The Eglinton Crosstown, which is a light rail transit (LRT) line that will run across Eglinton Avenue between Mount Dennis (Weston Road) and Kennedy Station, is

currently under construction. From Mount Dennis Station to Laird Station, the line will operate underground and will transfer to an at-grade alignment just east of Brentcliffe Road.

The intersection of Laird Drive and Eglinton Avenue East has been identified as a location for an LRT station. The main entrance will be at the southwest corner of Laird Drive and Eglinton Avenue East and the secondary entrance will be in the southeast corner.

3.3.2 Laird Focus Area, 2014

Through the Eglinton Connect Planning Study, the area around the intersection of Laird Drive and Eglinton Avenue was identified as a key focus area. The following main objectives and principles related to transportation were identified:

- Provide finer grain of public streets and blocks, by introducing new north-south and east-west public streets;
- Enhance permeability of the site for pedestrians by creating connections throughout larger blocks including direct linkages to station entrances;
- Integrate LRT access points into new developments to provide seamless and integrated access to rapid transit; and
- Provide a new pedestrian crossing of the future extension of Vaughan Street and Wicksteed Avenue.

This resulted in the recommendation to conduct this current study, to consider potential road networks, connect surrounding areas, and manage traffic operations.

3.4 Guidelines, Policies and Design Guidance

Further to the specific policies that influence the study area directly, there are several other provincial and municipal guidelines that provide guidance on a range of active transportation, design, and development related best practices. The follow sections present the relevant documents that will guide elements of this study as applicable.

3.4.1 City of Toronto Complete Streets, 2017

As part of the City's Official Plan, with the objective to ensure new and existing City Streets will incorporate a "complete streets" approach, designed to preform diverse roles by:

- Balancing the needs and priorities of various users and uses within the right-of-way;
- Improving the quality and convenience of active transportation options within all communities by considering the needs of pedestrians, cyclists, and public transit users;
- Reflect the differences in local context and character;
- Provide building access and address, as well as amenities such as view corridors, sky view, and sunlight; and
- Serve community destinations and public gathering places.

These key guiding principles are to be incorporated in various elements throughout this study, ensuring that streets are for people, placemaking, and prosperity.

3.4.2 MTO Transit Supportive Guidelines, 2012

The guidelines identify best practices in Ontario, North America and abroad for transit-friendly land-use planning, urban design and operations that look to create an environment that is supportive of transit, and developing services and programs to increase transit ridership. Strategies identified include:

- Layout of local streets and open spaces to enhance access to transit and create a more positive user experience;
- Creating complete streets that support all road users;
- Enhancing access to transit to ensure that stations and stops facilitate access and transfers;
- Creating a transit-supportive urban form; and
- Parking management to ensure parking resources are adequately utilities and encourage a shift away from single-occupant vehicles.

These guidelines help provide starting points and ideas that combined with localized context, will ensure transportation plan that is supportive of transit ensure.

3.4.3 Design Guidelines

There are numerous design guidelines provided by the City of Toronto and Province of Ontario, that will be relevant to proposed transportation solutions in this study. These include:

- City of Toronto Curb Radii Guidelines, 2017 - While Transportation Association of Canada (TAC) Guidelines are typically relied upon for design, the City of Toronto Curb Radii Guidelines were developed to better incorporate the needs of all road users, including pedestrians and cyclists of all ages and abilities.
- City of Toronto Curb Extension Guidelines, 2017 - the City of Toronto Curb Extension Guidelines were developed to better address site-specific conditions encountered in Toronto.
- City of Toronto Vehicle Travel Lane Width Guidelines, 2017 - The City's Travel Lane Width Guidelines were reviewed and updated, and will become part of the future Toronto-specific street design guidelines. The new guidelines rebalance safety, access, and comfort of all road users, including cyclists and pedestrians, when recommending lane widths.
- OTM Books 15 and 18 - The Ontario Traffic Manual (OTM) is comprised of several books which provide guidance for the "planning, design, construction, and operation of traffic control devices and systems" thus promoting uniformity of approaches across Ontario. There are two recently updated Books which provide the latest innovation and guidance on active transportation: Book 15 - Pedestrian Crossing Facilities, and Book 18 - Cycling Facilities.

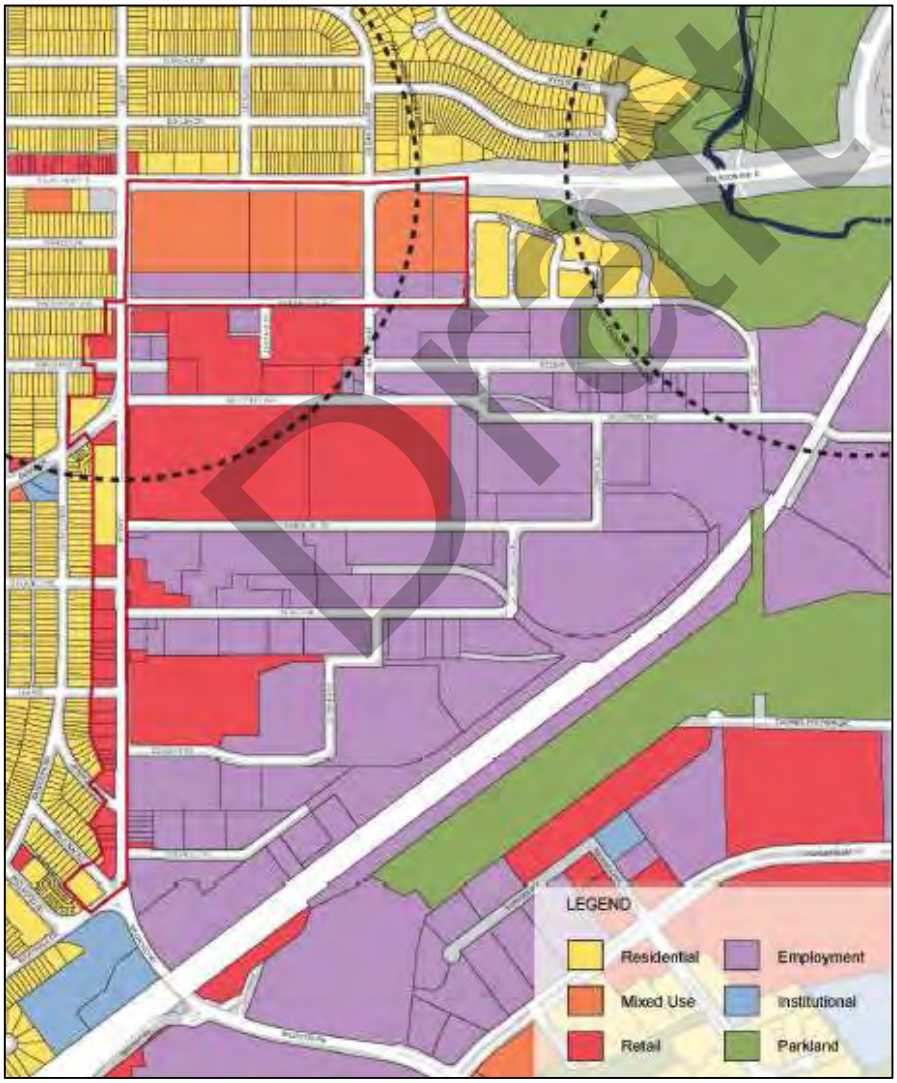
4 Existing Conditions

4.1 Land Use and Travel Context

4.1.1 Land Use

The current land use designations within the study area is primarily employment with some mixed-use areas along Eglinton Avenue and Laird Drive. North and west of the study area, within the communities of Leaside and North Leaside, it is primarily comprised of residential communities. East of the site, there are natural areas as part of the Don Valley Ravine.

Figure 4-1: Existing Land Use Designations within Study Area



4.1.2 Car Ownership Trends

Transportation Tomorrow Survey (TTS) data was used to observe historical trends for the following:

- Employment and household trends within the Leaside employment lands area (i.e. area bounded by Laird Drive, CPR and Eglinton Avenue - Leaside residential areas exhibited relatively stable population and employment between 1991 and 2011).
- Vehicle ownership trends within the Leaside residential and employment areas between 1991 and 2011.

It was found for the Leaside employment lands area that in 1991 there was a peak in employment, followed by a decline that reached its lowest point in 2001. By that point, employment in the area had more than halved, from just under 5,000 people to less than 2,000. Employment has returned to the Leaside employment lands area, with figures reaching 4,000 people in the latest 2011 TTS survey. This trend is illustrated can be seen in Figure 4-2.

Given that the area is primarily for employment use, there is a limited number of households. Some residential developments have been constructed within the last decade, with just over 100 households observed in 2011 as shown in Figure 4-2.

Given the low number of households within the employment lands area, vehicle ownership was assessed with the inclusion of the nearby North Leaside and Leaside neighbourhoods to reflect trends in the general area. It was found that car ownership has increased over time, with the average number of vehicles per household increasing from 1.21 in 1991, to 1.45 in 2011 with a greater share of households now having 2-3 vehicles as shown in Figure 4-3. This is likely a reflection of lowered employment in the study area and the increase in dual worker households.

Figure 4-2: TTS Historical Employment and Residents for Employment Lands Area

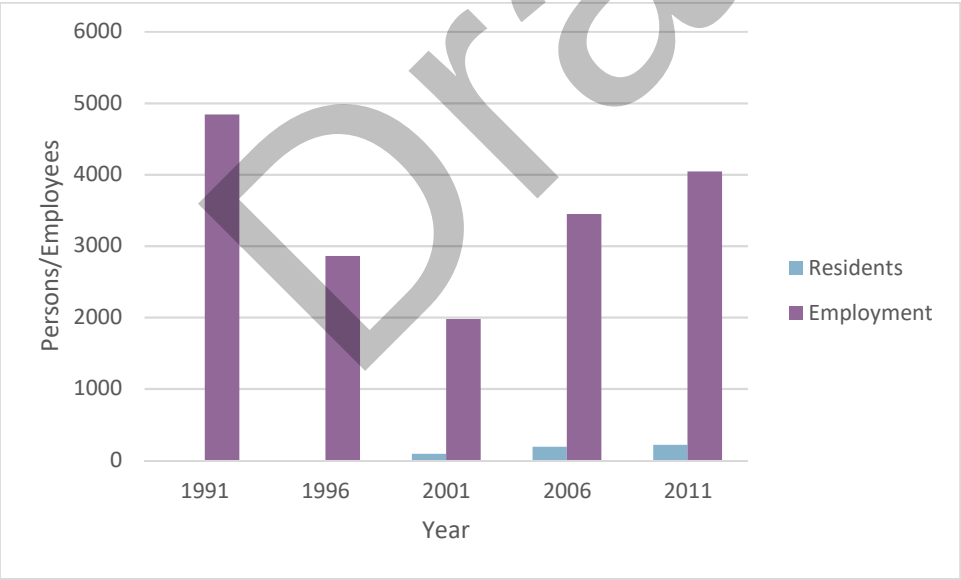
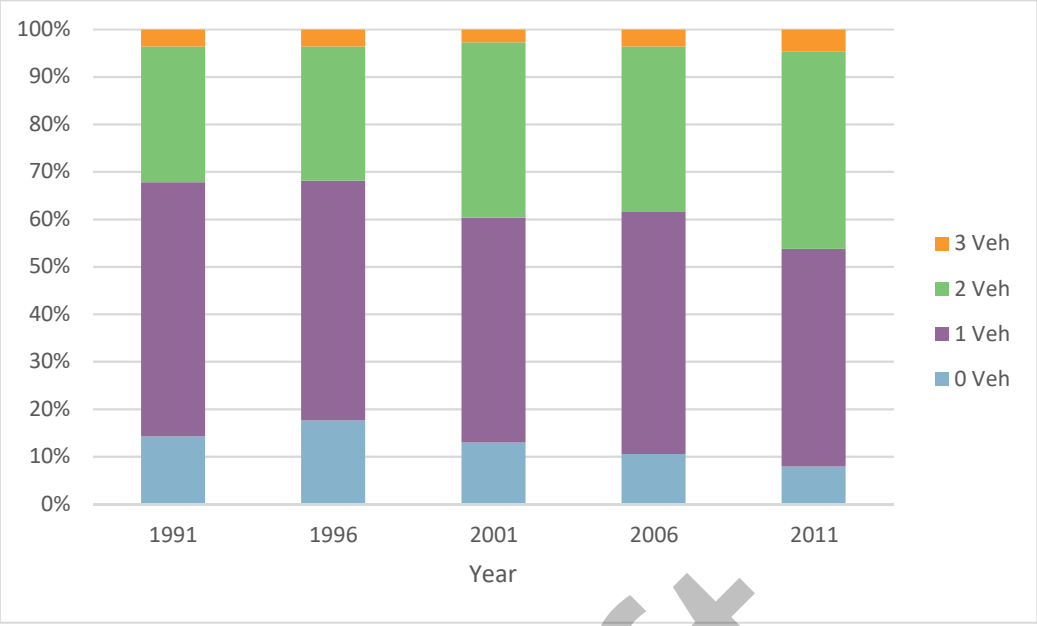


Figure 4-3: Vehicle Ownership Around Study Area

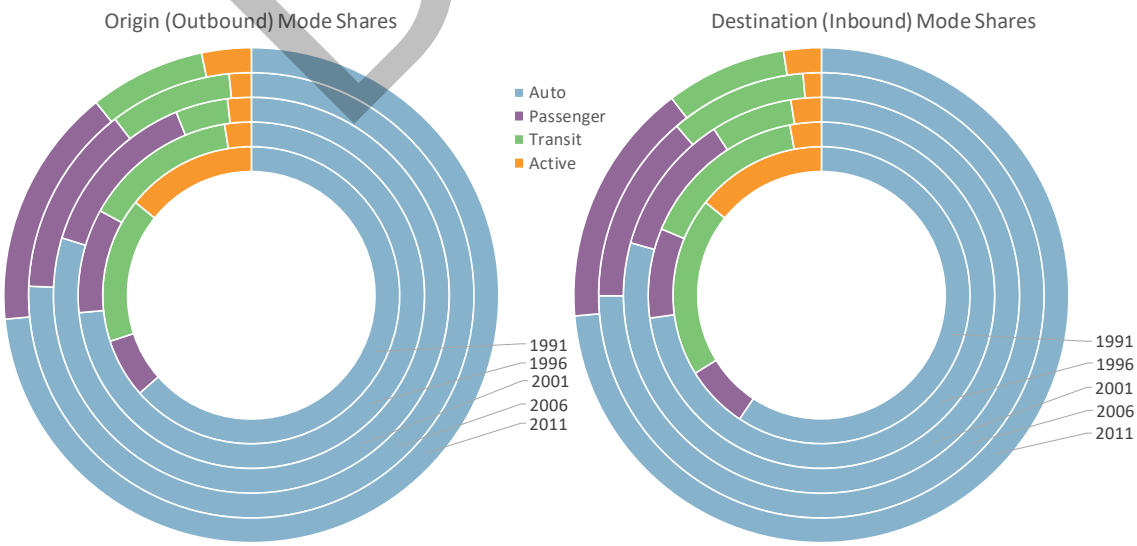


4.1.3 Travel Patterns

Mode Splits

Trips into and out of the study area have significantly changed in travel mode shares since 1991. Initially, trips to the area had a low number of auto trips, with significant use of active modes. However, active mode share use has dropped significantly since then, with an increasing reliance on auto, both as a primary driver and passenger. This is also reflective of the trend in nearby areas for increased vehicle ownership as shown in the previous section. There has been a marginal decline in transit trips due to the lack of new infrastructure in the area.

Figure 4-4: Travel Mode Shares



Peaking

The distribution of trips throughout the day is generally consistent with the land use in the area (commercial/industrial), based on 2011 TTS data. Most of the inbound work trips occur during the morning peak hour, and leave during the afternoon peak hour. Other trips, primarily retail related, tend to occur starting at 10 AM and end around 8 PM This is consistent with the commercial land uses in the area, and reflect the operating hours of the establishments. These trends are shown in Figure 4-5 and Figure 4-6 for trips out of and into the study area respectively. Each trip type, home based work (HBW), home based school (HBS), home based other (HBO), and non-home based (NHB) are showing separately.

Figure 4-5: Outbound Trip Distribution

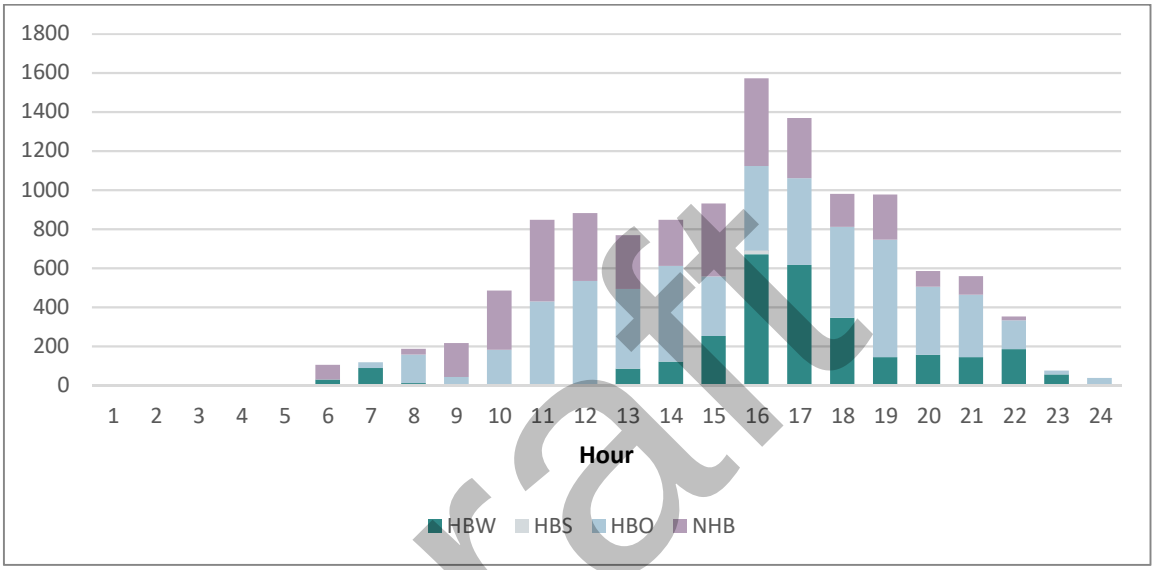
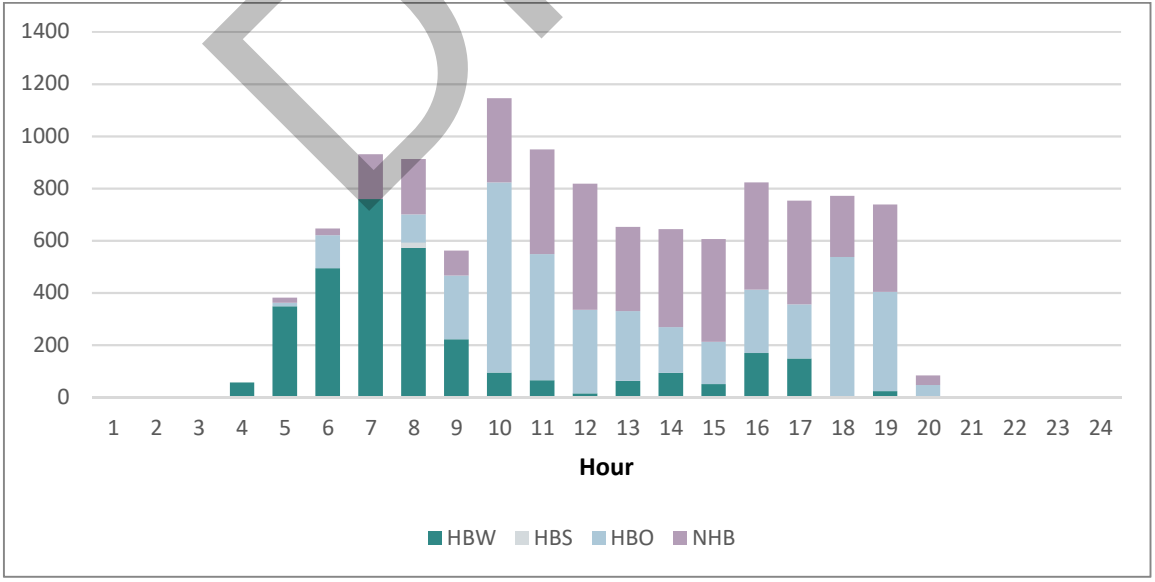


Figure 4-6: Inbound Trip Distribution



4.1.4 Regional Travel

Regional travel patterns were assessed, and overall travel to and from the study area through all modes was determined using TTS 2011 data. It was found that approximately 20% of the trips were localized within Ward 26 which the study area is a part of. This ward is bounded

approximately by Bayview Avenue to the west, Eglinton Avenue to the north, and the Don Valley Parkway to the east/south. Around 60% of the trips occur to and from the North York, and central Toronto regions. Etobicoke, Scarborough, and other areas in the GTA accounted for only 20% of the total trips as shown in Figure 4-7. Over half of all trips remain within the overall North York area. These high-level TTS findings are consistent with location-based data findings provided in the next section.

Figure 4-7: Regional Travel Patterns

4.1.5 Location-Based Data

In addition to the travel context analysis done with Transportation Tomorrow Survey (TTS) data, analysis using StreetLight Data Inc. location-based data was also conducted. Streetlight uses archived GPS data from connected cars, trucks, traffic apps, and other similar data sources to develop metrics for travel behavior. This allows for unique assessments of specific zones, locations, and routing of personal and commercial vehicle traffic. To be noted, Streetlight data captures analytics for over 20% of the adult Canadian population, while TTS data generally has only a 5% sample size.

For the purposes of this report, Streetlight data was used to assess vehicular travel demands from a regional context, neighbourhood travel patterns and potential infiltration findings, and commercial vehicle travel patterns.

To fully appreciate the vehicle travel patterns, six origin-destination zones were setup that started at the local level with the Leaside and employment lands areas, and expanded to regional scales of the entire Greater Golden Horseshoe, as shown in Figure 4-8. Data is collected by identifying gates or zones where traffic is tracked to and from, as shown in Figure 4-9.

This vehicular travel-pattern assessment showed that approximately 50% of peak period traffic in a typical fall day in 2016 travelled to and from the study area, either internally or from nearby areas (less than 3 km), and that 7-8% of total traffic was from areas outside the City of Toronto boundaries. Key findings from this data assessment include:

- Generally, all designated local roadways exhibit over 90% vehicular traffic to / from the local community and the immediate surrounding areas (i.e. Zone 3, which is bounded by Lawrence/Yonge/Bloor-Danforth/DVP – an area within 3 km of the study area);
- Arterial roads and collectors such as Eglinton Avenue, Bayview Avenue, Laird Drive, McRae Drive, and Southvale Drive exhibit similar characteristics, with 50% of traffic derived locally within the Leaside area (i.e. within the existing community), and a further 25% or more from the surrounding area (< 3 km); and
- Average trip length from within the community (i.e. Zones 1 and 2) is 1.6 km, and along the local roads only (i.e. excluding McRae, Southvale, Millwood), 50% to 80% of the trips are to / from this community.

From this analysis, the roadways are generally compatible with the functional role as per their classification. It also indicates that traffic within the community is primarily from the local community (ranging between 50% to 80% along local roadways) and the adjacent surrounding areas (10% to 40%) , which is compatible with the functional role of a local roadway. Trips to / from the community, Zones 1 and 2 that are from / to the surrounding areas, Zone 3, are prime candidates for improved safe and attractive pedestrian and cycling facilities, an enhanced feeder bus network, and coordinated TD measures. Longer distance trips (greater than 3 km) are limited to arterial and collector roadways, with only the major arterials experiencing vehicular trips to / from the broader Toronto area.Figure 4-10 shows a high-level summary of this data.

Figure 4-8: Traffic Zones for Location-Based Data Collection

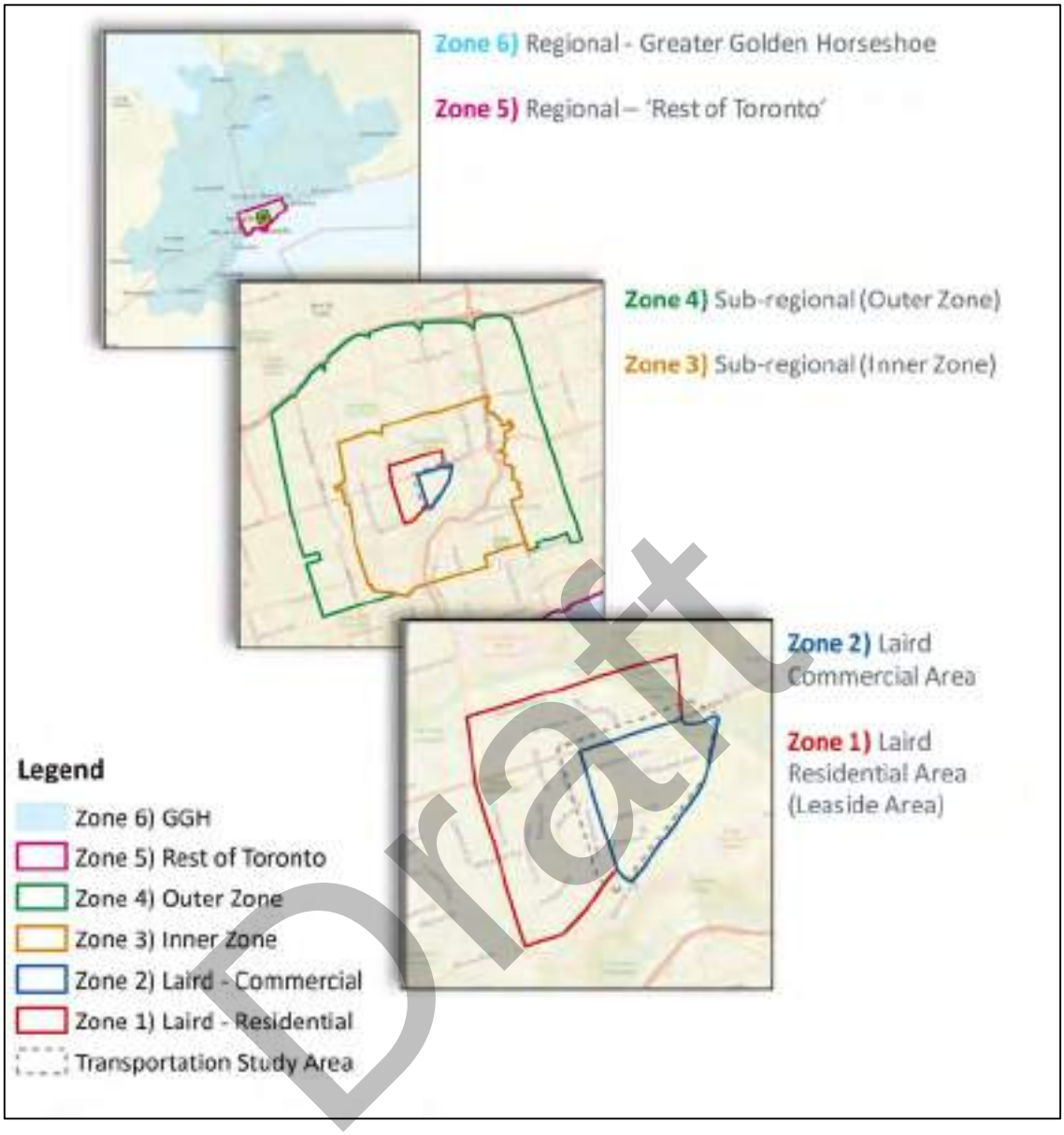


Figure 4-9: Zones and Gates

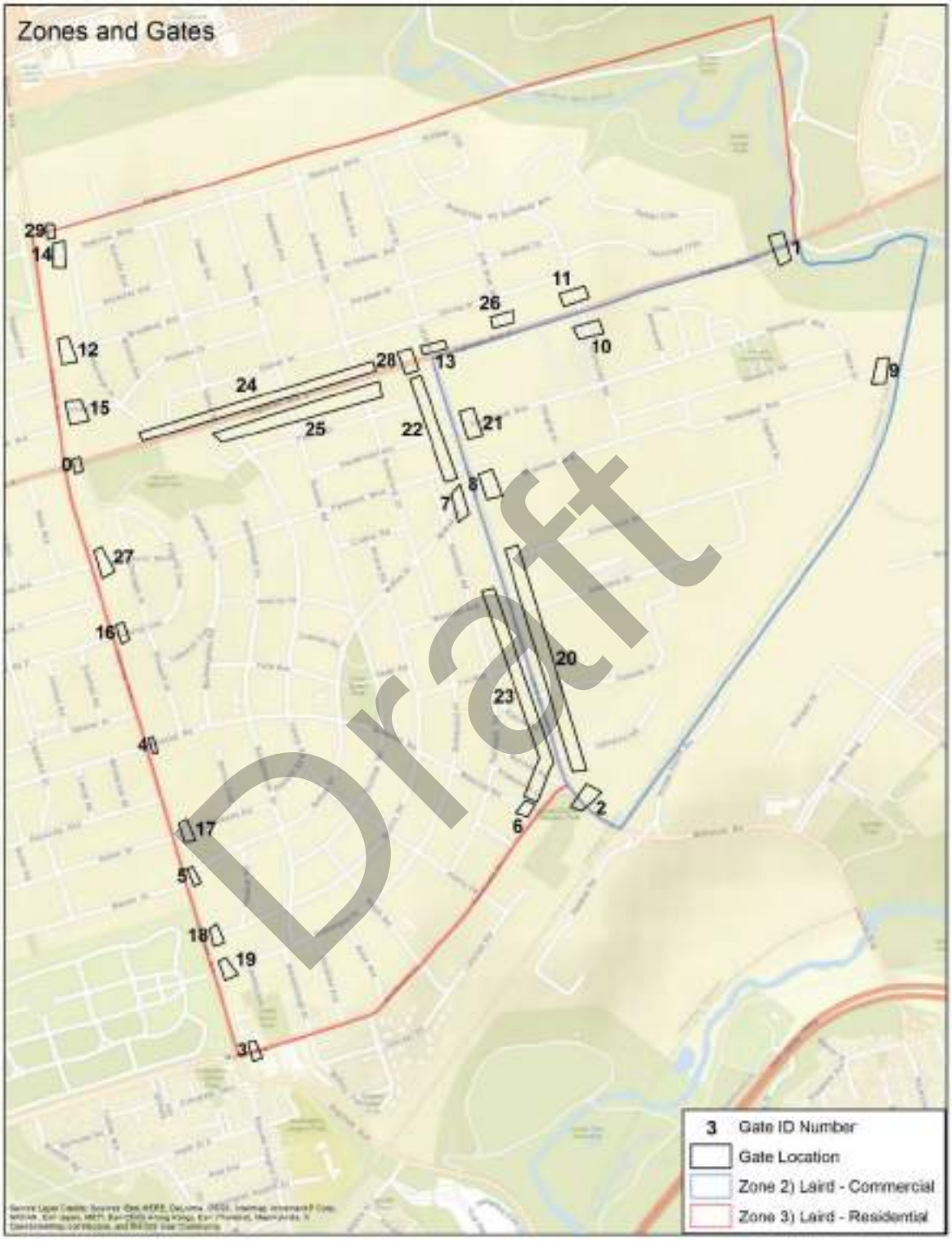
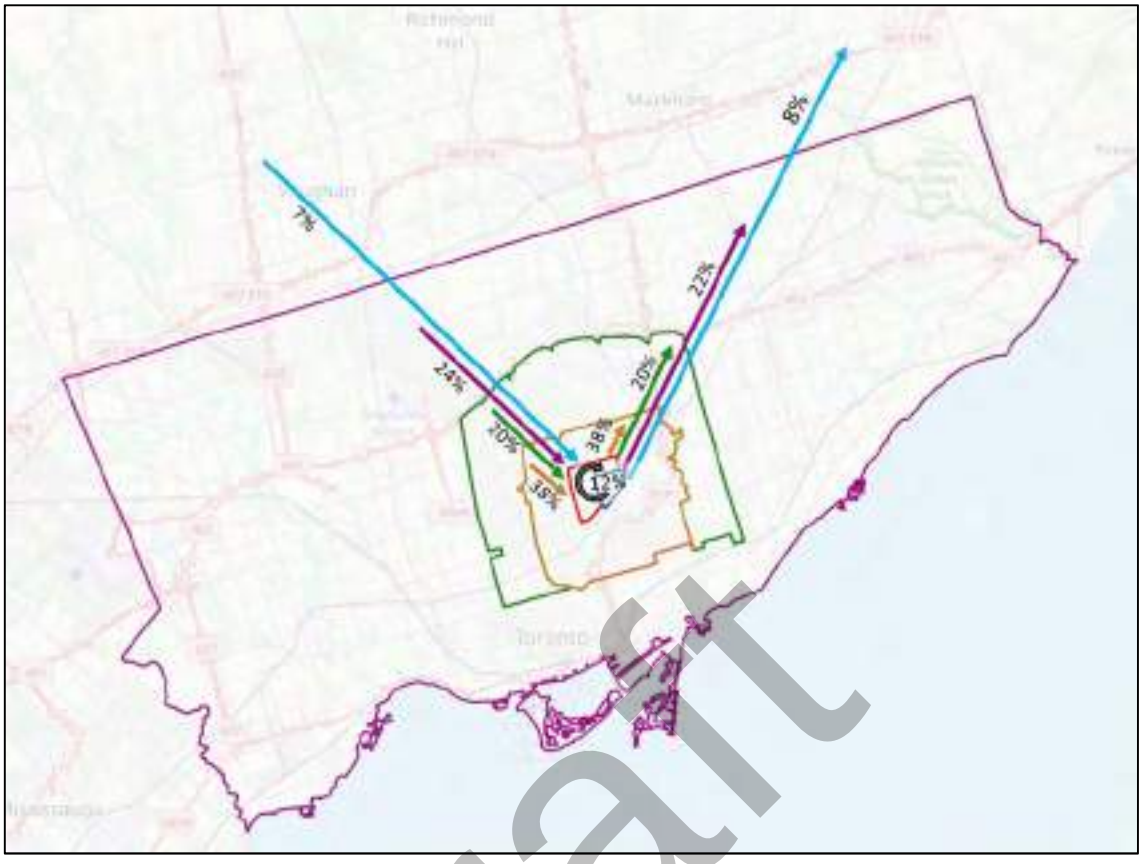


Figure 4-10: Streetlight 2016 Daily Regional Travel Patterns



4.2 Road Network

The road network within the transportation study area has not significantly changed since Eglinton Avenue East was extended easterly to cross both the CPR corridor and the Don River valley to connect to Don Mills Road and the Don Valley Parkway in the mid-1950's.

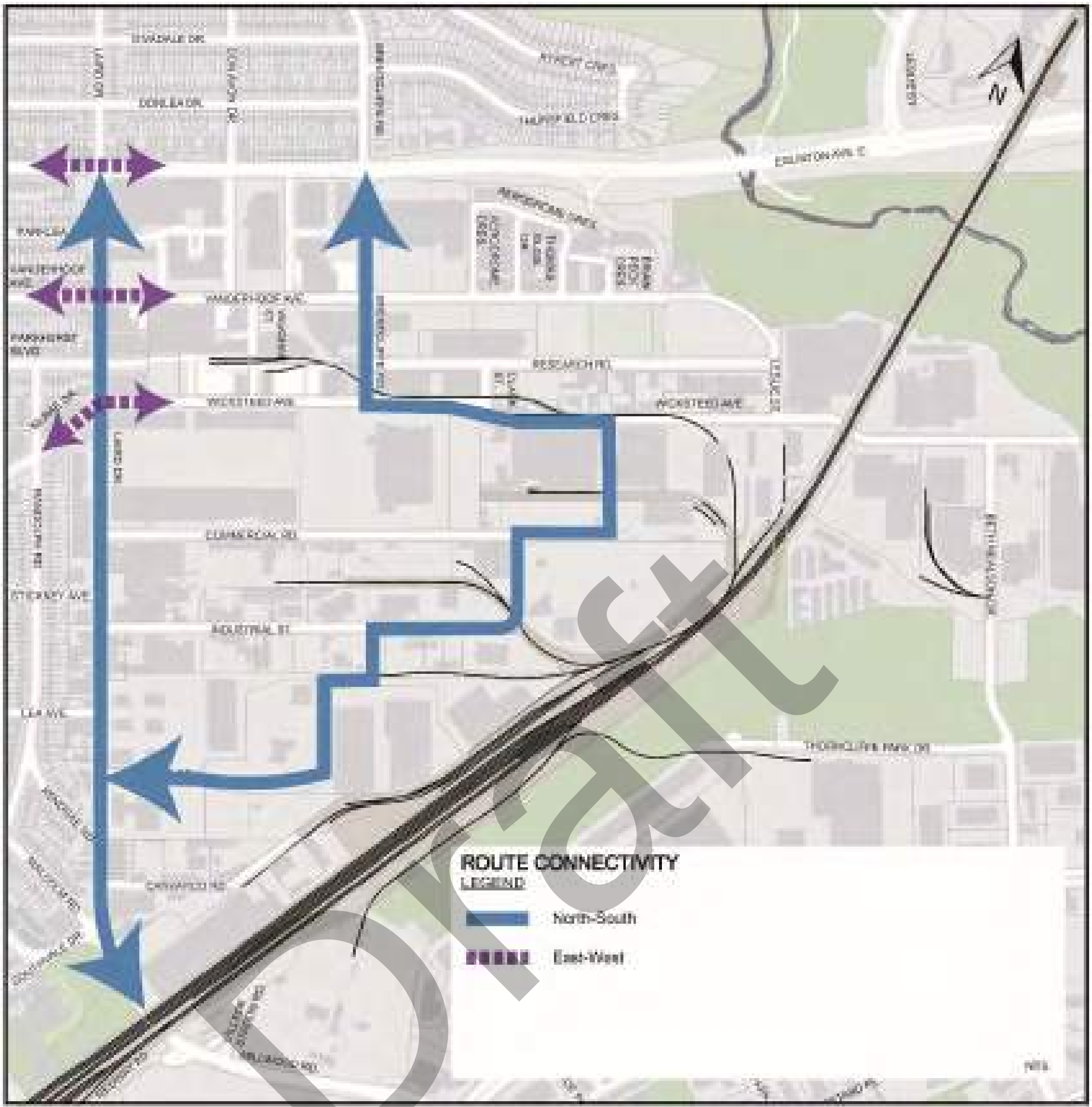
4.2.1 Connectivity

Connectivity within the study area is limited, the road network lacks granularity, consistent with the current big box retail / industrial land uses. Other than Laird Drive, there is no north-south connections that extend through the study area. Many of the roadways have 90° bends rather than intersections and transition from east-west to north-south roadways for short segments, as shown in Figure 4-11.

Laird Drive has a barrier effect for vehicles moving east-west, as side streets are offset, and/or there is a median to prevent through traffic. As a result, the east-west connectivity is limited to Eglinton Avenue, Vanderhoof Avenue, and Wicksteed Avenue. This leaves a significant lack of east-west connectivity for all users south of Wicksteed Avenue, as shown in Figure 4-11.

West of Laird Drive, the road network is suited for the residential land uses, and thus provide a much finer grain road network.

Figure 4-11: North-South and East-West Connectivity



4.2.2 Regional Connections

There are limited connections from the study area to adjacent regional areas due to the barrier effect of the CPR corridor, and the Don Valley Ravine. The main connections into and out of the area are shown in Figure 4-12.

- East-west connectivity primarily through Eglinton Avenue East;
- Southvale Drive, McRae Drive and Millwood Rd also provide some connectivity west to Bayview Avenue;
- Wicksteed Drive and Millwood Road/Laird Drive, in addition to Eglinton Avenue, provide the only two crossings of the CPR corridor;
- Travel to the north facilitated through Bayview Avenue to the west, and Leslie Street to the east; and
- Travel to the south is along Laird Drive, which connects to both Southvale Drive, which leads to Bayview Avenue, and via Millwood Road.

Figure 4-12: Regional Road Network Connections

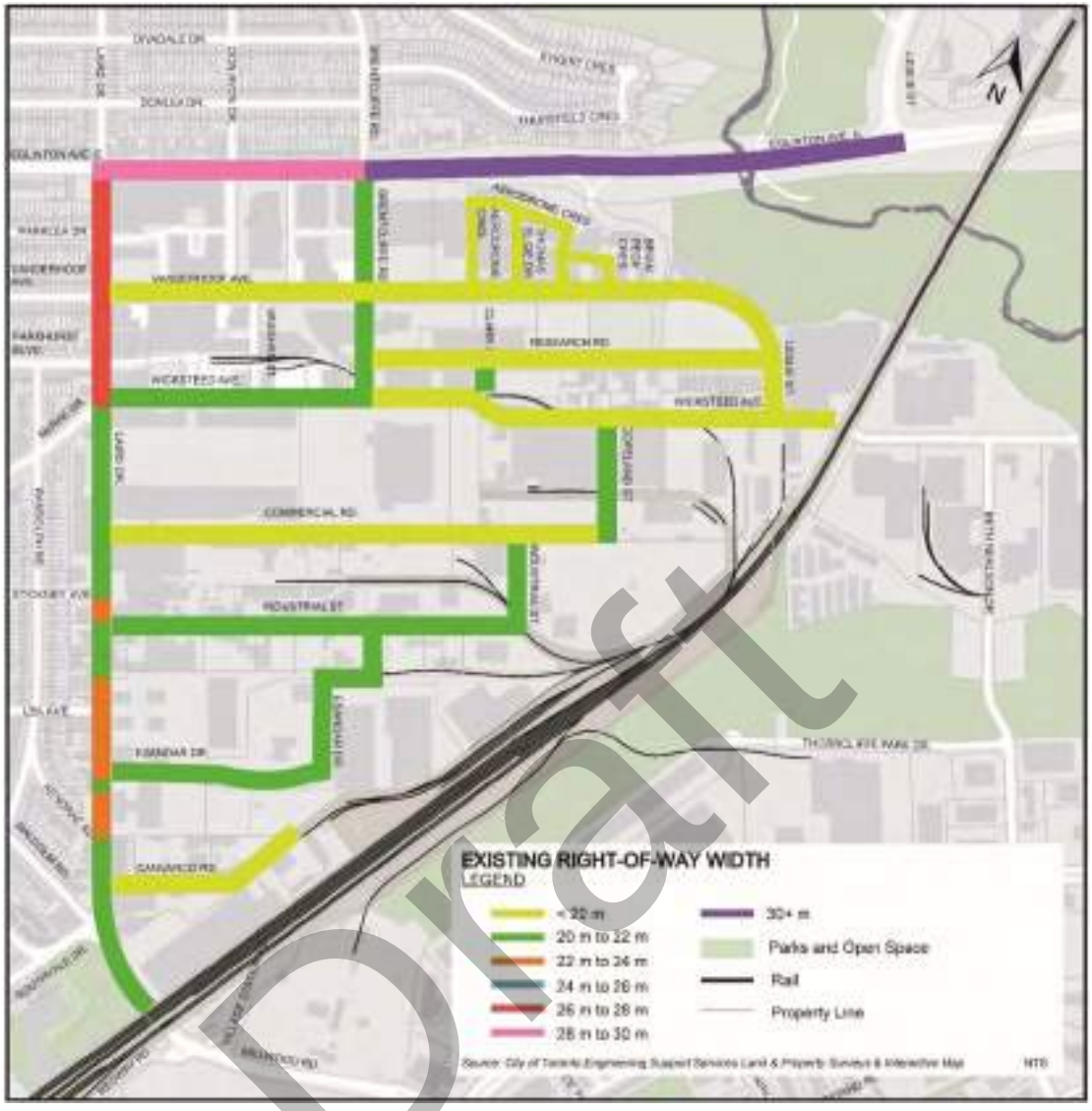
4.2.3 Road Classification and Right-of-Way Width

In the transportation study area, there are two major arterial roads, Eglinton Avenue East, and Laird Drive south of Eglinton Avenue. Wicksteed Avenue and Brentcliffe Road serve as two minor arterials, while key collector streets include McRae Drive, Southvale Drive, and Wicksteed Avenue east of Brentcliffe Road. All other streets are classified as local. Figure 4-13 shows the relevant collector and local roadways in the study area. The traffic volumes, and commercial vehicle activity on these roads are further explored in Section 4.7 and 4.8 respectively.

Right-of-way widths are provided in Figure 4-14. There is a lack of consistent right-of-way widths on most roadways within the study area. Although there may be a longer-term opportunity to normalize right-of-way widths as development occurs along each road, transportation improvements and adopting the City's complete street principles will be challenging given the existing conditions.

Figure 4-13: Road Classification Map

Figure 4-14: R.O.W. Widths



4.2.4 Safety

Collision data provided by the City was assessed for a 10-year period (2005-2016). The most recent year, 2016, was only partially complete and thus records dating back to 2005 were used. In total, the study area was broken down into 23 roadway segments, and 8 intersections. The total collisions, separated by severity type (property damage only, personal injury, and fatality), is provided in Figure 4-15 and Figure 4-16. Only one fatality occurred in the study area, along Eglinton Avenue from Leslie Street to 7362 Eglinton Avenue East.

It was found the mid-block segments, Laird Drive from Vanderhoof Avenue to Wicksteed Avenue, and Eglinton Avenue from Laird Drive to Don Avon Drive, showed the highest number of collisions within the study area. At signalized intersections, Eglinton Avenue and Laird Drive, and Eglinton Avenue and Brentcliffe Road had the highest number of collisions, which can be due to the high percentage of turning movements, including truck volumes.

This presents an opportunity to better enhance the intersections designs and roadway elements, to ensure a safer environment for all users as per the City of Toronto's Vision Zero Plan. Cycling and pedestrian related collisions are low as shown in Figure 4-17.

Figure 4-15: Collisions at Signalized Intersections (2005-2016)

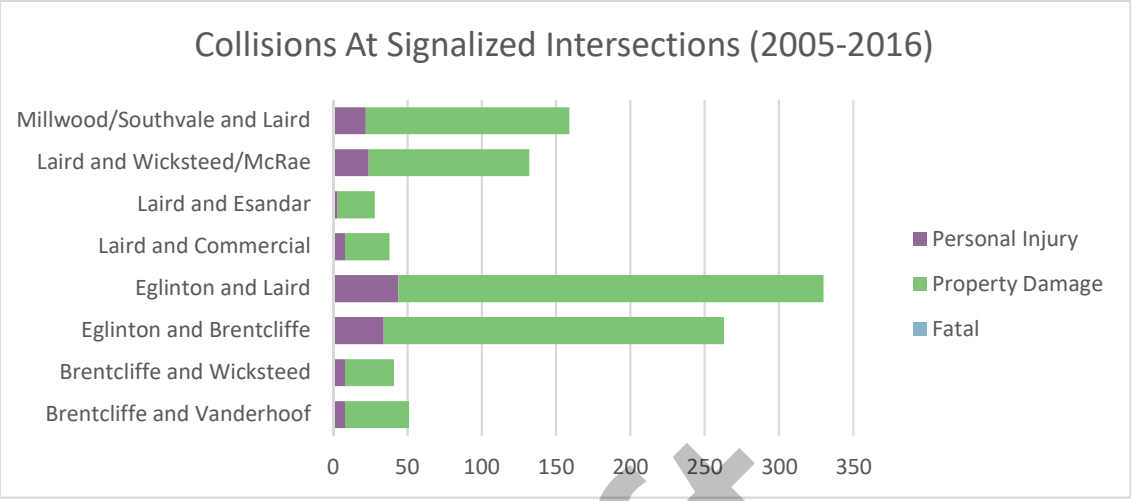


Figure 4-16: Collisions at Mid-Block Segments (2005-2016)

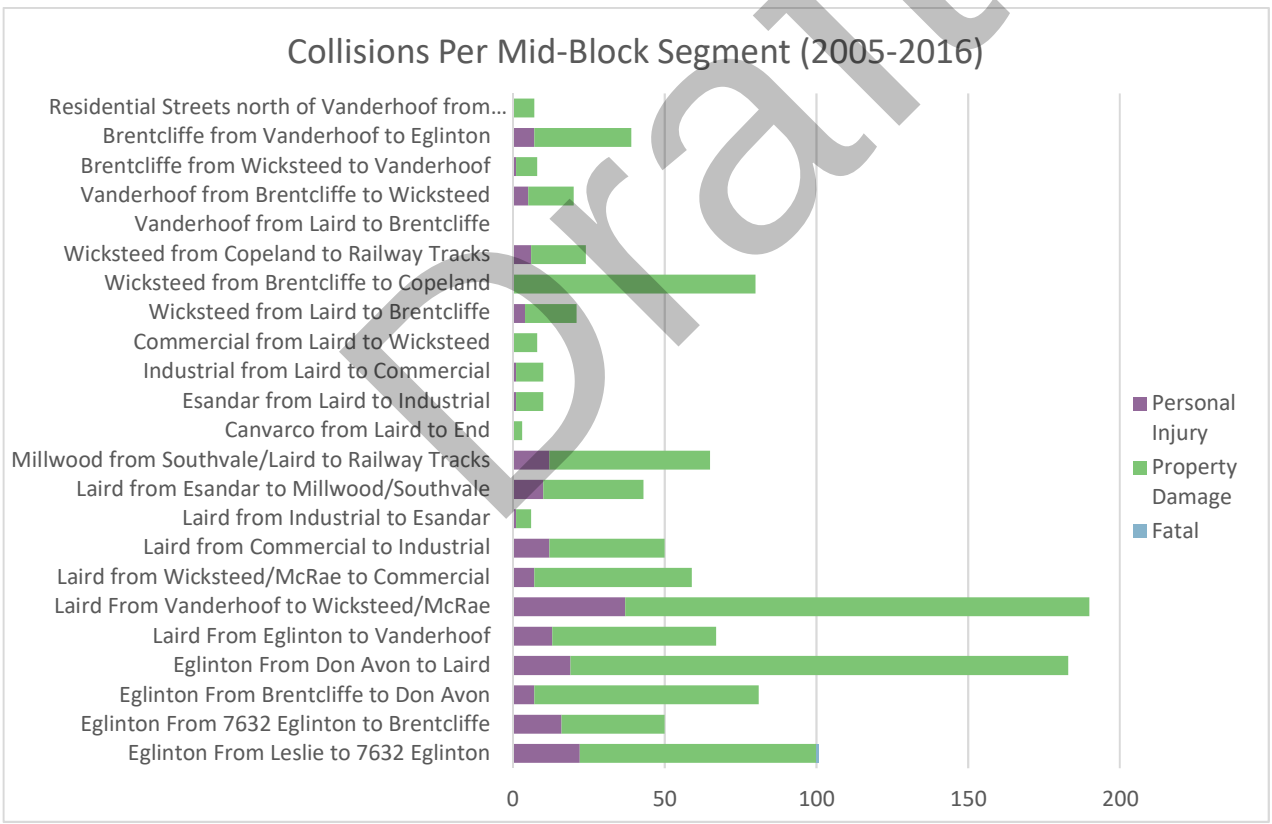
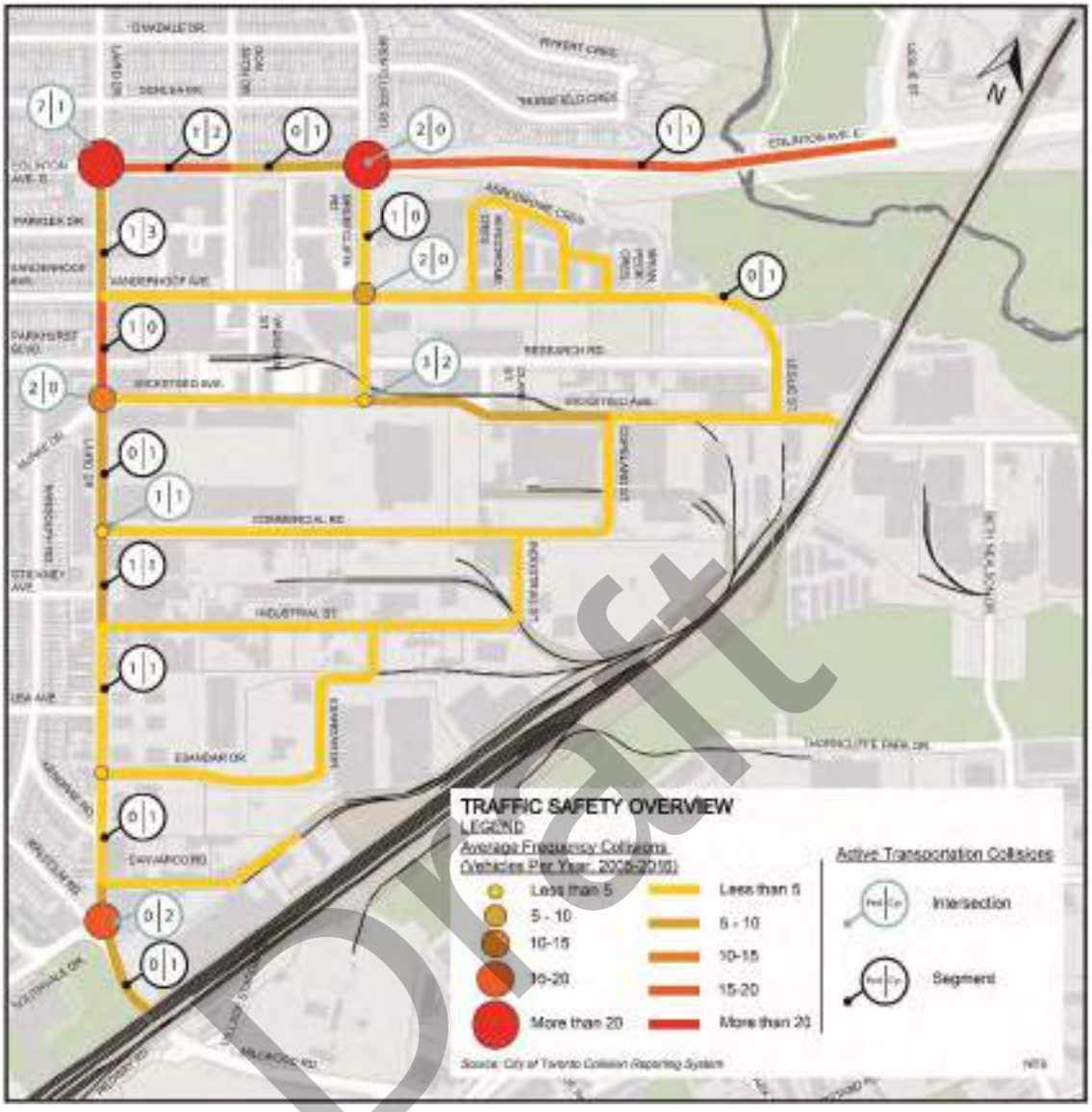


Figure 4-17: Collision Summary



4.3 Transit

Transit is served locally by the TTC. GO Transit service is provided along the Don Valley Parkway to the east of the study area. The study area is well served by the local TTC transit system, with 5 different bus routes passing through and stopping. The routes form a network of connections along Eglinton Avenue East, Leslie Street, Laird Drive, McRae Drive, Wicksteed Avenue, and Beth Nealson Drive. The route information is provided in Table 4-1, and the routes themselves, including bus stop locations, are shown in Figure 4-18.

As previously noted, transit usage has marginally declined since 1991 based on TTS data. The changing character of the employment lands, transitioning from primarily industrial to more mixed commercial / retail uses, and combined with the increased car ownership in the surrounding areas, have significantly contributed to the lack of transit usage growth over the years.

Figure 4-18: TTC Routes and Bus Stop Locations

Table 4-1: TTC Route Information

Route No.	Route Name	Buses Per Direction Peak Hour	Max Transit Capacity*	Peak Direction AM Peak Hour Ridership	Peak Direction PM Peak Hour Ridership
34	Eglinton East	14 (34A) 6 (34C)	700 300	450	500
51	Leslie	4	200	50	50
54	Lawrence East	10	500	350	300
56	Leaside	6	300	200	100
88	South Leaside	4	200	50	50

*based on TTC Vehicle Crowding Standards, 2015 (Rounded to 50 persons/vehicle)

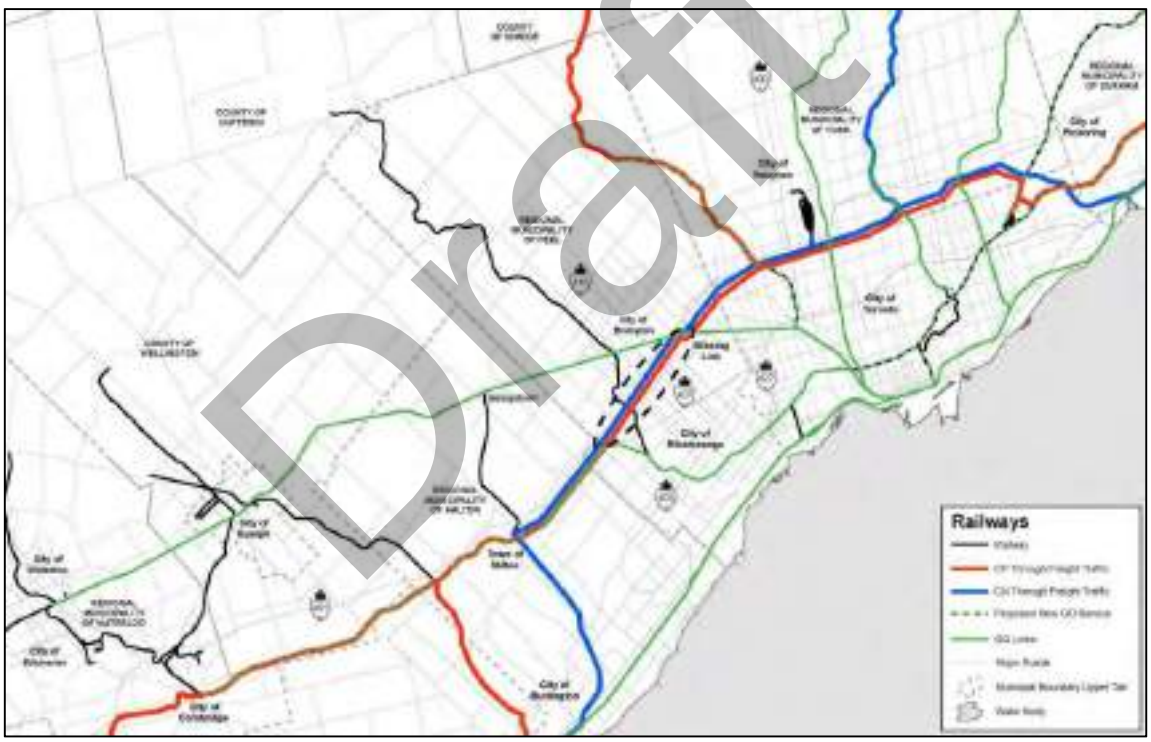
4.4 Rail

Historically, Leaside had a rail station located adjacent to the study area owned by Canadian Pacific (CP) Rail. Originally built to serve the developing Leaside community, passenger service ended in 1982. The current rail corridor that passes through the study area, is used for freight rail traffic from CP Rail that connects through the central areas of Toronto. Existing freight traffic amounts to approximately 30-50 trains per day.

There is a potential for adding the "Missing Link", as shown in Figure 4-19, which if constructed would enable the diversion of freight traffic around Toronto. This would free up the existing rail corridor to be used for commuter / passenger travel, including allowing for a potential station within the vicinity of the study area, and/or further east at Don Mills Road. This is considered a longer-term plan, with no committed timelines and funding.

Currently there are three CPR corridor crossing points in the study area, Eglinton Avenue, Millwood Road and Wicksteed Avenue. Both Eglinton Avenue and Millwood Road are grade separated, while Wicksteed Avenue is not. The need for grade separation along Wicksteed Avenue will need to be investigated for both future rail traffic and other road users.

Figure 4-19: Rail Corridor Missing Link



4.5 Cycling Environment

There are no existing dedicated cycling facilities within the study area, however cycling traffic is still prevalent, based on the limited data available and through community consultation. Cycling amenities for bike storage / parking are very limited in the study area based on site visits.

Cycling within the study area will be an integral part to the success of the future LRT Laird Station. This section documents the presently planned cycling network, existing cycling environment and user experience.

4.5.1 Planned Cycling Network

Based on the City of Toronto's 10-Year Cycling Plan, Eglinton Avenue, Leslie Street, Brentcliffe Road, Wicksteed Avenue, Southvale Drive, and Millwood Road will have dedicated cycling lanes in the future. These proposed routes are shown in Figure 4-20, along with the existing cycling volumes at signalized intersections within the area. There are opportunities to add additional cycling infrastructure within the study area in conjunction with emerging development, including the addition of community facilities and parks.

4.5.2 Cycling Comfort

Cycling comfort was evaluated using the two following criteria that provide high-level considerations of the cycling level of service along roadways and for crossings:

- Midblock Segments – City of Ottawa Multi-Modal Level-of-Service (LOS) Evaluation

  Originally developed by Charlotte NC, cycling LOS for mid-block segments have been adopted by use by the City of Ottawa as part of their Complete Streets Framework. This methodology will allow for a preliminary overview of the conditions faced by cyclists when travelling along the corridor.

- Signalized Intersections - National Highway Association Crosswalk Safety Indices

  Developed in 2007, the intersection safety indices allow for an evaluation of the safety for cycling movements crossing a signalized intersection. The values range from 1 to 6, with 1 being the safest, and 6 being the least safe, and highest priority for more detailed evaluation/consideration.

The resultant LOS and safety indices are shown in Figure 4-23. Eglinton Avenue presents an unfriendly cycling environment, which will be addressed through it's redesign, as outlined in the Eglinton Connects planning study. Laird Drive, although adequate, has significant room for improvement when considering the future connections to / from the ECLRT Laird Station, and existing and planned community facilities / parks.

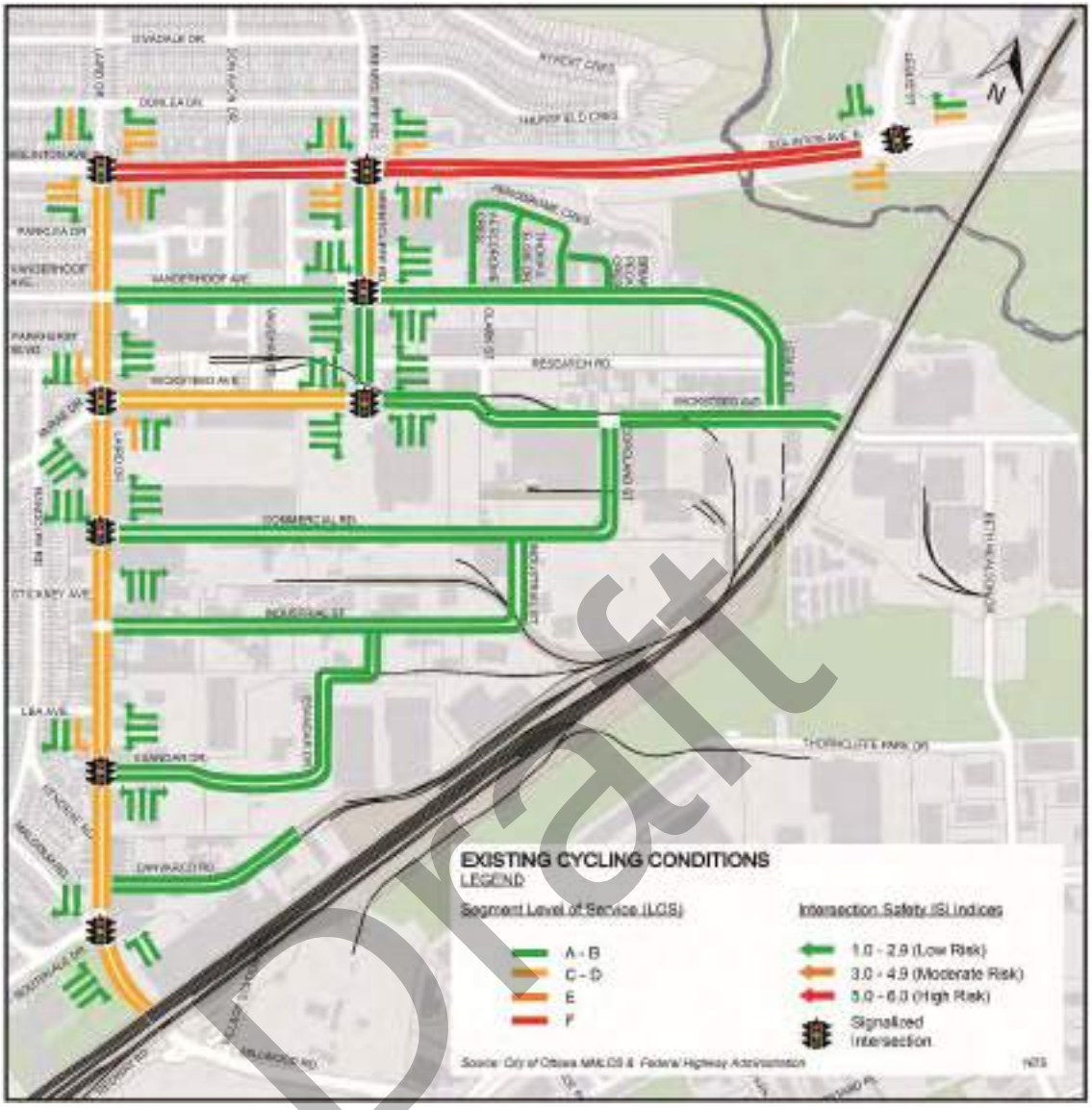
4.5.3 Other Cycling Considerations

Other considerations that emerged from site visits and community consultation include:

- No existing cycling facilities presently near the study area except in the Don Valley Ravine, which has high usage;
- Not a strongly integrated cycling network that is supportive of the ECLRT investment and that serves the local community;
- Latent cycling travel demand along Laird and Eglinton corridors, with a local community desire to connect to the Don Valley, despite the existing lack of a connected network;
- Existing industries / retail employment within the Leaside employment lands are not considered as typical cycling markets;
- Good cycling environment, as per the above analysis, within the Leaside employment lands, does not consider the number of commercial driveways and heavy truck movements; and
- Increased vehicle-cycling collisions have occurred at intersections experiencing significant vehicle turning volumes and queueing (i.e. Wicksteed / Brenticliffe intersection, Southvale / Millwood / Laird intersection).

Figure 4-20: Existing and Proposed Cycling Facilities

Figure 4-21: Cycling LOS and Intersection Crossing Safety Indices



4.6 Pedestrian Environment

There are existing sidewalks within the study area, and pedestrian movement is highly related to accessing retail and bus stop facilities, based on the limited data available and through community consultation. Pedestrian amenities, such as benches, street furniture, streetscaping, and shade are very limited in the study area based on site visits.

Pedestrian access and mobility within the study area will be an integral part to the success of the future LRT Laird Station. This section documents the existing pedestrian facilities and user experience.

4.6.1 Pedestrian Network

Sidewalks are present on both sides of the major roadways, Eglinton Avenue and Laird Drive, and along streets that connect to the big-box retail stores. However, other local roads have either a sidewalk on only one side, or no sidewalks at all. Combined with the previously

mentioned street network issues, such as the lack connectivity and granularity, a poor pedestrian network results, detracting from both transit and active transportation as a mobility option.

The existing pedestrian facilities along the road network is illustrated in Figure 4-22.

4.6.2 Pedestrian Comfort

Pedestrian comfort was evaluated using the same two criteria as used for the cycling assessment - the City of Ottawa's Multi-Modal LOS for midblock segments, and the NHA Crosswalk Safety Indices for signalized intersections.

The resultant LOS and safety indices are shown in Figure 4-23. The results generally indicate the provision of adequate service, but key findings include that there is a high degree of segmentation for all roads which leads to lack of connectivity within the study area.

4.6.3 Other Pedestrian Considerations

Other considerations that emerged from site visits and community consultation include:

- Narrow effective sidewalk widths with limited boulevards along Laird Drive (i.e. numerous driveways, utility poles), including the existence of minimal City of Toronto sidewalk width standards;
- Most of the employment lands has sidewalks on one side only and along large street blocks – in general the area is poorly served;
- Very limited amenities provided via street furniture (i.e. benches) and streetscaping (i.e. shade);
- Limited east-west crossing opportunities of Laird Drive due to offset roadway intersections, and raised roadway centre medians;
- Pedestrian network is discontinuous and indirect;
- Existing residential development near Aerodrome Crescent is poorly connected to existing and planned transit;
- Minimal direct walking connections to the proposed ECLRT Laird Station entrances and planned community facilities / parks with the existing local community; and
- Lack of east-west connectivity to existing retail uses and to the Don Valley due to difficulty crossing Laird Drive and the CPR corridor.

Figure 4-22: Existing Pedestrian Facilities, Volumes, and Future Station Catchments

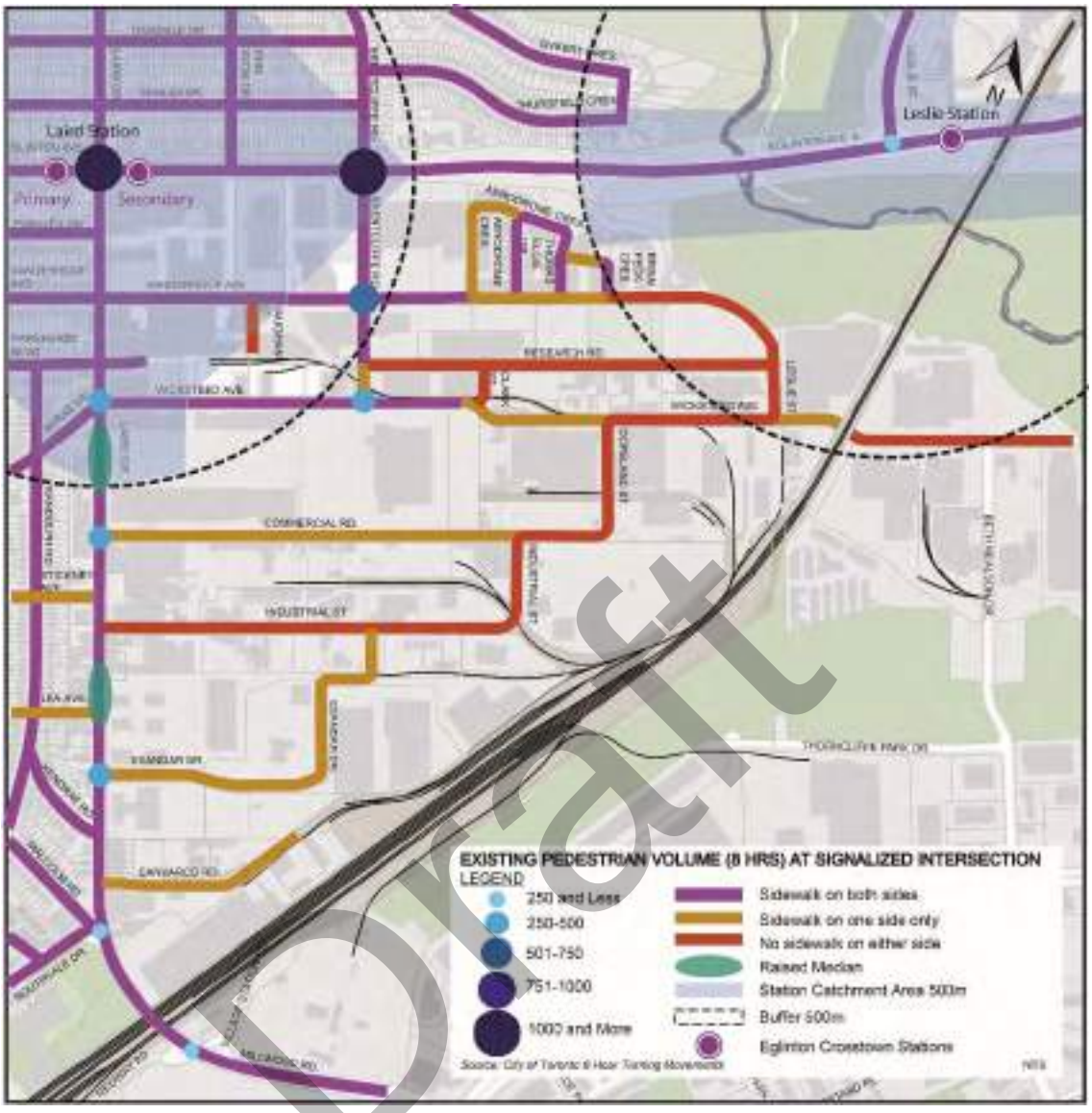


Figure 4-23: Pedestrian LOS and Crosswalk Safety Indices

4.7 Vehicular Travel and Traffic Operations

Eglinton Avenue East is a major busy arterial within the City of Toronto. Additionally, due to many of the barrier effects in the area, there are several capacity constrained intersections. This section discusses the existing traffic operations at signalized intersections, as well as the noted neighbourhood infiltration concerns from community feedback/comments.

4.7.1 Traffic Operations

All intersections along Eglinton Avenue operate poorly, with several critical movements in both the AM and PM peak hours. All intersection levels of service (LOS) and critical movements as per City of Toronto guidelines are shown in Figure 4-24. The full evaluation summary is provided in Table 4-3 and Table 4-4 for the AM and PM peak hours respectively.

Furthermore, the intersections of Laird Drive at McRae Drive and at Southvale Drive both operate poorly in the PM peak hour. Operations at Laird Drive and Commercial Road and at

Esandar Drive both operate well. Limitations in the Laird corridor capacity is constrained by both the higher volume side-street connections at McRae Drive and Southvale Drive, but also by the number of offsetting crossing roadway intersections.

Also, to be noted, via both site observations and community consultation, significant queuing was being experienced along Brentcliffe Road, north and south of Eglinton Avenue; along McRae Drive / Wicksteed Avenue, from west of Laird Drive to Brentcliffe Road; and along Southvale Drive, west of Laird Drive.

Table 4-2: Level-of-Service Definitions

LOS	Signalized Intersection	Unsignalized Intersection
A	≤10 sec	≤10 sec
B	10–20 sec	10–15 sec
C	20–35 sec	15–25 sec
D	35–55 sec	25–35 sec
E	55–80 sec	35–50 sec
F	>80 sec	>50 sec

Figure 4-24: Signalized Intersection Operations and Critical Movements

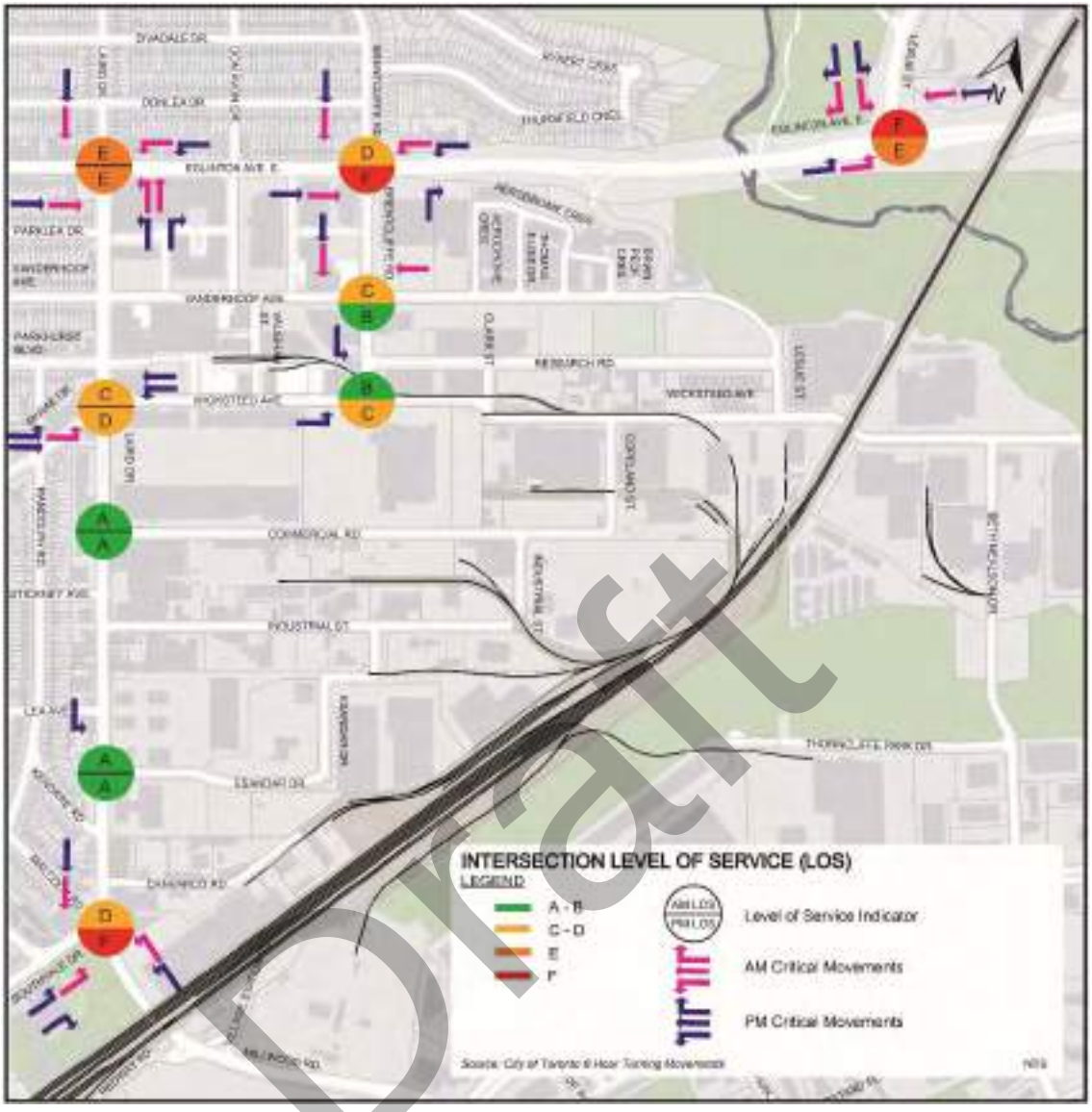


Table 4-3: AM Peak Hour Intersection Capacity and Critical Movements

Intersection	Intersection LOS	Intersection V/C Ratio	Critical Movement			
			Movement	LOS	V/C Ratio	95th Percentile Queue (m)
Brentcliffe Rd & Eglinton Ave	D	0.94	EBT	D	0.88	148
			WBL	F	1.08	189
			SBT	D	0.59	87
Laird Dr & Eglinton Ave	E	1.28	EBT	D	0.94	145
			WBL	F	1.25	235
			NBL	F	1.14	109
			NBT	D	0.41	70
			SBT	E	0.72	99
Eglinton Ave & Leslie St	F	1.42	EBL	E	1.00	181
			WBT	D	0.78	131
			SBL	F	1.04	145
			SBR	F	3.16	529
Laird Dr & McRae Dr	C	0.72	EBL	B	0.37	23
Laird Dr & Southvale Dr	D	1.04	EBL	E	0.96	104
			NBL	E	1.02	182
			SBT	E	0.92	84
Southvale Dr & Millwood Rd	B	0.61	None			
Brentcliffe Rd & Vanderhoof Ave	C	0.86	WBT	D	0.89	85
			SBT	B	0.85	164
Wicksteed Ave & Brentcliffe Rd	B	0.78	SBL	B	0.68	80
Laird Dr & Commercial Rd	A	0.49	None			
Laird Dr & Esandar Dr	A	0.4	None			

Table 4-4: PM Peak Hour Intersection Capacity and Critical Movements

Intersection	Intersection LOS	Intersection V/C Ratio	Critical Movement			
			Movement	LOS	V/C Ratio	95th Percentile Queue (m)
Brentcliffe Rd & Eglinton Ave	F	2.21	EBT	C	0.90	198
			WBL	F	2.83	250
			NBR	D	0.88	210
			SBT	D	0.74	115
Laird Dr & Eglinton Ave	E	1.57	EBT	D	0.87	130
			WBL	F	1.52	226
			NBL	F	1.41	175
			NBR	D	0.81	151
			SBT	E	0.81	122
Eglinton Ave & Leslie St	E	1.01	EBL	E	1.02	209
			WBT	D	0.81	135
			SBL	E	0.85	99
			SBR	F	1.35	210
Laird Dr & McRae Dr	D	0.99	EBL	E	0.89	91
			EBT	E	0.81	83
			WBL	D	0.48	50
			WBT	F	1.09	146
			SBL	F	0.99	100
Laird Dr & Southvale Dr	F	1.2	EBL	F	1.13	157
			EBR	F	1.03	148
			NBL	F	1.18	186
			SBT	F	1.06	167
Southvale Dr & Millwood Rd	B	0.82	SBT	D	0.92	87
Brentcliffe Rd & Vanderhoof Ave	B	0.79	None			
Wicksteed Ave & Brentcliffe Rd	C	0.9	EBL	D	0.90	85
			SBL	C	0.68	64
Laird Dr & Commercial Rd	A	0.63	None			
Laird Dr & Esandar Dr	A	0.67	SBL	B	0.69	65

4.7.2 Neighbourhood Infiltration

Concerns regarding potential neighbourhood infiltration was raised during both the prior Eglinton Connects Laird Focus Area assessment, as well as during this study's consultation activities. To identify the true nature of traffic patterns within the study area, inclusive of the nearby residential neighbourhoods of Leaside North and Leaside, location-based traffic data was used.

Figure 4-25 and Figure 4-26 show the AM and PM peak period travel patterns for personal traffic, while Figure 4-28 and Figure 4-29 show the travel patterns for commercial traffic. The pie charts in each figure are to scale relative to the total vehicular travel volumes through that location, with the percentage of traffic to / from each zone also illustrated. Refer to Section 5.1.5 for additional background detail.

Key findings from this data include:

- Generally, all designated local roadways exhibit over 90% vehicular traffic to / from the local community and the immediate surrounding areas (i.e. Zone 3, which is bounded by Lawrence/Yonge/Bloor-Danforth/DVP – an area within 3 km of the study area);
- Arterial roads and collectors such as Eglinton Avenue, Bayview Avenue, Laird Drive, McRae Drive, Southvale Drive exhibit similar characteristics, with 50% of traffic from locally within the Leaside area (i.e. within the existing community), and a further 25% or more from the surrounding area (< 3 km); and
- Average trip length from within the community (Zones 1 and 2) is 1.6 km.

This indicates that traffic within the community is primarily from the local community and the adjacent surrounding areas, which is how these road types should function. Longer distance trips (greater than 3 km) are limited to arterial and collector roadways, with only the major arterials experiencing vehicular trips to / from the broader Toronto area.

The increased traffic in the local community and being experienced by residents is not a result of longer distance drive-thru trips. As outlined in Section 5.1 of this report, historical context indicates an increase in vehicle ownership, and auto/passenger mode shares within the study area strongly correlate with the increased traffic experienced by residents.

Given the high percentage of trips from the local community and the adjacent surrounding areas (< 3 km), significant opportunity is presented for enhanced and accessible mobility choice, such as active transportation and improved connections to existing / planned transit, to reduce vehicular travel in the study area. Furthermore, increased employment and mixed land uses within the study area will assist in both decreasing any longer distance trips, and / or encouraging active mode shares.

Some minor traffic calming solutions may be applicable on select local streets to encourage greater use collectors and arterials, outside the study area. However, given the short distances of the majority of trips, there would likely be diminishing returns on impacts to travel patterns. These options are already being investigated as part of the Leaside and Leaside North Traffic Calming Plan being completed by Paradigm Transportation Solutions Limited.

Within this study area, complete street initiatives will be promoted, such as narrowing the roadway approaches, reducing the curb radii, and introducing a modest vertical grade change. These design techniques not only provide travel cues that discourage thru travel, they also promote active transportation modes.

Figure 4-25: Average Weekday AM Peak Period Personal Vehicle Travel Patterns

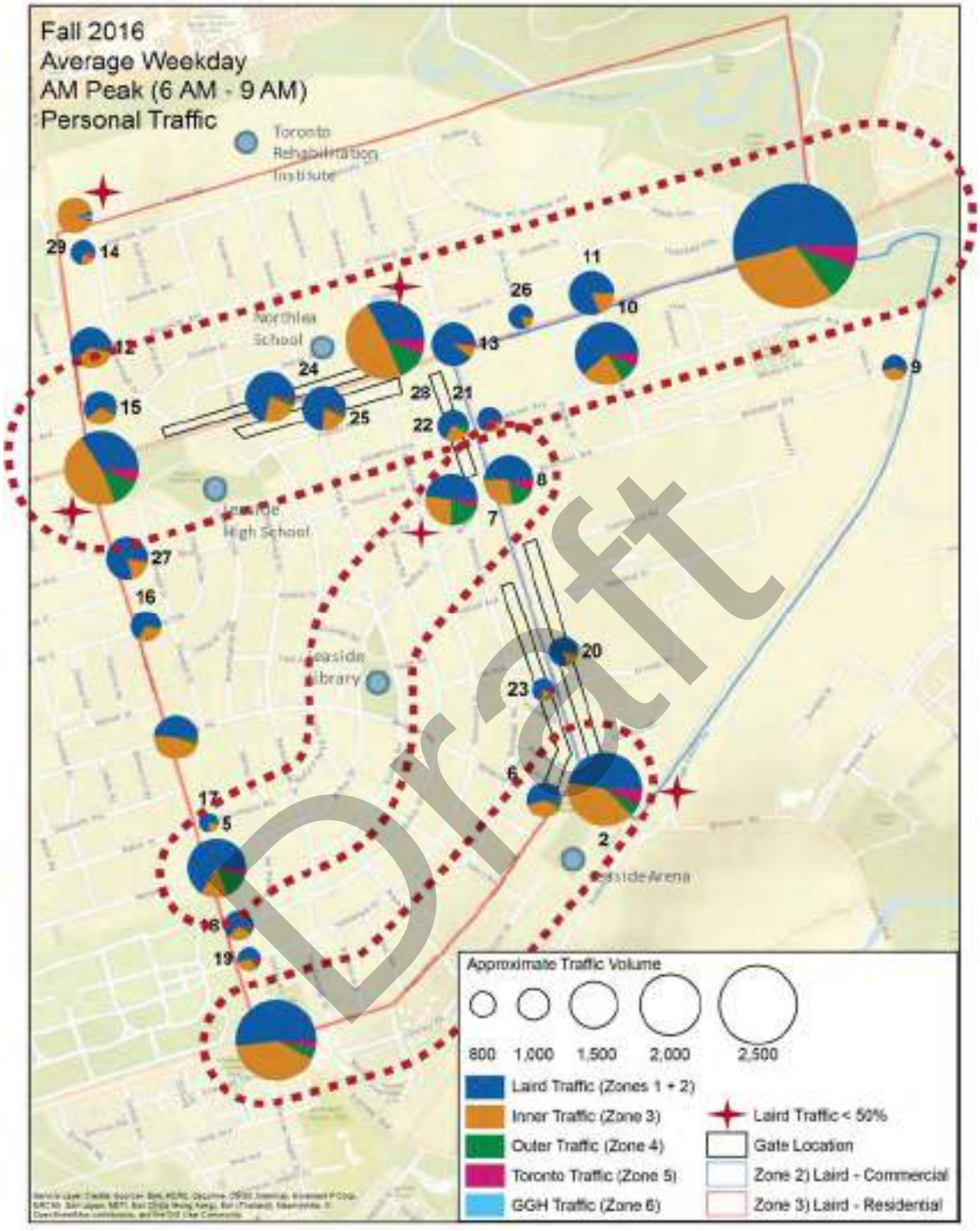
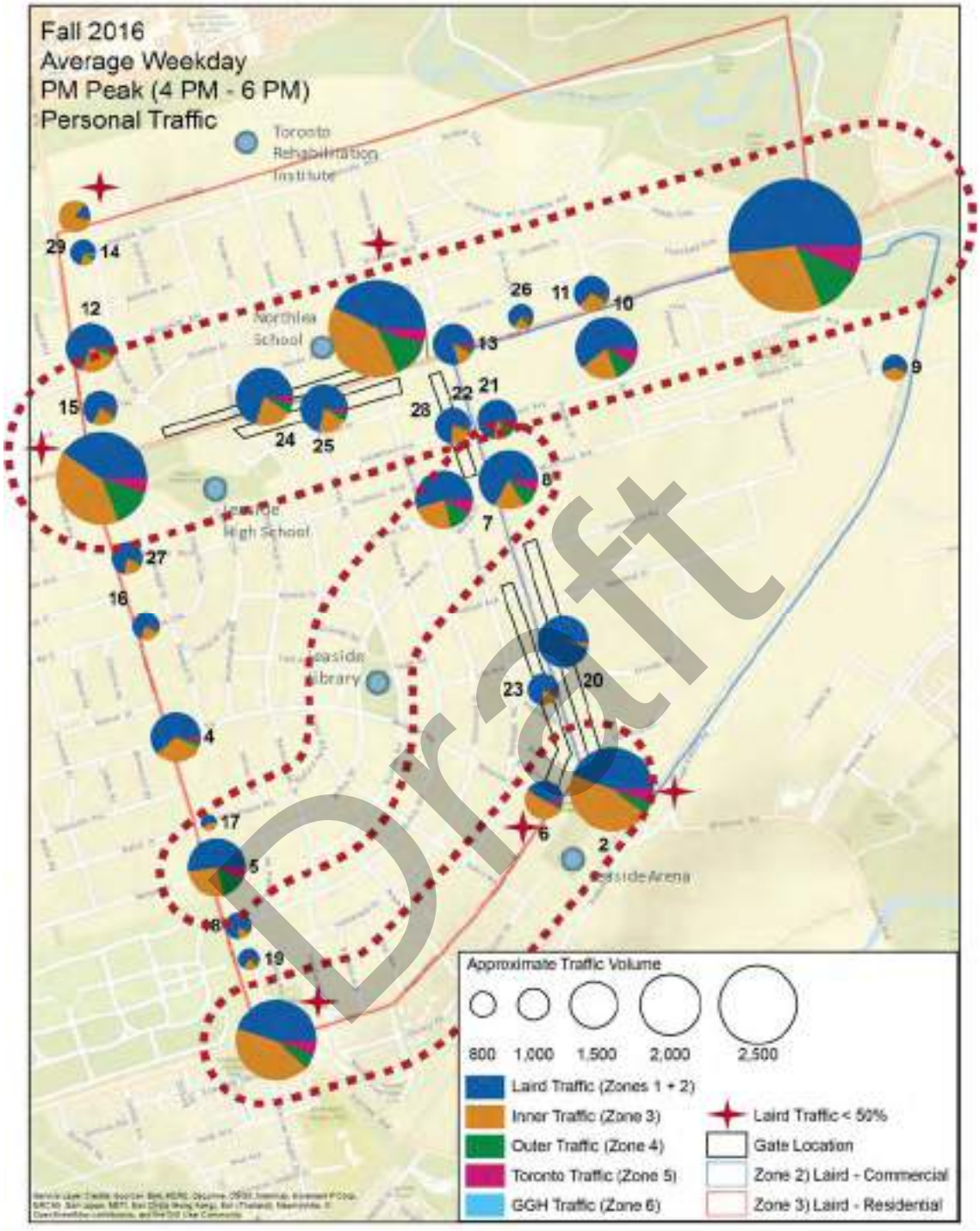


Figure 4-26: Average Weekday PM Peak Period Personal Vehicle Travel Patterns



4.8 Goods Movement

Historically, the Leaside area had many industrial facilities that directly and primarily utilized the rail line that bounds the study area. Today, commercial transportation and goods movement is primarily done by trucks. Major trucking routes are Eglinton Avenue, Laird Drive, Millwood Road, Brentcliffe Road, and Wicksteed Avenue as evident by the percentage of trucks exhibited by the turning movement counts.

The observed major truck generators within the study area, based on site visits and observations, as well as the truck volumes from the City-provided turning movement counts are shown in Figure 4-27.

To supplement this analysis, recent and more comprehensive location-based travel data was used. Figure 4-28 and Figure 4-29 show the travel patterns for commercial traffic between the identified destination zones. The pie charts in each figure are to scale relative to the total commercial vehicle travel volumes through that location, with the percentage of traffic to / from each zone also illustrated. Refer to Section 5.1.5 for additional background detail.

This commercial vehicle travel data indicates the following:

- AM and PM findings are similar with respect to travel patterns; however AM volumes are larger than the PM volumes;
- Overwhelmingly the majority of commercial traffic into the study area is to / from within the City of Toronto; and
- Access points into the study area include Brentcliffe Road from Eglinton Avenue, Wicksteed Avenue / Commercial Road / Industrial Street / Esandar Drive from Laird Drive, and Wicksteed Avenue from east of the rail tracks.

Figure 4-27: Businesses with High Heavy Vehicle Traffic

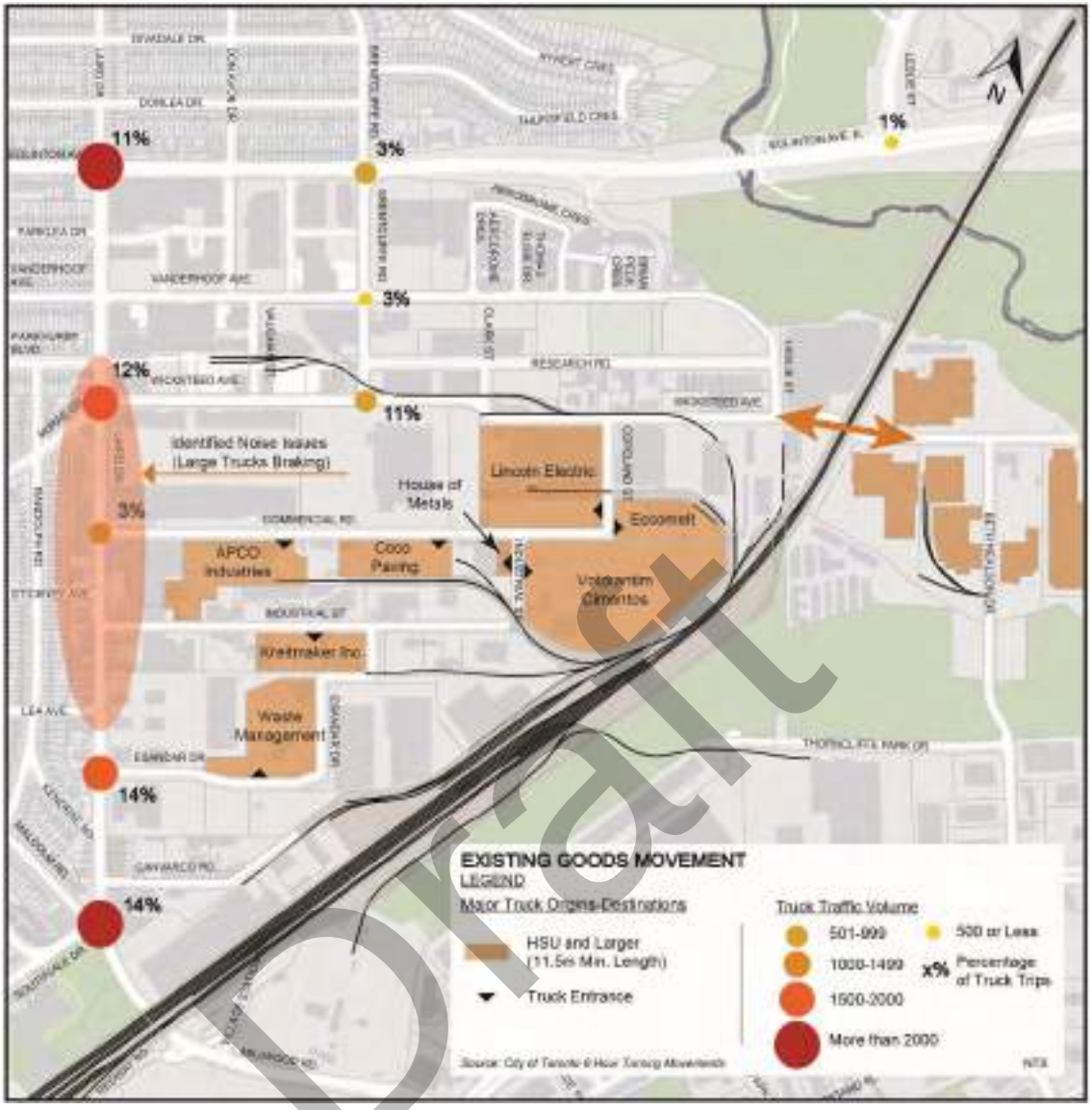


Figure 4-28: Average Weekday AM Peak Period Commercial Vehicle Travel Patterns

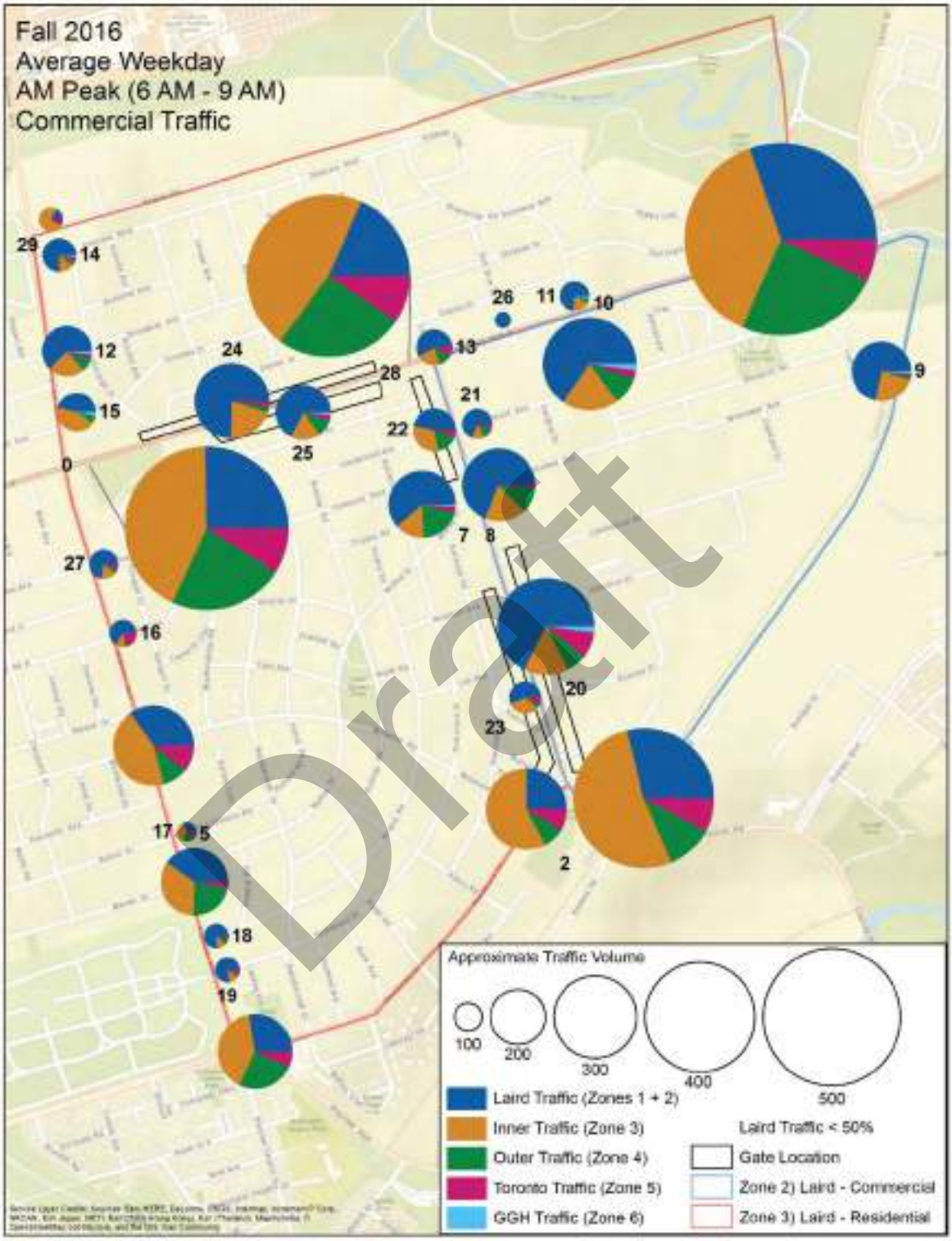
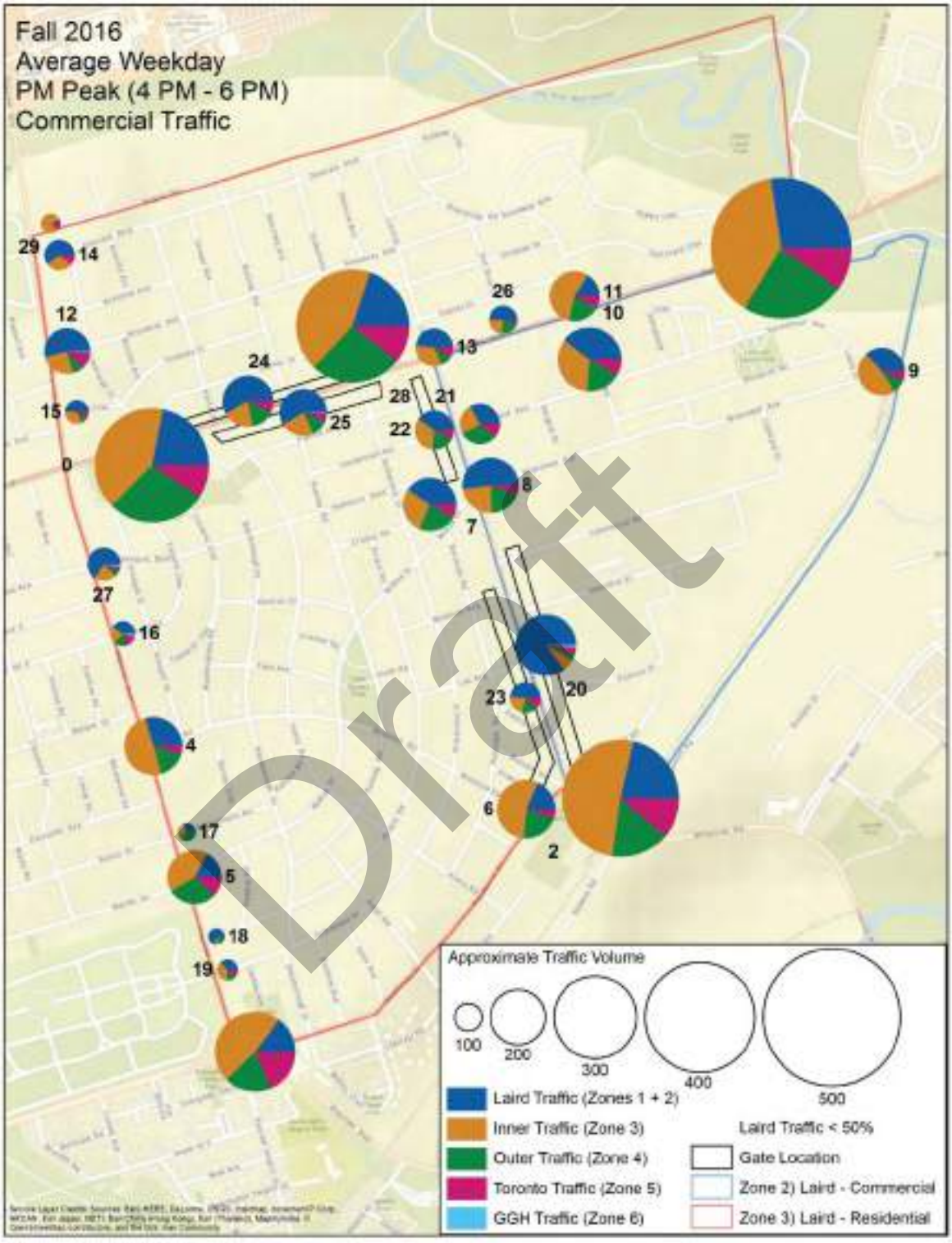


Figure 4-29: Average Weekday PM Peak Period Commercial Vehicle Travel Patterns



4.9 Parking

Given the area's current makeup of low density industrial and big box store land uses, there is a significant amount of privately-owned surface parking. The surface parking within the study area is shown in Figure 4-30.

On-street parking is generally restricted in most of the study area given the abundance of off-street parking capacity available. However, near the small residential block east of Brentcliffe Road along Vanderhoof Avenue, residential parking is allowed. A map showing the available residential and off-street retail parking is provided in Figure 4-30.

No off-street publicly-owned parking facilities or shared parking arrangements were identified in the study area.

During one consultation event, some on-street parking spillover from the retail uses on the east of Laird Drive into the local community was noted (i.e. along Parklea Drive).

4.10 TDM Policies and Smart Commute

No existing TDM strategies have been identified in the study area. Review of the supporting transportation studies for the proposed development applications, have indicated that TDM measures will be implemented.

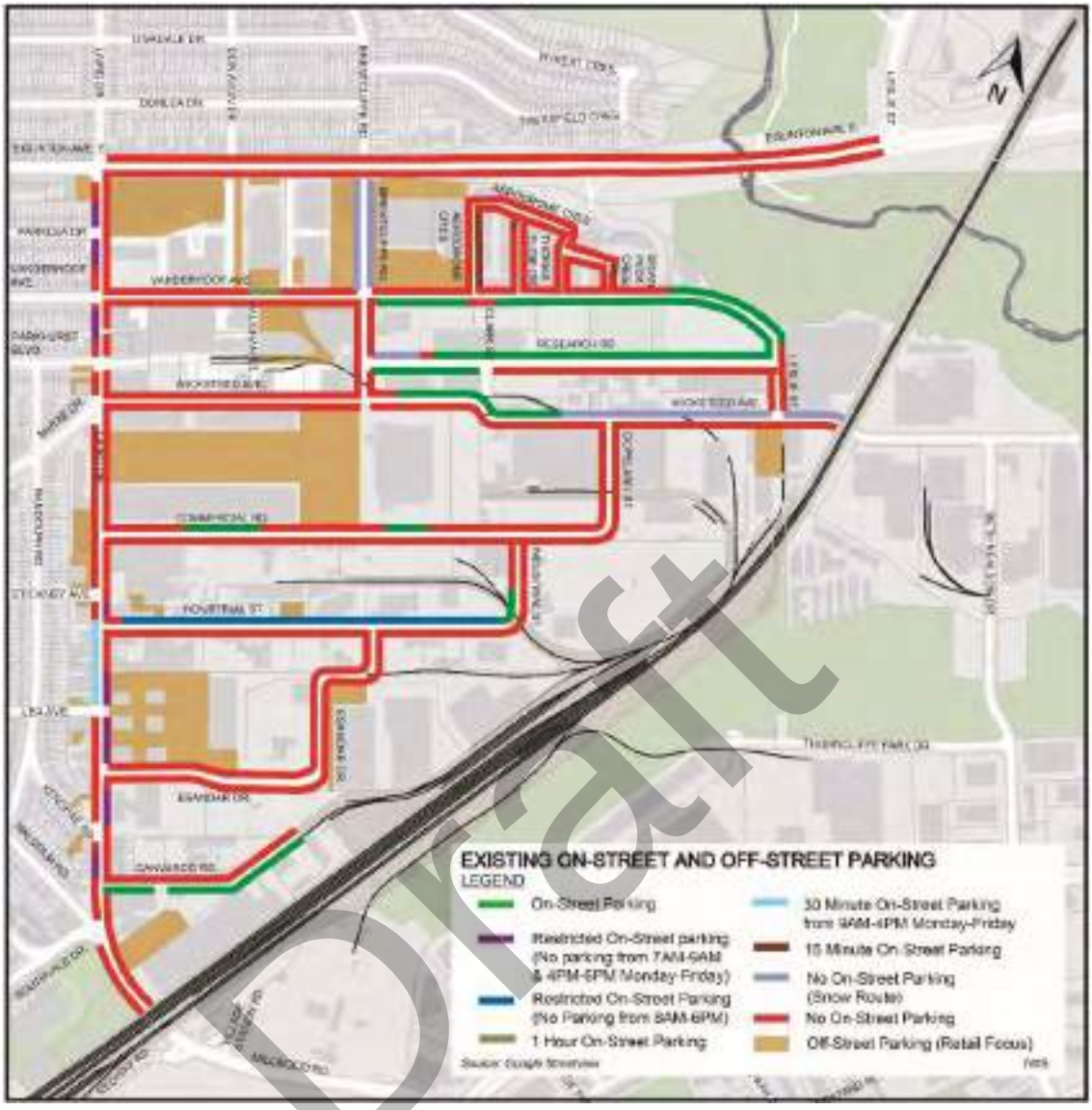
Several transportation demand management (TDM) strategies are implemented at regional and local scales that affect the study area. A potential program, in conjunction with the emerging redevelopment, is Metrolinx's Smart Commute program to help facilitate travel options other than auto driver. The program works with the community and employers to promote these alternative travel modes. This will provide opportunity for future residents / employers, community facilities, and others to implement travel demand management strategies.

4.11 Leaside High School Travel Planning (STP)

The Leaside High School is approximated 750m west of Laird Drive along Eglinton Avenue East. To improve active and transit mode shares to and from the school, they have implemented a school travel plan (STP). Within this plan, five main action areas are identified, education, encouragement, enforcement, engineering, and evaluation. One of the key recommendations from the plan was to work with this study, to plan safer bike routes that connect to the school.

In addition to potential coordination with the emerging development in the study area, it is also a template for adoption by other schools in the study area and the immediate surrounding neighbourhoods. Safe and secure access to all schools could discourage potential vehicular trips to each school for drop-offs / pick-ups, as evidenced both by observed queuing and by the number of short trips undertaken indicated by the location-based data.

Figure 4-30: Surface Parking within Study Area



5 Opportunities

The **Laird in Focus** study area is defined as the lands bounded by the CP rail corridor that runs along its eastern and southern edges, Laird Drive to the west, and Eglinton Avenue East to the north. These lands were assessed as the study area for the transportation component of the study. Phase 1 of the study determined the background conditions and potential opportunities in the area for all travel modes as summarized below. Further details can be found in the Existing Conditions report in Appendix A.

- Despite a poor environment, physical barriers, and low connectivity to existing and future destinations, there are sufficient ROW spaces, growth potential, and land availability to create an attractive and safe pedestrian network.

- Despite a poor environment, physical barriers, and lack of a cycling network, opportunities to build on the latent demand and support new growth is demonstrated.

- ECLRT implementation will transform mobility access and options in the study area, it requires a balanced and coordinated plan to provide first and last mile solution by maximizing active transportation and transit connectivity, while maintaining vehicle access and goods movement in a balanced manner.
- With arterial and collector roadways experiencing capacity issues during peak hours capacity and significant portion of vehicle trips being made are a short distance within the study area. Travel demand management strategies, to reduce single occupancy vehicles and allow other mobility options to have the opportunity to flourish in this environment in the future. Significant potential presented given the size and intensity of mixed use development scenarios for carpooling, car-share, bike-share, variable parking strategies, and trip planning.

- A coordinated goods movement strategy is required to support the on-going vitality of the Leaside employment lands, while co-existing with the increasing mobility demand for transit and active transportation for employees and residents.

- Physical barriers and lack of grid street network contribute significantly to arterial and collector roadways operating at / near capacity, but perhaps most importantly to the significant queuing at key boundary locations of the study area.

- As future mobility continues to shift away from vehicular uses, opportunity for comprehensive parking strategies to create a balance environment to accommodate future vehicle demand with appropriate policies to control parking supplies in partnership with Toronto Parking Authority.

6 Consultation

Multiple consultations were held during each Phase of the study. The following provides a summary of each consultation event held.

6.1 Phase 1:

6.1.1 Project Kick Off

(November 30, 2016)

The project was introduced by City of Toronto staff with the objective of gathering feedback that would inform the study process, its key themes, and its content.

6.1.2 Transportation Summit

(March 25, 2017)

The consultation session provided a forum for the project team to better understand the transportation issues enabling them to better focus efforts in the initial stages of the project. Fifteen people (in addition to City staff and the project team) participated representing residents, business owners, and active transportation advocates.

6.1.3 Local Advisory Committee Meeting No. 1

(April 25, 2017)

The study's purpose, process, schedule, background research, and key consultation activities to date were presented. The meeting included a round-table discussion focused on obtaining input for the team to develop the Vision Statement and Design Principles.

6.1.4 Public Consultation Meeting No. 1: Visioning & Emerging Principles

(May 1, 2017)

The team's understanding of the Study Area was presented at the late afternoon and evening sessions with the purpose of gaining feedback from the public. A total of 100 participants attended the 2 sessions and contributed to the basis of a vision statement and a set of guiding principles.

6.1.5 Public Consultation Meeting No. 2: Design Charrette

(June 3, 2017)

Registrants participated in a morning or afternoon workshop with the expressed purpose of developing design alternatives for Study Area A and B, evolving scenarios for the Transportation Study Area, and streetscape options for key streets. The two sessions garnered interest from a total of 38 individuals who contributed to the formation of the options.

6.1.6 Design Review Panel

(June 8, 2017)

The Laird in Focus Study was presented to the Design Review Panel which provided comments on the project's scope, its urban design approach, and potential public realm opportunities.

6.1.7 Leaside Business Park Association

(June 14, 2017)

City Planning staff attended a meeting of the Leaside Business Park Association to introduce the project and receive feedback and comments.

6.1.8 Landowners' and Business Owners' Drop-in No. 1

(June 29, 2017)

The results of the design charrette were presented at a breakfast drop-in attended by 30 local landowners and business proprietors. Feedback from the session helped to inform subsequent work on the study.

6.1.9 Toronto Planning Review Panel

(June 10, 2017)

The panelists provided comments to City staff on the project's deliverables to date. They spoke to issues regarding employment areas in general before providing feedback on the Study Area concerning the emerging vision and principles, urban design and built form, transportation, and servicing.

6.2 Phase 2:

6.2.1 Local Advisory Committee Meeting No. 2

(October 10, 2017)

The meeting offered an opportunity prior to the upcoming public session to review and provide feedback on the presentation material. The subjects discussed included the progress to date of the Heritage Study, the emerging vision and the results of the design charrette, draft alternative development options for both Study Areas A and B, an emerging streetscape concept, and the results of the transportation analysis.

Public Consultation Meeting No. 3: Development Alternatives

(October 17, 2017)

The purpose of this meeting was to present the planning and urban design scenarios for each of the study areas and to gather feedback that would inform subsequent steps of the study. At the public session transportation analyses was provided as well as a draft framework for evaluating the options. 150 people attended the presentation and provided comments on this and the accompanying display panels.

6.2.2 Landowners' and Business Owners' Drop-in No. 2

(October 19, 2017)

The breakfast drop-in provided an opportunity for land- and business owners to review the alternative development options as well as streetscape options and potential future road network scenarios for the Leaside Business Park. Seven people attended the event.

6.2.3 Local Advisory Committee Meeting No. 3

(November 21, 2017)

An evaluation of the alternative development options was presented leading to a draft preferred alternative for Eglinton Avenue (Study Area A) as well as a draft urban design approach for Laird Drive (Study Area B). The committee provided comments that informed refinements to the subsequent public presentation.

6.2.4 Public Consultation Meeting No. 4: Draft Emerging Preferred Alternative

(December 5, 2017)

The draft emerging preferred alternative for Study Area A as well as for test sites along Laird Drive (Study Area B) were presented as well as an update on the transportation component of the project. Comments were provided in breakout sessions that focused on issues concerning height and density, transportation, community facilities, the public realm, land use, heritage, and infrastructure.

6.3 Phase 3:

6.3.1 Local Advisory Committee Meeting No. 4

(April 10, 2017)

Committee members were presented with the draft public presentation which included “The 10 Big Moves”, refined demonstration plans for Study Areas A and B, properties to be considered for the City’s heritage registry, recommendations for the Transportation Study Area, the Streetscape Master Plan, transportation phasing, and the results of the servicing analysis. Projected population and employment yields were provided along with a breakdown of the potential number of residential unit types.

6.3.2 Public Consultation Meeting No. 5: Preferred Alternative Plan

(April 23, 2018)

The evening was comprised of a presentation by the project team followed by a “question and answer” session bookended by an open house. Participants viewed panels illustrating “The 10 Big Moves”, prospective sites for consideration on the City’s heritage registry, and the demonstration plans for each of the study areas. Augmenting this material were precedent images and development yield statistics. Rounding out the exhibit were panels describing transportation and servicing improvements required to support the projected development capacity. Approximately 85 people attended the presentation and open house.

7 Alternative Land Use Options

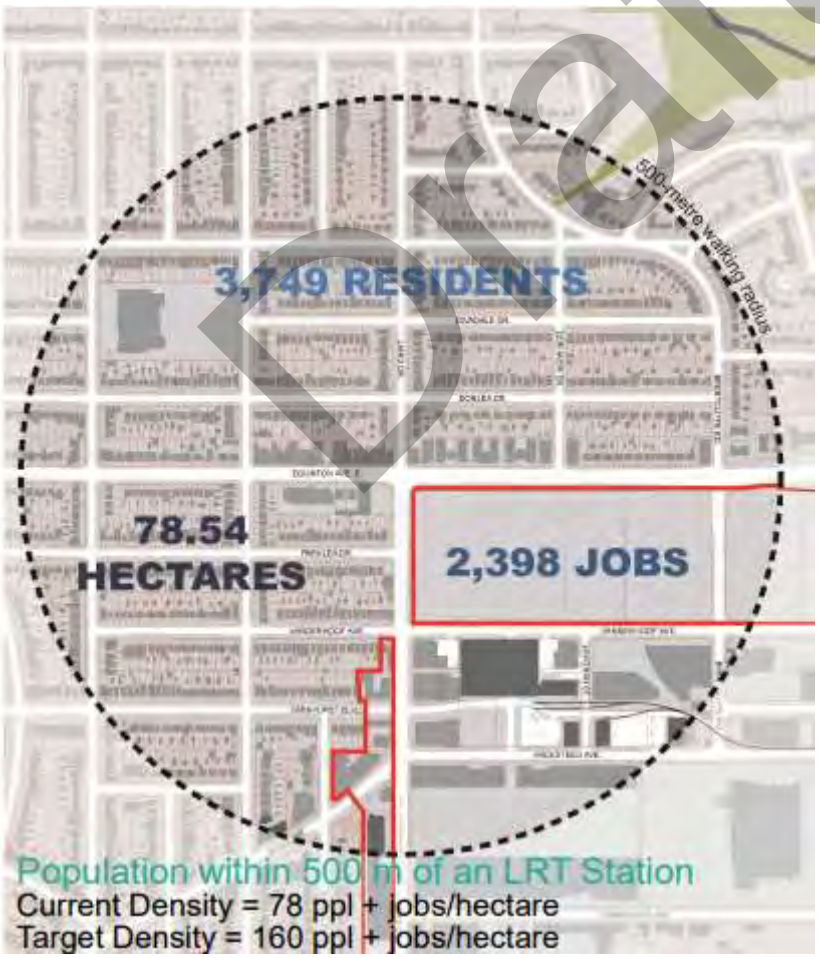
Within Study Area A and B, there are numerous opportunities to implement different land use options. Due to the constrained transportation environment, an iterative process to evaluate land-use options and the resulting travel demands was conducted.

7.1 Land Use Context

7.1.1 Places to Grow

The provincial planning document, Places to Grow - Growth Plan for the Greater Golden Horseshoe (2017) indicate a target of 160 residents/jobs per hectare for those served by light rail transit or bus rapid transit. Within the current development context, the area around the proposed ECLRT stop would have a density of 78 people + jobs per hectare as shown in Figure 7-1.

Figure 7-1: Resident and Job Density



7.1.2 939 Eglinton Avenue East

The City has also already approved a proposed residential development located at 839 Eglinton Avenue East. This development is expected to accommodate 1,841 residents, over a land area of approximately 2 hectares. As a result of this decision, this development sets a precedent for the density of adjacent buildings, in particular those that are closer to the Laird ECLRT stop. Thus, proposed developments closer to Laird Station would at least be permitted to develop to a similar density as 939 Eglinton Avenue East.

7.1.3 Study Area B

Study Area B primarily consists of mid-rise small development blocks. As a result, there are minimal alternative options from a transportation perspective due to the constrained block sizes. As a result, an estimate of feasible development sizes was used to evaluate Study Area B transportation impacts within the context of the overall study area.

7.2 Concept Development Process

An iterative and integrated process between land-use/built form, and transportation was conducted. Given the opportunities and constraints identified within the existing conditions, for the area, it is clear there are numerous trade-offs from both land-use and transportation perspectives for potential built-form options. Due to the numerous constraints, iterations help shape a solution that incrementally determines impacts of land-use changes on transportation, and vice versa. This allows fine-tuning, and careful consideration of each incremental change, allowing a solution that is balanced between an ideal built form, while ensuring mobility in the area is suitable for all modes and available infrastructure. The process is shown in Figure 7-2.

Figure 7-2: Iterative Process

7.3 Model Process and Multi-Modal Approach

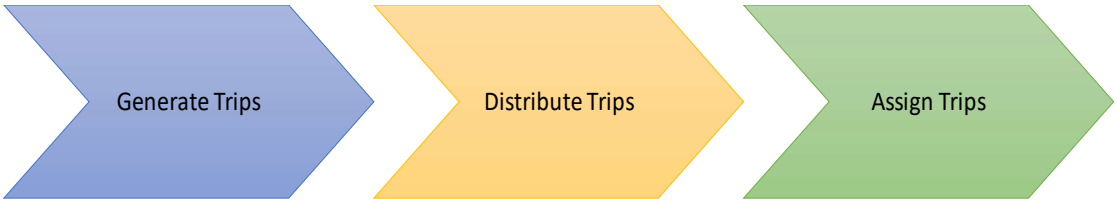
To adequately assess changing mobility conditions for the study area, a simple multi-modal demand model for the area was developed. This purpose of this model is to be able to reflect changes in development and travel behaviors, and its impact on the travel patterns of vehicles, transit users, pedestrians and cyclists. Creating a simplified demand model allows for quick testing of development scenarios, but also robust enough to offer flexibility in accommodating real-world data and assumptions.

The transportation demand model follows 4 basic steps, trip generation, distribution, modal split and trip assignment. In a typical 4-step model, the modal split typical would factor in an aggregated travel cost based on travel speeds, monetary costs and other factors, and then user behavior may be altered based on actual capacities.

Given the localized sub-area context, mode splits are derived based on the development characteristics, including population demographics, facilities available, and directness of travel paths. As a result, modal split behavior could be reasonably approximated based on existing data and similar areas of the City. This model was not calibrated, as the intent was not to create a demand model, but create a platform for comparative purposes between land use scenarios.

Thus the proposed sub-area models follows 3 simple steps as shown in Figure 7-3.

Figure 7-3: Model Process

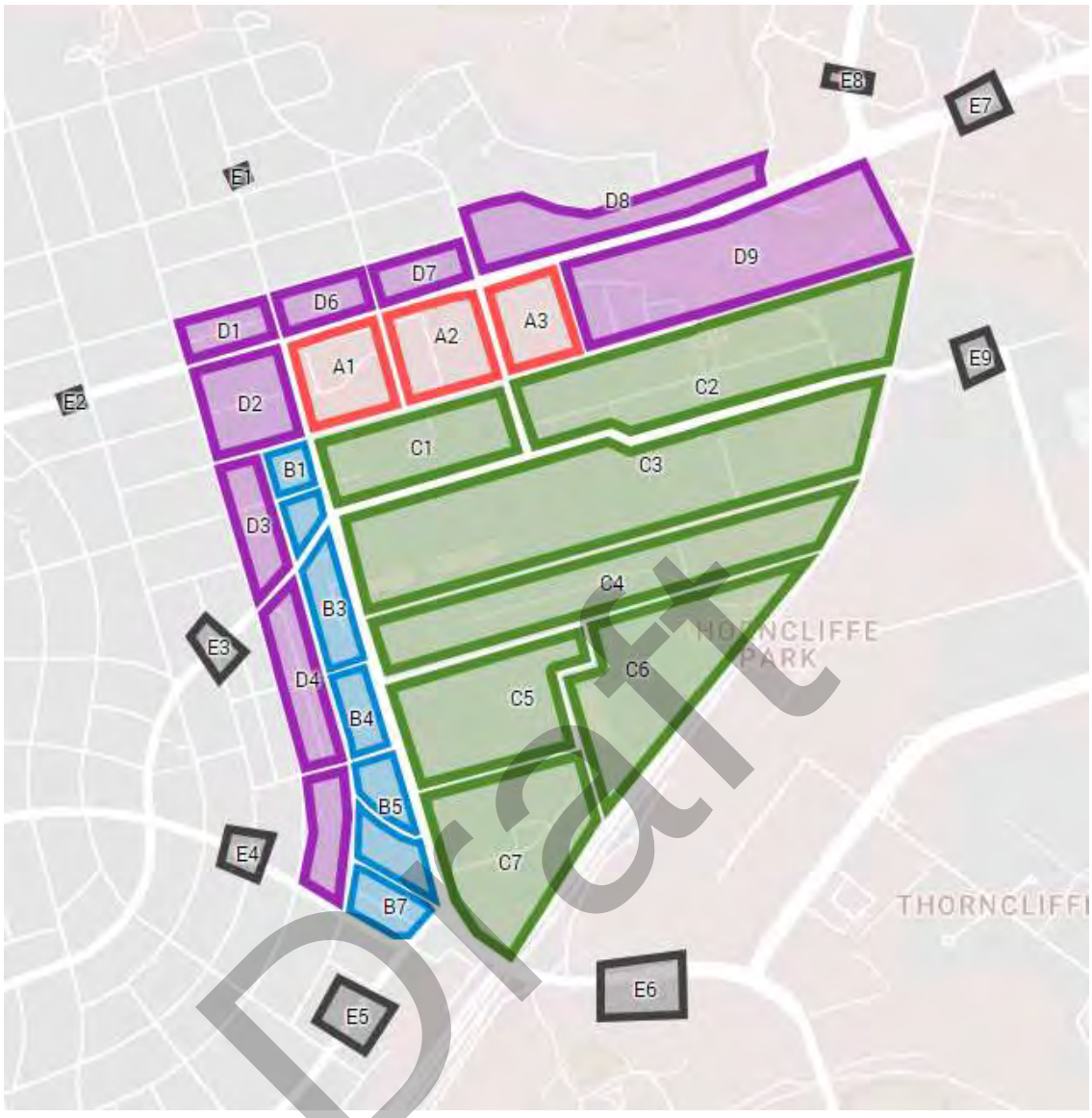


7.4 Traffic Zones

Like any traffic demand modelling exercise, the study area needs to be disaggregated into development blocks. For Laird in Focus, the proposed study area was broken in development blocks as shown in Figure 7-4. The zones within Study Area's A, B, and C were disaggregated to ensure that travel demands would be adequately distributed into proposed development blocks and internal roads.

Additional zones of existing neighbourhoods were added to allow for interaction between new developments and existing areas. The extents of these existing development areas characterized as D, were limited as their only purpose was to evaluate travel between a new development block and an immediately adjacent area. Further travel was captured by external zones shown as E, which represents travel demands into and out of the study area along different routes.

Figure 7-4: Demand Analysis Zones



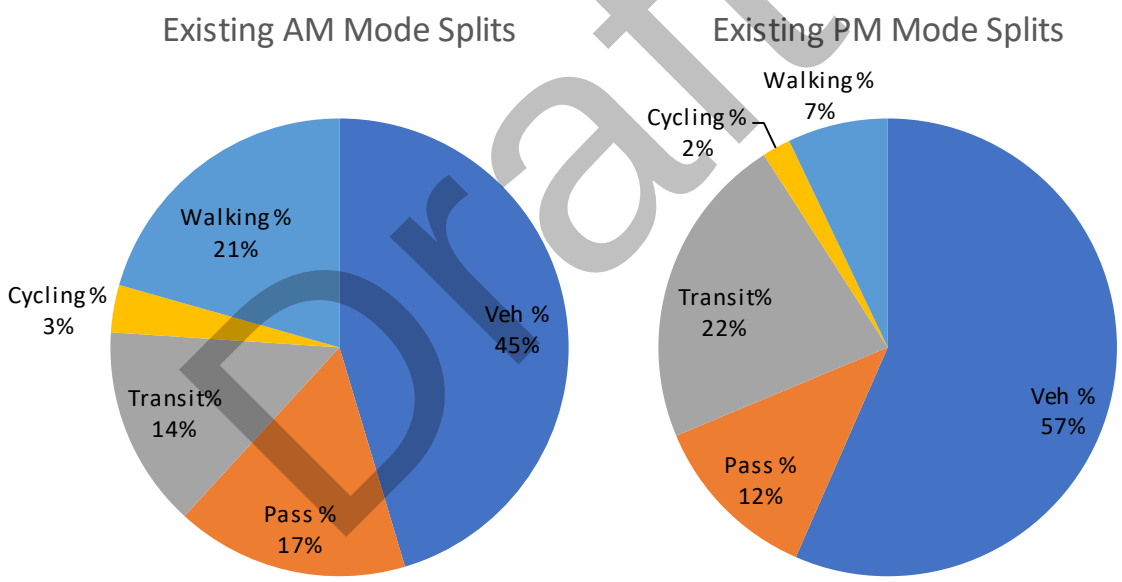
7.4.1 Trip Generation

To assess total travel demands, total trips would need to be generated, and then assigned to different mode shares. Assumptions for each of the following development type, residential, commercial, office, and community/institutional is provided below.

Modal splits for existing land uses were based on TTS estimates of the area including zones 217, 219, and 220 as shown in Figure 7-5. The existing mode splits for the AM and PM peak hours is shown in Figure 7-6. To remain conservative, it was assumed that the existing blocks within Area's C and D would continue to follow the existing mode splits.

Figure 7-5: TTS Zones Assessed

Figure 7-6: Existing Mode Splits



Residential

Residential trip generation was calculated based on the total number of residents in the 3 TTS zones, and the total number of trips to and from the zones. Results and the rate used to develop total trips per resident in the peak hour is shown below. This was used for both existing and future residential developments. The number of residents per existing zone was determined by the disaggregating the TTS zone by land area.

Table 7-1: Residential Trip Generation Rates

Period	Inbound Per Resident	Outbound Per Resident
AM Rate	0.02	0.31
PM Rate	0.19	0.04

Office/Employee

New office developments within the mixed scope context compared with existing employment uses are significantly different. As a result, existing employment uses were calculated based on the number of employment based trips TTS Zone 220 produced, and the number of employees within the zone. Employment within each development block in Area C was simply the existing employment numbers for the area based on TTS split evenly among each zone.

Future employment was quite low, only approximately 500 employees in the Area A development blocks, as a result, the ITE Trip Generation Manual rates were used as a reasonable approximation as shown below.

Table 7-2: Employment Trip Generation Rates

Period	Inbound Per Employee	Outbound Per Employee
AM Rate	0.40	0.06
PM Rate	0.07	0.34

Commercial

The majority of existing commercial development is within Area C. As a result, zones C3, and C5, which contain two of the largest commercial blocks were assumed to generate the majority of commercial traffic within Area C. All shopping purposed trips from TTS in this Zone were assigned to these two blocks to remain conservative. Future retail/commercial trips were calculated based on ITE Trip Generation Manual Rates as a reasonable approximation as shown below.

Table 7-3: Commercial Trip Generation Rates

Period	Inbound Per 100 Sq M	Outbound Per Sq M
AM Rate	0.021	0.015
PM Rate	0.037	0.037

Community/Institutional

Community and institutional land uses can be extremely varied depending on the actual land use type. The community facility trip rate was based trip rates proposed for a community facility nearby (Leaside Arena), where proxy sites were used to estimate trip rates as shown below. The institutional land use within Area B was approximated using commercial rates given the lack of data available.

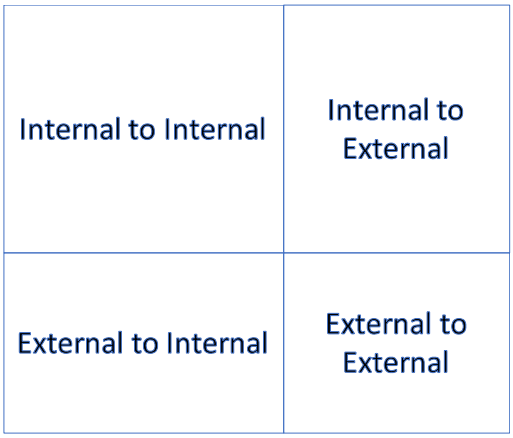
Table 7-4: Community Trip Generation Rates

Period	Inbound Per 100 Sq M	Outbound Per 100 Sq M
AM Rate	0.0	0.0
PM Rate	1.07	0.49

7.4.2 Trip Distribution

In a typical demand model, there are four trip origins and destination sets that need to be assessed as shown in Figure 7-7.

Figure 7-7: Typical Trip Distribution Matrix



To determine the trips to and from the study area blocks (A, B, C, and D) that remain within these blocks, versus destined to or from external zones, the "*National Cooperative Highway Research Program (NCHRP) Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*" methodology was used. Generated trips were inputted into this tool, which resulted in a matrix of travel demands between internal trip uses, and the external travel demands per mode.

Internal – Internal Trips

Internal trips from the internal trip capture methodology were distributed based on the proportion of trips each development block produces for each trip purpose. TTS data for the area shows that for short distance trips followed a mode split of 60% auto, 39% walking and 1% cycling with transit trips removed. It was assumed that in the context of the study area boundaries, there would be limited availability and opportunity for transit trips in between the development blocks.

Internal – External / External - Internal Trips

The total number of trips from and to each development block is outputted from the internal trip capture methodology. These were then distributed to each development block by the proportion of trips per mode each block generated. The external zone distribution was derived using Streetlight GPS data, this is shown in the table below.

Table 7-5: External Trip Distribution

External Zone	AM		PM	
	From (Ext to Int)	To (Int to Ext)	From (Ext to Int)	To (Int to Ext)
E1	0%	0%	0%	1%
E2	19%	4%	19%	21%
E3	8%	8%	7%	9%
E4	3%	1%	1%	1%
E5	15%	6%	17%	17%
E6	14%	14%	16%	7%
E7	5%	39%	22%	17%
E8	32%	26%	17%	24%
E9	3%	2%	1%	3%

Transit trips are not subject to this distribution as they start from each development block, assumed to travel using an active mode share to the transit stop/station before continuing on the transit route. Existing route passenger volumes were used to determine the percentage of trips to each transit route. Transit trips can then be assigned to the pedestrian and cycling networks and layered with the pedestrian and cycling trips, but also be used to assess capacities required on the feeder bus network and at the ECLRT station.

Table 7-6: Transit Distribution

Transit Line/Stop	From Transit Stop to Study Area	From Study Area to Transit Stop	Basis/Justification
Line/Route 1	72%	72%	(Eglinton LRT based on #34+54)
Line/Route 2	5%	5%	(Other interlined routes along Eglinton Based on #51)
Line/Route 3	19%	19%	(Leaside based on #56)
Line/Route 4	5%	5%	(south Leaside based on #88)

External – External Trips

External trips are unrelated to the study area are represent the background traffic levels through the area. Future travel patterns will change depending on a variety of roadway capacity factors, thus to estimate these background trips, Streetlight data was used to find the proportion of trips from each external node to the other. Streetlight allows calibration of these trips to traffic counts, and projected counts based on the Eglinton Connects study were used. It should be noted that the methodology for Eglinton Connects simply growing existing counts based on an established growth rate for the area.

The resultant external-external matrix required some manual calibration based on existing counts due to some order of magnitude differences at the calibration locations. This is presumed to be as a result of differences in travel patterns over time, and the fact counts are subject to daily fluctuations. An assignment was completed with only these external-external trips to ensure that generated network volumes were reasonable.

Distributed Trips

The different matrices for internal and external trips were then combined for each travel mode, vehicle, cycling and pedestrian. Transit trips generate a separate pedestrian and cycling distribution matrix based on the stop locations.

7.4.3 Trip Assignment

Trips were assigned based on an All or Nothing algorithm. This means that trips from each zone/block would take the same route to reach a different zone/block based on the shortest travel time and/or distance. As a result of this methodology, it should be noted that proposed vehicle flows are desired vehicle flows that do not take into account available capacity and delays.

7.4.4 Base Case Analysis

To begin the iterative assessment process, the first step was to develop an assessment of the base built form alternatives. Three alternatives were initially reviewed, however due to the limited differences in total population and employment for the three alternatives, Scenario A was considered the base case as all three scenarios would each produce a similar number of potential trips. It should be noted that changes in land-use and built form would primarily affect Study Area A, whereas Area B has limited development block sizes, thus there are

limited options possible. The mode share was derived from existing conditions for zones which are not changing, and new development areas used assumptions from other areas along Eglinton Avenue as per the Eglinton Connects Study. The following table shows the populations in Area A, with a breakdown by land use type.

Table 7-7: Initial Development Scenarios

Scenario	Total Population	Residential	Office	Commercial	Community Facility
Scenario A	8834	7886	363	573	12
Scenario B	9171	7178	1627	366	0
Scenario C	8868	8352	80	400	36

The base case test shows that vehicles would face some constrained conditions along Eglinton Avenue east of Brentcliffe, and along Laird Drive south of Eglinton. This could result in the following impacts:

- Peak spreading due to limitations in capacity during peak hour
- Further changes in mode splits due to slow travel times of personal vehicle trips
- Shortcutting or use of alternative routes
- Longer queues and delays at intersections
- Increased need for TDM and/or other strategies to limit vehicle trips

Table 7-8: Base Case Demand

Scenario	Link	Capacity Available Per Direction	Traffic Volumes	
			SB/WB	NB/EB
Initial Base ~40%/60%	Laird South of Vanderhoof	1000-1500	1260 (1090)	1400 (1670)
	Eglinton East of Laird	2000-2500	1530 (2120)	2370 (1970)
	Eglinton East of Brentcliffe	2000-2500	1610 (2210)	2760 (2090)

7.5 Land Use Refinement

An iterative process between the land use and proposed built form, followed by the resulting roadway capacity and transportation impacts was used to work towards a preferred development scheme.

After the initial base case assessment, a more refined option was considered, with reduced population and employees in Study Area A. The results are shown in the table below.

Table 7-9: Refined Development Scenario Statistics Per Zone

Zone/Block	Residential Population	Employees	Commercial GFA (M^2)	Community/Institutional GFA (M^2)
A1	2,754	180	8,195	2,400
A2	2,601	335	8,440	0
A3	1,923	0	1,420	0
Area A Total	**7,278**	**515**	**18,055**	**2,400**
B1	98	0	1,244	0
B2	174	0	616	0
B3	580	0	1,558	11,451
B4	274	0	3,100	0
B5	125	0	2,444	0
B6	131	0	808	0
B7	148	0	0	0
Area B Total	**1,530**	**-**	**9,770**	**11,451**

Along with the proposed land-use, further permutations of mode splits and development sizes for Area A were considered to provide guidance towards a preferred planning alternative. Results are shown in Table 7-10. To allow for traffic operations along Laird Drive and Eglinton Avenue to function acceptably during peak hours, further reductions in development size, improvements to alternative modes of travel, reductions in travel demand or additional road capacity is required. One of the key constraints is eastbound along Eglinton Avenue in the AM peak hour east of Laird past Brentcliffe.

Table 7-10: Development Size and Mode Split Testing

Scenario Vehicle / Transit + Active	Link/Segment Volumes - AM (PM)	Residential Percentage of Part A Developments							
		25%		50%		75%		100%	
		1820 Residents		3640 Residents		5460 Residents		7280 Residents	
		SB/WB	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB
~50%/50%	Laird South of Vanderhoof	1300 (1100)	1410 (1660)	1330 (1120)	1420 (1690)	1360 (1140)	1420 (1720)	1390 (1160)	1430 (1750)
	Laird South of Industrial	930 (840)	1230 (1270)	980 (850)	1230 (1320)	1590 (850)	2400 (1360)	1080 (860)	1240 (1410)
	Eglinton East of Laird	1580 (2110)	2270 (2000)	1580 (2130)	2330 (2010)	1730 (2160)	2710 (2020)	1590 (2180)	2460 (2030)
	Eglinton East of Brentcliffe	1720 (2150)	2400 (2180)	1720 (2200)	2550 (2180)	1730 (2250)	2710 (2190)	1730 (2310)	2870 (2200)
~40%/60%	Laird South of Vanderhoof	1270 (1050)	1370 (1620)	1300 (1070)	1370 (1650)	1320 (1090)	1380 (1680)	1340 (1100)	1380 (1700)
	Laird South of Industrial	910 (820)	1200 (1230)	950 (820)	1200 (1270)	990 (820)	1200 (1310)	1030 (830)	1210 (1350)
	Eglinton East of Laird	1560 (2070)	2220 (1970)	1560 (2090)	2270 (1980)	1570 (2110)	2330 (1990)	1570 (2140)	2380 (2000)
	Eglinton East of Brentcliffe	1690 (2100)	2320 (2140)	1690 (2150)	2460 (2140)	1690 (2190)	2590 (2150)	1700 (2240)	2720 (2160)
~30%/70%	Laird South of Vanderhoof	1230 (990)	1310 (1570)	1250 (1010)	1310 (1590)	1270 (1030)	1320 (1620)	1290 (1040)	1320 (1640)
	Laird South of Industrial	880 (790)	1160 (1190)	910 (790)	1160 (1220)	940 (790)	1160 (1250)	970 (790)	1160 (1280)
	Eglinton East of Laird	1540 (2030)	2160 (1940)	1540 (2050)	2200 (1940)	1540 (2070)	2240 (1950)	1540 (2080)	2280 (1960)
	Eglinton East of Brentcliffe	1650 (2050)	2230 (2090)	1650 (2090)	2330 (2100)	1660 (2120)	2430 (2100)	1660 (2160)	2530 (2110)

8 Transportation Framework

The multi-modal analysis and iterative approach shows a capacity bottlenecks along Eglinton Avenue and Laird Drive. Testing of different potential land use options helped refine the preferred draft alternative. While the vehicular capacity was the limiting constraint, the overall multi-modal demand and other policies/strategies are important to a successful mobility solution.

To address the overall objectives and guiding principles set forth, this section tests potential impacts of different strategies on the draft alternative. The potential opportunities and solutions for the road network need to consider physical constraints such as the railway, heritage buildings, row availability, and the ravine. Furthermore, consideration of existing uses and demands were considered, included commercial vehicle movements, neighbourhood infiltration, and safety.

8.1 Changes to Built Form

The three primarily limitations to changing the built form include:

- Places to Grow minimum density requirements
- Existing approved developments; and
- Existing transportation capacity limitations.

As a result of the first two limitations, development sizes could only be limited to a small degree, as any further limitations would be unreasonable from a planning perspective. This means that the proposed built form could generate more vehicular traffic that what the proposed road network could accommodate under the current mode share assumptions.

Thus, the only potential way to limit built form is through a phasing program, whereby a sub-area of the development would need to be subject to further investigation/monitoring to ensure that other targets are met.

Figure 8-1: Emerging Preferred Option

8.2 TDM Strategies and Policies

Policies to encourage non-auto travel demands and/or reduce travel during peak hours can also significantly reduce the number of vehicle trips during peak hours. However, these measures tend to have greater impacts on newer, mixed use developments, and would typically have low impacts on existing low density residential developments.

Furthermore, the potential impacts of TDM strategies and policies can significantly vary, dependant on regional destinations, changes in region-wide infrastructure, and other factors outside not directly related to changes within the study area. As a result, different mode-shares and trip reductions were tested. This allowed for a detailed assessment of the sensitivity of the road network to the success of TDM measures, thereby allowing for a implementation and monitoring plan that helps better understand development and its impact on mobility.

8.2.1 Mode Share

As the mobility options of the local area, and on a broader regional context changes, there are options to encourage mode shares of active transportation and transit increase to a level that would sustain the proposed development. A more refined testing of mode-choice changes was conducted on the preferred option.

The success of individual policies and strategies may be different to the overall outcome of the full set of recommended policies and strategies. As a result, the intent of this sensitivity testing was to ensure that key breakpoints in terms of vehicle capacity are understood.

Table 8-1: Mode Share Sensitivity Testing

Scenario Vehicle/ Transit+Active	Link/Segment Volumes - AM (PM)	Capacity Available Per Direction	Preferred Built Form (Area A - 7135 Residents)	
			SB/WB	NB/EB
~45%/55%	Laird South of Vanderhoof	1000-1500	1360 (1150)	1420 (1740)
	Laird South of Industrial	1000-1500	1050 (850)	1230 (1380)
	Eglinton East of Laird	2000-2500	1600 (2160)	2410 (2030)
	Eglinton East of Brentcliffe	2000-2500	1730 (2270)	2780 (2200)
~40%/60%	Laird South of Vanderhoof	1000-1500	1340 (1120)	1400 (1710)
	Laird South of Industrial	1000-1500	1030 (840)	1220 (1350)
	Eglinton East of Laird	2000-2500	1590 (1160)	2380 (1600)
	Eglinton East of Brentcliffe	2000-2500	1710 (2240)	2710 (2170)
~35%/65%	Laird South of Vanderhoof	1000-1500	1320 (1100)	1370 (1700)
	Laird South of Industrial	1000-1500	1000 (830)	1190 (1350)
	Eglinton East of Laird	2000-2500	1570 (2140)	2320 (2000)
	Eglinton East of Brentcliffe	2000-2500	1690 (2240)	2610 (2160)
~30%/70%	Laird South of Vanderhoof	1000-1500	1290 (1060)	1340 (1650)
	Laird South of Industrial	1000-1500	970 (800)	1170 (1280)
	Eglinton East of Laird	2000-2500	1560 (2090)	2270 (1970)
	Eglinton East of Brentcliffe	2000-2500	1670 (2160)	2530 (2120)

8.2.2 Travel Demand Reduction

It is also possible to further reduce the overall number of trips made during the peak hour. Given that the main vehicle capacity constraint is during the AM peak hour, options to encourage off-peak travel, telecommuting or other strategies may be effective in lowing overall demands. Alternative development profiles, which attract different types of tenants (students, seniors, lower income etc.) would also reduce peak hour demands. The existing trip rate used reflects the current trend in the existing study area. More developed urban environments, such as that along Yonge Street, near Finch station show much lower travel demands as shown in Table 8-2.

Table 8-2: Potential Future Residential Trip Rate

Period	Study Area (217, 219, 220)	Comparable Future TTS Zone (450)
AM Rate	0.33	0.19
PM Rate	0.23	0.16

Thus to provide a project for future trip generation, a conservative estimate of 5% was assumed as a reasonable reduction in the trip rate for new residents in the area, as a transition occurs. It is likely that given the potential character of the area in becoming more like the other sample zone shown, 10%, or even greater reduction in peak hour trips is achievable. This was only applied to new development areas, and not any of the existing residential zones, but requires additional strategies aimed at reducing vehicle ownership to be successful.

8.3 Transit

The existing feeder bus network is expected to be re-evaluated and changed to accommodate the ECLRT when completed. However, the existing capacity constraints, and potential increases to these routes based on the existing ridership with minor adjustments was assessed to provide a high-level understanding of the feeder bus network. Projected demands and capacity constraints are shown in the following tables for the AM and PM peak hours. In general, some existing bus routes with low capacity such as the 56 Leaside, may need an increase in bus service to accommodate future development and demand from the ECLRT station. In general however, the proposed demands during the peak hour can be accommodated with a feeder bus network similar to existing.

The quality of service, and connectivity to stops can have an impact on proposed transit routes. As a result, bus bays should be places strategically to connect key destinations, facilitate bus operations, allow for implementation of transit signal priority at key locations and provide queue jumping opportunities.

Table 8-3: AM Transit Demands and Capacity

AM Peak Hour		Existing/Base Projection		Future Total (40%/60%)		Existing Capacity	
Route	Location	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB
ECLRT	West Side (Near Bayview)	2400	5550	2578	6328	7200	7200
	East Side (Near Leslie)	2050	4900	2337	5264	7200	7200
Feeder along Eglinton (Leslie and/or Other)	West Side (Near Bayview)	50	50	67	84	200	200
	East Side (Near Leslie)	50	50	84	67	200	200
56 Leaside	South near Millwood	204	38	344	313	300	300
88 Leaside	West Side (Near Millwood)	30	73	49	130	200	200
	East Side (past Rail Tracks)	14	26	25	42	200	200

Table 8-4: PM Transit Demand and Capacity

PM Peak Hour		Existing/Base Projection		Future Total (40%/60%)		Existing Capacity	
Route	Location	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB
ECLRT	West Side (Near Bayview)	5550	2400	6169	2667	7200	7200
	East Side (Near Leslie)	4090	2050	4544	2278	7200	7200
Feeder along Eglinton (Leslie and/or Other)	West Side (Near Bayview)	50	50	78	74	200	200
	East Side (Near Leslie)	50	50	74	78	200	200
56 Leaside	South near Millwood	57	103	170	199	300	300
88 Leaside	West Side (Near Millwood)	59	22	103	39	200	200
	East Side (past Rail Tracks)	40	17	71	30	200	200

8.4 Vehicular

Capacity constraints is identified along Laird Drive south of Eglinton Avenue and these issues can be resolved by increasing potential linkages north-south, to provide development traffic an alternative to access Eglinton Avenue. With improved north-south connections between Wicksteed Avenue and Eglinton Avenue within the context of Study Area A, capacity constraints along Laird Drive would be less significant and users would have alternative options.

Eglinton Avenue East near Brentcliffe Road is another key constraint area, particularly during the AM peak hour eastbound. Additional roadway capacity options are difficult to provide here due to the Don Valley Ravine, rail corridor, and regional connectivity needs. One option may be a grade separation for Wicksteed Avenue across the rail tracks which may divert development trips away from Eglinton Avenue. Future study is required to determine the actual feasibility.

Figure 8-2: AM Vehicle Flow

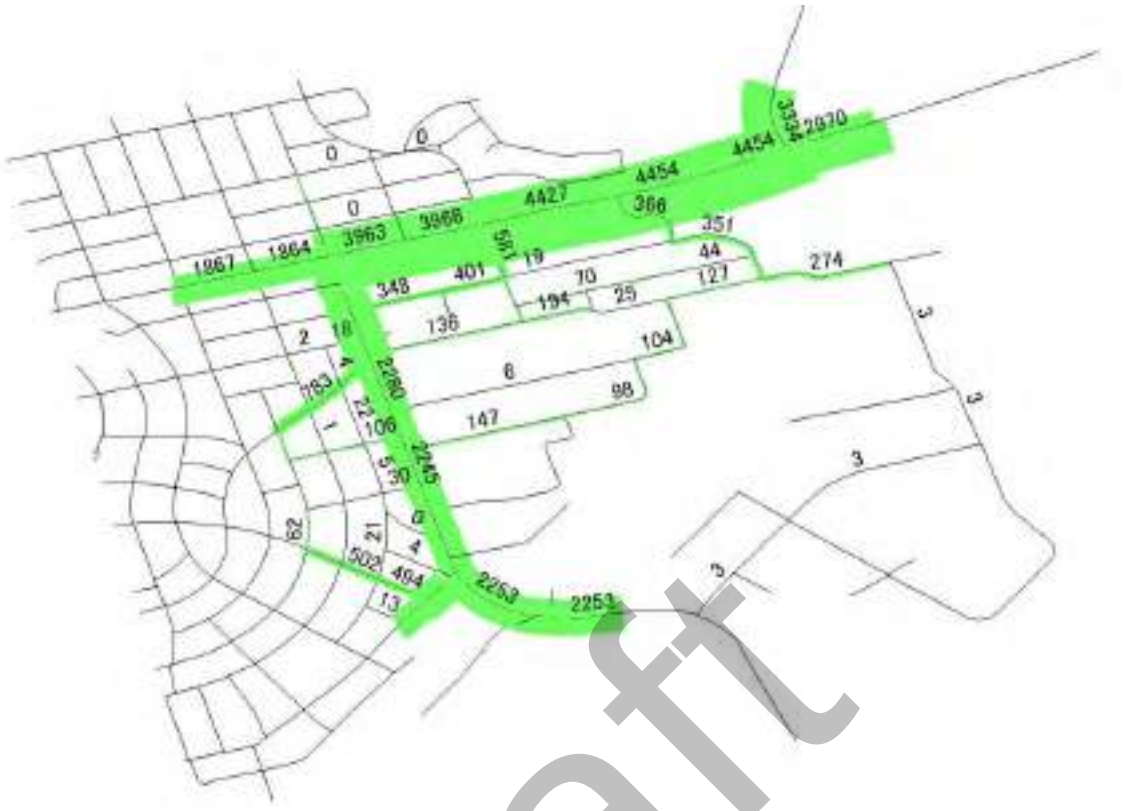
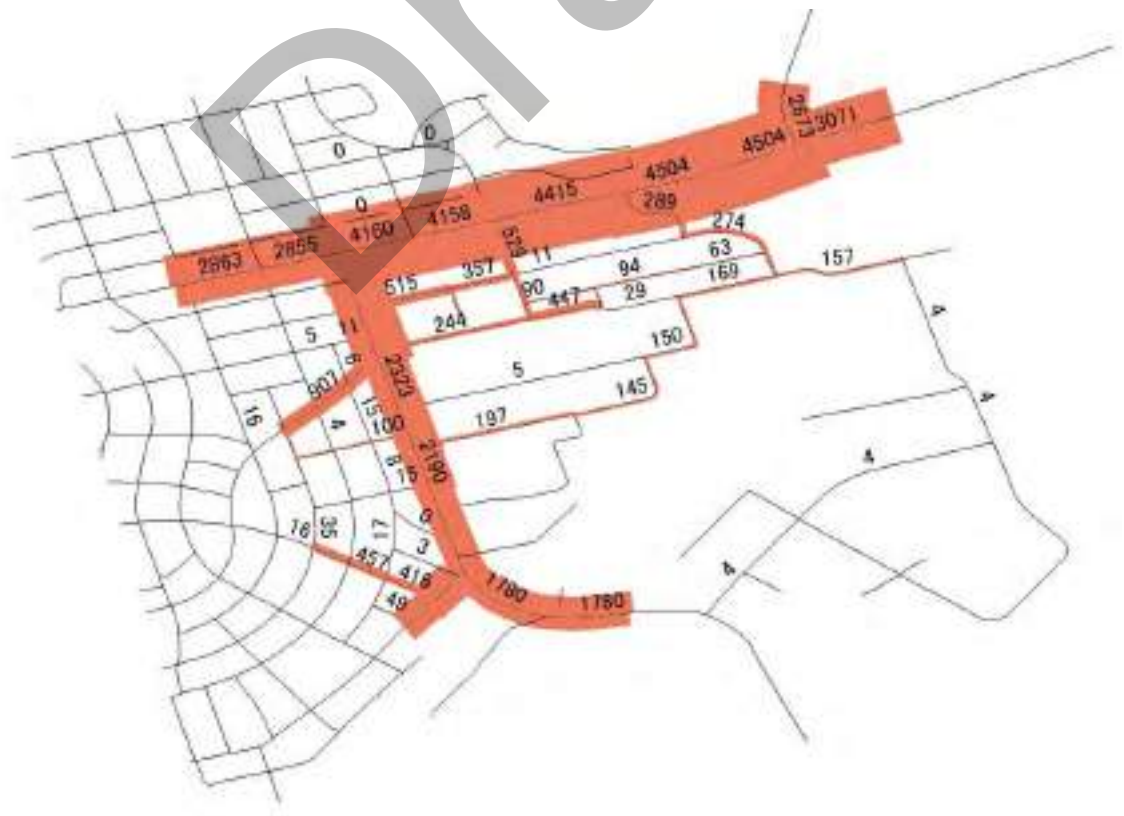


Figure 8-3: PM Vehicle Flow



8.4.1 Traffic Operations

Traffic operations analysis was conducted to review intersections affected by the new developments that access the major arterials in the area, Eglinton Avenue and Laird Drive. This ensured that storage lengths for Don Avon Drive, Brentcliffe Road, and Vanderhoof Avenue were sized appropriately. An initial test of full development conditions with the base assumptions for mode shares (40% vehicular) would cause some capacity constraints at these intersections.

A further test, with reduction in development size, as completed during the macro-level analysis was then preformed. It was found that at around 80% development levels for Study Area the development could potentially work for the given road network. In general, the access roads onto Eglinton Avenue and Laird Drive for Study Area A operate near capacity, but primarily due to high volumes on both arterials.

Table 8-5: AM Future Operations

Intersection	Intersection LOS	Critical Movement			
		Mvmt	LOS	V/C Ratio	95th Percentile Queue (m)
Laird Dr & Eglinton Ave	F	EBT	F	1.71	492.0
		WBL	F	1.89	396.0
		NBT	F	1.37	244.0
		SBT	D	0.17	30.0
Eglinton Ave & Don Avon Dr	C	EBT	C	0.94	277.0
		NBT	E	0.88	107.0
Brentcliffe Rd & Eglinton Ave	F	EBT	F	1.25	436.0
		WBL	F	1.05	78.0
		NBL	D	0.03	6.0
Laird Dr & Vanderhoof Ave	B	WBL	E	0.92	87.0
		EBL	E	0.79	96.0
Laird Dr & McRae Dr	D	WBL	F	1.17	116.0
		NBL	F	1.19	45.0
		SBT	F	0.95	308.0

Table 8-6: PM Future Operations

Intersection	Intersection LOS	Critical Movement			
		Mvmt	LOS	V/C Ratio	95th Percentile Queue (m)
Laird Dr & Eglinton Ave	F	EBT	F	1.26	381.0
		WBL	F	1.27	231.0
		NBT	F	1.09	171.0
		NBR	D	0.79	182.0
		SBT	D	0.04	11.0
Eglinton Ave & Don Avon Dr	C	EBT	B	0.88	172.0
		WBL	F	0.86	24.0
		WBT	C	0.93	210.0
		NBT	D	0.56	48.0
Brentcliffe Rd & Eglinton Ave	D	EBT	E	1.09	354.0
		WBL	E	0.80	41.0
		WBT	C	0.97	340.0
		NBT	D	0.02	5.0
Laird Dr & Vanderhoof Ave	C	NBR	D	0.71	96.0
		WBT	D	0.85	114.0
		SBT	B	0.95	70.0
Laird Dr & McRae Dr	C	EBL	E	0.99	102.0
		WBL	D	0.80	68.0

8.4.2 Neighbourhood Infiltration

Concerns with neighbourhood infiltration was highlighted by many residents during consultation. In order to continue to support the existing neighbourhoods to the north of Eglinton Avenue and west of Laird Drive, the new signalized intersections limit through movements into these neighbourhoods. This includes the intersection of Vanderhoof Avenue and Laird Drive, as well as Eglinton Avenue and Don Avon Drive.

8.4.3 Goods Movement

The existing conditions assessment, as well as stakeholder consultation with business owners in the area highlighted a need for truck access to the commercial developments within the area. To safely accommodate truck movements, larger receiving lanes and turning radii are required, which conflicts with objectives to improve the pedestrian environment. As a result, only key intersections were selected to provide a preferred route for trucks, and limit the number of potential conflicts with other users.

The major routes for trucks will be along Eglinton Avenue, Laird Drive, Brentcliffe Road, Millwood Road, Wicksteed Avenue and Commercial Road. This allows for two distinct truck entrances, one to the employment lands south of Wicksteed Avenue, and another for servicing the proposed mixed-use developments within Study Area A.

8.5 Pedestrian

Pedestrian flows for the AM and PM peak hours show that there is significant demand to and from the ECLRT transit station and nearby transit stops. This leads to a high volume along Laird Drive, between Eglinton Avenue and Vanderhoof Avenue, over 1600 in the AM and PM peak hours.

Improved connectivity, specifically north-south connections within Study Area A will help divert some of this demand onto smaller residential streets. However, even with this consideration, most of the transit demand in the AM peak hour will be headed westbound. Thus, a large volume of pedestrian would cross at the intersection of Eglinton Avenue and Laird Avenue, or other nearby intersections which have pedestrian crossing opportunities. These pedestrian crossings should be designed to enhance pedestrian comfort and safety. Furthermore, where possible, crossing distances should be minimized.

Figure 8-4: AM Ped Flow

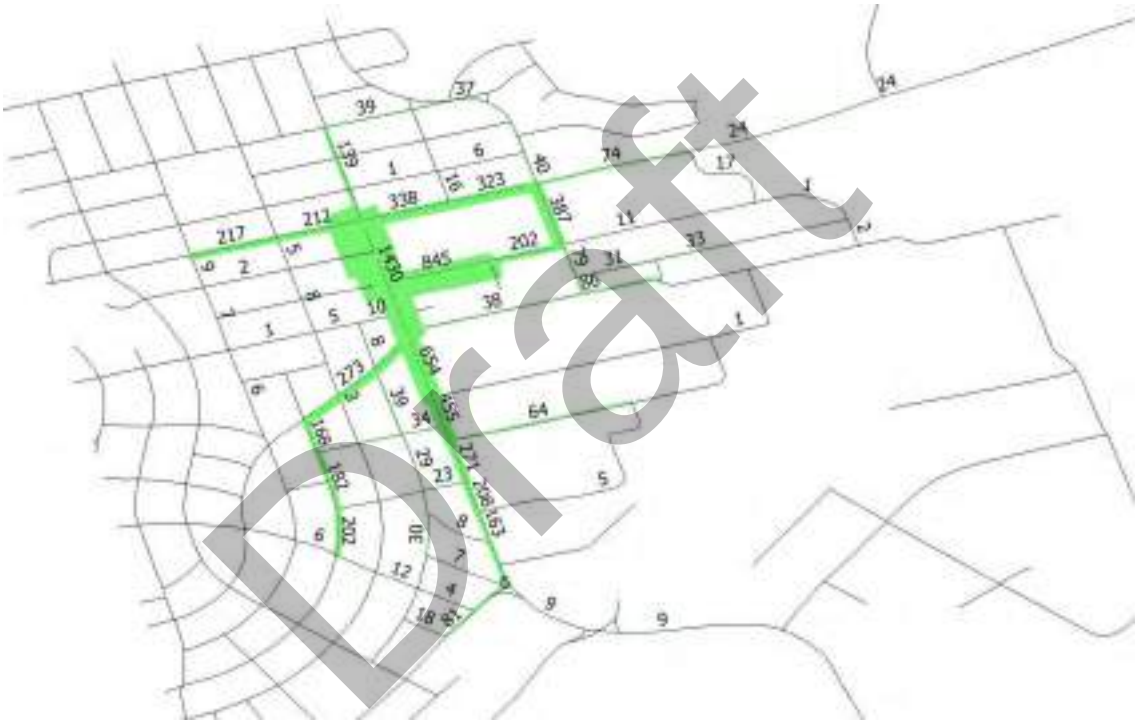
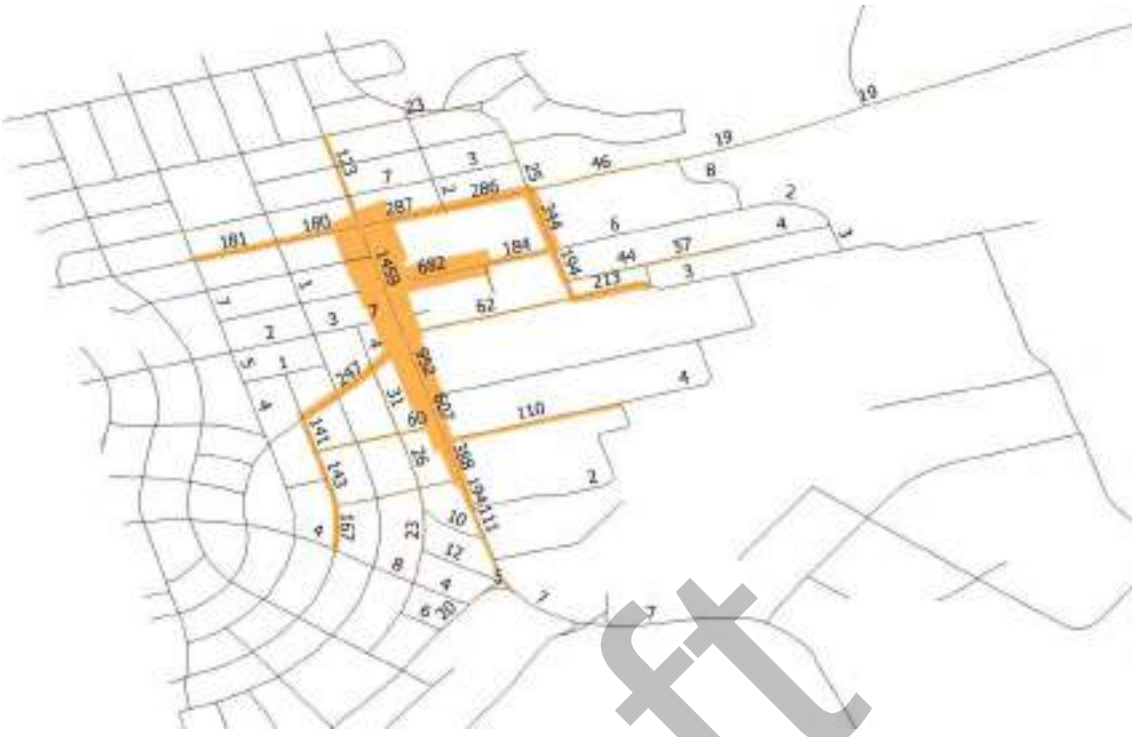


Figure 8-5: PM Ped Flow



8.6 Cycling

Cycling volumes during peak hours are quite low and do not necessitate cycling lanes based on volumes generated by the developments within the study area. Key volumes along each route is shown in the following figures. It should be noted that recreation cycling traffic during non-peak hours would be expected, particularly those accessing the ravine trails to the east of the study area.

There is a need for improved cycling connectivity in consideration of connections with key routes to other parts of the City, improving the overall network and allowing for better mobility options to other parts of the City. A cycling option along Laird Drive would provide more direct connectivity and the 10 Year Cycling Plan should be amended to reflect Laird and Vanderhoof as the preferred streets for cycling infrastructure.

Cycle tracks along Laird Drive and Eglinton Avenue help enhance overall city network connectivity, however both roads are expected to be quite busy for vehicular traffic. Although cycle tracks provide a high level of comfort and safety, particularly for commuter cyclists, more recreational users may prefer alternative options. As a result, a multi-use path is recommended along Vanderhoof Avenue and a small segment of Brentcliffe Road, provide access to development blocks and areas east of the study area.

Furthermore, much of the cycling traffic that do originate/end within the study area is to and from the transit stations. As a result, cycling parking amenities at transit stations, and nearby developments should be provided.

Figure 8-6: AM Cycling Flow

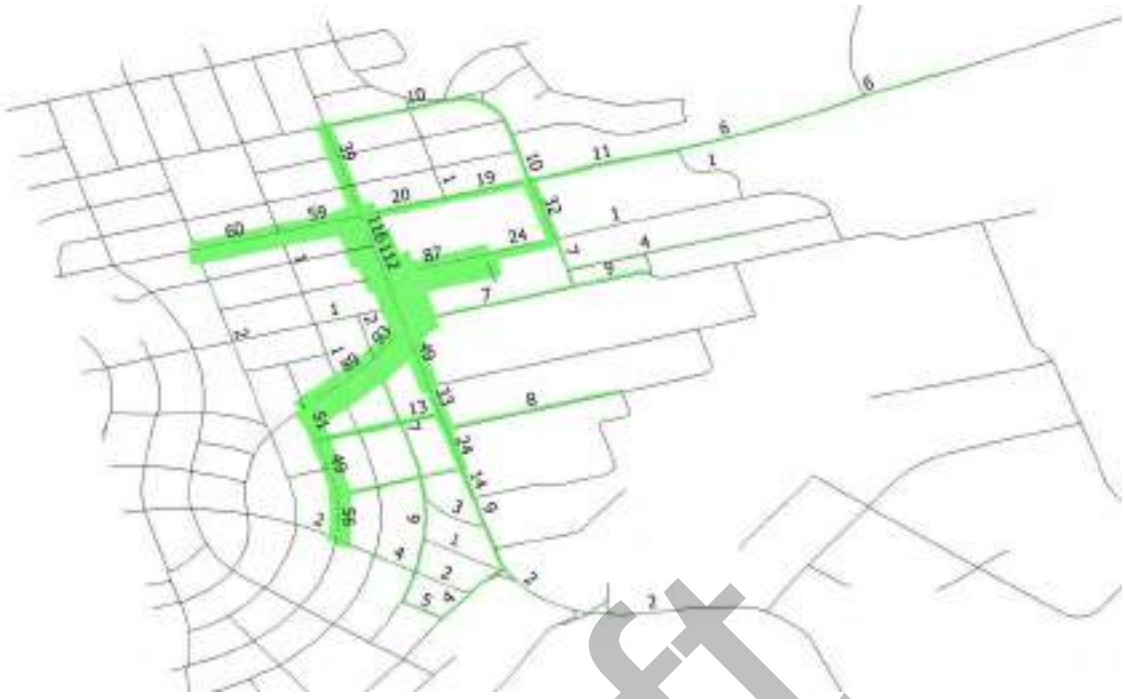


Figure 8-7: PM Cycling Flow

8.7 Parking Strategies

Progressive parking strategies help ensure that new developments cater towards more non-auto oriented users, reducing vehicular travel demands. Not only does this help reduce peak hour travel demands, it also encourages low auto-ownership rates, that have impacts all trips that person would make.

However, a minimum number of parking spaces is still required to support current uses, and ensure that overspill parking does not negatively impact existing neighbourhoods.

8.7.1 Minimum Parking Rates

Situated along a major transit corridor, it would be expected that both Study Area A and B would follow Policy Area 2/3 as per City guidelines for parking supply requirements. This is consistent with the approved development at 939 Eglinton Avenue. The following table shows the required parking spaces per unit type for residential developments based on this requirement.

Table 8-7: City Residential Parking Policy

	1 Bedroom	2 Bedroom	3 Bedroom	Visitor (per Unit)
PA 2/3 - Spaces per Unit	0.7	0.9	1.0	0.1

Furthermore, for Policy Area 2/3, the following parking supply is required for each of the non-residential land uses proposed within both study areas.

Table 8-8: City Non-Residential Parking Policy

Land Use	Space Per 100 Square Meters
Office	1.0
Retail	1.0
Community	0.5

To reduce overall parking demand and permit better sharing of parking uses, it is recommended that non-residential parking be shared among all developments within Study Area A. This allows for several significant benefits longer-term:

- Ability to fully utilize parking spaces throughout the day by unlocking synergies between multiple uses (office, retail, and community facility);
- Flexibility to adjust pricing strategies to improve mode-share changes within the area;
- Flexibility to incorporate and adjust due to future technologies and car-share allocation; and
- Improved ability change parking supply, either reconfiguring parking spaces for other uses when vehicle mode share and/or car ownership decreases, or increase supply as developments come online.

The City has established percentages for office, retail, and community facility parking. The AM/PM/Evening utilization of parking spaces for each use are as follows:

- Office – 100%/60%/0%
- Retail – 20%/100%/100%
- Community - 25%/100%/100%

Therefore, the parking supply should be the maximum parking demand in either the AM, PM, or Evening periods. Given the current estimated floor area in the preferred plan, this would result in 429 spaces without shared parking arrangements as shown below. However, with shared parking, the PM period would require the highest parking supply, but only result in a total of 334 parking spaces.

Office: 23,960 Sq m – 240 Spaces

Retail: 17,420 Sq m – 174 Spaces

Community: 2,950 Sq m – 15 Spaces

Residential parking spaces, which are typically owned by individual unit owners are still recommended to be provided on site within individual buildings. Although a shared lot is possible if centrally located, there is minimal benefits to doing so as it does not reduce overall parking provision requirements. With the small study area and location of a public community centre, it would be recommended that the centralized parking facility be located here. This would not only provide adequate access for the entire study area, but also is close to the transit stop.

8.8 Shared Mobility

Shared vehicles and cycling allows for additional reductions in vehicle ownership rates, and improved mobility choice by a larger variety of users. Opportunities in Study Area B are limited due to the small development blocks, however, Study Area A has a high potential for shared mobility hubs that include shared vehicles and/or shared cycling facilities.

8.8.1 Bike Share

Two locations are currently identified as potential bike share locations. One is to be located at the southeast corner of Eglinton Avenue and Laird Drive, ensuring access to and from the proposed ECLRT stop. The second location is to be located at Brencliffe Road, this allows more access for developments on the western portion of Study Area A and beyond. It also is situated adjacent to the proposed multi-use paths along Brentcliffe Road and Vanderhoof Avenue, providing a potential for a calmer more recreational experience.

These two locations help service two distinct types of cyclists, one that is more commuter oriented near the LRT stop and Eglinton Avenue, while the other for recreational users.

8.8.2 Car Share

With the recommendation that parking for non-residential users be provided centrally, car-share locations should also be provided at this location. It is generally found that the potential usage of a car-share station is most likely within 500m which would be provided by the proposed parking facility for all of Study Area A. As redevelopment occurs south of Vanderhoof Avenue in the future, additional car-share stations could be considered to facilitate use by new developments.

In additional, individual residential development blocks can consider car-share space allocations to provide vehicular access to residents with more sporadic usage.

8.8.3 Rideshare

Ride sharing could reduce the number of vehicle trips by increasing the number of passengers per vehicle, thus accommodating the same overall trips with less vehicles. Ridesharing can vary dependant on many mobility and economic factors, however regardless is an important mode choice to be considered. It is recommended that opportunities be provided for residents and employees to be able to utilize ridesharing as an option. This includes convenient pick-up/drop off locations, trip planning apps coordinated between developments, and trip planning programs development by employers, schools, and/or others.

9 Recommended Mobility Plan

The study and surrounding areas were planned for cars and trucks. Combined with a lack of a grid network and physical barriers (i.e. railway corridor, large property parcels, and ravine system), the street network is disconnected. A challenging pedestrian and cycling environment is presented. This further encourages people to drive, creating further traffic delays, congestions and safety issues.

The transportation review and multi-modal analysis confirms that the major investment into the Eglinton Crosstown LRT (ECLRT) line will significantly improve regional and local mobility, directly with enhanced higher-order and connected feeder bus transit options, and indirectly with supportive multi-modal access and shared mobility strategies.

Short-term opportunities for the area include the introduction of cycling facilities, which currently do not exist. A network of dedicated cycle tracks and multi-use pathways can provide efficient connections between key local destinations such as the future LRT station, community facility, and new and existing parks. The network should also connect to the larger cycling system that is comprised of the future Eglinton Avenue cycle track, the existing Millwood Road bicycle lanes, and the Don Valley ravine system.

Support for employment uses includes the identification of specific truck routes to facilitate movement within and beyond the Leaside Business Park. These routes tie into the larger arterial and highway road system and should be designed to minimize pedestrian and cyclist conflicts with heavy vehicles while also ensuring truck movement is efficiently realized.

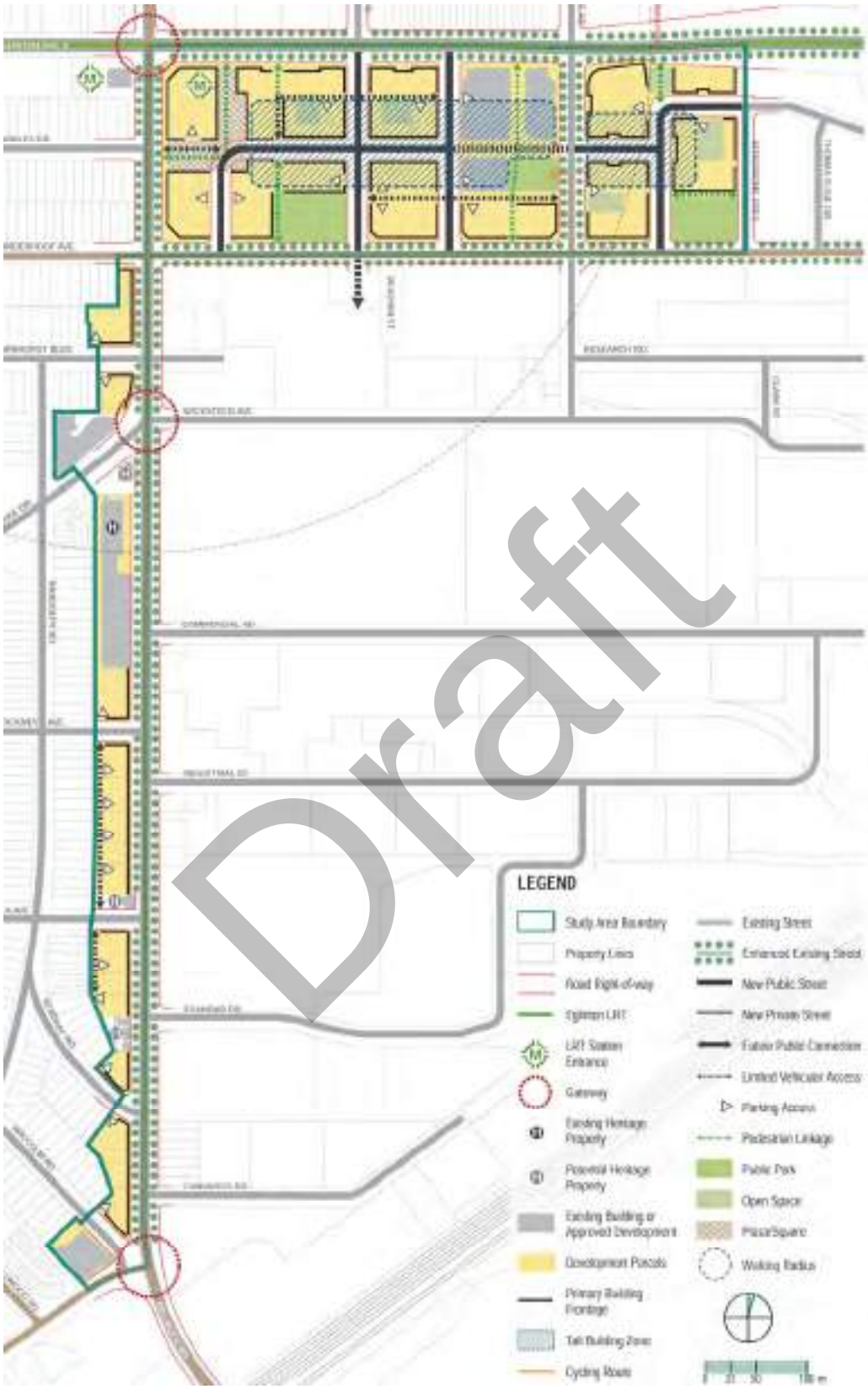
Correspondingly, emerging City-building initiatives will present opportunities to integrate new residential and employment intensification, including an enhanced public realm and community facilities. As such, this integrated planning process considered safe mobility access and choice in the development of the overall planning framework. This is evidenced by the several transportation-related references in the Laird in Focus Vision Statement and the associated principles, and in five of the ten identified “Big Moves” for the study.

Figure 9-1: Study Area and Context]

9.1 Shifting Away from Vehicles – A Balanced Approach

Once ECLRT is operational, a transformation in travel modes will occur, locally and regionally. The degree which future travel moves away from vehicles however, will be measured by how well we achieve a balanced and integrated multi-modal transportation network. Critical for success will be enhanced access and connections to ECLRT, that includes reliable and convenient local transit, and safe and comfortable walking and cycling facilities.

Figure 9-2: Study Area Structure Plan



Based on multi-modal analysis and extensive consultation, a long list of mobility recommendations has been identified to transform the study area from car-dependent travel to transit and other modes. Central to most of the recommendations were re-imagining Laird Drive and guiding new development to be non-auto based.

Laird Drive will become a central spine in the area, unifying existing residential neighbourhoods, retail uses and employment areas with an attractive multi-modal transportation corridor. It connects existing and planned community centres, has major bus routes and provides access to the vital employment lands. However, cycling routes lack safe connectivity to the Leaside neighbourhoods and beyond the study area to the network. Further, existing sidewalks and boulevards are generally unattractive, due to narrow widths, utility pole locations, numerous driveway depressions, and limited greenery and amenities.

The re-imagined Laird Drive is highlighted by implementing continuously on both sides a grade-separated cycle track facility and wide sidewalks. Boulevard widths are optimized for streetscape greening and street furniture, with additional width generally provided along the west side to integrate with emerging mixed-use development. Another key design component is integrating the bus stops into the boulevards, ensuring that shelters, street furniture / seating, shade, lighting, and bike parking, are incorporated to enhance the comfort of transit patrons. This is being achieved while maintaining reasonable traffic operations, including goods movement via trucks, within the established right-of-way.

Guiding the emerging neighbourhood along Eglinton Avenue is largely founded on implementing a finer grain street network to provide choice for how people will move around and access to where people want to go. Additional safe and comfortable mid-block connections will be encouraged through the development blocks to improve permeability. With a green and attractive setting and a resulting lower speed environment the following attributes will be achieved:

- increased pedestrian and cycling activity with safe, comfortable and attractive conditions;
- enhanced and convenient access and connectivity to transit; and,
- alternative routing choices that connect to the surrounding street network, that will distribute vehicular trips within the study area.

The extent of a mode shift to active transportation and transit will be magnified by the success of a travel demand management (TDM) program and associated innovative mobility strategies. The recommended mobility plan promotes TDM to promote travel demand measures and technological advances that will ensure additional travel choice to single occupant vehicular travel, including adding capacity to the network without expansion. Smart Commute programs, school trip planning, parking maximums and development-related benefits should be the minimal expectations to provide modest reduction on vehicle trips. Enhanced and progressive TDM measures are continuously being advanced with technology, presenting significant opportunities. Monitoring of the transportation network as development occurs is critical, to ensure that trips are being diverted to transit and the effectiveness of the adopted TDM program, but also when / if further transportation infrastructure is required.

In embracing a multi-modal transportation approach that is sustainable and balanced, redefining the transportation mode hierarchy is required. The following transportation mode hierarchy has been adopted, consistent with the City's policies:

- active transportation – walking and cycling modes provide both health and infrastructure capital and operating cost benefits.
- transit network – higher-order transit lines, such as the Eglinton Crosstown, provide significant opportunities to not only impact regional trip choices away from vehicles, but also to facilitate development that is active transportation supportive. Further, feeder bus networks can be effectively planned to connect higher-order transit lines with residential communities and employment districts.
- transportation demand management (TDM) and innovative mobility strategies – adopting TDM and technological advances, accepting emerging governance structures, supporting shared arrangements, and encouraging / incentivizing societal behaviour changes directly present infrastructure cost benefits, but also fulfils a need for non-peak travel periods.
- goods movement – supporting the vitality of employment lands is critical to an economically sustainable City.
- vehicular movement and associated parking – it is recognized that vehicles and parking will remain essential elements of a transportation network, however to accommodate future transportation demands, major infrastructure costs and quality of life impacts will be presented. Shifting away from vehicular trips is necessary for a sustainable and balanced transportation system within a vibrant City.

Recognizing the benefits of an integrated multi-modal transportation system, the recommended mobility plan also reinforces low-carbon options, while addressing environmental and health benefits, and societal equity in mobility planning for all users.

Based on analysis and extensive consultation, the following mobility recommendations are presented, that will transform the study area from car-dependent travel to other modes, and most predominately to transit.

9.1.1 Pedestrian Network

Providing a high quality and safe pedestrian network will help to promote shorter trips by enhancing travel choice, provide access and connectivity to where people want to go, and improve the quality of the pedestrian experience.

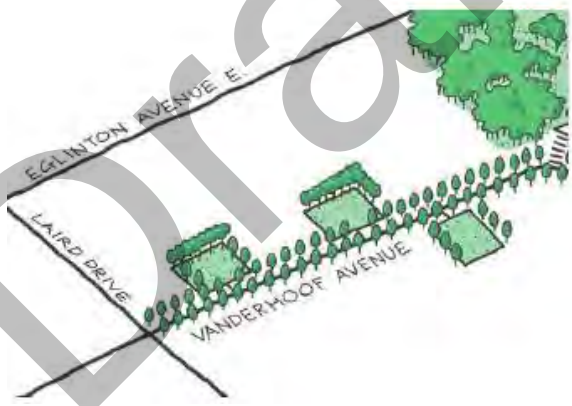
Recommendation 1. Implement recommendations along Eglinton Avenue as per EGLINTONconnects.

Recommendation 2. Implement a finer grain street network that includes generous sidewalks on both sides of new and existing streets. This will provide choice for how people will move around and will emphasize safe and comfortable walking. Streets will provide a green and comfortable setting for all users and activities. These local streets will have lower travel speeds and primarily provide only local access supporting an increase level of pedestrian activity. Additional safe and comfortable mid-block connections are encouraged through the development blocks to improve permeability. The implementation of a finer grain street network will occur in phases as redevelopment happens to improve linkages and connectivity to facilitate a mode shift to active transportation, and support access to all transit.

Figure 9-3: Study Area A Structure and Connections

Recommendation 3. Establish a new east-west mid-block green street that will act as a connector from residential areas to destinations. Destinations include the transit station, the existing and planned community centres, and emerging retail and office uses. With an attractive public realm treatment, the new street will be pedestrian-friendly with a focus on intimate passive activities in comparison with Eglinton Avenue.

Figure 9-4: Green Street Concept



Recommendation 4. Transform Vanderhoof Avenue into a greenway spine. This will connect the existing Leaside neighbourhood and the planned developments with new and existing parks, as well as the Don Valley trail system to the east. This greenway spine will have a widened north boulevard comprising of a generous 2.1 m sidewalk, and a 3.0 m multi-use path buffered with additional greenery. The widened boulevard and associated buildings setback present a walking and cycling environment that is appropriate for all users and age, while establishing a clear transition to the remaining employment lands to the south.

Recommendation 5. Provide generous and continuous wide sidewalks along both sides of Laird Drive (2.1 m), including optimizing boulevard widths for streetscape greening and street furniture.

Recommendation 6. Incrementally enhance the pedestrian environment and safely connect to the enhanced pedestrian network within the employment lands as redevelopment occurs with the provision of sidewalks on both sides.

Recommendation 7. Implement City of Toronto's Vision Zero road safety plan to improve safety for pedestrians. Specific measures include:

- narrowing all roadway lane widths to minimize crossing walking distances;
- introduce a new signalized intersection at Laird Drive and Vanderhoof Avenue to facilitate safe Leaside neighbourhood access to the transit station, community centre, emerging retail and office uses, and existing and planned parks;
- for local roads into the Leaside residential neighbourhoods, introduce curb extensions consisting of a narrowed roadway and a tighter radius, and a raised textured intersection profile – for pedestrians there will be an increased storage area at the intersection corners and a shorter crossing walking distance, while vehicular traffic will require lower speeds;
- remove existing Laird Drive medians which encourage unsafe mid-block pedestrian crossing, but investigate new controlled pedestrian crossings at key intersection or mid-block locations;
- modify signalized intersection configuration at Laird Drive and McRae Drive to remove traffic island and to reduce radii, including potential turning restrictions, to shorten the walking distances and reduce vehicular speeds at this highly pedestrian-active intersection;

Figure 9-5: Laird and McRae Treatment Option

- through roadway design and placement of utilities, encourage truck movement along preferred corridors, thereby reducing potential conflict with pedestrians;

- provide widen crosswalks (6 m) an anticipated high pedestrian volume crossing (i.e. Eglinton Avenue and Laird Drive, Laird Drive and Vanderhoof Avenue), and correspondingly ensure larger pedestrian storage areas with wider boulevards and building setbacks;
- promote active transportation along Brentcliffe Road on the west side to avoid significant northbound turning truck movements at Eglinton Avenue; and,
- provide continuous uninterrupted sidewalks across driveways and minor unsignalized intersections.

9.1.2 Cycling Network

Cycling trips will be promoted, particularly for short to moderate length trips, by enhancing travel choices that support safe and comfortable connections to the existing and planned cycle network.

Recommendation 8. Implement grade-separated cycle track recommendations along Eglinton Avenue as per EGLINTONconnects.

Recommendation 9. The finer grain street network consisting of new east-west and north-south streets, and associated mid-block connections through development blocks, present a lower speed environment that is cycling-friendly. The implementation of a finer grain street network will improve linkages and connectivity to facilitate a mode shift to active transportation, and support access to all transit.

Recommendation 10. Undertake a refinement to the City's 10 Year Cycling Network Plan, that includes a continuous grade-separated cycle tracks along Laird Drive between Eglinton Avenue and Millwood Road, and a continuous off-street multi-use path along Vanderhoof Avenue between Laird Drive and the Don Valley trail system.

Figure 9-6: Cycling Connections

Recommendation 11. Transform Vanderhoof Avenue into a greenway spine connecting the existing Leaside neighbourhood and the planned development with

new and existing parks, as well as the Don Valley trail system to the east. This greenway spine will have a widened north boulevard comprising of a generous 2.1 m sidewalk, and a 3.0 m multi-use path buffered with additional greenery. The widened boulevard and associated buildings setback present a walking and cycling environment that is appropriate for all users and age, while establishing a clear transition to the remaining employment lands to the south.

Recommendation 12. Implement continuous grade-separated cycle tracks along Laird Drive, completing a critical section of the cycling network between Eglinton Avenue and Millwood Road, which will provide safe and comfortable connections to transit and community facilities. In addition, this key connection will improve connectivity beyond the study area, including the adjacent Leaside neighbourhoods.

Recommendation 13. Incrementally enhance and safely connect to the refined and broader cycling network within the employment lands as redevelopment or capital works occurs with the provision of buffered cycling facilities.

Recommendation 14. Provide public bicycle parking spaces along the key cycling routes and at key destinations, such as transit station entrances and community facilities, to provide increased opportunities to secure bicycles in the area.

Recommendation 15. Coordinate with the Toronto Parking Authority, and developers and landowners to create a bike share network in the area. This will promote movement between key destinations, such as transit facilities, community and park facilities, and area businesses.

Recommendation 16. Encourage cycling usage through the development process by: a) securing above minimum long-term on-site bike parking; b) providing development-related cycling benefits; c) promoting the implementation of cycling repair stations in the area; d) including educational training programs for all users and ages.

Recommendation 17. Implement the City of Toronto's Vision Zero road safety plan. In addition to implementing the City of Toronto's Vision Zero road safety plan and related pedestrian safety measures, adopted cycling safety measures include implementing bike boxes for safer turning movements for on-street to on-street cycling facility movements, and consistent integrated cycle track treatment at bus stop locations.

Figure 9-7: Streetscape Concept

9.1.3 Transit Infrastructure

Improving the experience and amenities of the local feeder bus network along with the opening of the ECLRT will shift travel from private vehicles to more transit usage. In addition, enhanced active transportation access and connectivity to transit will support this mode shift to transit.

Recommendation 18. Coordinate with the Toronto Transit Commission regarding bus stop locations and associated design requirements. Bus bays and associated amenities need to consider potential routing, timed layover locations, and potential vehicle type / length. Shelters will be provided at all bus stop locations.

Recommendation 19. Implement the recommended two-bus bay along Eglinton Avenue as per EGLINTONconnects.

Recommendation 20. Implement bus bay locations for timed layover and / or at anticipated high volume of passengers getting on and off locations. In addition to the two-bus bay along Eglinton Avenue, other identified locations include: a two-bus bay along Brentcliffe Road in the southbound direction south of Eglinton Avenue; a two-bus bay along Vanderhoof Avenue in the westbound direction east of Laird Drive; and a two-bus bay along Laird Drove in the southbound direction south of Eglinton Avenue.

Recommendation 21. Adopt consistent integrated bus stop treatments with the planned cycle tracks. Maintaining the cycle track facility separate and in front of the bus stop waiting area / shelter is preferred.

Recommendation 22. Provide proper integration of transit facilities with development where appropriate.

Recommendation 23. To improve passenger comfort, in addition to shelters at all bus stop locations, other amenities such as additional shelters, street furniture / seating, shade, lighting, and bike parking, should be included,

particularly at anticipated high volume of passengers getting on and off locations.

Recommendation 24. Explore the introduction of transit priority measures for the local feeder bus network, particularly near the transit station or at congested intersections, to provide a more reliable choice for commuters.

Recommendation 25. Improve active transportation connections to and from transit stations / stops by establishing a finer grain street network and mid-block linkages through the development process. Include associated wider crosswalks at anticipated high passenger volume locations.

Recommendation 26. Design the street network to not delay bus movement, including appropriate intersection turning radius and avoiding intersecting local streets on heavy travelled transit routes near the ECLRT station.

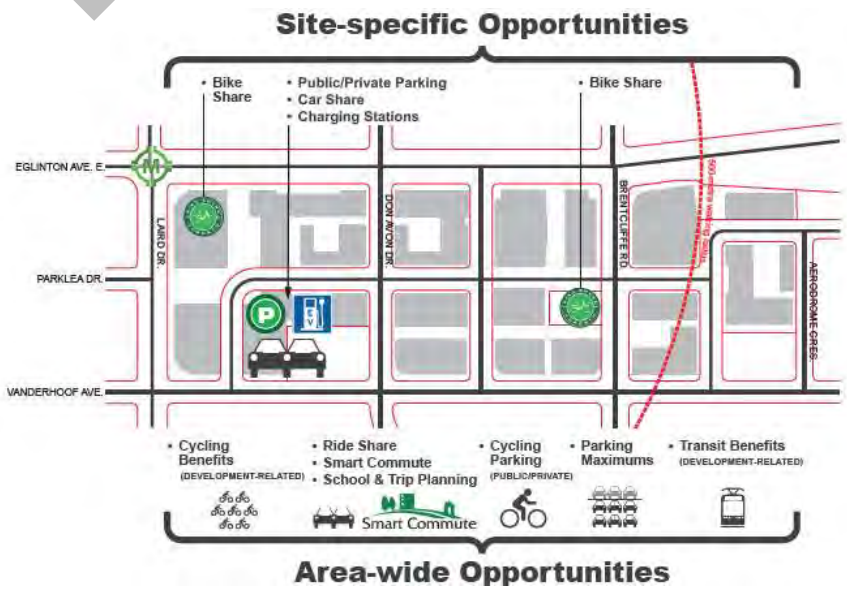
Recommendation 27. Encourage transit usage through the development process by providing development-related transit benefits, such as transit passes, real-time arrival display boards, and direct connections to the station.

9.1.4 Travel Demand Management (TDM) and Innovative Mobility Strategies

Transportation Demand Management (TDM) and innovative mobility strategies are to be encouraged. These strategies promote travel demand measures and technological advances that support alternatives to single occupant vehicular travel, adding capacity to the network without requiring its expansion.

Recommendation 28. Coordinate with Metrolinx Smart Commute program, developers, and businesses and related associations to incorporate a TDM plan to increase convenience and usage. Developers will be required to submit a comprehensive TDM plan and contribute to a TDM monitoring program. Encourage developers to incorporate trip planning techniques with the onset of their development marketing, working with Smart Commute to promote, educate and implement.

Figure 9-8: Area Shared Mobility and TDM Strategies



Recommendation 29. Coordinate with local school boards and school trip planning programs to incorporate new development requirements. Encourage developers to incorporate school trip planning techniques with the onset of their development marketing. Ensure that developers contribute to a TDM monitoring program.

Recommendation 30. Integrate publicly accessible parking infrastructure (i.e. Toronto Parking Authority) near the transit station and the proposed community centre, control parking supply, and implement other innovative mobility plan elements such as car-share and shared-bike facilities.

Recommendation 31. Secure TDM measures, electric vehicle charging infrastructure, and other Toronto Green Standards requirements in new developments through the development review process to reduce the number of vehicle trips.

9.1.5 Parking Strategies

The provision of parking will be planned to manage traffic volume growth and limit unnecessary car travel, thereby encouraging transit and alternative travel modes.

Recommendation 32. On-street parking along Laird Drive will not be permitted.

Recommendation 33. Parking for development along Laird Drive will be underground or rear property that will be accessed from the local streets, not from Laird Drive.

Recommendation 34. On-street short-term parking will be provided along the new east-west mid-block street that will support planned ground-level retail uses, and drop-off / pick-off functions near the transit station entrance and the proposed community facility.

Recommendation 35. Consideration for lower parking rates for new developments in concert with TDM strategies. Given the proximity to transit availability, population density and enhanced mobility options being introduced, lower parking rates will limit the supply of parking spaces and encourage non-auto trips.

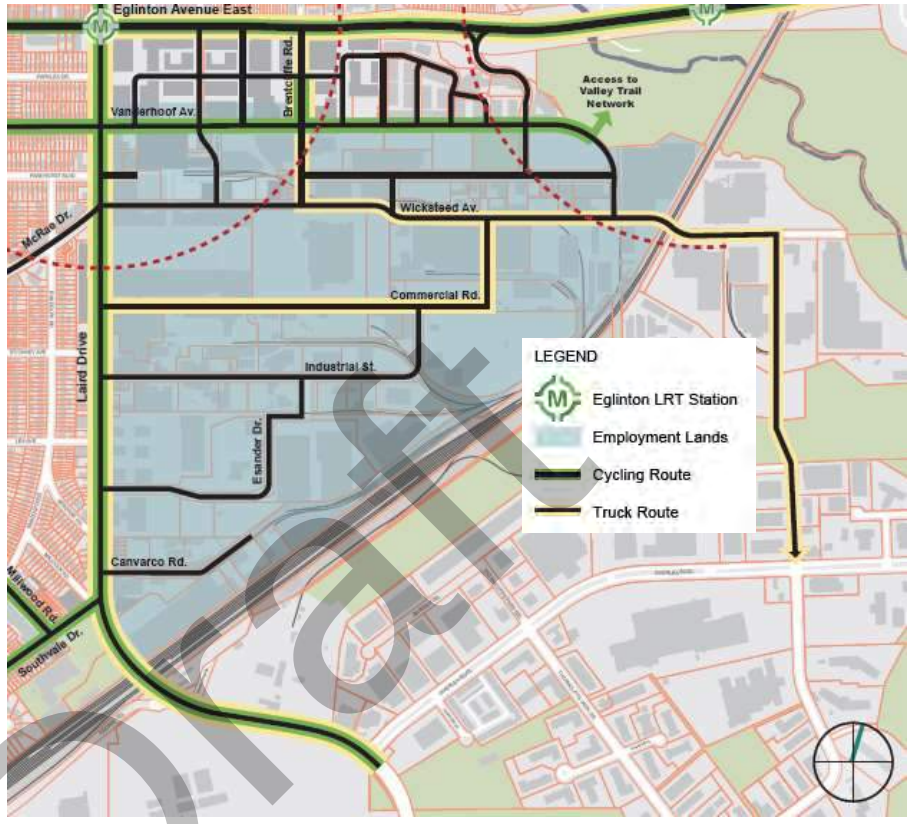
Recommendation 36. Integrate publicly accessible paid parking spaces for all new developments, including along laird Drive.

9.1.6 Goods Movement

Supporting the vitality of Employment Lands is critical to an economically sustainable city. The City recognizes the importance of the Leaside Business Park and is committed that the Leaside employment lands are to remain as “employment lands”, maintaining access to and from their operations. The mobility plan recommends a safe and balanced approach to maintaining the employment lands vital, while providing the opportunity for people to work, live and play locally.

Recommendation 37. Support key truck / goods movement routes, consisting of arterial roadways to the Leaside Business Park (i.e. Eglinton Avenue, Laird Drive, Brentcliffe Road and Millwood Road), and internal roadway access via Commercial Road and Wicksteed Avenue, including the provision of truck turning radii and lanes where appropriate.

Figure 9-9: Proposed Truck Routes



Recommendation 38. Implement appropriate roadway / streetscape designs and utilities placement to reduce potential conflict with pedestrians and cyclists.

Recommendation 39. Goods servicing for the emerging new development along Eglinton Avenue will be accessed from the internal local roadways, preferably to underground facilities and / or to screened locations off the local roadways.

Recommendation 40. Goods servicing for development along Laird Drive will be in the rear of the property, accessed from the local streets, and not from Laird Drive.

Recommendation 41. Implement a southbound left turn lane along Laird Drive approaching Commercial Road to separate the primary truck entrance into the employment lands from other traffic to improve safety and ensure operational efficiency.

Recommendation 42. Incrementally enhance the pedestrian and cycling environment, and safely connecting to the enhanced transit and active transportation

network within the employment lands as redevelopment occurs, to provide increased travel choice for employees and patrons.

Recommendation 43. Future consideration for Wicksteed Avenue improvements, to provide additional roadway capacity and to facilitate goods movement.

9.1.7 Street Network

The development of this emerging neighbourhood will implement a finer grain street network, improving access and connectivity while facilitating a modal shift to active transportation and transit. This network will further provide alternative routing choices that connect to the surrounding street network, thereby distributing vehicular trips within the study area.

Recommendation 44. Implement recommendations along Eglinton Avenue as per EGLINTONconnects.

Recommendation 45. The emerging neighbourhood along Eglinton Avenue will implement a finer grain street network that will provide alternative routing choices that connect to the surrounding street network, thereby distributing vehicular trips within the study area.

Recommendation 46. Development proponents must demonstrate to the City's satisfaction that the street network will function appropriately, and ensure capacity and access is available for the proposed development. Ensure that developers contribute to monitoring provisions that will assess TDM effectiveness and the actual diversion to the transit mode.

Recommendation 47. Laird Drive will be reconfigured between Eglinton Avenue and Millwood Road as a "Complete Street". The intent is to re-balance the existing vehicle-focussed functions with appropriate multi-modal uses while prioritizing key traffic movements. Specifically, this includes combining lanes to provide wider sidewalks, a continuous cycle track, and optimizing boulevard widths for streetscape greening and street furniture.

Recommendation 48. Vanderhoof Avenue roadway will introduce narrowed lanes to include a continuous left turn lane to ensure safe and efficient traffic operations given the existing offset roadways and driveways on both sides and projected large turning volumes.

Recommendation 49. Additional road capacity such as Wicksteed Avenue improvements are potentially required as development occurs, subject to actual TDM effectiveness and diversion to transit. Additional study would be required, but a preliminary concept envisions, as a minimum, a roadway widening from Brentcliffe Road to Millwood Road via Beth Nealson Drive, including a CPR grade separation.

Recommendation 50. Implement City of Toronto's Vision Zero road safety plan. Specific measures include:

- narrowing all roadway lane widths to minimize crossing walking distances;
- introduce a new signalized intersection at Laird Drive and Vanderhoof Avenue to facilitate safe Leaside neighbourhood access to the transit station, community centre, emerging retail and office uses, and existing and planned parks;
- for local roads into the Leaside residential neighbourhoods, introduce curb extensions consisting of a narrowed roadway and a tighter radius, and a raised textured intersection profile – for pedestrians there will be an increased storage area at the intersection corners and a shorter crossing walking distance, while vehicular traffic will require lower speeds;
- remove existing Laird Drive medians which encourage unsafe mid-block pedestrian crossing, but investigate new controlled pedestrian crossings at key intersection or mid-block locations;
- modify signalized intersection configuration at Laird Drive and McRae Drive to remove traffic island and to reduce radii, including potential turning restrictions, to shorten the walking distances and reduce vehicular speeds at this highly pedestrian-active intersection;

Figure 9-10: Improved Intersection Configurations

- provide widen crosswalks (6 m) an anticipated high pedestrian volume crossing (i.e. Eglinton Avenue and Laird Drive, Laird Drive and Vanderhoof Avenue), and correspondingly ensure larger pedestrian storage areas with wider boulevards and building setbacks;
- promote active transportation along Brentcliffe Road on the west side to avoid significant northbound turning truck movements at Eglinton Avenue;
- provide continuous uninterrupted sidewalks across driveways and minor unsignalized intersections.

9.2 Functional Concept Plan

A functional concept plan for the recommended mobility plan has been developed. The functional design of all roadways and rights-of-way has considered the proposed changes in use, intensity and character as the development occurs, and adheres to the Toronto Complete Street Guidelines (2016), the Toronto Green Technical Standards (2018), and numerous other City design standards. In addition, all new local streets will conform to Toronto's Development Infrastructure Policy and Standards (DIPS).

The functional concept plan drawings illustrating key components and associated typical sections are provided separately. The functional concept plan has been developed to an approximate 10% design level, at a scale of 1:1000 and typical sections at 1:100.

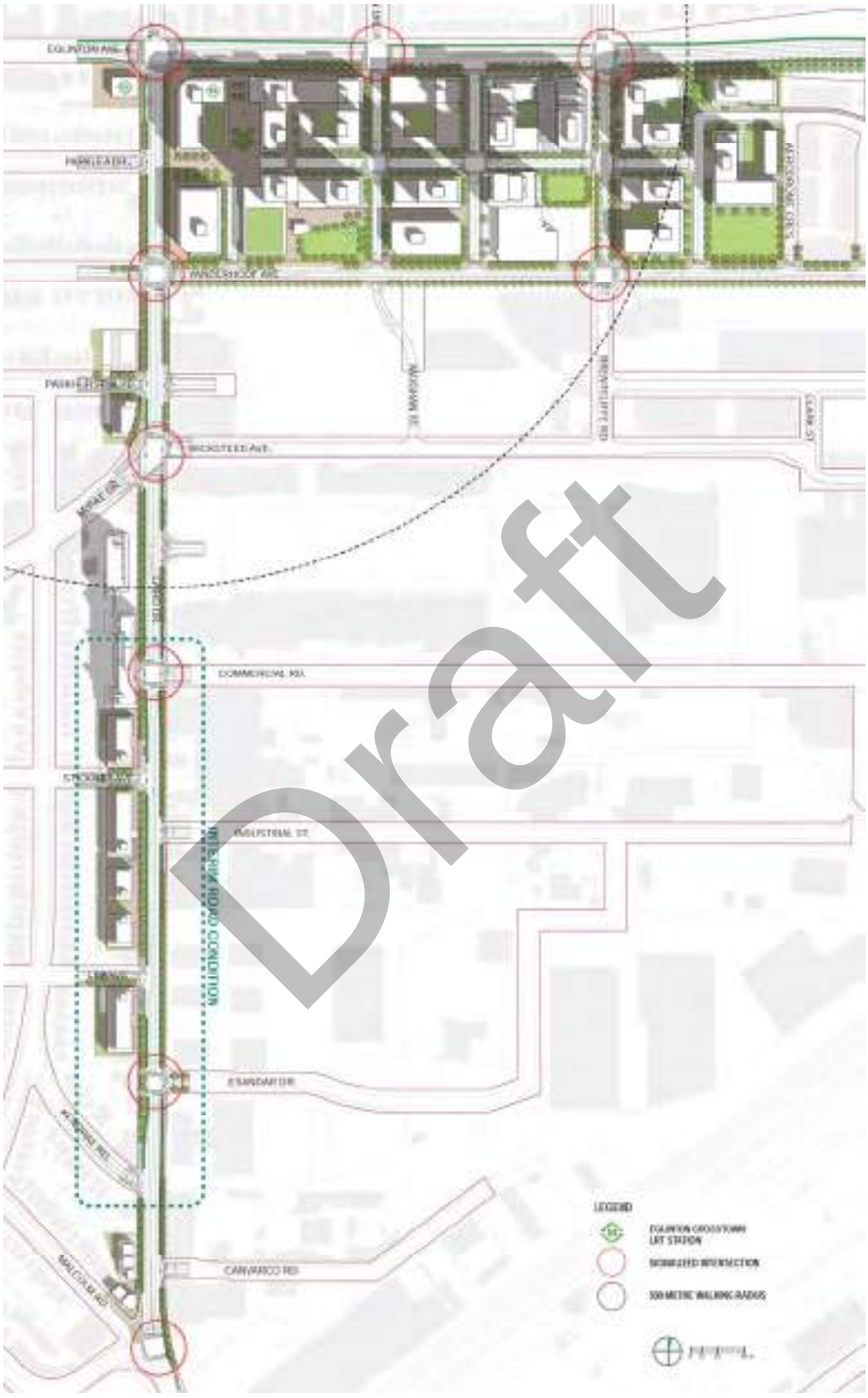
9.2.1 Roadway Descriptions

The following sub-sections provide an overview of the recommended typical sections for key roadways in the study area. To be read in conjunction with the functional concept plan and typical sections, these elements are addressed:

- roadway classification;
- right-of-way requirements;
- pedestrian and cycling facilities;
- bus transit interface provisions;
- boulevard and streetscape features;
- goods movement considerations;
- number and width of vehicular lanes, including identification of any intersection treatments, on-street parking provisions, and any non-standard treatments.

The typical sections have been used to confirm maximum right-of-way widths, and to inform of any necessary amendments to the Official Plan. The overall plan is provided in Figure 9-11.

Figure 9-11: Overall Roadway Plan



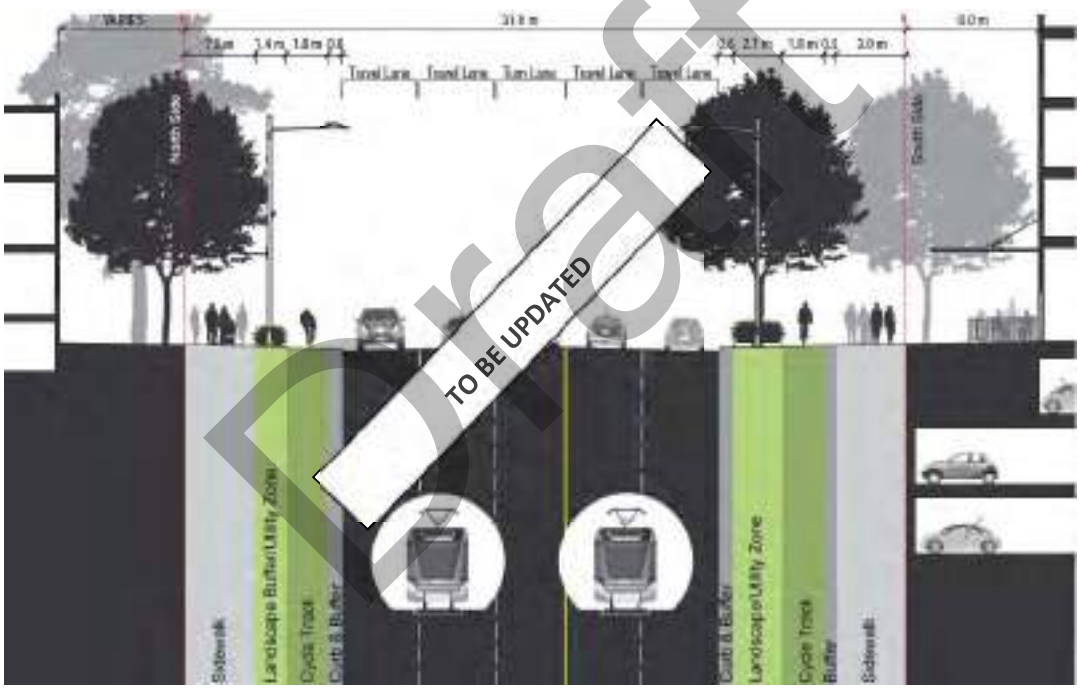
Eglinton Avenue

The recommendations from the EGLINTONconnects study are supported and endorsed for implementation. Recommended generous sidewalks in conjunction with building setbacks, cycle tracks buffered by landscaped zones and strategically placed bus lay-bys and on-street car parking, will provide an enhanced walking and cycling environment. This will support safe and comfortable access to the ECLRT to encourage non-vehicular trips, and to the planned mixed uses along Eglinton Avenue, with the anticipated greater range of and intensity of users than the other streets in the study area.

Although Eglinton Avenue will remain a major arterial with a high volume of vehicles and trucks, that will continue to provide regional connections as part of the larger transportation network, once the ECLRT is operational, a transformation in travel modes will occur, locally and regionally. A balanced and integrated multi-modal transportation network is critical for success to reduce the number of vehicular trips.

Figure 9-12 illustrates the proposed Eglinton Avenue cross-section in the vicinity of the study area.

Figure 9-12: Eglinton Avenue Typical Section



Laird Drive

Laird Drive is the primary north-south street in the study area that separates 2 distinct land uses in the Leaside community – the residential neighbourhood to the west and employment areas to the east. On the east side is a combination of recent low density mixed use / retail uses and older commercial properties. The west side presents a combination of older low density mixed use / retail uses and emerging new mid-rise residential developments. Heritage sites, including a few recently designated ones, are present along the west side of Laird Drive.

Although designated as a major arterial, Laird Drive presently provides a broad transportation role with respect to vehicular movement, which negatively impacts the pedestrian and cycling environments. Laird Drive provides direct driveway access and on-street parking, while also

being an important link in the local and regional road and goods movement network, a network that is challenged by a high degree of circuity. The ECLRT and supportive development presents an opportunity to evolve the transportation network and provide improved mobility.

It is envisioned that Laird Drive could provide an increasingly multi-modal function role as a central spine for the Leaside community that unifies the distinct land uses – residential to the west and the employment areas to the east – providing a safe and comfortable street for all ages and abilities.

Laird Drive can evolve into a destination for both communities, for workers and area residents both during and after typical business hours. Laird Drive can unify the existing distinct land uses with an enhanced landscaped streetscape. Combined with generous landscaped building setbacks this will promote the green streetscape character that can accommodate opportunities for grade-related plazas, patios and other public amenities. Laird Drive will become increasingly a local destination.

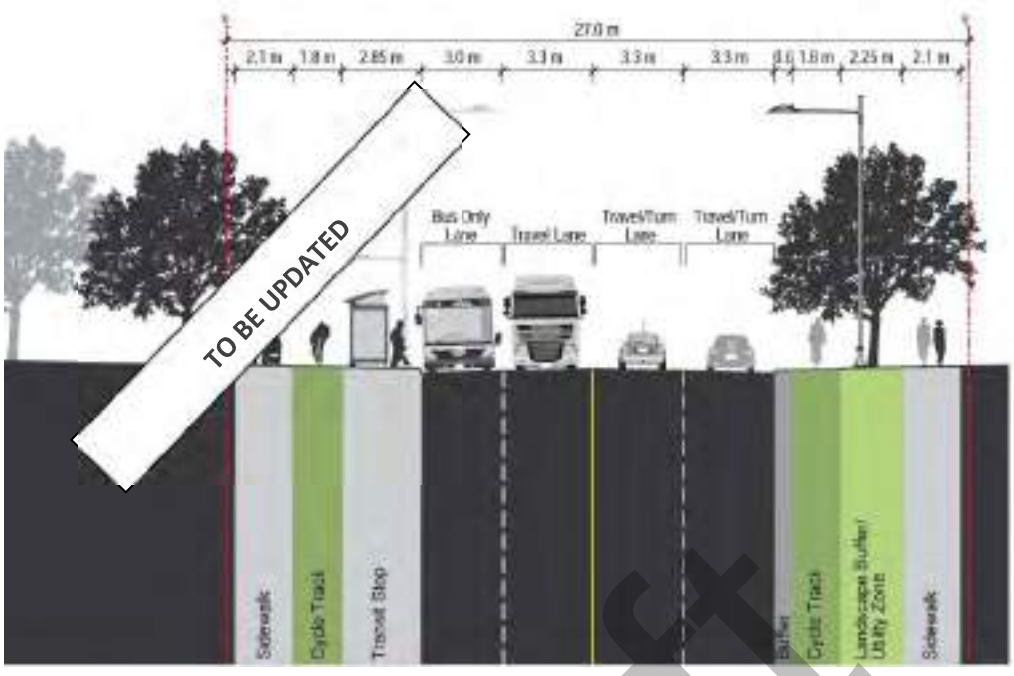
Laird Drive will also be the key connector for all modes to the ECLRT, to existing and planned community facilities, and to the regional transportation network and recreational resources.

To achieve this destination, unifying, and connector function, Laird Drive's transportation role needs to evolve into a balanced multi-modal transportation role to better serve the local community needs and to promote local non-auto trips within the area. Improved walking and cycling facilities, streetscape and amenities integrated with the local surface bus network, while maintaining an appropriate level of service for vehicular and goods movement requires a re-balancing of the planned 27.0m right-of-way (ROW) width.

The following discussion describe for Laird Drive segments the recommended re-balancing of the proposed 27.0m ROW, including supporting rationale.

Segment 1 – Eglinton Avenue to McRae Drive: This segment is in the vicinity of the ECLRT's Laird Station entrances, the planned community facility, emerging retail uses, and a major east-west cycling facility. Significant pedestrian and cycling volumes, and numerous on-street surface bus connections are not only anticipated, but also desirable. To accommodate a balanced multi-modal approach within a 27.0m ROW, but also recognizing that a 6m building setback will be provided on the east side, a recommended typical section has been developed, as illustrated in Figure 9-13, and summarized as follows:

Figure 9-13: Laird Drive Typical Section - South of Eglinton Avenue



- Curb-to-curb roadway width of 12.9m consisting of a dedicated northbound 3.3m right turn lane, a combined northbound 3.3m thru and left turn lane, a southbound 3.3m lane, and a 3.0m bus only lane. A widen and dedicated northbound right turn lane between Vanderhoof and Eglinton Avenues addresses the anticipated significant turning volumes, including trucks and frequent buses. Northbound surface bus routes leaving the stop at Vanderhoof Avenue will generally encounter minimal traffic to Eglinton Avenue. The dedicated southbound 3.0m bus lane, as opposed to a separate bus lay-by configuration, provides many benefits: a two-bay bus stop / layover area is required to facilitate frequent bus service and to permit timed transfer / schedule adjustments; provides encroachment area for both eastbound and westbound bus / truck southbound turning movements; and, buses are presented an opportunity to jump ahead of general traffic in the southbound direction. No on-street parking is permitted.
- A 1.8m raised cycle track will be provided on both sides, buffered by a 0.6m utility zone on the roadway side, and a 2.0m to 2.5m landscaping / street furniture / utility zone on the outside. At the bus stop / layover area, the cycle track is proposed to divert behind the bus platform / shelter area to minimize potential conflict with the anticipated higher bus passenger boardings / alightings, however to be reviewed at the detailed design stage.
- Pedestrian clearways will be provided on both sides, and be no less than 2.1m. Along the east side, the pedestrian environment will benefit from the planned 6m building setback, increased intersection daylighting at Eglinton and Vanderhoof Avenues, and the extended Street 'A' plaza area. Increased pedestrian activity associated with the transit station, retail uses, and the community centre will be safer and more comfortable.

South of Parklea Drive to McRae Drive the roadway curb-to-curb width increase to 13.2m (4 – 3.3m lanes). The intersection at Vanderhoof Avenue will be signalized to: provide a safe pedestrian and cycling crossing to access transit, the planned community centre, emerging retail uses, and the proposed east-west multi-use trail facility; and, to facilitate the anticipated

increased turning movements. To be noted, Vanderhoof Avenue westbound thru movements will not be permitted into the residential community. At both Vanderhoof Avenue and McRae Drive intersections, lane functions (i.e. thru and / or turning) transition to prioritize anticipated key vehicular movements. Further, at proposed bus stop locations, the cycle track will ramp up to the platform elevation, and traverse the bus stop area on the roadside of the bus shelter.

Access into the proposed new development on the east side, across from Parkhurst Boulevard, will be designed to restrict movements to only right-ins and right-outs.

Figure 9-14: Laird Cycling Use

Segment 2 – McRae Drive to Commercial Road: In addition to improving the pedestrian / cycling / transit environments, this segment will need to address major driveways to planned developments on both sides of Laird Drive, and significant truck volumes as Commercial Road is the proposed designated truck route and access point into the Leaside Business Park.

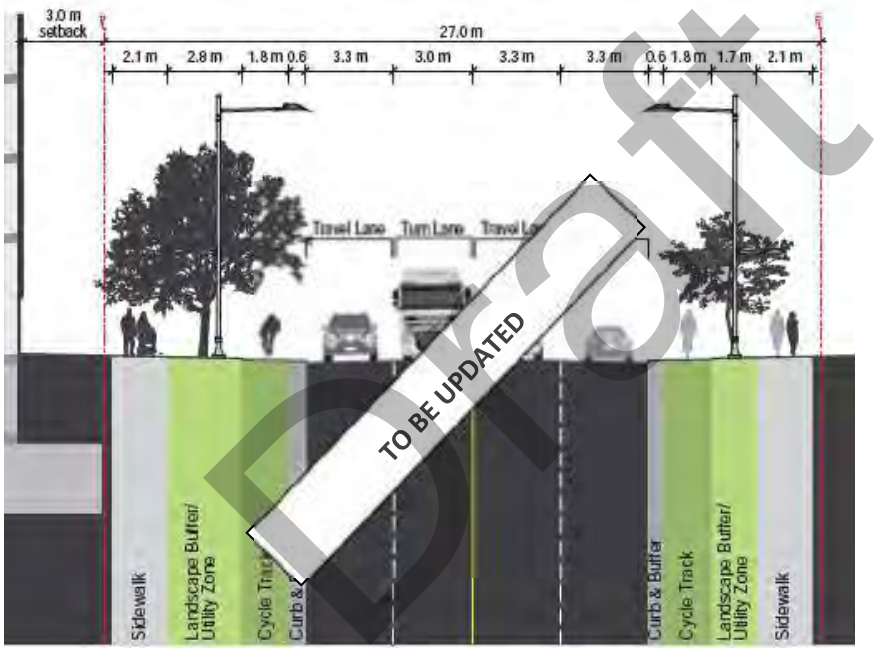
Figure 9-15 illustrates the recommended typical section along Laird Drive between McRae Drive and Commercial Road, summarized as follows:

- Curb-to-curb roadway width of 12.9m can accommodate 4 vehicular lanes. This configuration can permit two southbound lanes and two northbound lanes with shared left turn access. No on-street parking is permitted. However, from the analysis provided, there is an opportunity to explore an alternate option which would better accommodate future goods movement and traffic operations. As demonstrated in Figure 9-15, a configuration of two northbound lanes, one southbound 3.3m through lane, and a continuous 3.0m two-way median left turn lane is desirable. This would provide a safe southbound left truck turning movements onto Commercial Road, and improves traffic operations at McRae Drive by providing a dedicated northbound left turn lane. Southbound vehicular movements are anticipated to be lower south of McRae Drive, with significant southbound right turning volumes onto McRae Drive.

- A 1.8m raised cycle track will be provided on both sides, buffered by a 0.6m utility zone on the roadway side, and a 1.7m to 2.8m landscaping / street furniture / utility zone on the outside. At proposed bus stop locations, the cycle track will ramp up the stop platform / boulevard / sidewalk elevation, and traverse the bus stop area on the roadside of the bus shelter.
- Pedestrian clearways will be provided on both sides, and be no less than 2.1m.

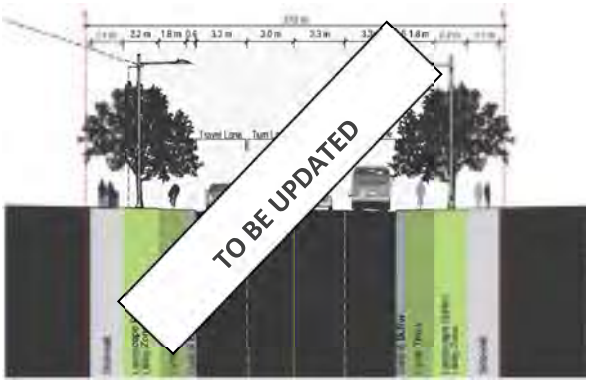
Given the provision of a singular and narrowed southbound lane, it is recommended that the McRae Drive eastbound movement include a right turn restriction. Existing turning movements are very low and there are several alternative routes presented. Removal of the channelization island and replacing it with a minimum radius and turning restriction, will reclaim significant right-of-way to implement a gateway feature that could highlight Leaside's heritage and support cycling and walking amenities. But more importantly, the reduced crossing lengths and increased storage areas enhances the safety for pedestrians and cyclists for all intersection crossing movements.

Figure 9-15: Laird Drive Typical Section - South of McRae Drive



Segment 3 – Commercial Road to Esandar Drive: During the progress of the study, heritage properties were identified including 96 Laird Avenue (northwest corner of Laird Drive / Lea Avenue), which encroaches into the proposed 27.0m right-of-way. To be noted, Laird Drive was originally a 20m ROW, but assumed a 3.5m property conveyance on both sides when redevelopment occurs that would provide an ultimate 27.0m. To date, only the east side 3.5m has been conveyed, so presently there is a 23.5m ROW available.

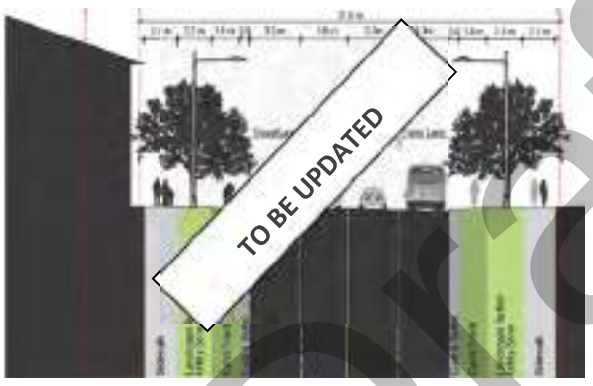
Figure 9-16: Typical Section at 96 Laird Drive (Pre-Heritage Designation)



Prior to the heritage property designations, a symmetrical cross-section was shown to the public as the recommended typical section. Key roadway elements included (refer to Figure 9-16):

- 2.1m sidewalks;
- 1.8m cycle tracks buffered with a 0.6m utility zone and a 2.2m landscaping zone;
- 4 – 3.3m vehicular lanes with no on-street parking.

Figure 9-17: Typical Section at 96 Laird Drive (Ultimate Cross-Section with Heritage Designation)



Ultimately, 4 – 3.3m vehicular lanes will be required beyond the designated heritage property, as illustrated in Figure 9-17.

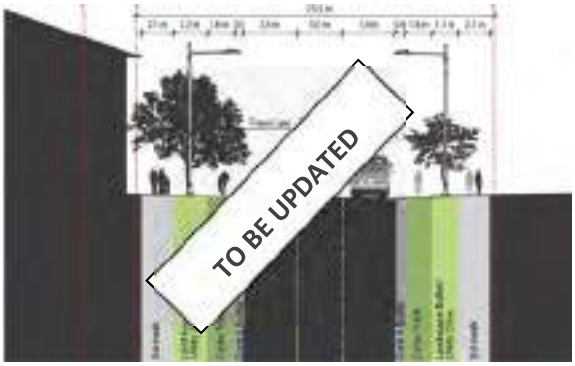
This too will require a 27.0m right-of-way, which means that an additional 3.5m property conveyance is required when redevelopment occurs on the east side.

However, to promote near-term cycle track construction along Laird Drive, 2 potential interim options were reviewed, considering only an initial 23.5 right-of-way.

Figure 9-18: Option 1 - Interim Typical Section at 96 Laird Drive

Interim Option 1 utilizes the existing 23.5m ROW and provides the ultimate 4-lane with cycle tracks cross-section. As a result, as shown in Figure 9-18, no green / landscaping zone is provided on either side. Further, a roadway shift of over 2m is required presenting a significant roadway transition on both the north and south approaches, which impacts all roadway elements. This option could also be considered as an ultimate option, although undesirable.

Figure 9-19: Option 2 - Interim Typical Section at 96 Laird Drive



Interim Option 2 also initially utilizes the existing 23.5m ROW, but with only 3 traffic lanes – a 3.3m lane in the northbound and southbound direction, and a 3.0m continuous two-way left turn lane. This configuration allows for landscaped boulevards on both sides. The resulting roadway shift is reduced. Both the roadway shift and the west side boulevard is constructed to the ultimate 4-lane cross-section configuration.

When redevelopment occurs on the east side, including with an additional 3.5m property conveyance, the ultimate 4-lane cross-section can be constructed, with only the roadway's east side requiring widening and reconstruction. Neither interim option has been shown to the public.

For the purposes of this functional concept plan, Interim Option 2 has been adopted, but subject to future consultation. Figure 9-19 illustrates the interim recommended typical section along Laird Drive between Commercial Road and Esandar Drive within the existing 23.5m right-of-way:

- Curb-to-curb roadway width of 9.6m consisting of a 3.3m lane in both directions, and a continuous 3.0m two-way median left turn lane. No on-street parking is permitted.
- A 1.8m raised cycle track will be provided on both sides, buffered by a 0.6m utility zone on the roadway side, and approximately a 2m landscaping / street furniture / utility zone on the outside. At proposed bus stop locations, the cycle track will ramp up the stop platform / boulevard / sidewalk elevation, and traverse the bus stop area on the roadside of the bus shelter. To be noted, beyond 96 Laird Drive, the property line will revert to the original designated 27.0m ROW, which is 3.5m to the west. As a result, the west boulevard will be significantly wider.
- Pedestrian clearways will be provided on both sides, and be no less than 2.1m.

Segment 4 – Esandar Drive to Millwood Road

This segment will ultimately be a 4-lane cross-section, two lanes in each direction, but an interim transition from a 3-lane cross-section north of Esander Drive (as per Segment 3 discussion) may be required. Although the designated ROW is 27.0m, additional property may be required to: facilitate an ultimate 4-lane transition at the Esandar Drive intersection; provide a typical bus stop configuration; and, to ultimately extend the cycle track network across the CPR corridor.

The recommended Laird Drive 4-lane typical section from south of Esandar Drive to the reconstructed Millwood Road intersection is summarized as follows:

- Curb-to-curb roadway width of 13.2 m consisting of 2 - 3.3 m northbound and southbound lanes. No on-street parking is permitted.
- Pedestrian clearways will be provided on both sides, and be no less than 2.1 m.

- A 1.8 m raised cycle track will be provided on both sides, buffered by a 0.6 m utility zone on the roadway side, and a 2.0 m minimum landscaping / street furniture / utility zone on the outside.

Vanderhoof Avenue

Transforming Vanderhoof Avenue to become a beautiful greenway linking existing Leaside neighbourhoods and planned developments to shared public uses and the Don Valley ravine system was one of the identified "10 Big Moves" of the Laird in Focus study.

The intent is to provide an asymmetrical cross-section within the existing 20.0m right-of-way, providing a wider boulevard width on the north side. As a result, an increased buffer distance with the remaining employment lands to the south will be provided. This wider boulevard also provides for a lay-by facility to be used for TTC buses, and as a pick-up / drop-off (PUDO) zone for the planned community facility and associated parklands.

For the purposes of this study, it has been determined that Vanderhoof Avenue will remain classified as a collector roadway with a 20.0m right-of-way. However, it is recognized that if further mixed-use development occurs in the employments lands to the south that the role and function of Vanderhoof Avenue may need to be reassessed at that time, including a potential roadway re-classification and associated right-of-way widening.

Figure 9-20 and Figure 9-21 illustrate the recommended typical section proposed for Vanderhoof Avenue, summarized as follows:

- Curb-to-curb roadway width of 9.4m consisting of a 3.2m lane in each direction, and a continuous median 3.0m dual left turn lane. A continuous median left turn lane was deemed desirable for safe and efficient traffic operations to address: anticipated high turning movements onto Street 'A' to access the planned community centre, underground parking facility, and the new developments; and, to provide access to new streets / driveways on the north side and existing streets / driveways on the south side. No on-street parking is permitted within the travelled portion of the roadway.
- A 2.1m pedestrian sidewalk will be provided on the north side, clear of all utilities. The sidewalk on the south side will be a monolithic 2.1m sidewalk, but will not be clear of utilities (i.e. light standard poles). As previously mentioned, when redevelopment occurs on the south side, the sidewalk and boulevard design can be reconsidered in context of a potential roadway ROW widening and / or building setback provisions.
- A 3.0m off-street two-way multi-use trail will be provided on the north side between the pedestrian clearway and the curb, buffered by a 0.6 m utility zone on the roadway side and a 2.5m landscaping / street furniture / utility zone on the outside.
- East of Street 'A' and within the north boulevard, a 2.5m lay-by is being provided to facilitate: (a) two-bus bay stop that will provide for timed schedule adjustments; and, (b) short-duration pick-up / drop-off (PUDO) zone for the planned community centre and associated park lands. Implementation of this lay-by will mean there will not be a landscaping zone in the roadway ROW, however the lay-by is directly adjacent to a planned park area that will have associated trees and street furniture to provide comfort and shade.

The intersection of Vanderhoof Avenue and Laird Drive will be signalized. The design will be focussed on providing safe pedestrian and cycling movement and access for the local

communities. Vehicular through movements along Vanderhoof Avenue will be restricted to minimize vehicular traffic on local streets.

Figure 9-20: Vanderhoof Avenue Typical Section

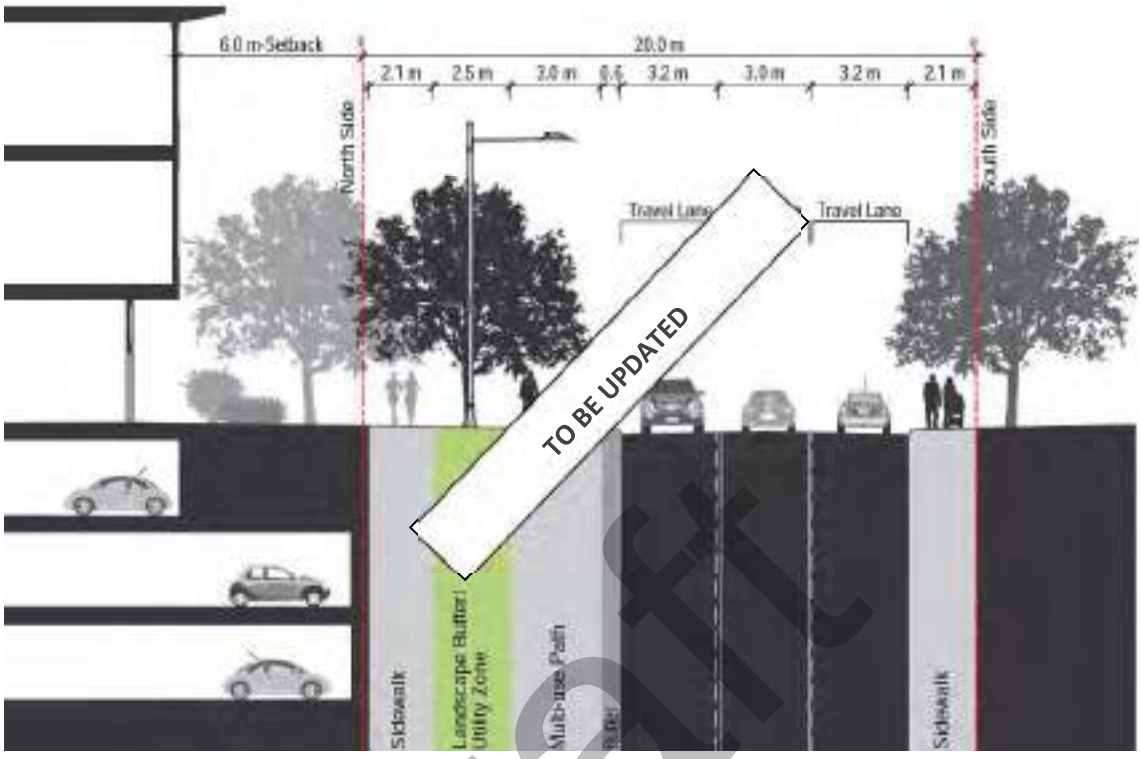
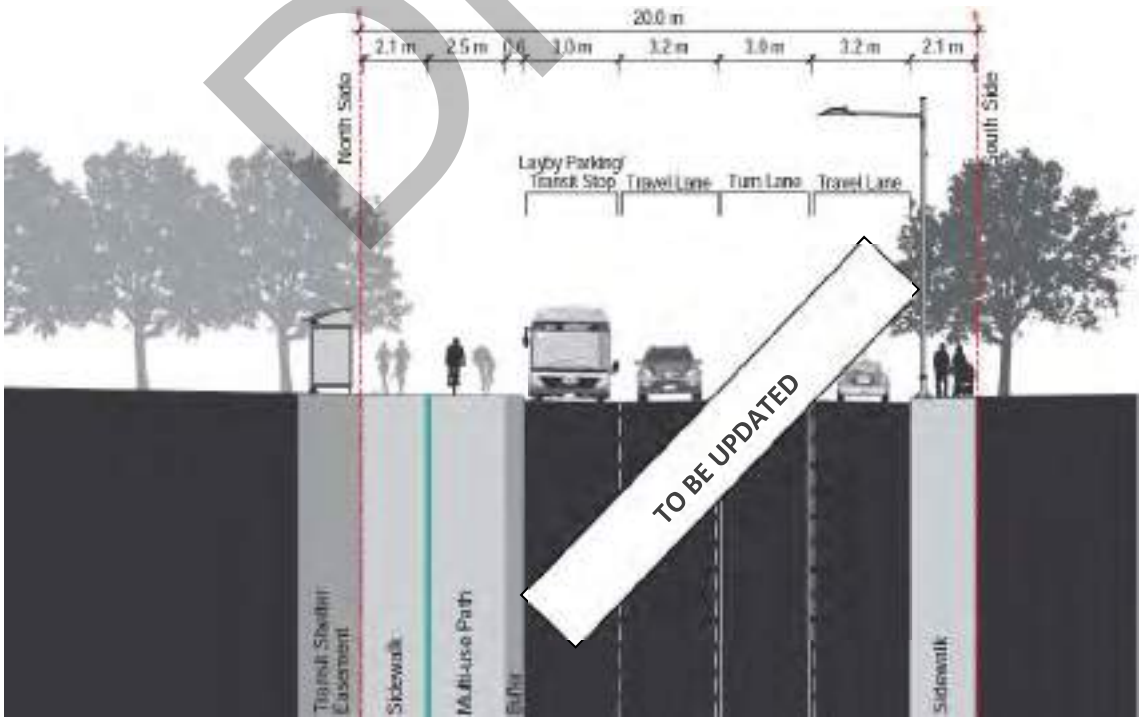


Figure 9-21: Vanderhoof Avenue Typical Section with Lay-by



To be noted, in order to maintain a consistent cross-section with the multi-use trail on the north side, the travelled roadway of Vanderhoof Avenue will have to be shifted to the south east of Aerodrome Crescent and in the vicinity of Leonard Linton Park.

Wicksteed Avenue

As noted elsewhere in this report, Wicksteed Avenue improvements are potentially required to provide additional roadway capacity and an alternative truck route as development occurs, subject to actual TDM effectiveness and diversion to transit. In this scenario, it is envisioned, that a roadway widening is required from Brentcliffe Road to Millwood Road via Beth Nealson Drive, including a CPR grade separation. Ideally, depending on the proposed redevelopment, the widening would be extended to Laird Drive with the potential McRae Drive / Laird Drive / Wicksteed Avenue intersection reconfiguration. This Wicksteed Avenue improvement would require the widening of the existing 20.0m right-of-way and likely roadway re-classification, all subject to a completion of an environmental assessment. Other options to increase road capacity are limited, but can be explored in future studies.

Figure 9-22: Existing Rail Crossing on Wicksteed

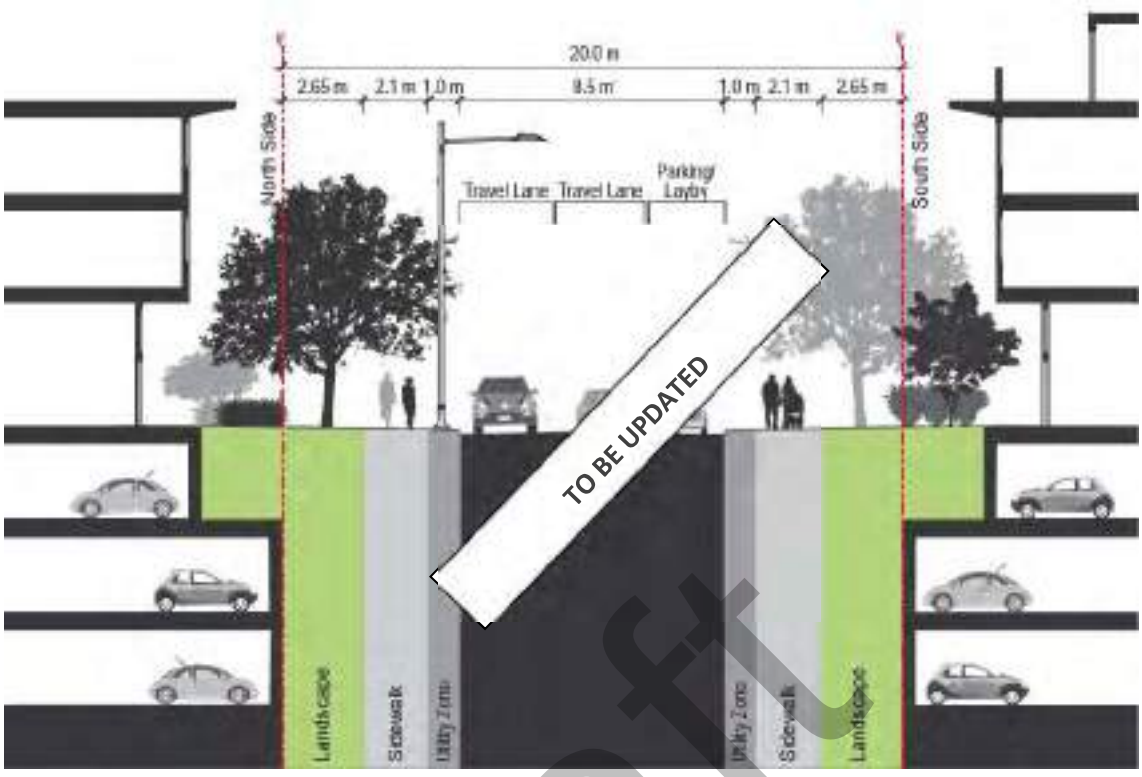
Figure 9-23: Wicksteed and Laird

Street 'A' (Mid-Block)

A new east-west mid-block green street is proposed between Eglinton Avenue and Vanderhoof Avenue that will act as a connector from residential areas to destinations. Destinations include the transit station, the existing and planned community facilities, parks, and emerging retail and office uses. This mid-block street will connect to additional safe and comfortable roadways and linkages through the development blocks to improve permeability. To be noted, this mid-block street has not been extended to Laird Drive and hence not impacting bus and vehicle movements south of Eglinton Avenue close to the LRT station.

With an attractive public realm treatment and a resulting lower speed environment, the new street will be pedestrian-friendly with a focus on intimate passive activities in comparison with a busier and active Eglinton Avenue. It will also achieve increased cycling activity with safe, comfortable and attractive conditions, and provide enhanced and convenient access and connectivity to transit.

Figure 9-24: Street 'A' (Mid-Block) Typical Section



- Curb-to-curb roadway width of 8.5m consisting of a lane in each direction, and parking / layby provisions on one side. On-street short-term parking will be permitted to support of planned ground-level uses. Drop-off/Pick-up locations will be provided near the transit station entrance and the proposed community facility.
- A 2.1m pedestrian sidewalk will be provided on both sides, buffered by a 1.0m utility zone on the roadway side, and a 2.0m landscaping / street furniture zone on the outside. Combined with building setbacks, a wide attractive public realm opportunity is presented.

Street 'A' is primarily a public right-of-way, classified as a local roadway with a 20.0m ROW, excluding the section associated with the 939 Eglinton Avenue development, however aligned and consistent with respect to design elements.

Don Avon Drive and Street 'B' (new N-S streets)

New north-south streets are proposed between Laird Drive and Brentcliffe Drive, the extension of Don Avon Drive and Street 'B'. These streets between Eglinton Avenue and Vanderhoof Avenue are critical to implementing a finer grain street network that will provide alternative routing choices that connect to the surrounding street network.

The streets will be classified as local roadways, and will have a 20.0m right-of way with generally the same typical section as Street 'A', as previously described. These streets will have slower travel speeds, including all stops at Street 'A', and will provide access to primarily adjacent residential and commercial properties. Combined with a wide and attractive public realm, an increased level of pedestrian and cycling activity is supported, providing safe facilities for all users.

The Don Avon Drive extension was aligned with the existing Don Avon Drive to the north of Eglinton Avenue considering proposed development block sizes and traffic operations along

Eglinton Avenue. However, as part of the redesign of the Don Avon Drive and Eglinton Avenue intersection, which will be signalized, vehicular through movements will be restricted to minimize vehicular traffic on local streets. The intersection design will focus on providing safe pedestrian and cycling access for the local community.

Brentcliffe Drive

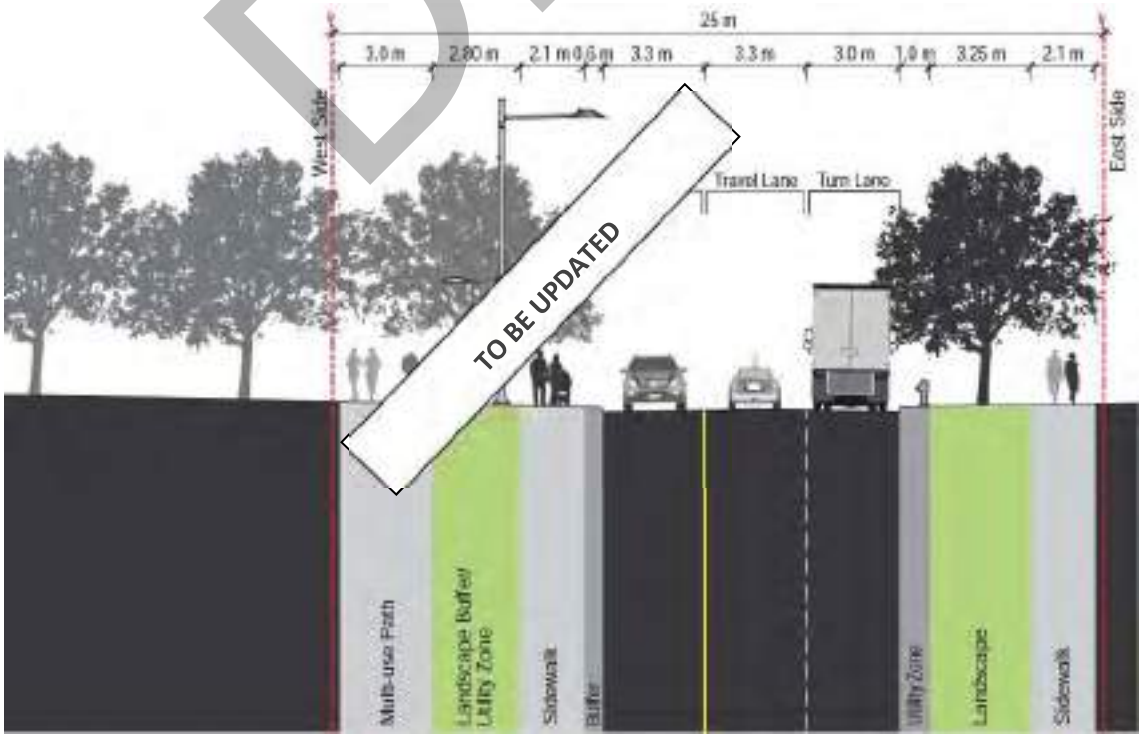
Brentcliffe Drive between Eglinton Avenue and Wicksteed Avenue is designated as a minor arterial that presently, and will continue to, provide a significant transportation role with respect to vehicular, transit, and goods movement. This is a major consideration in the development of the built form, and correspondingly the re-balancing of transportation elements within the existing 25.0m right-of-way. Figure 9-25 illustrates the proposed re-balancing within the ROW.

It is envisioned that Brentcliffe Drive will remain as a key goods movement route, in and out from the Leaside Business Park. Providing a long northbound right turn lane at Eglinton Avenue, uninterrupted with a mid-block stop, including a larger turning radius, will continue to support goods movement activities.

Generous 2.1m sidewalks are provided on both sides buffered by a wide landscaping zone on the roadway side with a minimum 3.0m width that will significantly enhance the pedestrian environment for all ages and abilities. However, cycling facilities are being limited to providing a 3.0m multi-use trail on the west side. It will connect to the proposed multi-use trail along Vanderhoof Avenue, and presently terminate at Street 'A' in the vicinity of a proposed park facility.

A two-bus bay along Brentcliffe Road in the southbound direction, south of Eglinton Avenue, is also proposed for timed layovers for potential multiple routres.

Figure 9-25: Brentcliffe Drive Typical Section



9.2.2 Design Elements

As indicated, a functional concept plan has been developed and is provided separately. The following sections refers to the plan, and highlights key items.

9.2.3 Roadway Alignment

Based on planning-level mapping, the horizontal and vertical alignment for roadways and associated pedestrian and cycling facilities, adheres to all City standards and best practices.

9.2.4 Intersection Treatments

Different techniques are recommended to promote a safe pedestrian and cycling environment, and to discourage non-local traffic entering the adjacent residential neighbourhoods. The major proposed initiative is to locally narrow the roadway width, reduce the intersection turning radii, and to introduce an elevation raise, preferably with visual cues (i.e. texture and colour treatments).

Figure 9-26: Intersection Treatment Options

These treatments will reduce speeds and thereby lengthen travel times, and will significantly discourage larger vehicles / trucks from entering. As a result of these initiatives, safety is promoted, including pedestrian and cycling crossing times are shorten.

These treatments are recommended along local roads only along Laird Drive intersections (Parklea Drive, Vanderhoof Avenue, Parkhurst Boulevard, Stickley Avenue, Lea Avenue, Kenrae Avenue) and at the Eglinton Avenue and Don Avon Drive intersection.

9.2.5 Right-of-Way Requirements

As previously described, the recommended mobility plan is generally within the roadway's designated right-of-way, with the following potential exceptions;

- additional property near the proposed heritage designated property at 96 Laird Drive in order to provide a consistent and continuous streetscape along Laird Drive, and / or to protect for an ultimate 4-lane cross-section along Laird Drive;
- localized property beyond the designated right-of-way widths to site bus stops with desirable shelters / amenities and cycling facility interface (to be noted, TTC have not finalized preferred bus stop locations).

In the longer term, property may be required widen and grade separate Wicksteed Avenue at the CPR crossing, and to extend the planned cycling facility from Laird Drive to Millwood Road. Both property requirements would be subject to an environmental assessment process.

9.2.6 Typical Sections (street side / boulevard features)

Roadway right-of-way typical sections have been described in previous sections and detailed on the functional concept plans

9.2.7 Cycling Facilities

Cycling and multi-use trail facilities have been described in previous sections and detailed on the functional concept plans. Remaining considerations to be resolved include:

- interface / storage details between network facilities, specifically at the Vanderhoof Avenue and Laird Drive and Eglinton Avenue and Laird Drive intersections;
- connecting routes into the North Leaside community (i.e. via Laird Drive, Don Avon Drive, and / or Brentcliffe Road;
- short-term and long-term connection details between the planned Laird Drive cycle tracks and the existing Millwood Road facility;
- bike-share facility siting discussions.

9.2.8 Overall Pavement Markings and Signage for Traffic Control Devices

The following non-standard and site-specific pavement markings / traffic control devices are recommended:

- wider crosswalks (i.e. 6m) along key pedestrian movement routes and where high volumes are anticipated;
- no thru traffic signage to be provided for the northbound through movement at the Don Avon Drive and Eglinton Avenue intersection, and for the westbound through movement at the Vanderhoof Aveneue and Laird Drive intersection;
- no right turn signage in the eastbound directions at the McRae Drive and Laird Drive intersection.

An intermediate signalized crossing location along Laird Drive between Commercial Road and Esandar Drive should also be explored, considering where the TTC plans to place a bus stop along this section.

9.2.9 Structural Requirements

No structural requirements, such as bridges and major retaining walls, have been identified in the short term. However, in the longer term, CPR crossings may have to be addressed: a grade-separation along Wicksteed Avenue; and, extending the planned cycling facility from Laird Drive to Millwood Road. Both crossings would be subject to an environmental assessment process.

9.2.10 Preliminary Cost Estimates

Preliminary cost estimates, with appropriate contingencies for utilities and property, will be developed for the identified short-term improvements along Laird Drive, Vanderhoof Avenue, and Brentcliffe Road.

9.3 Neighbourhood Plan

A number of initiatives have been outlined in this mobility plan that recognizes both the existing and potential future concerns, but also provides significant emerging benefits. The mobility plan benefits include the following recommendations:

- a re-invented Laird Drive as a vibrant street and local destination, highlighted by safe and comfortable continuous sidewalks and cycle tracks for all ages and abilities, that connects

to major destinations such as the LRT station, existing and planned community facilities / parks, and new retail and employment development;
- from this envisioned Laird Drive that will provide an increasingly multi-modal function role as a central spine for the Leaside community, new safe crossing opportunities are presented;
- foremost of these crossing opportunities is the transformation of Vanderhoof Avenue to become a beautiful greenway linking existing Leaside neighbourhoods and planned developments to shared public uses and the Don Valley ravine system via a new signalized intersection; and,
- signalized intersections will be maintained at Commercial Road and Esandar Drive, and an intermediate signalized crossing location is recommended and should be explored, considering where the TTC plans to place a bus stop along this section.

From the study's analysis, it was found that that traffic within the local neighbourhoods along the local roads is primarily from the local community (i.e. ranging between 50% to 80%) and the adjacent surrounding areas (i.e. additional 10% to 40%), which is compatible with the functional role of a local roadway. Further, trips to / from the community that are from / to the surrounding community are being improved with linkages to safe and attractive pedestrian and cycling facilities.

However, there are additional techniques that are recommended to discourage non-local traffic entering the adjacent residential neighbourhoods. In addition to providing no thru traffic signage at Don Avon Drive and Vanderhoof Avenue intersections, the major proposed initiative is to locally narrow the roadway width, reduce the intersection turning radii, and to introduce an elevation raise, preferably with visual cues (i.e. texture and colour treatments). These treatments will reduce speeds and thereby lengthen travel times, and as such, will significantly discourage all vehicles / trucks from entering. These treatments are recommended along local roads only along Laird Drive intersections (Parklea Drive, Vanderhoof Avenue, Parkhurst Boulevard, Stickley Avenue, Lea Avenue, Kenrae Avenue) and at the Eglinton Avenue and Don Avon Drive intersection.

9.4 Employment Lands Plan - Leaside Business Park

The City recognizes the importance of the Leaside Business Park, and is committed that the Leaside employment lands are to remain as employment lands, including maintaining access to and from their operations.

Supporting the vitality of employment lands is critical to an economically sustainable City, as well as planned and integrated growth with a supportive transportation system. The mobility plan recommends a safe and balanced approach to maintaining the employment lands vital, while providing the opportunity for people to work, live and play locally.

Key recommendations to maintaining the employment lands vital are:

- Support key truck / goods movement routes, consisting of arterial roadways to the Leaside Business Park (Eglinton Avenue, Laird Drive, Brentcliffe Road and Millwood Road), and internal roadway access via Commercial Road and Wicksteed Avenue, including the provision of truck turning radii and lanes where appropriate;
- Minimize potential conflicts with pedestrians and cyclists through roadway / streetscape design and placement of utilities;
- Incrementally enhance the pedestrian and cycling environment, and safely connecting to the enhanced transit and active transportation network within the employment lands as

redevelopment occurs, to provide increased travel choice for employees and patrons; and,
- Including potential Wicksteed Avenue improvements, as warranted, to provide additional roadway capacity and an alternative truck / goods movement route, as development occurs.

9.5 Implementation Plan

An implementation plan for the recommended mobility plan has been developed defining infrastructure, policy, and service improvement requirements. The following section outlines the requirements for:

- Development Phasing;
- Coordination and Priorities;
- Policy Directions;
- Environmental Assessment (EA) Requirements;
- Financial Strategy and Funding Sources;
- Monitoring and Assessment Plan.

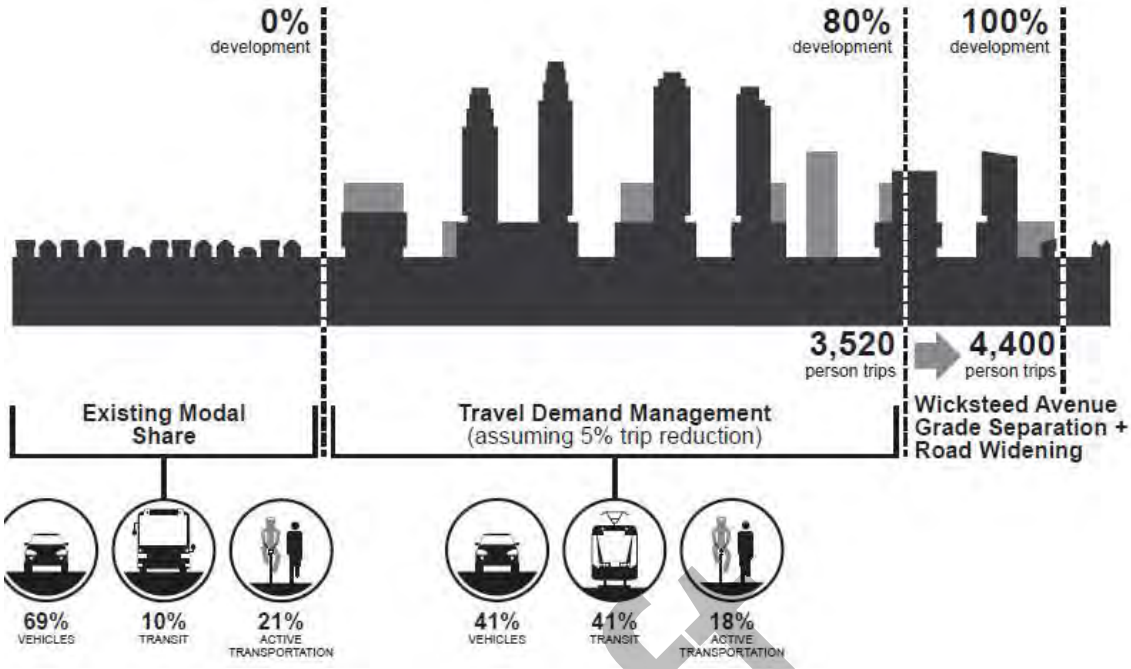
9.5.1 Development Phasing

The recommended mobility plan findings present an implementation plan based upon development levels and the need for additional infrastructure (to be noted assumes ECLRT operational). An additional critical roadway improvement is envisioned in order to add capacity to the network. A potential option is a Wicksteed Avenue roadway widening from Brentcliffe Road to Millwood Road via Beth Nealson Drive, including a CPR grade separation. This improvement will provide additional east-west roadway capacity, including increased connectivity and access to and from the employment lands.

Also noted, was that an achievable 10% TDM-related trip reduction rate with an associated 10% increase in the transit mode split, would provide a sufficient reduction in demand to accommodate the proposed development. To achieve the planned development levels, two scenarios are presented:

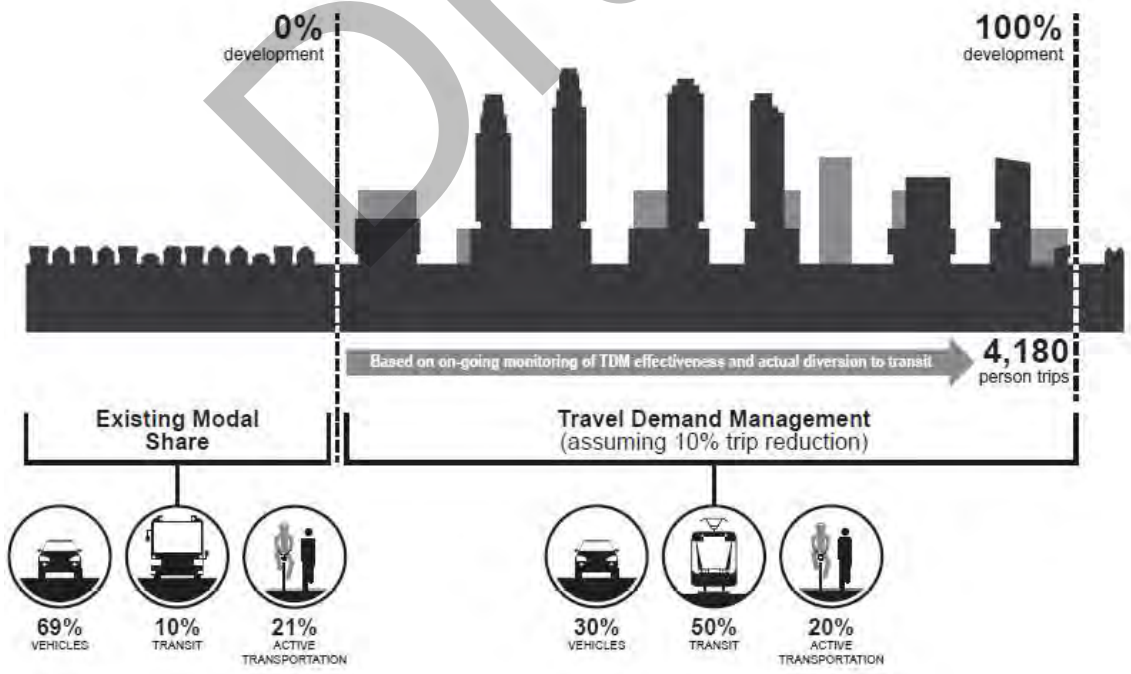
Option 1: Adopting a modest 5% TDM-related trip reduction, but including additional roadway infrastructure, such as a Wicksteed Avenue road widening and grade separation, at approximately the 80% development build-out phase.

Figure 9-27: Option 1 Key Benchmarks



Option 2: Successfully embracing TDM strategies to achieve a 10%-person trip reduction and an additional 10% person trip diversion to transit. Monitoring of the transportation network, pre-development and during development as it comes into service, is critical.

Figure 9-28: Option 2 Key Benchmarks



9.5.2 Policy Directions

Identified policy directions to implement the recommended mobility plan include:

- Official Plan Amendments – to secure all new public streets in Schedule 1 and 2 of the Official Plan;
- Cycling Network Amendment – to refine the Cycling Network Plan;

Zoning By-Law 569-2013 amendment to include Policy Area 2 designations for developments within 500m of a transit station, and a Policy Area 3 designation elsewhere. Further site-specific parking space rate reductions should be considered when accompanied with additional TDM and innovative mobility measures that will contribute to additional person trip reduction.

9.5.3 Environmental Assessment (EA) Requirements

Based on the recommended mobility plan, potential EAs to be undertaken have been Based on the recommended mobility plan, potential EAs to be undertaken have been identified:

- Road capacity improvements such as Wicksteed Avenue road widening and CPR grade separation; and,
- Laird Drive reconstruction, dependant on scope and capital costs, could include the addition of cycle tracks, roadway reconfiguration, municipal servicing and other utilities, and the extension of the proposed Laird cycle tracks across the CPR corridor to Millwood Road

9.5.4 Financial Strategy and Funding Sources

To assist in reducing taxpayer costs on the transportation improvements identified in this study, the City should pursue outside funding opportunities. An overview of potential sources is to be provided, including as a minimum development charges, Smart Commute, Ontario Municipal Cycling Infrastructure Program, and the Toronto Parking Authority.

9.5.5 Development Charges

The City conducts development charges studies to identify funds to be collected for transportation infrastructure improvements under the Development Charges (DC) Act and associated DC By-Laws. These studies typically identify all types of transportation infrastructure required to serve development growth, including roads, transit, and active transportation. The City should consider amending their DC By-Law to include associated infrastructure for emerging TDM (i.e. ride-share, car-share and trip planning programs) and sustainable technologies (i.e. electric vehicle charging points).

9.5.6 TDM Monitoring and Assessment Plan

A multi-modal demand model generated trips for the area was developed considering each mode, each development block, each existing and planned land use and characteristics, provided mobility choice and quality (i.e. vehicle, transit, cycling and pedestrian networks), and existing mode splits, volumes and travel patterns. Given the area's presently limited existence of ride-sharing and other typical TDM measures and existing low-density residential characteristics, a modest trip reduction of 5% was adopted.

This multi-modal analysis was based on a modest 5% TDM-related trip reduction presenting in the AM peak hour 4,400 additional trips due to the planned development, with a corresponding modal split of 41% vehicles, 41% transit, and 18% active transportation (existing

modal split of 69% vehicles, 10% transit, and 21% active transportation without the Eglinton Crosstown in operation). In addition, it was determined that approximately 80% of the development could be accommodated with the proposed street network. Additional roadway infrastructure, such as a Wicksteed Avenue road widening and grade separation to provide additional east-west roadway capacity, was deemed to be required.

Given that a relatively modest TDM-related trip reduction rate was adopted, potential for a higher rate is considered highly feasible with innovative technologies, evolving societal behaviour, and emerging programs supported by developing policies. As such, a higher trip reduction rate of 10% rate was tested, which is presently achievable in other parts of the City. Based on these tests, a 10% reduction to peak hour total person trips, and an additional increase in transit mode share of 10%, would allow for the planned development to be built in full, and be supportable by existing infrastructure.

As such, developers will be required to submit a comprehensive TDM plan and contribute to a TDM monitoring program.

Appendix A Existing Conditions Report

Draft

Appendix C

City of Toronto

Laird Focus Study

Functional Servicing Report

June 2018

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Project Number: 1896

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1.0 INTRODUCTION

SCS Consulting Group Ltd. has been retained by the Planning Partnership to prepare a servicing analysis as part of the Laird Focus Area Study, in support of future densification within the areas described below.

1.1 Purpose of the Report

This study is an assessment of the adequacy of the existing Toronto Water infrastructure with respect to the capacity of watermains, sanitary, storm and combined sewers within the study area. It will provide a description of each component of the existing infrastructure, the information reviewed, methodology, key assumptions, constraints identified and summary recommendations for improvements to properly support long term growth.

Having reported on the existing conditions of the Study Areas' infrastructure and based on the assessment of massing of the preferred alternative, this Phase 3 report outlines the servicing strategy for long-term growth within the Lair Focus Area Study.

Anticipated contributions to the municipal infrastructure from the proposed densification (preferred alternative) was modeled into the various systems reviewed to determine infrastructure recommendations to support future development.

A recent push for development in the area has resulted in the need to study local infrastructure for future intensification planning.

1.2 Study Area

The study area can generally be described as the west side of Lair Drive from Vanderhoof Avenue to Southvale Drive and the employment lands north of Vanderhoof Avenue from Laird Drive to Aerodrome Crescent. Please refer to **Figure 6.1** found in **Appendix C-1**

1.3 Objectives

This study is an assessment of the impact of densification on the existing Toronto Water infrastructure with respect to the capacity of watermains, sanitary, storm and combined sewers within the study area. It provides a description of each component of the existing infrastructure, the information reviewed, methodology, key assumptions, constraints identified and summary recommendations for improvements to properly support long term growth.

Specifically, the goals and objectives of the Phase 3 report is to:

- Build on the existing identified conditions and assess the future impacts of the proposed densification on Toronto Water infrastructure;
- Provide recommendations on infrastructure improvements to address previously identifies deficiencies; and,
- Provide recommendations on infrastructure improvements necessary to implement growth plan.

1.4 Preferred Alternative

The Focus Study includes two separate areas each representing different built-forms of densification. Area 'A', located along Eglinton Avenue East is roughly 9.7 hectares and is expected to yield a total unit count of 3,765 or an equivalent population count of 8,335 when factoring employment. Area 'B', located on the west side of Laird Drive is roughly 3.8 hectares and is expected to yield a total unit count of 815 or an equivalent population count of 1,975 when factoring employment. Please refer to the summary yields found in the planning study **Section 5.3 and 5.4** respectively, and **Appendix A.**

1.5 Applicable Standards, Design Criteria and Documents Reviewed

The following applicable standards, design criteria and public documents were considered and reviewed in the preparation of this Phase 3 report:

- Design Criteria for Sewers and Watermains, City of Toronto, November 2009.
- Wet Weather Flow Management Guidelines, City of Toronto, November 2006.
- Toronto Municipal Code, §681 Sewers, May 2016.
- Procedure F-5-5 of Guideline F-5: levels of treatment for municipal and private sewage treatment works discharging to surface waters, Ontario Water Resources Act, RSO 1990, Section 53.
- Building Code Act 1992
- Development applications as noted in Section 2.2.7 Recent Development Applications of the RFP.
- Sewer Atlas Maps (for information purposes only), City of Toronto, September 2010.
- Report on Municipal Services in the Leaside Area, Borough of East York, October 1973.
- 2017 Capital Works Program, City of Toronto.
- City of Toronto digital water model.
- City of Toronto digital sewer model
- Basement Flooding Study, Area 2, XCG Consultants Ltd., November 2014.
- Metrolinx Laird Station plans

2.0 PHASE 1 REPORT SUMMARY

In order to put the contents of this report into the proper context, we offer below a brief summary of the objectives and recommendations of the Phase 1 report.

2.1 Phase 1 Goals and Objectives

The Phase 1 report was an assessment of the existing Toronto Water infrastructure with respect to the capacity of watermains, sanitary, storm and combined sewers within the study area shown on **Figure 6.1**. It provided a description of each component of the existing infrastructure, the information reviewed, methodology, key assumptions, constraints identified and summary recommendations for improvements to properly support long term growth.

Specifically, the goals and objectives of the Phase 1 report were to:

a) Document existing conditions;
b) Provide an opinion as to the adequacy of the existing infrastructure to service future development; and,
c) Provide recommendations on immediate measures that can be taken to better document existing conditions and to address any identified infrastructure deficiencies.

2.2 Phase 1 Conclusions

Based on our review of the existing information, meetings with the City of Toronto staff, our field program and observations, the Phase 1 report concluded the following:

- Future densification along the Eglinton Avenue East frontage will require more in-depth study of the downstream impacts and will require municipal sanitary upgrades. Water demands and fire protection requirements will be studied in greater depths once the massing plan is finalized.
- Densification along Laird Drive is feasible based on dry-weather flow impacts only. As future development along this stretch of road is serviced by combined sewers, a 'net reduction' in combined flows (sanitary effluent + storm run-off) will be required for all storm events in order to improve downstream conditions.
- It is recommended to explore the feasibility of constructing new fully separated storm sewers through the study area and within the upstream catchment area to alleviate surcharging conditions.
- It is likely that watermain upgrades may be required in order to intensify the area, but this will be determined once intensification nodes have been determined.

3.0 EXISTING INFRASTRUCTURE

The following information is a summary of the existing infrastructure within the study area boundary depicted in **Figure 6.1** included in **Appendix C-1**.

3.1 Sanitary Sewer

There are few dedicated sanitary sewers located within the study area. Generally, these consist of 250-300 mm diameter sanitary pipes located on Vanderhoof Ave., Brentcliffe Rd., Aerodromme Cr. and on the south boulevard of Eglinton Ave. W. These sewers drain eastwards to the Metrolinx in-line storage pipe and ultimately discharges to the Don River West Branch trunk sewer.

There are no other sanitary sewers within the study area. There are some local sanitary sewers located east of the study area, within the industrial lands draining to the study area combined sewers, however these sewers were not studied as part of this report.

3.2 Storm Sewers

There are few storm sewers located within the study area. Generally, they consist of local sewers up to 1,200 mm diameter pipes located on Vanderhoof Ave., Brentcliffe Rd., Aerodromme Cr. These sewers outlet to a 1,200 diameter sewer outside of the study area and ultimately discharges into the Don River West tributary.

There are no other storm sewers within the study area. There are some local storm sewers located east of the study area, within the industrial lands draining to the study area combined sewers, however these sewers were not studied as part of this report.

According to the November 5, 2014 Basement Flooding Study, Figures 6.6 and 6.8, the depth of water in the overland flow system for the 5-year and 100-year storm respectively are reported to be between 0 – 150 mm in depth and thus was not flagged as problematic in the report.

3.3 Combined Sewers

The study area is mostly serviced by combined sewers ranging in size from 300 mm diameter sewers to 1,200 mm diameter sewer. Laird Drive has a dual combined sewer system. The east side mostly consists of small diameter local sewers, servicing the east side of Laird Drive which typically outlets the large diameter combined sewer located on the west side of Laird Drive. The west portion of Laird Drive consists of large diameter sewers serving both a local and trunk function.

There is one Combined Sewer Overflow (CSO) location along the downstream reach of sewers on Laird Drive, at Wicksteed Avenue. At this location, surcharging within the combined sewer is relieved by overflowing to a 975 mm storm sewer running eastward along Wicksteed to the Don River (just south of Eglinton Avenue).

Please refer to **Figure 6.2** found in **Appendix C-1** for a general layout of the sewer infrastructure located within the study area.

3.4 Watermains

The study area forms part of Pressure District 3E generally bounded by Bayview Avenue to the West, Kilgour Road to the north and the Don Valley Parkway to the east and south. Generally, the pressure district is fed from a 600mm diameter watermain along Don Mills Avenue via a 400 mm diameter main along Overlea Boulevard.

Water within the study area, and the larger pressure district, is locally supplied by small-diameter watermains, ranging in size from 150 mm to 400 mm. The infrastructure material vary throughout the pressure district, but typically consist of ductile iron and PVC pipes.

Study area 'A' bound by Vanderhoof Avenue and Eglinton Avenue East is generally serviced by local watermains ranging in size from 150 mm to 300 mm. These provide water services to development flanking Vanderhoof Avenue, Eglinton Avenue East, Brentcliffe Road and Aerodrome Crescent.

There are two watermain on Laird Drive (Study Area 'B'), a 400 mm diameter main feeding the pressure district from Don Mills Avenue, across Overlea Boulevard to Parkhurst Boulevard and 250 mm to 300 mm diameters local watermain providing water services to development flanking Laird Drive.

Please refer to **Figure 6.3** found in **Appendix C-1** for a general layout of the water infrastructure located within the study area.

4.0 IMPLEMENTATION

Each applicant will be responsible to clearly document how the proposed servicing strategy of the applicant will satisfy the Toronto Wet Weather Flow Management Guidelines.

In addition, each applicant will be responsible for the preparation of a detailed servicing report that must demonstrate to which sanitary/combined sewers the proposed flows will be directed to and demonstrate consistency with the contents of this report. Additional modeling work may be necessary to assess the impact of each individual application once exact population counts are established.

It is recommended that the City continue to follow its standard practice of requiring hydrant flow tests to support individual development applications. The results from these tests should be used by the City to confirm that the performance of the system when tested is consistent with the basis upon which this study was prepared, and also to confirm the suitability of the system to support the application.

Furthermore, proponents will be responsible for the preparation and submission of all technical documents related to applying for (if necessary) a Private Water Discharge Approval and obtaining approvals from Toronto Water.

4.1 Storm Sewer and Stormwater Management

4.1.1 Existing Drainage

The existing site consists of mostly hard surfaces, either roof or pavement. As shown on **Figure 6.4** found in **Appendix C-1**, Area A conveys runoff to Eglinton Ave while Area B conveys it to Liard Drive. It has been assumed that Area A may have some on-site controls, but is not currently in compliance with the TWWFMG. In addition it is expected that no controls are provided within Area B. As noted previously, runoff from Area A is conveyed east while runoff from Area B is ultimately conveyed to the south.

According to the November 5, 2014 Basement Flooding Study, Figures 6.5 and 6.7, surface flooding was identified during the 5-year storm event and the 100-year storm event along Eglinton Avenue between Laird Drive and Brentcliffe Road. This is schematically represented on Figure 6.7 in Appendix C-1.

4.1.2 Proposed Drainage

It is anticipated that both study areas will continue to convey runoff to the existing outlets upon redevelopment as illustrated on **Figure 6.5** found in **Appendix C-1.** Each applicant will need to demonstrate how existing drainage patterns are to be maintained.

4.1.3 Design Criteria

Based on the TWWFMG, the design criteria for the study areas are as follows:

Quantity Control

The release rate to the municipal storm infrastructure will be limited to the allowable discharge rate to be determined as the lesser of:

- The existing peak flow rate from a 2 year storm event (with a maximum runoff coefficient of 0.50); and
- The existing capacity of the receiving sewer.

It must be demonstrated that the existing downstream system has capacity to convey the proposed peak flow rates up to the 100 year design storm event to an existing outfall, or provide on-site detention to control the 100 year peak flow rate to the municipal system to the allowable discharge rate.

As noted in this report Area B outlets to a combined sewer, therefore a reduction of existing flows from any one development with respect to stormwater and sanitary combined will need to be less than existing so as to not adversely affect upstream and downstream conditions within the City's infrastructure.

Quality Control

- Provide an Enhanced (Level 1) quality control per Ministry of the Environment guidelines (i.e., 80% TSS removal).

Water Balance

- The 1991 precipitation data from the Pearson International Airport rainfall gauge is to be used for the analysis;
- Stormwater is to be retained on-site (to the extent practical) to achieve the same level of annual volume of overland runoff allowable from the development site under existing conditions;
- The maximum allowable annual runoff volume leaving a proposed development is 50% of the total average annual rainfall depth; and
- The minimum on-site runoff retention requires the proponent to retain all runoff from a small design rainfall event - typically 5 mm (on average, the total rainfall from all small events with daily rainfall amounts, less than or equal to 5 mm, is equivalent to about 50% volume of the total average annual rainfall in Toronto) through infiltration, evapotranspiration and rainwater re-use.

Erosion Control

- No erosion control is necessary, as the study area does not discharge directly to or within 100 m of a natural watercourse, and provided that the on-site retention of the 5 mm rainfall event will be achieved under the Water Balance Criteria.

4.1.4 Expected Release Rate

In accordance with the TWWFMG, the allowable release rate to the existing municipal infrastructure was assumed to be the 2 year runoff rate under existing conditions with a maximum runoff coefficient of 0.5. It is noted that future applications will be required to assess any downstream constraints to confirm the allowable release rate.

The rational method was used to determine the target release rate from the study areas based on Intensity-Duration-Frequency (IDF) rainfall curves from the City of Toronto Design Standards.

The 2 year runoff rate under existing conditions to the existing storm sewer infrastructure for Area A is approximately 2,225 L/s. The 2 year runoff rate under existing conditions with a runoff coefficient of 0.50 as per TWWFMG is approximately 1,236 L/s. Therefore, the total expected release rate from all developments within this area to the existing City of Toronto infrastructure is approximately 1,200 L/s, a reduction of nearly 1000 L/s in the 2 year storm event alone.

The 2 year runoff rate under existing conditions to the existing storm sewer infrastructure for Area B is approximately 858 L/s. The 2 year runoff rate under existing conditions with a runoff coefficient of 0.50 as per TWWFMG is approximately 477 L/s. Therefore, the total expected release rate from all developments within this area to the existing City of Toronto infrastructure is approximately 477 L/s, a reduction of 44% in the 2 year storm event.

4.1.5 Quantity Control

Quantity control can be achieved through a combination of above and below ground storage located within each individual site plan block. As a method of guidance, a cubic metre of storage per hectare was developed based on the allowable release rates and a proposed runoff coefficient of 0.9. A storage volume of approximately 300 cu.m/ha is required to provide adequate 100 year control for both study areas. As noted previously, the required quantity controls will assist to alleviate existing strain on the stormwater infrastructure.

4.1.6 Quality Control

To achieve the required MOECC Enhanced Level quality treatment, a variety of practices will be required to form a treatment train, focusing on above and below grade infiltration or filtration based LID's (permeable pavement, bioswales, rain gardens, green roofs, etc.) or end of pipe treatment (oil/grit separator (OGS), etc.) to provide 80% TSS removal.

4.1.7 Water Balance

Runoff from a 5 mm rainfall event will be required to be retained on each individual site plan. It will be up to the applicant to determine an appropriate method by which to reuse this rainfall volume

4.2 Watermains

The preferred development provided by the consulting team was used in the assessment of servicing requirements and opportunities. The Study Area focuses on two distinct development areas consisting of:

- Area "A" consists of three major blocks fronting on Eglinton Avenue East which generally includes high-density mixed-use developments. The flow generation design criteria used for this area is 191 L/c/D for residential units and 180,000 L/Ha/D for ICI development.
- Area "B" consists of seven smaller blocks along the west side of Laird Drive which generally includes medium density mixed use developments. The flow generation design criteria used for this area is 320 L/c/D for residential units and 180,000 L/Ha/D for ICI development

Based on the above, preliminary water demand calculations for the two areas were prepared and are summarized in **Table 1** below:

Table 1 Summary of Proposed Development Water Demands

Study Area	ICI Area (m^2)	Residential Units	Residential Population	Avg Day Demands		Max Day Demands		Peak Hour Demands	
				ICI (L/s)	RES (L/s)	ICI (L/s)	RES (L/s)	ICI (L/s)	RES (L/s)
Area "A"	44,670	3,771	7,372	9.31	14.78	10.24	19.21	11.17	36.94
Area "B"	21,090	1,017	2,094	4.39	7.78	4.83	12.84	5.27	19.30

The model was updated to reflect the preliminary development conditions. The existing meter-based demands for the proposed redevelopment addresses were removed from the appropriate nodes and the preliminary future design demands were assigned to new nodes. The model was thus modified to revise average day, Max day and Peak hour demand scenario for the preferred alternative conditions. Post Development conditions. The preliminary post development conditions were simulated with the modified calibrated model to establish the residual pressures under several demand scenarios throughout the Study Area. The model was simulated for the following scenarios and the pressure / head loss in system was evaluated to understand the impact of the preliminary development on the existing system capacity. The model output for the post development condition analysis is summarized in **Table 2**:

Table 2 Post Development Condition Modelling Scenario Results

Water Demand Modeling Scenario	Minimum Water System Requirements	Modelling Results
Average Day Demand	Recommended System Pressures = 40 psi to 100 psi	Model System Pressure = 43.4 psi to 93.1 psi (Ref Fig 8)
Maximum Day Demand	Recommended System Pressures = 40 psi to 100 psi	Model System Pressure = 30.6 psi to 87 psi (Ref Fig 9)
Peak Hour Demand	Recommended System Pressures = 40 psi to 100 psi	Model System Pressure = 19.4 psi to 81.8 psi (Ref Fig 10)
Required Fire Flow to be provided at a residual pressure of no less than 20 psi		
Maximum Day Demand plus Fire Flow	Residential Fire flow requirements per City of Toronto Standards, Q_f >64 L/s to 189 L/s	Model Residential Available Fire flow = 50.2 L/s to 269.5 L/s (Ref Fig 7)
	Employment Fire flow requirements per City of Toronto Standards, Q_f = 189 L/s to 317 L/s	Model Employment / High Rise Available Fire flow 75.3 L/s to 742.9 L/s (Ref Fig 7)

The model was run again to confirm the magnitude of the system upgrades required to mitigate the impacts of the proposed developments on the level-of-service provided throughout the service area. A series of system upgrades is given in **Table 3** below:

Table 3 Recommended Watermain Upgrades

Road	From	To	Length (m)	Type of Upgrade	Ex. Diam (mm)	Prop. Dia. (mm)
Overlea Blvd.	West of Don River	Thorncliffe Park	490.3	Rehab	400	400
Beth Nealson Dr	Thorncliffe Park Dr	Wicksteed Ave	500.4	Upsize	300	400
Wicksteed Ave	Beth Nealson Dr	Leslie St	350.1	Upsize	300	400
Leslie St	Wicksteed Ave	Research Rd	97.0	Upsize	200	300
Leonard Linton Park Easement	Wicksteed Ave	Vanderhoof Ave	184.9	Upsizing	150	200
Aerodrome Cres	Vanderhoof Ave	Thomas Elgie Dr	222.4	Upsizing	200	300
Brentcliffe Rd	Vanderhoof Ave	Eglinton Ave	184.5	Upsizing	200	300
Vanderhoof Ave	Brentcliffe Rd	Fut Block A1/A2 Easement	235.3	Upsizing	150	200
Vanderhoof Ave	Fut Block A1/A2 easement	Laird Dr	197.2	Upsizing	200	300

The impacts of the increased densities can be mitigated through approximately 2.5 km of local system improvements. The detailed modeling memorandum is found in **Appendix C-2.**

4.3 Sanitary and Combined Sewers

The sanitary flow rates for the revised models were based on the City of Toronto's criteria as noted in the following **Table 4**:

Table 4 – Sanitary Flow Rate Design Criteria

	Generation Rate	Peaking Factor
Residential	240 Lpcd	Harmon
Commercial, Office, Retail, Community Centre	180,000 L/ha/day	None

Using the provided densities and generation flow rates noted above, peak sanitary flows for each proposed development were calculated and are summarized in **Table 5** below:

Table 5 – Eglinton Development Statistics and Sanitary Flow

Address	Building No.	Population	Res. Flow (L/s)	Peak Res. Flow (L/s)	Office Area (m^2)	Office Flow (L/s)
815-845 Eglinton Ave	1	375	1.04	4.20	3,200	0.67
	2	1,056	2.93	11.10	6,950	1.45
	3	565	1.57	6.20	0	0
	4	0	0	0	8,990	1.87
	5	636	1.77	6.93	0	0
	6	198	0.55	2.28	5,340	1.11
849 Eglinton Ave	1	508	1.41	5.61	4,370	0.91
	2	475	1.32	5.26	0	0
	3	307	0.85	3.47	8,250	1.73
939 Eglinton Ave	1	638	1.77	6.94	1,285	0.27
	2	327	0.91	3.69	555	0.12
	3	671	1.86	7.27	0	0
	4	0	0	0	4,300	0.90
943-957 Eglinton Ave	1	596	1.66	6.51	1,400	0.29
	2	203	0.56	2.33	0	0
	3	552	1.53	6.06	0	0
	4	641	1.78	6.97	0	0

In total, the proposed densification in Area "A" will likely generate approximately 85 L/s to the existing infrastructure on Eglinton Avenue East.

The hydraulic grade line (HGL) profiles from the existing conditions were reviewed and analyzed for both main reaches (Eglinton Avenue East and Laird Drive) and for all four of the modelling scenarios. The branch along Eglinton Avenue East is part of the foul system and the branch along Laird Drive is part of the combined system.

- Under the "Baseline DWF (dry weather flow)" scenario, the Eglinton Avenue East HGL is completely eliminated, suggesting that the HGL is largely produced from the inflow and infiltration (I/I) along this branch. Similarly, the Laird Drive is largely contained within the pipes, equally suggesting that that the surcharging conditions are a direct result storm flows within the combined system.
- Under "Baseline 2-year" scenario, the Eglinton Avenue East HGL shows significantly less surcharging while the backwater condition is still occurring along the end of this branch. The Laird Drive HGL shows some surcharging along the northern part of the branch and near the limit of the study area however, the surcharging is below the 1.8m limit.
- Under the "Baseline 100-year" scenario, the Eglinton Avenue East HGL shows surcharging to ground on Eglinton Avenue, and a backwater condition within the valley. The Laird Drive HGL shows slight surcharging along the entire branch however the surcharging conditions meet the requirements of the City of Toronto and does not reach the 1.8 m limit below existing road centerline grades.
- Under the "Baseline May 12, 2000" scenario, the Eglinton Avenue East HGL shows surcharging at or below the surface along Eglington Avenue, while the Laird HGL indicates surcharging near the upstream portion of the study area. The surcharging conditions remain below the 1.8m threshold.

The simulations were reviewed on two branches – along Laird Drive and along Eglinton Avenue East. The HGL for both branches were reviewed for the 2-year and 100-year events, and it was observed that both show similar results when existing conditions and post-development conditions are compared. Additional discussions for each run follows.

Laird Drive: The results of the combined system modelling along Laird Drive indicates no adverse impacts to redeveloping the various sites along the west side of Laird Area "B". The 2-year storm HGL is similar under existing conditions and post-development conditions; that is to suggest that the development flow was similar to the existing flow removed. Similarly the 100-year storm HGL also looks comparable under existing conditions and post-development condition, suggesting that the development flow was similar to the existing flow removed. In terms of risk of basement flooding, the freeboard is lower than 1.8m on the first two pipe segments for both existing and future conditions. Therefore development within Area "B" does not adversely affect existing conditions.

Eglinton Avenue East: The 2-year storm HGL looks very similar under existing conditions and post-development conditions. The flow at the study boundary is slightly lower in post-development conditions than existing conditions, suggesting that the development flow added was less than existing conditions. This is likely due to replacement of inflow and infiltration flows with sanitary effluent. The 100-year storm HGL very similar under existing conditions and post-development conditions. The flow

at the study boundary is approximately the same as existing conditions, suggesting that the development flow added was similar to the existing flows removed. Under the 100-year storm, the surcharging on Eglinton Ave reaches surface and exceeds the 1.8m limit. Please refer to **Figures 6.5 and 6.6** found in **Appendix C-1** and **Sewer Profiles** found in **Appendix C-2**. Based on the modelling results, the following sewer segment, noted in **Table 6** do not meet the level of service expected by the City of Toronto:

Table 6 – Area "A" Sewer Upgrades

From MH	To MH	Length(m)	Existing diameter (mm)	Slope (m/m)
4119116042	4120716094	54.4	250	0.01151
4120716094	4122116139	46.8	250	0.00115
4122116139	4122816139	7.8	250	0.20218
4122816139	4131016115	84.6	250	0.00401
4131016115	4131516117	5.4	250	0.04259
4131516117	4138516096	73.4	250	0.00107

4.4 Hydrogeolgy and Groundwater

City of Toronto staff have advised of high groundwater levels within the study area, as identified through active development projects in the area. Should groundwater need to be discharged to the combined/sanitary system, as identified through the preparation of future development applications within the study area, the proponent will need to satisfy Toronto Water that sufficient capacity exists within the system to handle any potential discharge of groundwater.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the modeling and the expected local growth, we recommend the following:

5.1 Sanitary Sewers

- New development shall demonstrate that sufficient capacity is available to service future intensification. Where new/upgraded infrastructure has been identified as per Table 6 of this report, development proponents will have to make satisfactory arrangements with the City of Toronto to design/construct/fund the identified upgrades to attain a level of service acceptable to the City of Toronto.
- An inflow/infiltration study for infrastructure within this water should be conducted to identify the source of the unusually high inflow identified in the model. Remove the source of I/I would further improve sewer capacity.

5.2 Storm Sewers

- New developments shall comply with the TWWMFG and must achieve a minimum peak flow reduction of 50% or greater.

5.3 Combined Sewers

- New developments shall comply with the TWWMFG and must achieve a minimum net combined (storm plus sanitary) peak flow reduction of 50%.
- As future development along this stretch of road is serviced by combined sewers, a 'net reduction' in combined flows (sanitary effluent + storm run-off) is expected due to reduction in in storm runoff from implemented lot-level controls. Since a net reduction is expected, no improvements to the combined sewers are recommended.
- The City of Toronto should undertake a feasibility study for providing separated storm and sanitary sewers on Laird Drive. This should be coordinated with the recommended streetscape improvements of this plan.

5.4 Water

- Watermain upgrades identified in this report are to be scheduled in the city's capital works budget to ensure an adequate water supply for long term growth in the area. Alternatively the city may choose to have developers upfront the cost of the identified infrastructure which could partially offset DC credits.

6.0 COST ESTIMATE FOR RECOMMENDED IMPROVEMENTS

Please refer to **Appendix C-4** for a complete estimate of probable cost to implement the recommendations outlined in this report.

Respectfully Submitted:

SCS Consulting Group Ltd.

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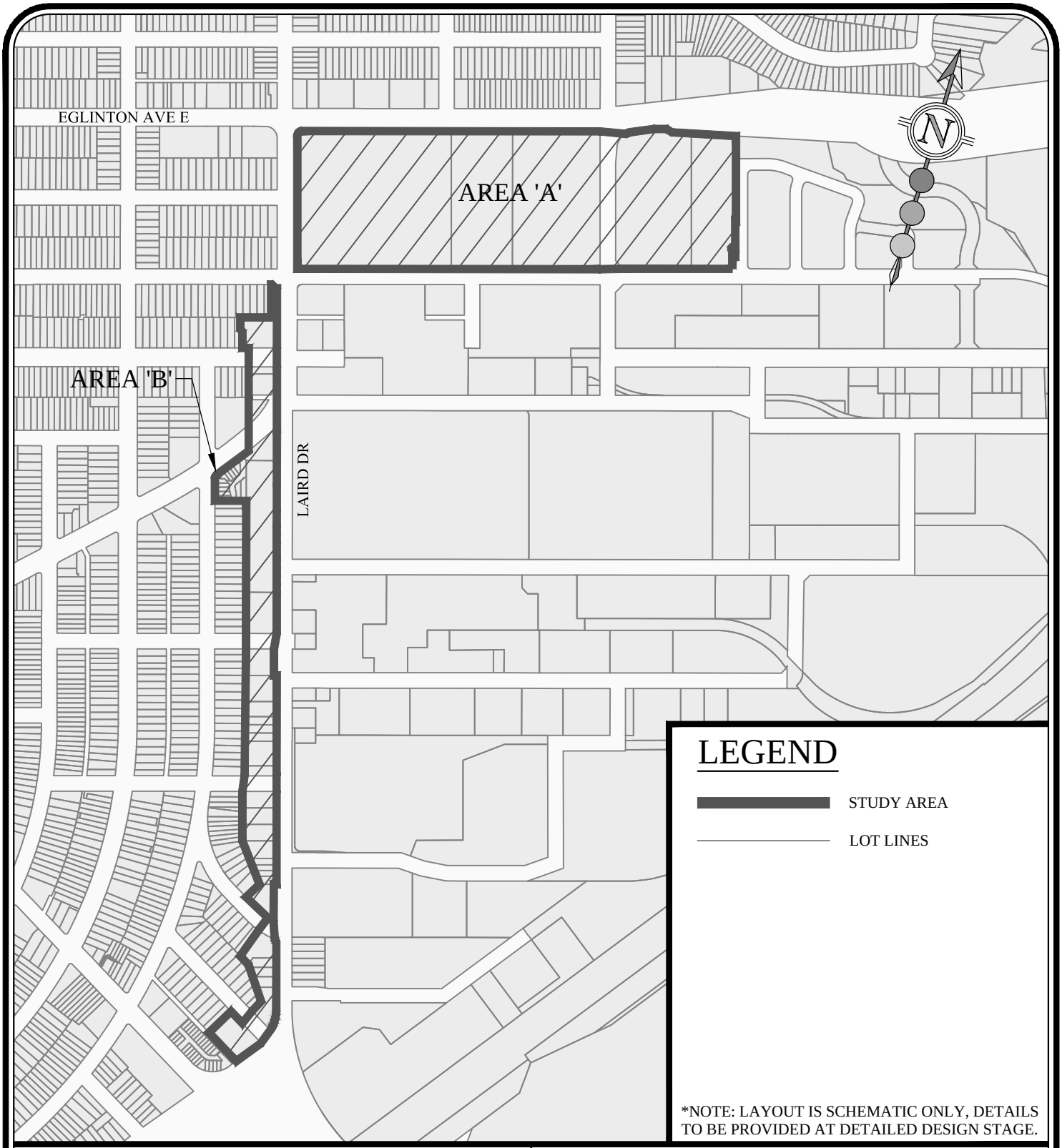
APPENDIX C-1

FIGURES



LAIRD FOCUS AREA STUDY

LAIRD STUDY AREA

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PROJECT No:	1896	FIGURE No:	6.1

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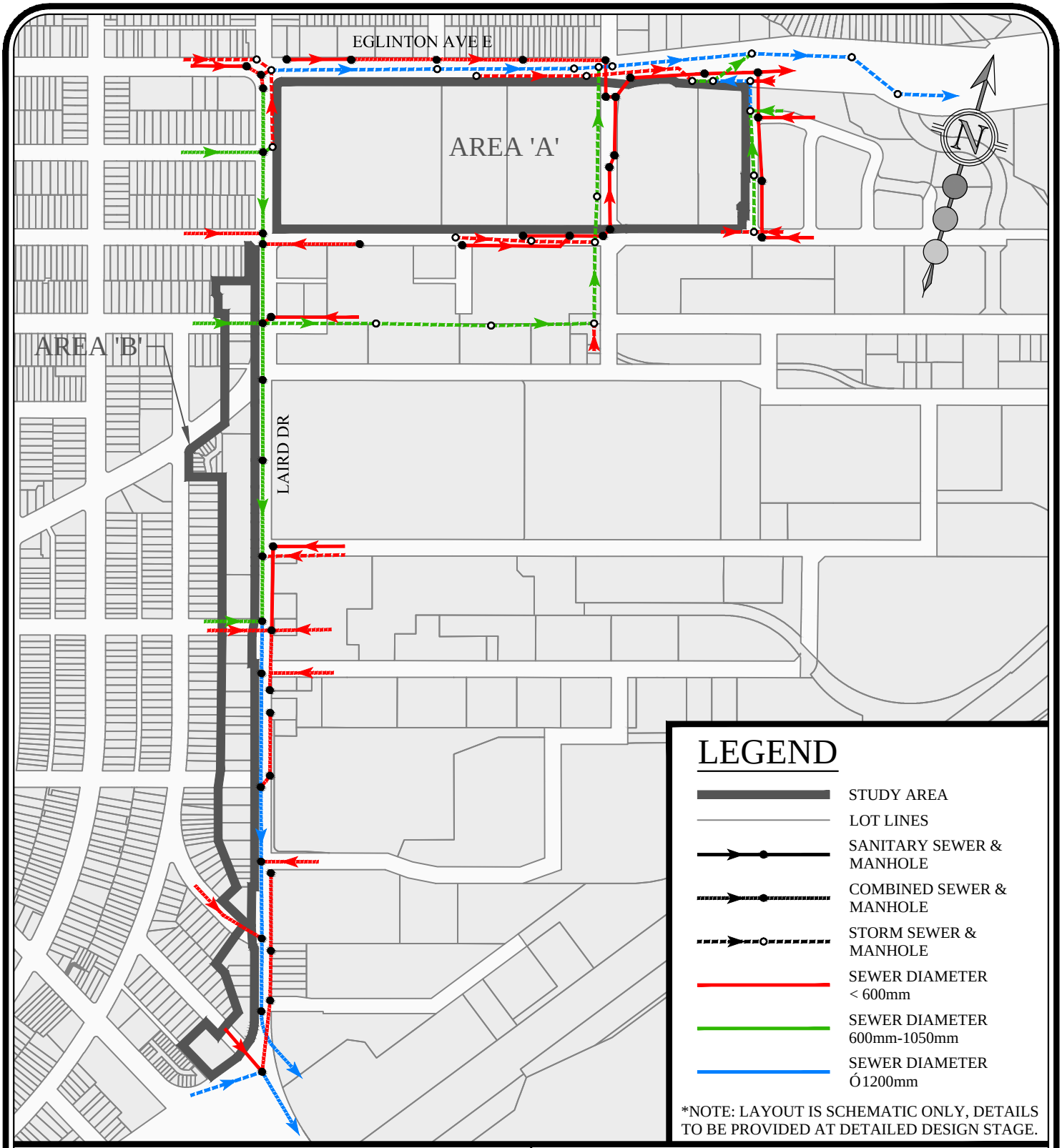

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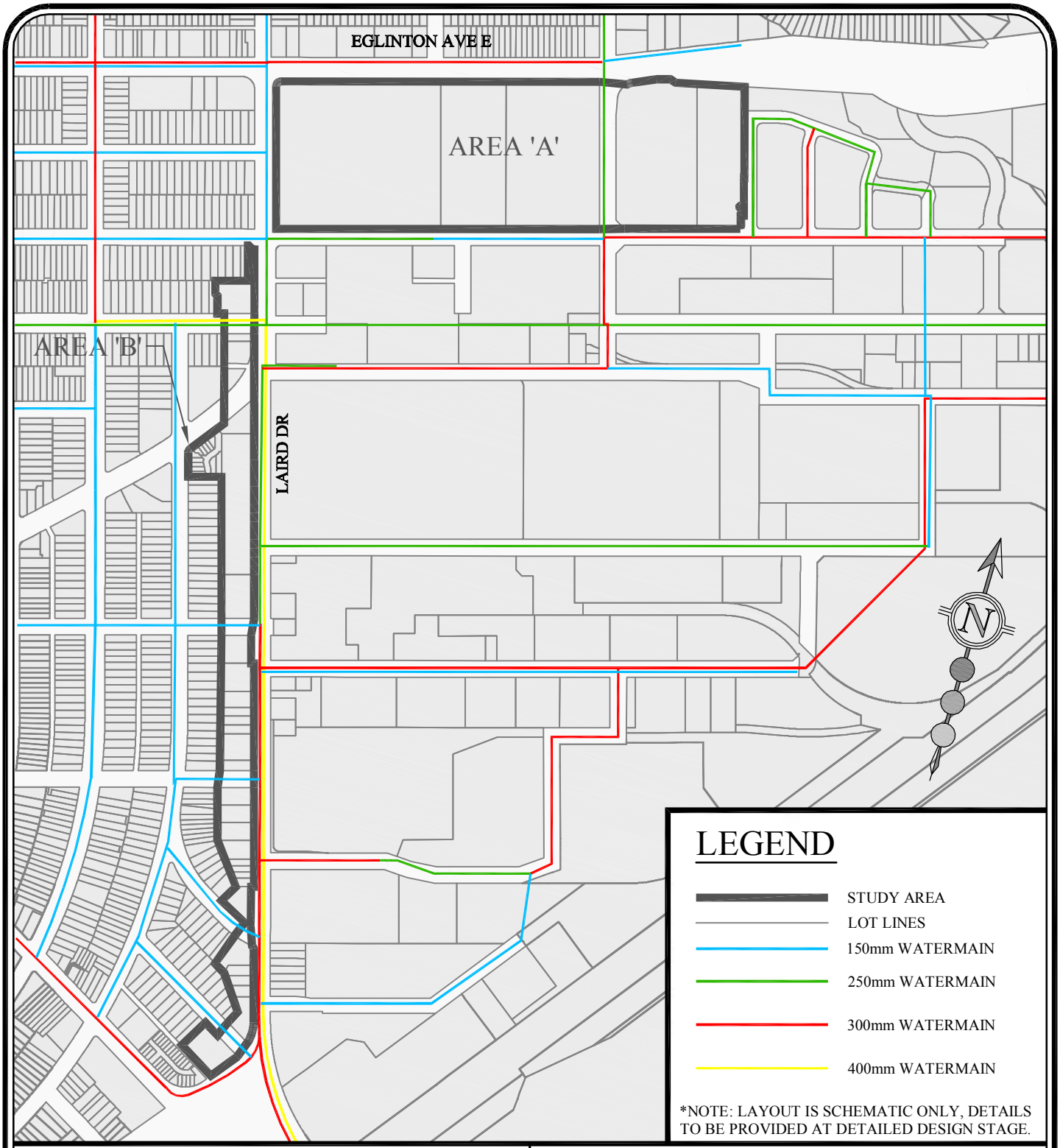

LAIRD FOCUS AREA STUDY

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LEGEND

- STUDY AREA / DRAINAGE AREA BOUNDARY
- LOT LINES
- STORM SEWER & MANHOLE
- COMBINED SEWER & MANHOLE
- EXISTING DRAINAGE AREA (ha)
- EXISTING RUNOFF COEFFICIENT
- DRAINAGE AREA ID

*MAXIMUM RUNOFF COEFFICIENT PER TORONTO WET WEATHER FLOW MANAGEMENT GUIDLINES (TWWFMG)

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

LAIRD FOCUS AREA STUDY

EXISTING STORM DRAINAGE PLAN

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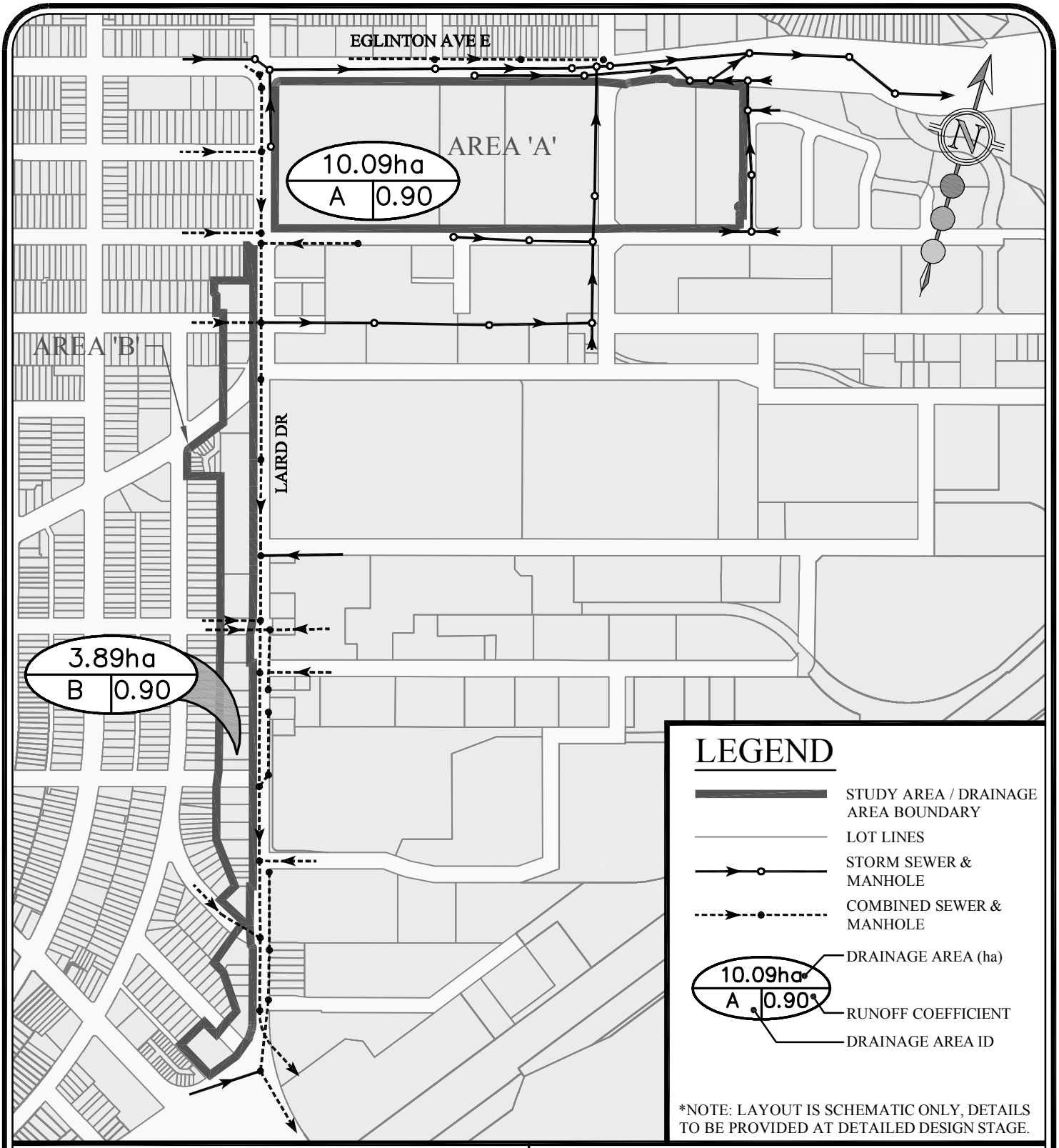

LAIRD FOCUS AREA STUDY

PROPOSED STORM DRAINAGE PLAN

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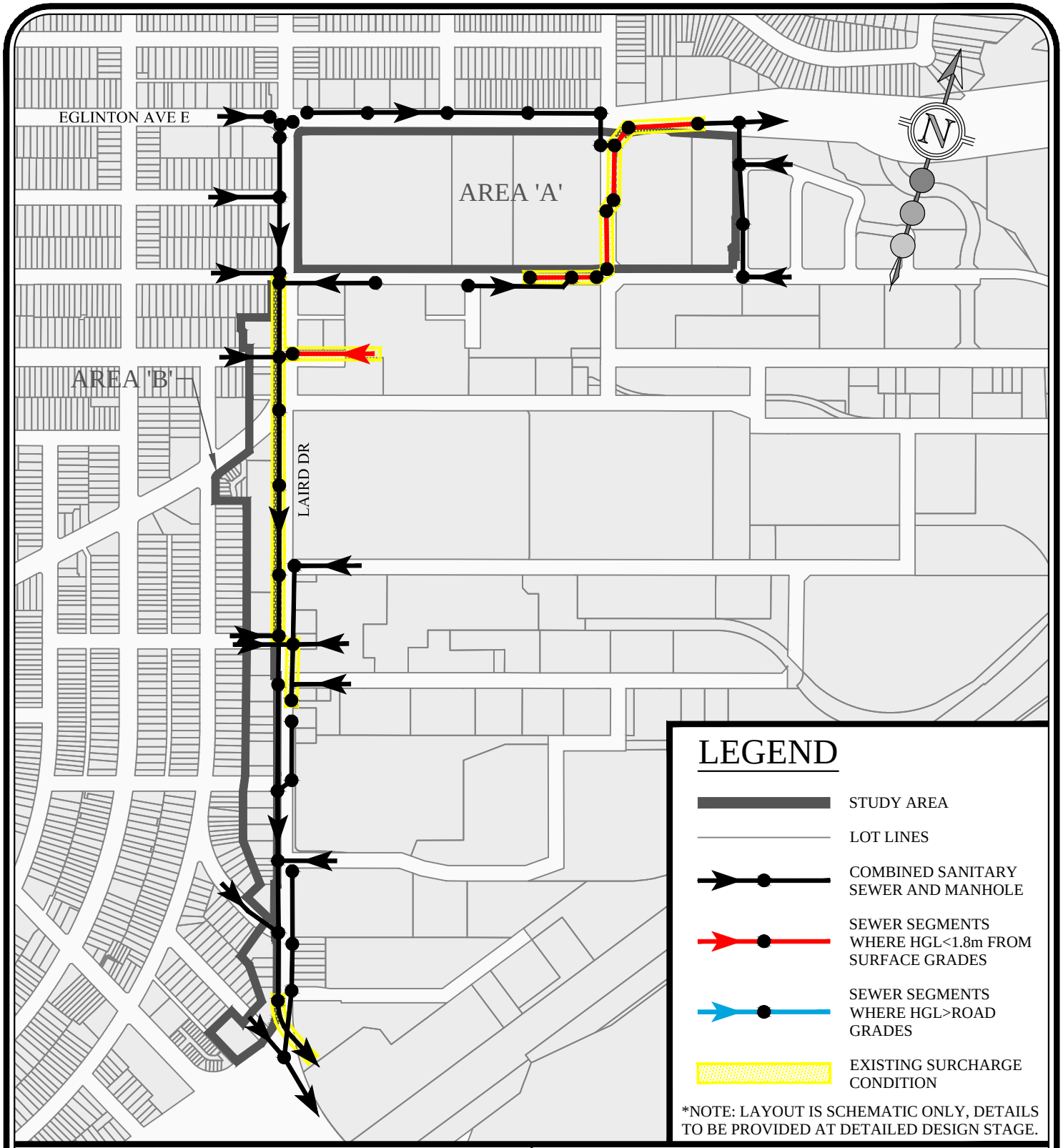

LAIRD FOCUS AREA STUDY

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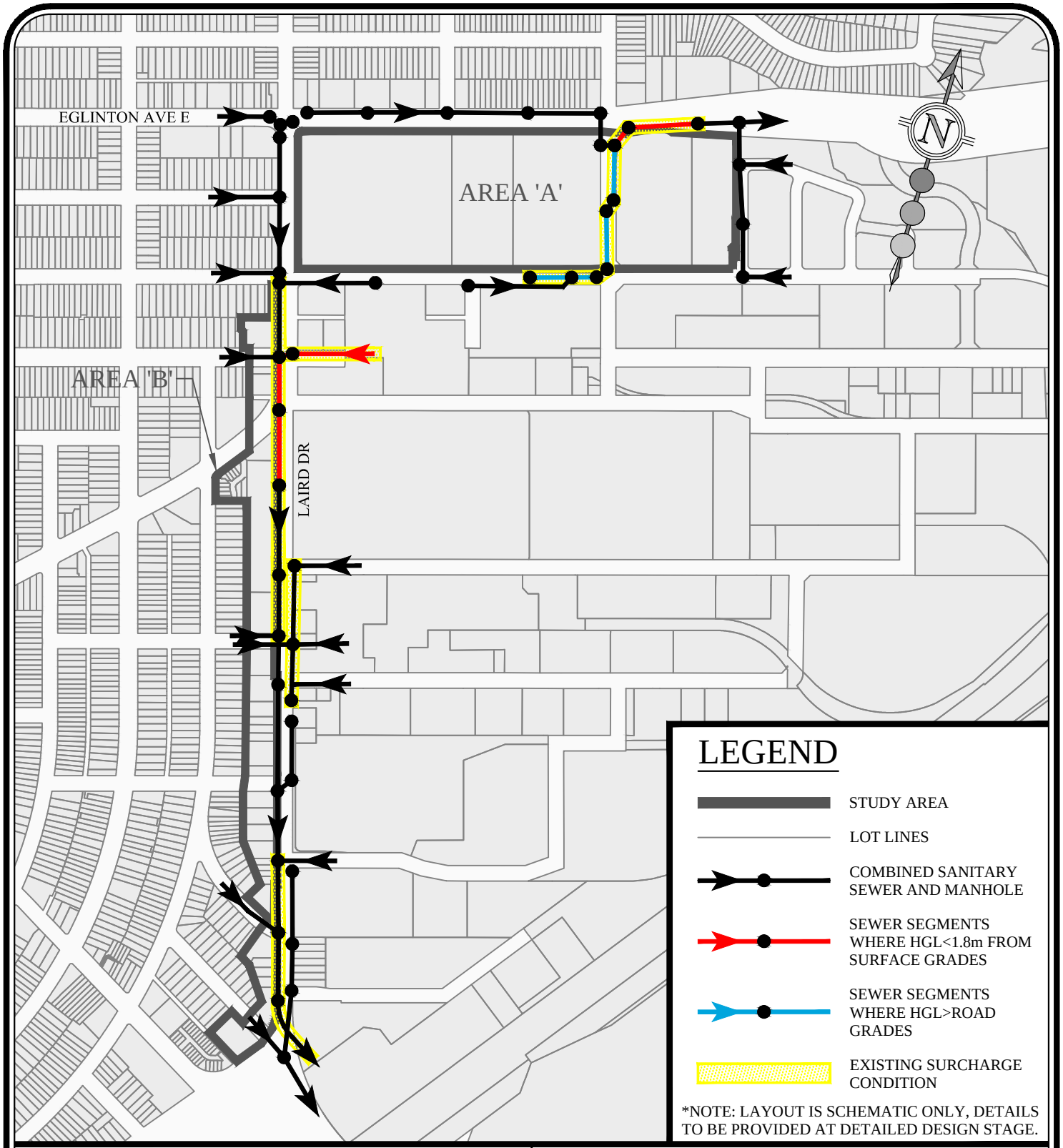

LAIRD FOCUS AREA STUDY

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APPENDIX C-2

SERVICING MEMOS AND MODELS

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TECHNICAL MEMORANDUM TM1

DATE	April 27, 2018
TO	**Pascal Monat, SCS Consulting**
SUBJECT	Eglinton and Laird Planning Study **Review of Wastewater Servicing Impacts**
FROM	Kevin Brown, P.Eng
PROJECT NUMBER	17103

1 Background

The Municipal Infrastructure Group Ltd. (TMIG) has been retained by SCS Consulting Limited (SCS) to conduct a servicing analysis to understand the existing water system in the study area and the capacity for the potential re-development of the Eglington/Laird Development Area.

The recommended preferred Development Densities were developed by The Planning Partnership, and have been used in the assessment of servicing requirements and opportunities.

The Eglinton-Laird Focus Area consists of two distinct development areas, as follows:

- Three major blocks that front onto Eglinton Avenue. These will generally consist of high-density mixed use developments in the range of 11-55 storeys high
- Seven smaller blocks along the west side of Laird Ave. These will genereally consist of medium-density units, up to approximately 6 storeys in height.

The development density Statistics are provided in **Appendix A**.

2 Existing Sanitary Servicing

2.1 Model Review

The City provided a copy of their InfoWorks model for “Basement Flooding Study Area 2”, which fully contains the Study Area.

The properties being reviewed as part of this planning study are tributary to one of two main sewer reaches:

1. Properties along Eglinton are generally connected to the Eglinton sanitary sewer, which flows east towards the Don Valley Trunk Sewer, outletting in the vicinity of Don Mills Road and Overlea Boulevard.
2. Properties along Laird Drive are connected to the Laird Drive combined sewer, which flows south along Laird Drive and Millwood Road to the Don Valley Trunk Sewer, outletting in the vicinity of Broadview Avenue and O’Connor Drive.

The model contained the following scenarios:

a) Area 2 - Baseline 100 Year (EC + Super Pipe MetroLinx)
b) Area 2 - Baseline 2-year storm (EC + Super Pipe MetroLinx)
c) Area 2 - Baseline DWF (EC + Super Pipe MetroLinx)
d) Area 2 - Baseline May 12,2000 (EC + Super Pipe MetroLinx)

The provided model considers the following rainfall scenarios:

- 2-Year
- 100-Year
- May 12, 2000 (Extreme)

The model contains various subcatchments. The sanitary subcatchments contain population, base flow and trade flow. The foul flow is calculated using the population within a subcatchment and the Wastewater Profile assigned to the subcatchment. The Wastewater Profile identifies the generation rate as well as the diurnal pattern for that subcatchment. The trade flow is entered in m^3/s and is not peaked with the diurnal pattern.

The storm subcatchments have a variety of parameters related to runoff and each storm subcatchment loosely represents different runoff areas (roof, eavestroughs, disconnected roofs, etc).

The City provided the *Basement Flooding Study – Area 2* Project File Report (Nov 2014), as well as the Technical Memorandum's. These reports helped to understand the intricacities of the model and how it was first developed. From these reports, this is what was understood:

- The initial City calibration was accomplished by fixing the runoff surface parameters and adjusting the contributing areas. City documentation on how and where areas were adjusted was not available or discussed in the reports.
- Storm Subcatchments are set up as follows:
    - Subcatchment 1: Overland flow generated from pervious and impervious surfaces (grass, driveways, road, parking, etc.)
    - Subcatchment 2: Roof connected and disconnected areas.
        - This seems to be represented by two subcatchments in the model.
    - Subcatchment 3: Runoff from overflowing building roofs during large storm events to pervious or impervious systems.
- Six rainfall profiles:
    - Rainfall 1: Total rainfall profile and used for Subcatchment 1.
    - Rainfall 2: Lower portion of the total rainfall that reflects the connected roof area downspout capacity (rainfall that is intercepted by downspouts/eavetroughs)
    - Rainfall 3: The difference between Rainfall 1 and Rainfall 2 (the roof overflow)
    - Rainfall 4: ICI Roof rainfall on the commercial area east of Laird Drive and south of Eglinton Avenue.
    - Rainfall 5: ICI roof spill (not used)
    - Rainfall 6: Rainfall for external areas contributing to the sanitary trunk system and is equal to profile 1 for assessment events
- Each Subcatchment has a Land Use ID:

Land Use ID	Runoff Area 1	Runoff Area 2	Runoff Area 3	Description	Note
1	10	20	30	SS	Sanitary Parameters
2	11		31	TT	Storm Surface Parameters
3			22	TB	Storm Roof Parameters
4		21		TC	Storm Roof Parameters
5	23		24	TV	Storm Roof Spillage Parameters

The Land Use ID translaters into a Runoff Area ID listed based on what Runoff Area is used (i.e. if the Land Use ID is 1, the area listed under "Runoff Area 1" would correlate to Runoff Surface ID 10).

- Also included in the Subcatchment Grid, the Runoff Surface ID translates into runoff parameters for that ID.

Runoff Surface ID	Description	Runoff Routing Value	Runof Volume Type	Surface Type	Initial Loss Type	Initial Loss Value (m)	Initial Abs. Factor	Routing Model	Fixed Runoff Coeff.
10	Sanitary Impervious	0.012	Fixed	Impervious	Slope	0.000071	0	SWM	1
11	Storm Impervious	0.013	Fixed	Impervious	Abs	0.00188	0	SWMM	1
20	Sanitary Roof	0.012	Fixed	Impervious	Abs	0	0	SWMM	1
21	Storm Connected Roof	0.013	Fixed	Impervious	Abs	0	0	SWMM	1
22	Storm Disconnected Roof	0.073	Horton	Pervious	Abs	0.002	0	SWMM	1
23	Storm Impervious Roof OVF	0.013	Fixed	Impervious	Abs	0	0	SWMM	1
24	Storm Pervious Roof OVF	0.200	Fixed	Pervious	Abs	0	0	SWMM	1
30	Sanitary Pervious	0.200	Horton	Pervious	Abs	0.002	0	SWMM	1
31	Storm Pervious	0.410	Horton	Pervious	Abs	0.005	0	SWMM	1

2.2 Model Results – Existing Conditions

The Hydraulic Grade Line (HGL) profiles from the existing conditions model runs are provided for both main reaches (Eglinton Ave and Laird Drive) and for all four of the modelling scenarios provided. The branch along Eglinton is part of the foul system and the branch along Laird Dr is part of the combined system.

a) Area 2 - Baseline 100 Year (EC + Super Pipe MetroLinx)

Under this scenario, the Eglinton HGL shows surcharging to ground on Eglinton Avenue, and a backwater condition within the valley. This may be affected by the changing pipe sizes within the valley.

Under this scenario, the Laird HGL shows slight surcharging along the entire branch. The surcharging does not reach the 1.8 m limit.

b) Area 2 - Baseline 2-year storm (EC + Super Pipe MetroLinx)

Under this scenario, the Eglinton HGL shows significantly less surcharging than under the 100 Year storm along Eglinton. The backwater condition is still occurring along the end of this branch.

Under this scenario, the Laird HGL shows some surcharging along the northern part of the branch and some surcharging near the outfall. The surcharging appears to be below the 1.8m limit.

c) Area 2 - Baseline DWF (EC + Super Pipe MetroLinx)

Under this scenario, the Eglinton HGL is not visible either, suggesting that the HGL is largely produced from the inflow and infiltration along this branch.

Under this scenario, the Laird HGL is very low and not truly visible on the HGL, suggesting that the HGL is largely influenced from the storm flows within the combined system.

d) Area 2 - Baseline May 12,2000 (EC + Super Pipe MetroLinx)

Under this scenario, the Eglinton HGL shows surcharging below the surface along Eglington and backwater condition within the valley.

Under this scenario, the Laird HGL shows surcharging along Laird, with the largest amount of surcharging occurring near Eglinton Ave. The surcharging remains below the 1.8m limit.

2.3 Modifications to Reflect Post-Development Conditions (Area A)

There are three existing “Foul” subcatchments in the vicinity of the Eglinton development. These subcatchments have the ID’s of SAC06, SAC09 and SP2S25. All three have no population and some baseflow or “Additional Foul Flow”. There is no visible relationship with the baseflow or “additional foul flow” and the area of the subcatchment. SAC06 and SAC09 had runoff areas (Areas 1, 2 and 3 on both subcatchments) with a Land Use ID of 1.

Subcatchment ID SP2S25 drained to the combined system on Laird Dr. Subcatchment ID SAC06 and SAC09 drain to the foul system on Eglinton Ave.

The existing subcatchments were removed entirely in advance of the Proposed “Area A” (Eglinton) development addition.

The Eglinton Development consists of 16 different buildings over four addresses along Eglinton Avenue. To accommodate these new buildings in the model, new foul subcatchments were created:

Subcatchment ID	Address	Building Numbers Included
A1-1	815-845 Eglinton Ave	1-3
A1-2	815-845 Eglinton Ave	4
A1-3	815-845 Eglinton Ave	5
A2-1	849 Eglinton Ave	1-2
A2-2	849 Eglinton Ave	3
A3-1	939 Eglinton Ave	1-4
A4-1	943-957 Eglinton Ave	1-2
A4-2	943-957 Eglinton Ave	3
A4-3	943-957 Eglinton Ave	4

The sanitary flow calulations used the following design criteria:

	Generation Rate	Peaking Factor
Residential	240 Lpcd	Harmon
Commercial, Office, Retail, Community Centre	180,000 L/ha/day	None

The development statistics and estimated sanitary flow is shown in Appendix B and summarized in Table 1.

TABLE 1 – EGLINTON DEVELOPMENT STATISTICS AND SANITARY FLOW

Address	Building No.	Population	Res. Flow (L/s)	Peak Res. Flow (L/s)	Office Area (m^2)	Office Flow (L/s)
815-845 Eglinton Ave	1	391	1.09	4.37	3,170	0.66
	2	1,093	3.04	11.46	3,020	0.63
	3	0	0	0	10,890	2.27
	4	1,163	3.23	12.14	850	0.18
	5	0	0	0	2,080	0.43
849 Eglinton Ave	1	520	1.44	5.73	1,410	0.29
	2	463	1.29	5.13	690	0.14
	3	0	0	0	1,350	0.28
939 Eglinton Ave	1	638	1.77	6.94	1,285	0.27
	2	327	0.91	3.69	555	0.12
	3	671	1.86	7.27	0	0
	4	0	0	0	4,300	0.9
943-957 Eglinton Ave	1	635	1.76	6.91	2,230	0.46
	2	194	0.54	2.24	0	0
	3	544	1.51	5.98	0	0
	4	596	1.66	6.51	0	0

Overall, approximately 85 L/s will be added to the sanitary or combined systems for the Eglinton Ave development.

2.4 Model Results – Post-Development Conditions

The simulations were reviewed on two branches – Run 1 is the combined sewer along Laird and Run 2 is the foul sewer along Eglinton.

The HGL for both branches under the 2-year and 100-year, show similar results under existing conditions and post-development.

Run 1 (Laird Dr): The results of the combined system modelling along Laird Dr indicates no adverse impacts to redeveloping the site. The 2-year storm HGL looks very similar under existing conditons and post-development conditions. This suggests that the development flow was similar to the existing flow removed. In terms of risk of basement flooding, the freeboard is lower than 1.8m on the first two pipes, under existing and future conditions.

The 100-year storm HGL also looks similar under existing conditions and post-development conditions. This suggests that the development flow was similar to the existing flow removed. In terms of risk of basement flooding, the freeboard is lower than 1.8m on the first two pipes, under existing and future conditions.

Run 2 (Eglinton Ave): The 2-year storm HGL looks very similar under existing conditions and post-development conditions. The flow at the end is slightly lower in post-development conditions than existing conditions, suggesting that the development flow added was less than existing conditions.

The 100-year storm HGL very similar under existing conditions and post-development conditions. The flow at the end is approximately the same as existing conditions, suggesting that the development flow added was similar to the existing flows removed. Under the 100-year storm, the surcharging on Eglinton Ave reaches surface and exceeds the 1.8m limit.

Run 1 (Laird Dr), Pre-development:

From MH	To MH	Length(m)	Diameter (mm)	U/S Inv (m)	D/S Inv (m)	Slope (m/m)	Full Capacity (m3/s)	DWF Peak Flow (m3/s)	DWF + 2-yr Storm Peak Flow (m3/s)	DWF + 100-yr Storm Peak Flow (m3/s)
4113215853	4109815736	121.7	300	128.382	127.876	0.00416	0.058	0.00107	0.02551	0.04934
4109815736	4100215764	99.9	600	127.38	126.98	0.004	0.361	0.04486	0.62134	0.73341
4100215764	4093615783	69	675	126.42	126.15	0.00391	0.488	0.05508	0.55117	0.51781
4093615783	4084215811	97.7	675	126.15	125.75	0.00409	0.5	0.05507	0.52449	0.51734
4084215811	4074115841	106.1	675	125.75	125.33	0.00396	0.491	0.05515	0.51896	0.52631
4074115841	4073415843	6.6	675	125.33	125.25	0.01212	0.86	0.05515	0.53482	0.58158
4073415843	4065215867	85.5	675	125.25	124.96	0.00339	0.455	0.05514	0.65294	0.79818
4065215867	4059515883	59.5	1200	123.673	123.328	0.0058	2.757	0.10299	1.96778	2.66781
4059515883	4046215921	138.2	1200	123.327	122.435	0.00645	2.909	0.10928	2.03153	2.71125
4046215921	4037615947	89.9	1200	122.435	121.802	0.00704	3.038	0.11003	2.06492	2.75266
4037615947	4028715974	93.4	1200	121.802	121.146	0.00702	3.034	0.11383	2.34054	3.07064
4028715974	4014316063	178.8	1200	121.146	120	0.00641	2.899	0.11535	2.52559	3.38082
4014316063	4007316119	89.4	1200	115.73	115.46	0.00302	1.99	0.11737	2.59961	3.31796
4007316119	3998516199	119.1	1200	115.46	115.053	0.00342	2.117	0.12056	2.76749	3.59068
3998516199	3996116180	30.4	1500	114.796	114.683	0.00372	5.539	0.12057	2.94617	4.04177
3996116180	3992016148	52.1	1500	114.683	114.447	0.00453	6.114	0.15091	3.92206	5.64623
3992016148	3985216125	78.8	1500	114.447	114.141	0.00388	5.661	0.15091	3.91692	5.6428
3985216125	3979116151	65.8	1500	114.141	113.401	0.01125	9.634	0.15091	3.91173	5.64172
3979116151	3977616158	16.7	1500	113.401	113.257	0.00862	8.436	0.1509	3.91177	5.64143
3977616158	3975316202	49.3	3658	90.096	89.767	0.00668	57.793	1.03583	29.15681	81.76344

MH ID	Ground Level (m)	DWF Max Water Level (HGL,m)	DWF + 2-yr Storm Max Water Level (HGL,m)	DWF + 100-yr Storm Max Water Level (HGL,m)	DWF Min Freeboard (m)	DWF + 2-yr Storm Min Freeboard (m)	DWF + 100-yr Storm Min Freeboard (m)
4113215853	130.4	128.417	128.835	129.659	1.983	1.565	0.741
4109815736	131.1	127.525	128.733	129.301	3.575	2.367	1.799
4100215764	130.5	126.575	127.381	127.844	3.925	3.119	2.656
4093615783	130.4	126.303	127.079	127.52	4.097	3.321	2.88
4084215811	130.3	125.905	126.663	127.068	4.395	3.637	3.232
4074115841	130	125.469	126.199	126.559	4.531	3.801	3.441
4073415843	130	125.411	126.145	126.491	4.589	3.855	3.509
4065215867	130.1	123.841	124.443	125.193	6.259	5.657	4.907
4059515883	130.6	123.495	124.089	124.828	7.105	6.511	5.772
4046215921	131.6	122.601	123.195	124.004	8.999	8.405	7.596
4037615947	132.1	121.97	122.633	123.428	10.13	9.467	8.672
4028715974	132.5	121.318	122.031	122.676	11.182	10.469	9.824
4014316063	131	115.935	117.296	118.298	15.065	13.704	12.702
4007316119	131.2	115.661	116.775	117.467	15.539	14.425	13.733
3998516199	126.4	114.951	115.795	116.139	11.449	10.605	10.261
3996116180	127	114.845	115.719	116.062	12.155	11.281	10.938
3992016148	119.2	114.615	115.486	115.786	4.585	3.714	3.414
3985216125	125.9	114.357	114.922	115.166	11.543	10.978	10.734
3979116151	120.2	113.545	114.208	114.46	6.655	5.992	5.74
3977616158	117.9	90.477	91.941	94.178	27.423	25.959	23.722

Run 1 (Laird Dr), Post-Development:

From MH	To MH	Length(m)	Diameter (mm)	U/S Inv (m)	D/S Inv (m)	Slope (m/m)	Full Capacity (m3/s)	DWF Peak Flow (m3/s)	DWF + 2-yr Storm Peak Flow (m3/s)	DWF + 100-yr Storm Peak Flow (m3/s)
4113215853	4109815736	121.7	300	128.382	127.876	0.00416	0.058	0.01853	0.03968	0.06075
4109815736	4100215764	99.9	600	127.38	126.98	0.004	0.361	0.06233	0.62872	0.73783
4100215764	4093615783	69	675	126.42	126.15	0.00391	0.488	0.07254	0.5501	0.51938
4093615783	4084215811	97.7	675	126.15	125.75	0.00409	0.5	0.07253	0.52446	0.51896
4084215811	4074115841	106.1	675	125.75	125.33	0.00396	0.491	0.0726	0.51938	0.52795
4074115841	4073415843	6.6	675	125.33	125.25	0.01212	0.86	0.0726	0.53513	0.58337
4073415843	4065215867	85.5	675	125.25	124.96	0.00339	0.455	0.0726	0.65327	0.79987
4065215867	4059515883	59.5	1200	123.673	123.328	0.0058	2.757	0.12048	1.96815	2.66987
4059515883	4046215921	138.2	1200	123.327	122.435	0.00645	2.909	0.12676	2.03221	2.7119
4046215921	4037615947	89.9	1200	122.435	121.802	0.00704	3.038	0.12752	2.06549	2.75347
4037615947	4028715974	93.4	1200	121.802	121.146	0.00702	3.034	0.13132	2.34117	3.0713
4028715974	4014316063	178.8	1200	121.146	120	0.00641	2.899	0.13284	2.52624	3.38067
4014316063	4007316119	89.4	1200	115.73	115.46	0.00302	1.99	0.13487	2.60053	3.31806
4007316119	3998516199	119.1	1200	115.46	115.053	0.00342	2.117	0.13805	2.76862	3.58984
3998516199	3996116180	30.4	1500	114.796	114.683	0.00372	5.539	0.13806	2.94744	4.04101
3996116180	3992016148	52.1	1500	114.683	114.447	0.00453	6.114	0.16839	3.92362	5.64463
3992016148	3985216125	78.8	1500	114.447	114.141	0.00388	5.661	0.16839	3.91845	5.64121
3985216125	3979116151	65.8	1500	114.141	113.401	0.01125	9.634	0.16839	3.913	5.63981
3979116151	3977616158	16.7	1500	113.401	113.257	0.00862	8.436	0.16839	3.91312	5.63951
3977616158	3975316202	49.3	3658	90.096	89.767	0.00668	57.793	1.05251	29.16056	81.74126

MH ID	Ground Level (m)	DWF Max Water Level (HGL,m)	DWF + 2-yr Storm Max Water Level (HGL,m)	DWF + 100-yr Storm Max Water Level (HGL,m)	DWF Min Freeboard (m)	DWF + 2-yr Storm Min Freeboard (m)	DWF + 100-yr Storm Min Freeboard (m)
4113215853	130.4	128.501	129.007	129.87	1.899	1.393	0.53
4109815736	131.1	127.551	128.764	129.323	3.549	2.336	1.777
4100215764	130.5	126.6	127.383	127.856	3.9	3.117	2.644
4093615783	130.4	126.328	127.081	127.53	4.072	3.319	2.87
4084215811	130.3	125.93	126.664	127.075	4.37	3.636	3.225
4074115841	130	125.487	126.2	126.564	4.513	3.8	3.436
4073415843	130	125.436	126.146	126.495	4.564	3.854	3.505
4065215867	130.1	123.851	124.443	125.195	6.249	5.657	4.905
4059515883	130.6	123.505	124.089	124.83	7.095	6.511	5.77
4046215921	131.6	122.61	123.195	124.004	8.99	8.405	7.596
4037615947	132.1	121.979	122.634	123.428	10.121	9.466	8.672
4028715974	132.5	121.327	122.031	122.676	11.173	10.469	9.824
4014316063	131	115.95	117.298	118.297	15.05	13.702	12.703
4007316119	131.2	115.676	116.776	117.466	15.524	14.424	13.734
3998516199	126.4	114.96	115.795	116.139	11.44	10.605	10.261
3996116180	127	114.853	115.719	116.062	12.147	11.281	10.938
3992016148	119.2	114.623	115.486	115.786	4.577	3.714	3.414
3985216125	125.9	114.361	114.922	115.166	11.539	10.978	10.734
3979116151	120.2	113.55	114.208	114.46	6.65	5.992	5.74
3977616158	117.9	90.48	91.941	94.178	27.42	25.959	23.722

Run 2 (Eglinton Ave), Pre-Development:

From MH	To MH	Length(m)	Diameter (mm)	U/S Inv (m)	D/S Inv (m)	Slope (m/m)	Full Capacity (m3/s)	DWF Peak Flow (m3/s)	DWF + 2-yr Storm Peak Flow (m3/s)	DWF + 100-yr Storm Peak Flow (m3/s)
4119116042	4120716094	54.4	250	127.102	126.476	0.01151	0.059	0.0001	0.01983	0.03829
4120716094	4122116139	46.8	250	126.476	126.422	0.00115	0.019	0.00085	0.02806	0.05522
4122116139	4122816139	7.8	250	126.422	124.845	0.20218	0.248	0.00097	0.04286	0.06122
4122816139	4131016115	84.6	250	124.795	124.456	0.00401	0.035	0.00097	0.03083	0.05261
4131016115	4131516117	5.4	250	124.506	124.276	0.04259	0.114	0.00097	0.02938	0.05304
4131516117	4138516096	73.4	250	124.246	124.002	0.00332	0.032	0.00107	0.03763	0.06875
4138516096	4141316109	30.5	250	123.952	123.864	0.00289	0.03	0.00533	0.08705	0.10489
4141316109	4144416194	90.3	250	123.814	122.923	0.00987	0.055	0.00605	0.0889	0.10821
4144416194	NewLRT1	44.2	250	122.923	120.836	0.04724	0.12	0.00605	0.0889	0.1082
NewLRT1	NewLRT2	16	300	120.776	119.928	0.053	0.207	0.00605	0.0889	0.1082
NewLRT2	NewLRT4	131.5	300	119.868	112.896	0.05302	0.207	0.00793	0.10939	0.15916
NewLRT4	NewLRT5	45.4	525	111.94	111.144	0.01753	0.529	0.0181	0.19175	0.28511
NewLRT5	NewLRTstorage	199	2100	106.345	105.35	0.005	11.386	0.0181	0.1538	0.15209
NewLRTstorage	NewLRT6	3.5	600	103.735	103.7	0.01	0.57	0.0181	0.12154	0.12696
NewLRT6	4152316642	21.6	250	103.67	102.81	0.03973	0.11	0.01889	0.11709	0.12787
4152316642	4149316679	90.6	250	102.76	99.81	0.03255	0.1	0.01889	0.11705	0.12786
4149316679	4152416741	36.4	250	99.76	96.27	0.09598	0.171	0.01889	0.11705	0.12787
4152416741	4152816800	58.9	375	96.22	95.81	0.00697	0.136	0.01889	0.12527	0.13662
4152816800	4154316886	87.1	375	95.77	95.1	0.0077	0.143	0.01889	0.14367	0.16231
4154316886	4157416968	87.7	375	95.08	92.9	0.02487	0.257	0.01898	0.14813	0.1923
4157416968	4157716976	9.3	375	92.87	92.638	0.02495	0.257	0.01898	0.15131	0.21021
4157716976	4154017146	174.4	1500	91.968	91.285	0.00392	4.108	1.01364	4.59111	4.83038

MH ID	Ground Level (m)	DWF Max Water Level (HGL,m)	DWF + 2-yr Storm Max Water Level (HGL,m)	DWF + 100-yr Storm Max Water Level (HGL,m)	DWF Min Freeboard (m)	DWF + 2-yr Storm Min Freeboard (m)	DWF + 100-yr Storm Min Freeboard (m)
4119116042	129.7	127.128	127.209	129.84	2.572	2.491	-0.14
4120716094	129.4	126.517	127.019	129.666	2.883	2.381	-0.266
4122116139	129	126.449	126.967	129.281	2.551	2.033	-0.281
4122816139	129	124.83	126.936	129.22	4.17	2.064	-0.22
4131016115	128.5	124.536	126.707	128.706	3.964	1.793	-0.206
4131516117	128.5	124.283	126.688	128.668	4.217	1.812	-0.168
4138516096	128.5	124.026	126.337	127.814	4.474	2.163	0.686
4141316109	128.3	123.873	125.543	126.683	4.427	2.757	1.617
4144416194	125.5	122.969	123.1	123.143	2.531	2.4	2.357
NewLRT1	123.6	120.821	120.918	120.936	2.779	2.682	2.664
NewLRT2	127.1	119.917	120.03	120.095	7.183	7.07	7.005
NewLRT4	119.2	112.023	112.166	112.224	7.177	7.034	6.976
NewLRT5	119.1	106.465	106.558	107.342	12.635	12.542	11.758
NewLRTstorag	109.7	103.83	106.18	107.342	5.87	3.52	2.358
NewLRT6	109.7	103.744	105.326	106.319	5.956	4.374	3.381
4152316642	105.06	102.838	104.281	105.082	2.222	0.779	-0.022
4149316679	103.31	99.821	99.952	99.976	3.489	3.358	3.334
4152416741	101.27	96.317	96.519	97.474	4.953	4.751	3.796
4152816800	101.11	95.864	96.204	97.098	5.246	4.906	4.012
4154316886	98.35	95.158	95.778	96.548	3.192	2.572	1.802
4157416968	98.24	92.948	95.323	95.958	5.292	2.917	2.282
4157716976	96.8	92.485	95.271	95.89	4.315	1.529	0.91

Run 2 (Eglinton Ave), Post-Development:

From MH	To MH	Length(m)	Diameter (mm)	U/S Inv (m)	D/S Inv (m)	Slope (m/m)	Full Capacity (m3/s)	DWF Peak Flow (m3/s)	DWF + 2-yr Storm Peak Flow (m3/s)	DWF + 100-yr Storm Peak Flow (m3/s)
4119116042	4120716094	54.4	250	127.102	126.476	0.01151	0.059	0.01616	0.01616	0.01616
4120716094	4122116139	46.8	250	126.476	126.422	0.00115	0.019	0.0169	0.02332	0.02535
4122116139	4122816139	7.8	250	126.422	124.845	0.20218	0.248	0.01703	0.04001	0.05507
4122816139	4131016115	84.6	250	124.795	124.456	0.00401	0.035	0.01703	0.03024	0.04965
4131016115	4131516117	5.4	250	124.506	124.276	0.04259	0.114	0.01703	0.02891	0.04801
4131516117	4138516096	73.4	250	124.246	124.002	0.00332	0.032	0.02811	0.04218	0.05341
4138516096	4141316109	30.5	250	123.952	123.864	0.00289	0.03	0.03236	0.08642	0.10266
4141316109	4144416194	90.3	250	123.814	122.923	0.00987	0.055	0.03308	0.08813	0.10582
4144416194	NewLRT1	44.2	250	122.923	120.836	0.04724	0.12	0.03308	0.08813	0.10581
NewLRT1	NewLRT2	16	300	120.776	119.928	0.053	0.207	0.03308	0.08813	0.10581
NewLRT2	NewLRT4	131.5	300	119.868	112.896	0.05302	0.207	0.03495	0.10885	0.15358
NewLRT4	NewLRT5	45.4	525	111.94	111.144	0.01753	0.529	0.04496	0.19015	0.27835
NewLRT5	NewLRTstorage	199	2100	106.345	105.35	0.005	11.386	0.04495	0.14991	0.14629
NewLRTstorage	NewLRT6	3.5	600	103.735	103.7	0.01	0.57	0.04494	0.12034	0.12621
NewLRT6	4152316642	21.6	250	103.67	102.81	0.03973	0.11	0.04572	0.11714	0.12716
4152316642	4149316679	90.6	250	102.76	99.81	0.03255	0.1	0.04572	0.11712	0.12715
4149316679	4152416741	36.4	250	99.76	96.27	0.09598	0.171	0.04572	0.11712	0.12715
4152416741	4152816800	58.9	375	96.22	95.81	0.00697	0.136	0.04572	0.1255	0.13855
4152816800	4154316886	87.1	375	95.77	95.1	0.0077	0.143	0.04572	0.1438	0.1651
4154316886	4157416968	87.7	375	95.08	92.9	0.02487	0.257	0.0458	0.14816	0.19335
4157416968	4157716976	9.3	375	92.87	92.638	0.02495	0.257	0.0458	0.15136	0.21142
4157716976	4154017146	174.4	1500	91.968	91.285	0.00392	4.108	1.03568	4.59384	4.83162

MH ID	Ground Level (m)	DWF Max Water Level (HGL,m)	DWF + 2-yr Storm Max Water Level (HGL,m)	DWF + 100-yr Storm Max Water Level (HGL,m)	DWF Min Freeboard (m)	DWF + 2-yr Storm Min Freeboard (m)	DWF + 100-yr Storm Min Freeboard (m)
4119116042	129.7	127.194	127.194	129.191	2.506	2.506	0.509
4120716094	129.4	126.643	126.93	129.169	2.757	2.47	0.231
4122116139	129	126.473	126.874	129.072	2.527	2.126	-0.072
4122816139	129	124.92	126.843	128.998	4.08	2.157	0.002
4131016115	128.5	124.577	126.623	128.368	3.923	1.877	0.132
4131516117	128.5	124.43	126.605	128.321	4.07	1.895	0.179
4138516096	128.5	124.158	126.285	127.621	4.342	2.215	0.879
4141316109	128.3	123.957	125.503	126.53	4.343	2.797	1.77
4144416194	125.5	123.016	123.099	123.133	2.484	2.401	2.367
NewLRT1	123.6	120.862	120.918	120.933	2.738	2.682	2.667
NewLRT2	127.1	119.956	120.029	120.086	7.144	7.071	7.014
NewLRT4	119.2	112.055	112.165	112.218	7.145	7.035	6.982
NewLRT5	119.1	106.482	106.557	107.263	12.618	12.543	11.837
NewLRTstorag	109.7	103.925	106.187	107.262	5.775	3.513	2.438
NewLRT6	109.7	103.786	105.332	106.251	5.914	4.368	3.449
4152316642	105.06	102.883	104.286	105.027	2.177	0.774	0.033
4149316679	103.31	99.852	99.953	99.974	3.458	3.357	3.336
4152416741	101.27	96.372	96.521	97.456	4.898	4.749	3.814
4152816800	101.11	95.918	96.208	97.085	5.192	4.902	4.025
4154316886	98.35	95.193	95.78	96.542	3.157	2.57	1.808
4157416968	98.24	92.983	95.325	95.958	5.257	2.915	2.282
4157716976	96.8	92.49	95.273	95.889	4.31	1.527	0.911

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TECHNICAL MEMORANDUM TM1

DATE	February 16, 2018
TO	**Pascal Monat, SCS Consulting**
SUBJECT	Eglinton and Laird Planning Study **Review of Water and Wastewater Servicing Opportunities**
FROM	Kevin Brown, P. Eng
PROJECT NUMBER	17103

1 Background

The Municipal Infrastructure Group Ltd. (TMIG) has been retained by SCS Consulting Limited (SCS) to conduct a servicing analysis to understand the existing water system in the study area and the capacity for the potential re-development of the Eglington/Laird Development Area.

The recommended preferred Development Densities were developed by The Planning Partnership and have been used in the assessment of servicing requirements and opportunities.

The Eglinton-Laird Focus Area consists of two distinct development areas, as follows:

- Three major blocks that front onto Eglinton Avenue. These will generally consist of high-density mixed-use developments in the range of 6 to 32 storeys high
- Seven smaller blocks along the west side of Laird Ave. These will generally consist of smaller 3 to 10 storey mixed-use developments.

The development density Statistics are provided in **Appendix A**.

Information about the water system provided by the City was reviewed, and a modelling methodology developed to be applied to the analysis was stated in the memo dated June 7, 2017.

As part of the modelling methodology, a model calibration was performed as per the memo dated August 8, 2017.

The Existing condition analysis with the calibrated model was described in the memo dated October 27, 2017.

2 Existing Servicing

From the City of Toronto Water Supply infrastructure map, we have identified that the study area falls under the Pressure District PD3E. The transmission main supplying this area is the 600 mm main located along Don Mills Road to the east. The study area borders the Pressure District PD4E along the Bayview Avenue. (Refer Fig 1. – Water System).

From a meeting with Toronto Water, we had been advised that PD3E is hydraulically connected to PD3 to the west, but that PD3E should be able to function alone.

We have also been advised that there are Pressure-Reducing Valves (PRVs) located along the PD4 watermain on Bayview Avenue which can supplement the water supply and maintain pressures in PD3E.

2.1 Model Development and Calibration

TMIG Developed an InfoWater model for this Study Area. The main components of the model are described below.

2.1.1 Pipe Network

The City provided GIS shapefiles for the Water system (watermains and valves), and these were used to generate the pipe network for the InfoWater model after clarifying the information gaps. (Refer Fig 1 – Water system)

2.1.2 Water Demands

The average consumption/billing data from the geocoded meter data provided has been used as the modelled average day demands for each parcel. Using the demand allocation tool in InfoWater, these demands have been assigned to closest node in the pipe network to create an average day demand set.

Based on City of Toronto guidelines, the Maximum Day peaking factor is 1.8 and the Peak Hour factor is 2.5. The average consumption from the meter data was multiplied by the peaking factors to create the Maximum Day and Peak Hour demand sets.

Fire demands have been assigned to junctions in the network based on the land use. (Refer Fig 2-Fire demand allocation)

2.1.3 Boundary Conditions

Since the model developed is for the local area only, additional system data was collected to provide a suitable boundary condition at the study area limits. A fixed head reservoir has been established west of Don River and east of Overlea Boulevard and Thorncliffe Park Drive servicing the 400-mm transmission main along Overlea Boulevard.

The HGL elevation was established at 194 m through pressure logging.

2.1.4 Field Testing Program

A field testing program was developed to calibrate the model. These tests involved five hydrant flow tests along major water mains to calibrate the roughness coefficients along these primary feeds. Also, pressure loggers were installed at two locations (Overlea Blvd and Parkhurst Blvd) to track normal pressure variations over the course of a typical week. Fig.3 shows the details of the field testing program.

The fire flow test analysis was performed for all the five locations using NFPA 291 Extrapolation Methodology. Attachment A shows the fire flow analysis on all the five locations. Attachment B shows the pressure variations at those locations during hydrant test.

2.1.5 Model Calibration

The hydraulic information in model regarding pipe roughness (Hazen Williams Coefficient) and the boundary conditions (HGL for Fixed Head Reservoir) were initially assumed based on standard values. Model calibration involves the adjustment of the primary network model parameters (i.e. pipe roughness coefficients and Reservoir HGL) until the model results closely approximate actual observed conditions as measured from field data.

a. Boundary conditions

Using the pressure logger data at two locations and the static pressure data at the five-fire flow locations, the HGL for fixed head reservoir is adjusted to reasonable value.

b. Pipe Roughness Coefficient

The model was simulated for all five fire flow tests by assigning the maximum hydrant flow to “Demand 10” in model at the Fire flow node and the residual pressure at the nearby node is noted. The pipe roughness was adjusted along the mains such that to reduce the difference in residual head between model and field data. The adjusted pipe roughness coefficient is within the range specific by City of Toronto Standards.

The calibrated model head with observed field data is given in Attachment C. It is observed that the observed and simulated HGL differ in the range of +5 m to -5 m.

Overall, a good match between the model and the measured pressures was achieved. However, the area along Overllea Blvd (FF 1) where the model results varied from the other test locations. It is not clear why the modelled pressures do not match existing, but it is possibly related to a topographical elevation error, since an excellent calibration was obtained at the other fire flow test locations.

There are Pressure-Reducing Valves along Bayview Avenue, but it is not clear whether these are active on a regular basis. Our modelling and calibration exercise did not indicate that the PD3E system pressures would drop enough that the PRVs become active.

2.2 Model Results – Existing Conditions

The existing conditions were simulated with the calibrated model to establish the residual pressures under several demands scenarios throughout the Study Area. The model was simulated for the following scenarios and the pressure and head loss in system can be studied to understand the existing system capacity. Attachment D shows the model output for the existing condition analysis. Summary of results are provided in Table 1.

TABLE 1 EXISTING CONDITION MODELLING SCENARIO RESULTS

Water Demand Modeling Scenario	Minimum Water System Requirements	Modelling Results
Average Day Demand	Recommended System Pressures = 40 psi to 100 psi	Model System Pressure = 46.8 psi to 95.3 psi (Ref Fig 4)
Maximum Day Demand	Recommended System Pressures = 40 psi to 100 psi	Model System Pressure = 38.3 psi to 90.1 psi (Ref Fig 5)
Peak Hour Demand	Recommended System Pressures = 40 psi to 100 psi	Model System Pressure = 33 psi to 87.3 psi (Ref Fig 6)
Required Fire Flow to be provided at a residual pressure of no less than 20 psi		
Maximum Day Demand plus Fire Flow	Residential Fire flow requirements per City of Toronto Standards, Q_f >64 L/s to 189 L/s	Model Residential Available Fire flow = 56.5 L/s to 318.3 L/s (Ref Fig 7)
	Employment Fire flow requirements per City of Toronto Standards, Q_f = 189 L/s to 317 L/s	Model Employment / High Rise Available Fire flow 80.6 L/s to 792.5 L/s (Ref Fig 7)

1. Refer Attachment D for detailed water modelling output table

The model simulation results show that the system pressures are within the recommended range of 40 psi to 100 psi (275 kpa to 690 kpa) in most of the area. However, under Max Day and Peak Hour demand scenario, there are areas with low pressures and these areas are at the higher elevation range of the current pressure district.

Fire flow analysis performed shows that generally there are suitable fire flows available in most areas, however, there are some areas with not adequate fire flows. It is not clear whether these areas would be supplemented by additional water supply (and therefore increased pressures) from PD4 vis the PRVs along Bayview Avenue.

3 Modifications to Reflect Post-Development Conditions

The recommended preferred development densities provided in Appendix A have been used in the assessment of servicing requirements and opportunities.

The Eglinton-Laird Focus Area consists of two distinct development areas, as follows:

- Three major blocks that front onto Eglinton Avenue.
  These will generally consist of high-density mixed-use developments. Therefore, following design criteria is used.
  Residential = 191 Lpcd; ICI = 180,000 L/ha/Day

- Seven smaller blocks along the west side of Laird Ave.
  These will generally consist of medium density mixed use developments. Therefore, following design criteria is used.
  Residential = 320 Lpcd; ICI = 180,000 L/ha/Day

Attachment E shows the detailed water demand calculations for the proposed developments. A summary of demands is provided in Table 2.

TABLE 2 SUMMARY OF PROPOSED DEVELOPMENT WATER DEMANDS

Development Area	ICI Area (m^2)	Residential Units	Residential Population	Avg Day Demands		Max Day Demands		Peak Hour Demands	
				ICI (L/s)	RES (L/s)	ICI (L/s)	RES (L/s)	ICI (L/s)	RES (L/s)
Eglinton Avenue	44,670	3,755	6,684	9.31	14.78	10.24	19.21	11.17	36.94
Laird Drive	21,090	1,017	2,102	4.39	7.78	4.83	12.84	5.27	19.30

1. Refer Attachment E for detailed water demand calculations

The model was updated to reflect the post development conditions. The existing meter-based demands for the proposed redevelopment addresses were removed from the appropriate nodes, and the proposed future design demands were assigned to new nodes. The model was modified to add average day, Max day and Peak hour demand scenario for the Post Development conditions.

3.1 Model Results – Post-Development Conditions

The post development conditions were simulated with the modified calibrated model to establish the residual pressures under several demands scenarios throughout the Study Area. The model was simulated for the following scenarios and the pressure and head loss in system can be studied to understand the impact of the development existing system capacity. Attachment F shows the model output for the post development condition analysis. A summary of the results is provided in Table 3.

TABLE 3 POST DEVELOPMENT CONDITION MODELLING SCENARIO RESULTS

Water Demand Modeling Scenario	Minimum Water System Requirements	Modelling Results
Average Day Demand	Recommended System Pressures = 40 psi to 100 psi	Model System Pressure = 43.4 psi to 93.1 psi (Ref Fig 8)
Maximum Day Demand	Recommended System Pressures = 40 psi to 100 psi	Model System Pressure = 30.6 psi to 87 psi (Ref Fig 9)
Peak Hour Demand	Recommended System Pressures = 40 psi to 100 psi	Model System Pressure = 19.4 psi to 81.8 psi (Ref Fig 10)
Required Fire Flow to be provided at a residual pressure of no less than 20 psi		
Maximum Day Demand plus Fire Flow	Residential Fire flow requirements per City of Toronto Standards, Q_f >64 L/s to 189 L/s	Model Residential Available Fire flow = 50.2 L/s to 269.5 L/s (Ref Fig 11)
	Employment Fire flow requirements per City of Toronto Standards, Q_f = 189 L/s to 317 L/s	Model Employment / High Rise Available Fire flow 75.3 L/s to 742.9 L/s (Ref Fig 11)

1. Refer Attachment F for detailed water modelling output table

The model simulation results show that the system pressures are within the recommended range of 40 psi to 100 psi (275 kpa to 690 kpa) in most of the area. However, under Max day and Peak Hour demand scenario, there are areas with pressures below the desired level-of service. While some of these areas experience low pressures under existing conditions, the extent of the low-pressure areas increases as a result if the increased demands associated with the proposed development.

The modelled fire flow analysis indicates that there are suitable fire flows available in most areas, however, there are areas with sub-standard fire flows (as in the existing conditions modelling). Due to the increased fire flow demands associated with the proposed land use changes, the proposed redevelopment areas will not be provided with the City's design fire flows without some system improvements.

Under the peak hour demand scenario, the low-pressure area generally falls between Hanna Road and Bayview Avenue.

Under the fire flow scenario, there are broadly two zones with sub-standard fire flows.

- West of Bessborough Dr and South of Eglinton Ave
- Central Part of study area along Laird Dr, along Eglinton Ave and Vanderhoof Ave

Head loss through the distribution system was reviewed to understand the potential hydraulic bottlenecks that are limiting the fire flow availability. From FIG 9 (Post Dev Peak Hour Demand Scenario), we can see very high head losses along watermains in the following areas:

- Overlea Blvd, west of Don River to Thorncliffe Park Dr
- Wicksteed Ave, from Beth Nealson Dr to Leslie St

It is anticipated that focussing system improvements in these areas will result in the most efficient opportunity to restore system pressures and mitigate any impacts from the proposed development.

3.2 Recommended System Upgrades

The model was run again to confirm the magnitude of the system upgrades required to mitigate the impacts of the proposed developments on the level-of-service provided throughout the service area.

A series of system upgrades in the locations identified above are shown in Fig 12. A summary of the proposed upgrades is given in Table 4 with complete details included in Attachment G.

TABLE 4 SUMMARY OF PROPOSED SYSTEM UPGRADES

Road	From	To	Length (m)	Type of Upgrade	Ex Dia (mm)	Prop Dia (mm)
Overlea Blvd	West of Don River	Thorncliffe Park Dr	490.3	Rehab	400	400
Beth Nealson Dr	Thorncliffe Park Dr	Wicksteed Ave	500.4	Upsizing	300	400
Wicksteed Ave	Beth Nealson Dr	Leslie St	350.1	Upsizing	300	400
Leslie St	Wicksteed Ave	Research Rd	97.0	Upsizing	200	300
Leonard Linton Park Easement	Wicksteed Ave	Vanderhoof Ave	184.9	Upsizing	150	200
Aerodrome Cres	Vanderhoof Ave	Thomas Elgie Dr	222.4	Upsizing	200	300
Brentcliffe Rd	Vanderhoof Ave	Eglinton Ave	184.5	Upsizing	200	300
Vanderhoof Ave	Brentcliffe Rd	Fut Block A1/A2 easement	235.3	Upsizing	150	200
Vanderhoof Ave	Fut Block A1/A2 easement	Laird Dr	197.2	Upsizing	200	300

1. *Refer Attachment G for detailed upgrades identified for system improvements*

3.2.1 Verification of Pressure Improvements

The Upgraded System Post Development conditions were simulated with the modified calibrated model to confirm whether the post-development residual pressures can be restored to pre-development conditions throughout the service area.

Attachment H shows the model output for the upgraded system post development condition analysis. Summary of results and comparison with other conditions are provided in Table 5. This demonstrates that the reduction in system pressures resulting from the proposed redevelopment densities can be mitigated through the system improvements identified above. There are still some areas where the modelling results indicate that the desired level-of-service will not be met, but these are consistent with the areas identified in the existing conditions analysis.

The areas with sub-standard pressures (according to the model results) are located along the western edge of the Service Area. The affected area is at the highest elevations within the service area, and adjacent to the PD-4 watermain along Bayview Avenue. The City has advised that there are PRVs along Bayview Avenue which can supplement PD-3E. As the modelling demonstrates that the proposed system upgrades will be successful in maintining the existing conditions, we anticipate that there will be no overall adverse impacts resulting from the proposed development.

TABLE 5 MODELLING RESULTS WITH SYSTEM IMPROVEMENTS

Water Demand Modeling Scenario	Existing Condition Ex System Modelling Results	Post Development Ex System Modelling Results	Post Development Upgraded System Modelling Results
Average Day Demand	Model System Pressure = 46.8 psi to 95.3 psi (Ref Fig 4)	Model System Pressure = 43.4 psi to 93.1 psi (Ref Fig 8)	Model System Pressure = 47 psi to 95.4 psi
Maximum Day Demand	Model System Pressure = 38.3 psi to 90.1 psi (Ref Fig 5)	Model System Pressure = 30.6 psi to 87 psi (Ref Fig 9)	Model System Pressure = 40.3 psi to 92.1 psi
Peak Hour Demand	Model System Pressure = 33 psi to 87.3 psi (Ref Fig 6)	Model System Pressure = 19.4 psi to 81.8 psi (Ref Fig 10)	Model System Pressure = 34.5 psi to 89.6 psi (Ref Fig 13)
Required Fire Flow to be provided at a residual pressure of no less than 20 psi			
Maximum Day Demand plus Fire Flow	Model Residential Available Fire flow = 56.5 L/s to 318.3 L/s (Ref Fig 7)	Model Residential Available Fire flow = 50.2 L/s to 269.5 L/s (Ref Fig 11)	Model Residential Available Fire flow = 59.8 L/s to 473.3 L/s (Ref Fig 14)
	Model Employment / High Rise Available Fire flow = 80.6 L/s to 792.5 L/s (Ref Fig 7)	Model Employment / High Rise Available Fire flow = 75.3 L/s to 742.9 L/s (Ref Fig 11)	Model Employment / High Rise Available Fire flow = 84.0 L/s to 1432.2 L/s (Ref Fig 14)

1. Refer Attachment D, F & H for detailed system water modelling output table

4 Conclusion

The proposed development will result in increased system demands (average day, maximium day, and peak hour). These increases will impact the residual pressures throughout the PD-3E service area.

The impacts of the increased densities can be mitigated through 2.5 km of local system improvements.

FIGURES

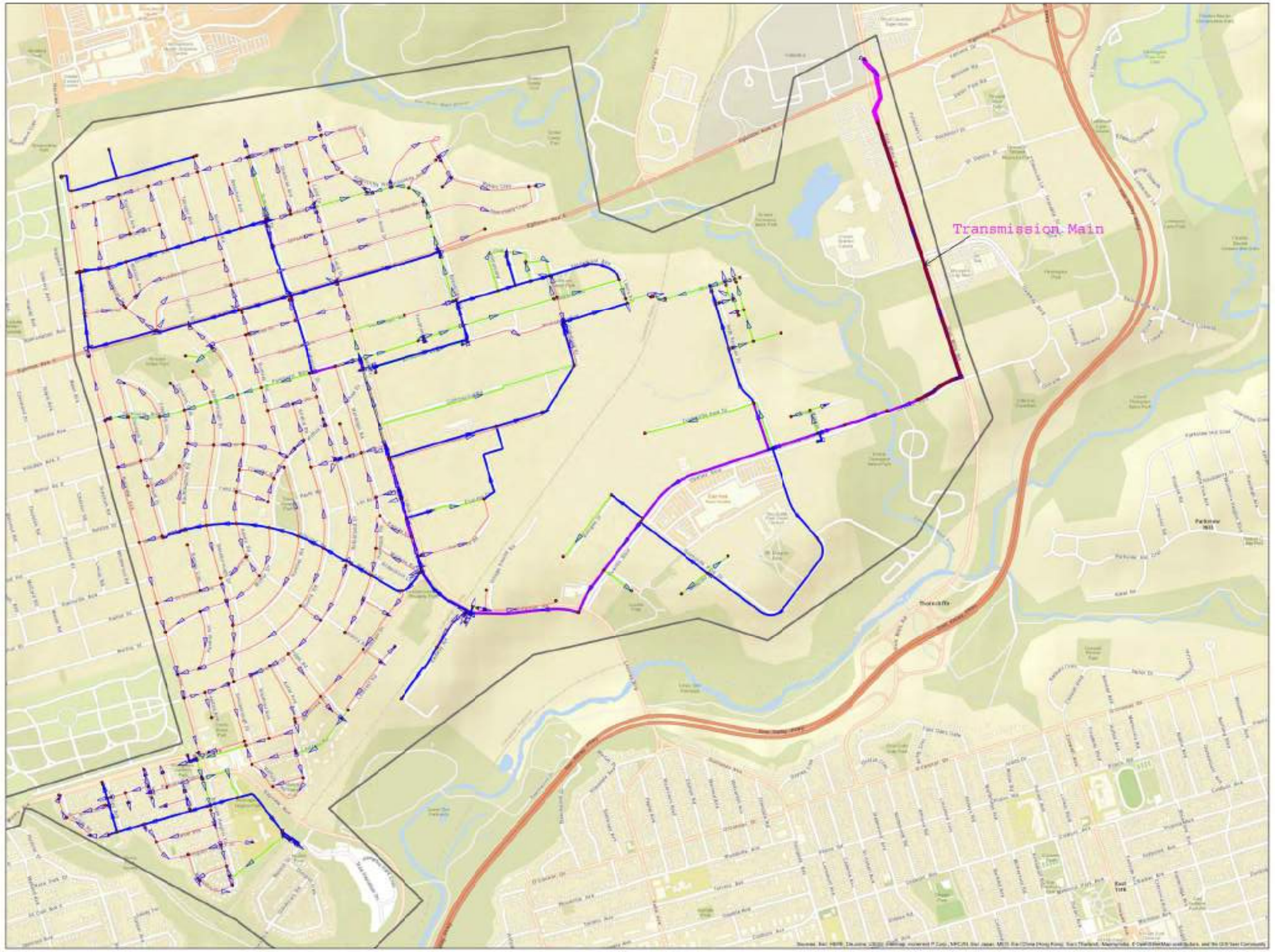
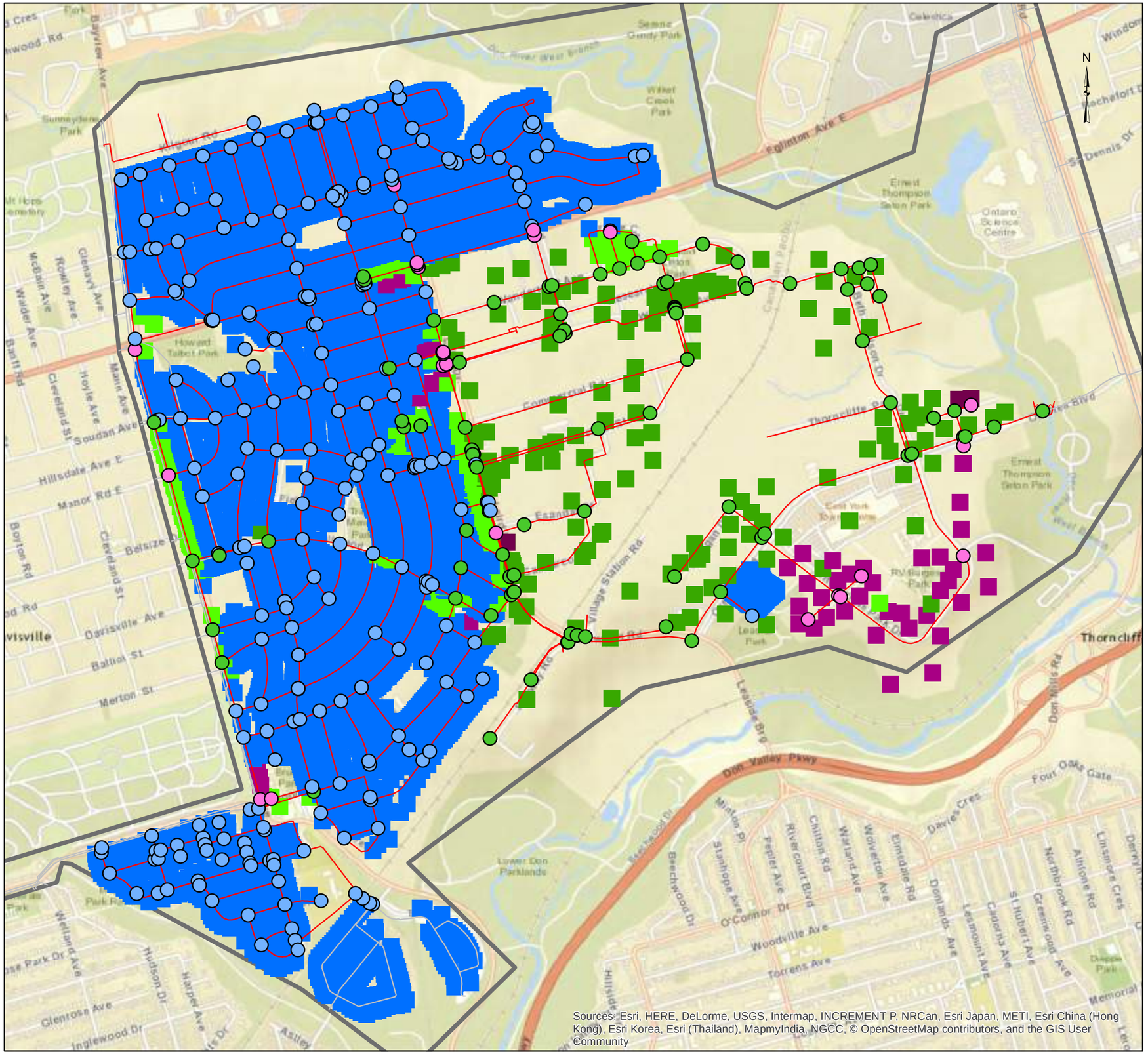


Fig 1.
Ex. Water
Distribution
System



Legend

Junction

FIRE_DEM

- 65 L/s
- 190 L/s
- 317 L/s

Meterdata_Landuse_Final

Land_Use

- RES, FF = 65 L/s
- ICI + RES , FF = 190 L/s
- ICI, FF = 190 L/s
- RES-HD, FF = 317 L/s
- ICI-HR, FF = 317 L/s

Fig 2. Fire Flow Demand Allocation

Fig 3

Legend

Pipe

RUN_DIAM

- < 150 mm
- 250 mm
- 300 mm
- 400 mm

FF5

FF4

FF2

Log 2

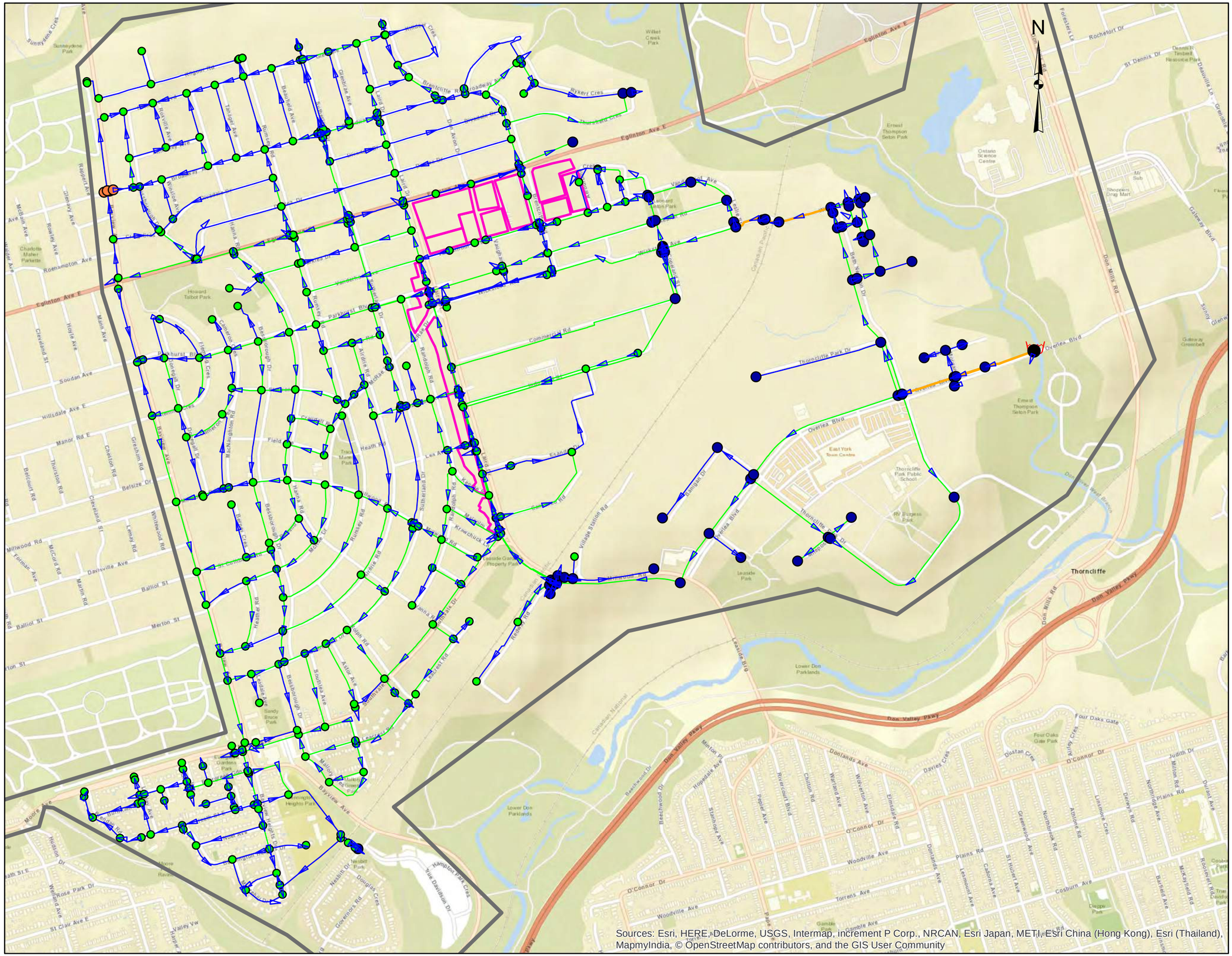
Log 1

FF3

FF1

Fig 1. Ex. Water Distribution System

Fig.3 Water Field Tests for Model Calibration



Legend

Junction

PRESSURE

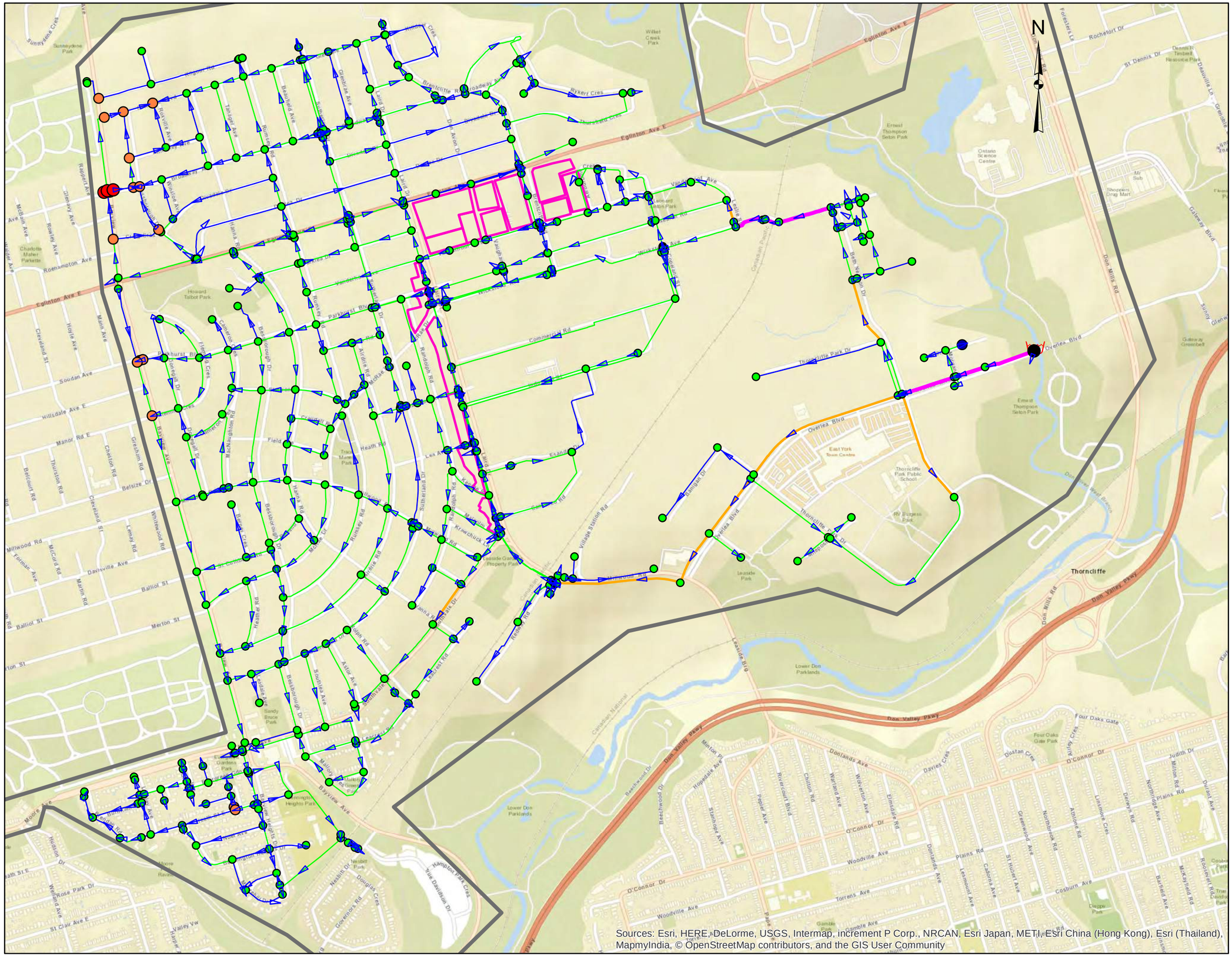
- < 40 psi
- 40 - 50 psi
- 50 -90 psi
- 90 -100 psi
- > 100 psi

Pipe

HL1000

- less than 0.00
- 0.00 ~ 1.00
- 1.00 ~ 5.00
- 5.00 ~ 10.00
- 10.00 ~ 20.76

Fig 4.
EX - Avg Day
Demand Scenario



Legend

Junction

PRESSURE

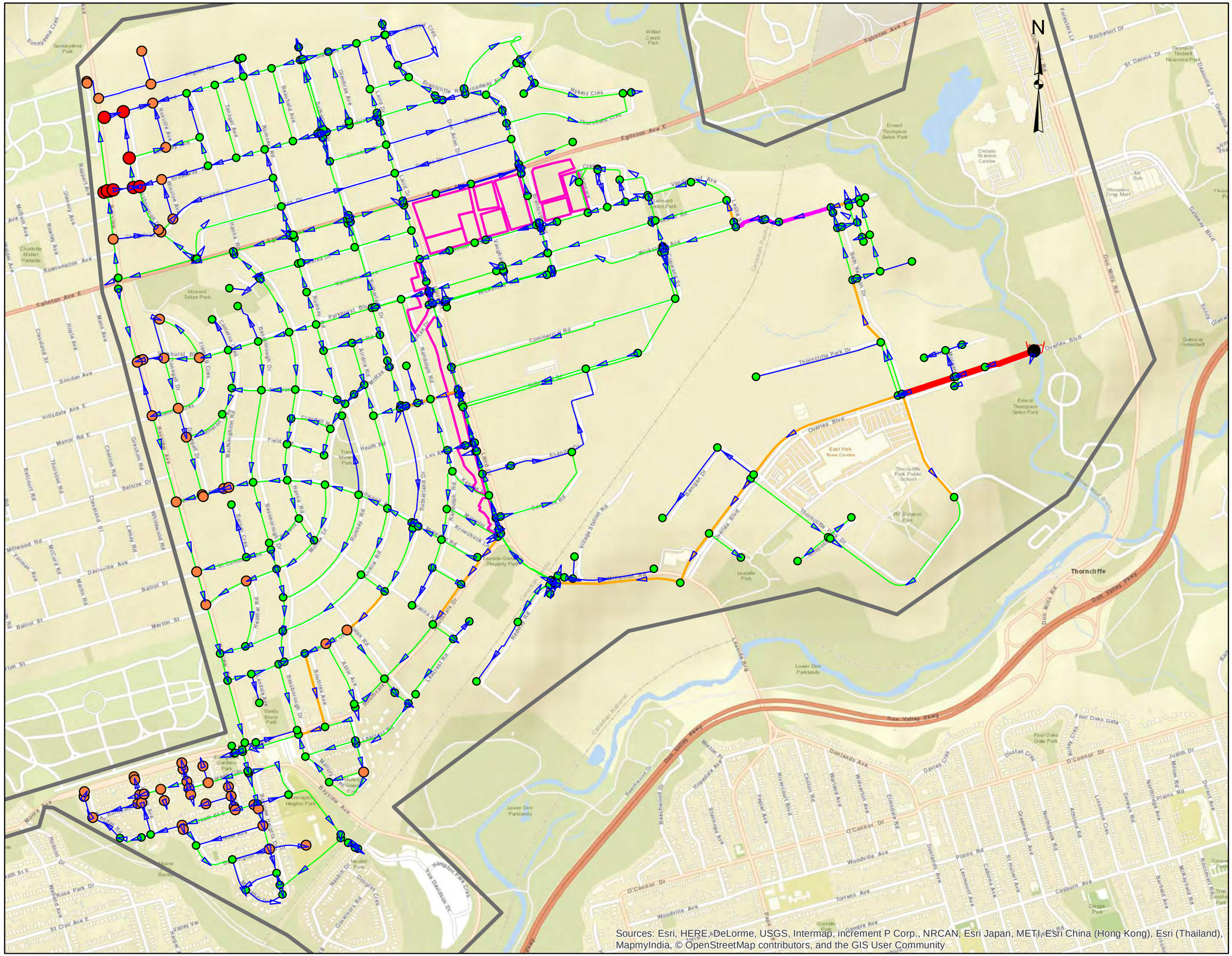
- < 40 psi
- 40 - 50 psi
- 50 -90 psi
- 90 -100 psi
- > 100 psi

Pipe

HL1000

- less than 0.00
- 0.00 ~ 1.00
- 1.00 ~ 5.00
- 5.00 ~ 10.00
- 10.00 ~ 20.76

Fig 5.
EX - Max Day
Demand Scenario



Legend

Junction

PRESSURE

- < 40 psi
- 40 - 50 psi
- 50 -90 psi
- 90 -100 psi
- > 100 psi

Pipe

HL1000

- less than 0.00
- 0.00 ~ 1.00
- 1.00 ~ 5.00
- 5.00 ~ 10.00
- 10.00 ~ 20.76

Fig 6.
EX - Peak Hour Demand Scenario

Legend

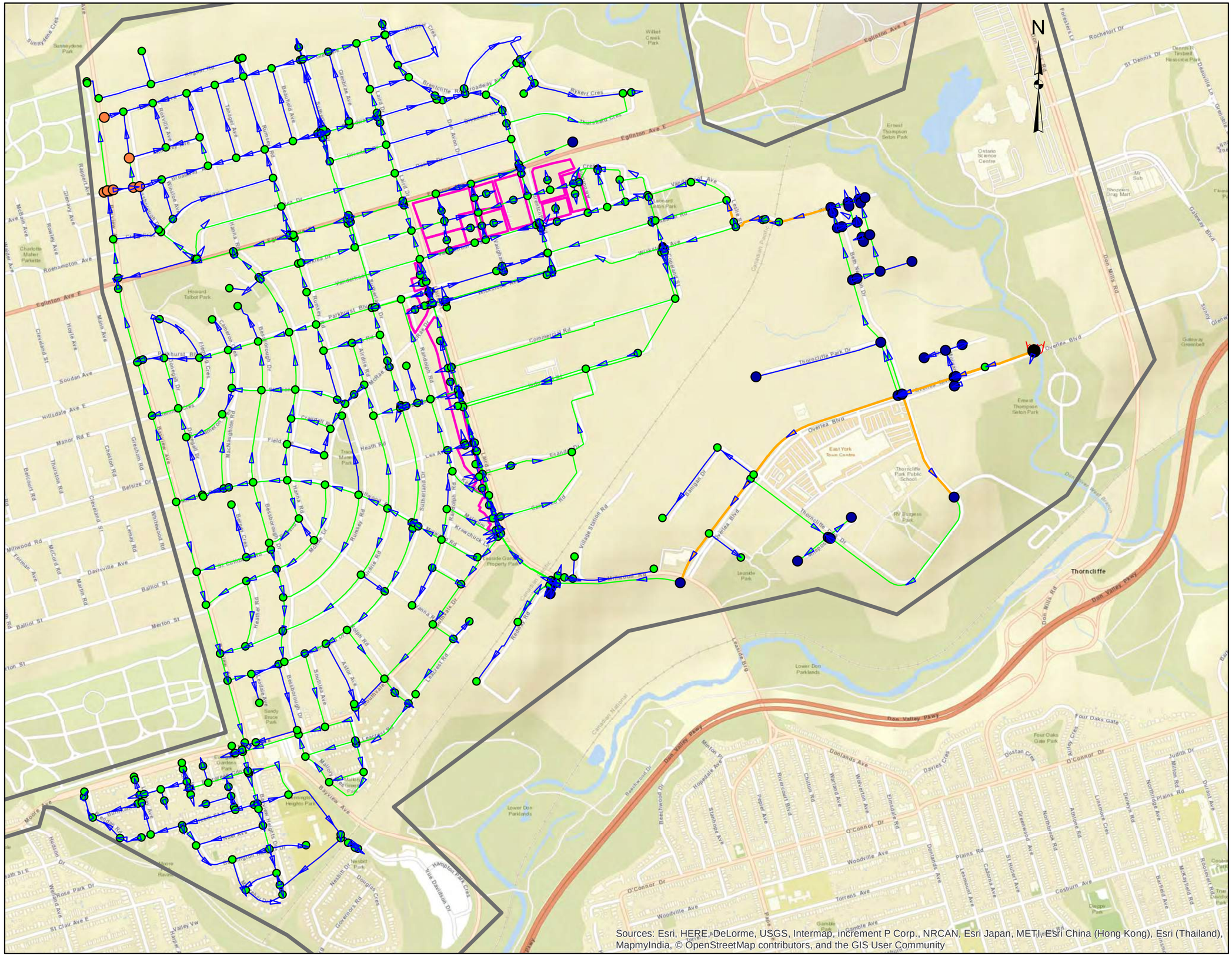
Junction

Junction.RES_FF

- Residual Fire Flow < 0 L/s
- Residual Fire Flow 0 - 5 L/s
- Residual Fire Flow > 5 L/s

Note:- At any given node the Available Flow at Hydrant must be greater than Total demand. Therefore the Residual Fire Flow at any node should be greater than Zero (indicating a greater available fire flow than what is required

Fig 7.
EX - Max Day + Fire Flow Demand Scenario



Legend

Junction

PRESSURE

- < 40 psi
- 40 - 50 psi
- 50 -90 psi
- 90 -100 psi
- > 100 psi

Pipe

HL1000

- less than 0.00
- 0.00 ~ 1.00
- 1.00 ~ 5.00
- 5.00 ~ 10.00
- 10.00 ~ 20.76

Fig 8.
Post Dev -
Avg Day Demand
Scenario