Development Master Plan

Rangeview

November 2022

Rangeview Landowners Group Inc.

Rangeview

Our Team

Delta Urban Inc.

Strategic and Technical Advice for Landowners Group Management

Bousfields Inc.

Urban Planning
Urban Design
Community Engagement

BA Group

Transportation

Schaeffers & Associates Ltd.

Civil Engineering

MBTW Group

Landscape Architecture

Urban Equation

Sustainability Strategy

SLR Consulting

Pedestrian Wind Assessment

Cicada Design Inc.

Visual Renderings

Technical Consultants

J.D. Barnes	Surveyor
D.S. Consultants	Hydrogeological Engineer
Primary Energy	Hydro and Utility Coordination Services

Table of Contents

Land Acknowledgement

We are grateful to have the opportunity to work on this land, and by doing so, give our respect to its first inhabitants. We would like to begin by acknowledging the land on which the Region of Peel operates, is part of the Treaty Lands and Territory of the Mississaugas of the Credit. For thousands of years, Indigenous peoples inhabited and cared for this land, and continue to do so today. In particular we acknowledge the territory of the Anishinabek, Huron-Wendat, Haudenosaunee and Ojibway/Chippewa peoples; the land that is home to the Metis; and most recently, the territory of the Mississaugas of the Credit First Nation who are direct descendants of the Mississaugas of the Credit.

1 Introduction & Purpose

This report contains the framework and vision that comprise the Development Master Plan ("DMP") for the lands identified in Chapter 13.3 the City of Mississauga Official Plan as Rangeview Estates. Rangeview Estates (also referred to herein as "Rangeview") is one of four precincts within the Lakeview Waterfront Major Node and is generally comprised of the lands located along the south side of Lakeshore Road East, between East Avenue and Hydro Road, and extending south to include the properties along both the north and south sides of Rangeview Road. Overall, Rangeview includes 33 properties under a variety of ownerships with a combined area of over 21 hectares, not including existing public roads.

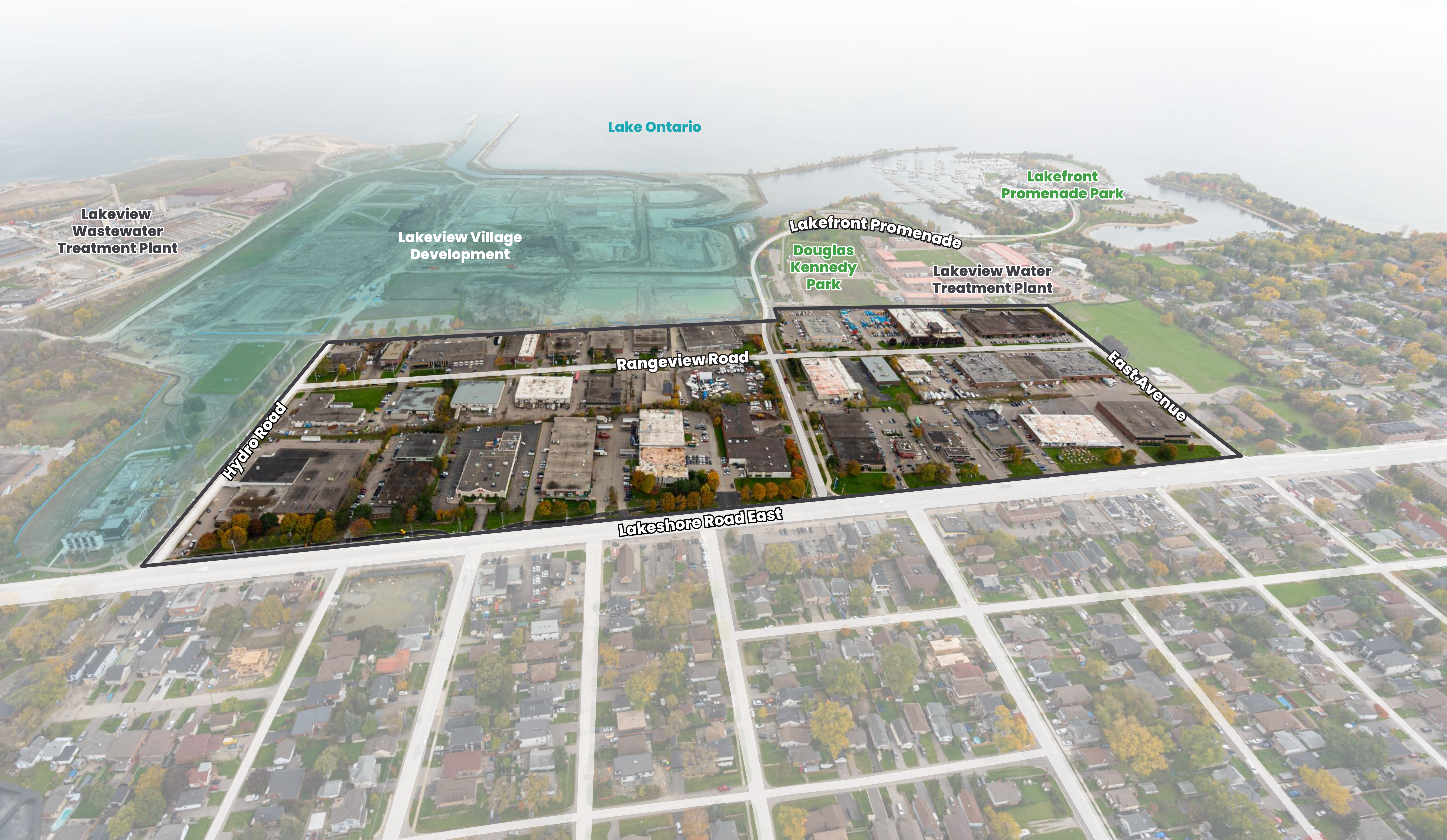
Rangeview forms part of the larger Inspiration Lakeview Master Plan area and its development represents the second and final piece of this new master planned waterfront community, with the other three precincts having been advanced through the combined Lakeview Village DMP process. The majority of Inspiration Lakeview's direct frontage onto Lakeshore Road East is occupied by Rangeview Estates, thus Rangeview's successful transformation from an industrial business enclave to a residential and mixed-use neighbourhood with a predominantly mid-rise built form is a key element in connecting the new community to the broader City of Mississauga and the planned Lakeshore Bus Rapid Transit service.

This report has been prepared on behalf of the Rangeview Landowners Group Inc. (the "Rangeview LOG"), which currently represents nine (9) landholders within Rangeview Estates. Collectively, the Rangeview LOG owns 21 properties within Rangeview, representing approximately 65% of all private landholdings. The remainder of the properties within Rangeview are currently owned by individuals or corporations that are not seeking to redevelop their properties at this time. In accordance with the policies of Chapter 13.3 the City of Mississauga Official Plan (the "Mississauga OP"), individual development of these non-participating parcels will generally not be approved until the respective landowners have become party to a landowners cost sharing agreement and/or joined the Rangeview LOG.

The purpose of the DMP for Rangeview is to provide urban design direction and guidance on the intended development of the lands at a more detailed, precinct-oriented level than is provided for in the policies of the Mississauga OP. The Rangeview DMP demonstrates the current vision of the Rangeview LOG for the orderly development of these lands with new, complete neighbourhoods that include a mix of low, medium, and high-density residential uses with retail and other non-residential uses provided in strategic locations. A variety of parks and open spaces are proposed throughout Rangeview Estates in order to provide opportunities for both passive and active recreation, and to facilitate pedestrian connectivity from Lakeshore Road East south to Lake Ontario. In addition, an expanded network of public roads will connect Rangeview to the surrounding existing and planned communities through a logical grid that is supported by public transit and active transportation connections.

Connectivity and integration with the adjacent Lakeview Village development (which comprises the three other precincts of the Lakeview Waterfront Major Node) has been considered in all aspects of the preparation of the Rangeview DMP. Together, Rangeview Estates and Lakeview Village provide a transformational opportunity to redefine Mississauga's waterfront and connect existing communities to Lake Ontario. The Rangeview DMP design recognizes and builds on the achievements of the Lakeview Village development, while responding to the unique, transitional context of Rangeview Estates.

Figure 1 - Aerial View of Rangeview Estates Towards Lake Ontario



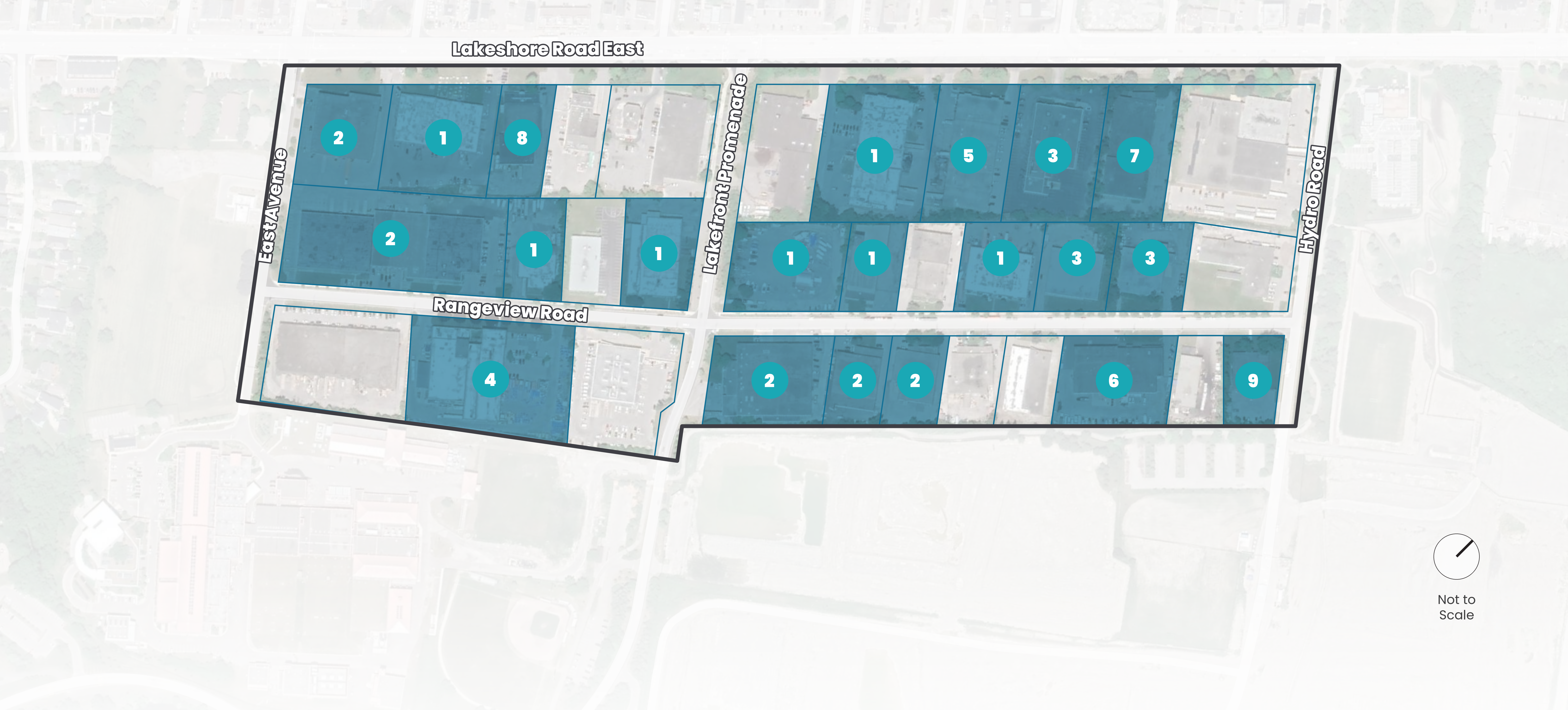
Rangeview Landowners Group

As noted above, the Rangeview LOG is comprised of nine (9) landowners who collectively own approximately 65% of the land within Rangeview, excluding the area of existing public roads. The Rangeview LOG includes a diverse range of business owners and operators, developers and landlords. **Table 1** below provides an overview of each participating landowner, their properties and the approximate area of their landholdings within Rangeview.

Table 1 - Rangeview Landowners Group Landholdings

	Landowner Name(s)	Property Address(es)	Area
1	**Dorsay (Lakeshore) Inc.** **Dorsay (Lakefront Promenade) Inc.** **Dorsay (Rangeview) Inc.** **(Dorsay Development Corp.)**	• 848-872 Lakeshore Road East • 974 Lakeshore Road East • 930 Lakefront Promenade • 925 Lakefront Promenade • 885 Rangeview Road • 983 Rangeview Road • 1025 Rangeview Road	4.49 ha (11.10 ac)
2	**Elgroup Holdings Inc.** **Elias Bros. Construction Limited**	• 830 & 832 Lakeshore Road East • 851, 855, 859, 861, 863, 865 Rangeview Road • 895 Lakefront Promenade • 992 Rangeview Road • 996 Rangeview Road	3.61 ha (8.92 ac)
3	**Rangeview 1035 Holding Inc.** **Rangeview 1045 Holding Inc.** **1207238 Ontario Limited Inc.**	• 1035 Rangeview Road • 1045 Rangeview Road • 1036 Lakeshore Road East	1.80 ha (4.45 ac)
4	**Whiterock 880 Rangeview Inc.** **(Dream Unlimited Corp.)**	• 880 Rangeview Road	1.31 ha (3.24 ac)
5	**447111 Ontario Limited** **(Norstar Group)**	• 1000, 1002, 1004, 1006 Lakeshore Road East	0.78 ha (1.93 ac)
6	**2120412 Ontario Inc.** **(Xtreme Tire)**	• 1044 Rangeview Road	0.72 ha (1.78 ac)
7	**ILSCO of Canada Limited**	• 1050 Lakeshore Road East	0.70 ha (1.73 ac)
8	**1127792 Ontario Limited**	• 880 Lakeshore Road East	0.43 ha (1.06 ac)
9	**Kotyck Investments Ltd.**	• 1076 Rangeview Road	0.35 ha (0.86 ac)
	Total		**14.19 ha (35.07 ac)**

Figure 2 - Rangeview Landowners Group Participation Map



The Rangeview LOG was formed in 2021 through efforts initiated by key landholders in the area. Its purpose is to act as a cohesive and collaborative group which will work together in securing development approvals for Rangeview Estates, while sharing costs associated with these approvals. Since its formation, the Rangeview LOG has worked effectively to identify priorities and constraints, based on which it has developed a master plan concept that implements and expands on the community and City's preliminary visions for Rangeview Estates as set out in the Inspiration Lakeview Master Plan and Lakeview Waterfront Major Node policies of the Mississauga OP.

The Consultant Team

To support the work of the Rangeview LOG, a multi-disciplinary team of consultants were retained to assist with the planning and development of the Rangeview DMP.

Delta Urban Inc. provides strategic and technical advice to assist in various components of the land acquisition, development approval, and pre-construction processes and are leaders in landowner group management, project management, and development management services. Delta Urban has coordinated and managed the Rangeview LOG through the preparation of the Rangeview DMP, providing strategic guidance and project management to ensure a satisfactory and successful master planning process for all participating landowners.

Bousfields Inc. is a planning, urban design and community engagement firm that offers a full range of land use planning and urban design services to the development industry, municipalities and government agencies. Bousfields has been responsible for the development and preparation of the Rangeview DMP from a land use planning and urban design perspective and has led the ongoing community engagement efforts for the Rangeview LOG.

BA Group provides transportation planning and engineering services to public and private organizations. BA Group focuses on transportation issues in support of high-quality urban environments, and specializes in sustainable planning, multi-modal transportation infrastructure, impact studies, site audits, parking facilities, concept design, and expert testimony. BA Group has guided the design of the existing and proposed road network within Rangeview and completed a detailed traffic analysis to ensure that this network can support the proposed population and employment density both within Rangeview and the surrounding developments.

Schaeffers & Associates Ltd. provides innovative and economic consulting services to private and public sector clients in Canada and internationally in the fields of civil (municipal) engineering and water resources management for a wide range of community growth related projects. Schaeffers has been responsible for all civil engineering design considerations in the development of the Rangeview DMP, including an evaluation of the existing municipal servicing infrastructure in Rangeview and development of the servicing plan and strategy.

Urban Equation combines decades of practical experience, diverse backgrounds and passion in real estate development, sustainability and community planning to help their clients drive value for their projects, investments or initiatives. With a unique understanding of the complexities of designing sustainable communities Urban Equation is known for their work on sustainability frameworks that allow developers to work more efficiently with city planners and for their support of governments in achieving the long-term change they envision for their communities. For the Rangeview DMP, Urban Equation has led the development of the sustainability strategy and provided guidance and input into the design of the master plan concept.

MBTW Group is a multi-disciplinary landscape architecture, urban design and community planning firm that has provided design consulting services to an international roster of clients in both the private and public sectors. Their experience spans a broad spectrum of projects including high density residential and mixed-use developments, greenfield communities, urban landscapes, parks and trails, and performance sports and recreation. MBTW Group has provided valuable input into the location, sizing and design of the proposed public park and open space elements of the Rangeview DMP. Their work has included a detailed gap analysis of the existing and planned park infrastructure and programming in the vicinity of Rangeview and the development of a preliminary programming plan for the proposed Rangeview parks in order to address identified service gaps.

Technical Consultants

In addition to the core consulting team outlined above, the advancement of the Rangeview DMP has been supported by additional technical consultants as follows:

SLR Consulting

Pedestrian Wind Assessment

Cicada Design Inc.

Visual Renderings

J.D. Barnes

Surveyor

D.S. Consultants

Hydrogeological Engineer

Primary Energy

Hydro and Utility Coordination Services

2

Background Context

2.1 Site and Area Context

Rangeview Estates forms part of the Inspiration Lakeview master plan area, which is generally located between the south side of Lakeshore Road East and Lake Ontario, from East Avenue in the west to the area south of Fergus Avenue in the east. This area has a long and varied history as has been documented in numerous reports and plans produced in recent years. Over the past century these lands have been home to military-related operations, arms manufacturing, an airport, varied industrial and semi-industrial uses and a coal-based power generating station. Following the closure of the Ontario Power Generation ("OPG") Lakeview Generating Station and its subsequent demolition starting in 2006, a community-initiated visioning exercise for the former generation station lands known as Lakeview Legacy ultimately led to a comprehensive master planning exercise for the area, undertaken by the City of Mississauga with the support of other stakeholders, including the Province, Peel Region and the OPG.

The Rangeview DMP represents the next step in advancing a development framework for Rangeview Estates, building on the master planning efforts undertaken previously and implementing current Provincial, regional and local policy direction.

Rangeview Estates, as delineated and named in the Mississauga OP, includes the lands located on the south side of Lakeshore Road East, between East Avenue and Hydro Road, and includes the properties fronting onto both the north and south sides of Rangeview Road. Comprised of 33 parcels of privately owned land with a net area of approximately 21.9 hectares, Rangeview also contains several existing public roads including East Avenue, Lakefront Promenade, Hydro Road and Rangeview Road.

Within the larger Lakeview Waterfront Major Node, which is more broadly located in southeast Mississauga approximately one kilometre west of the City's eastern limits and 2.6 kilometres east of the Port Credit GO Station, Rangeview Estates comprises the northwestern quadrant of the node and contains roughly 58% of the node's frontage on Lakeshore Road East.

Existing uses within Rangeview include a wide variety of light industrial, warehousing, retail, commercial and service commercial uses. As such, the existing buildings are generally one-storey in height with large footprints and many are multi-tenanted with a mix of various commercial and retail operators. Other buildings contain uses that require access to the full floor plate of these large structures. Most of the properties in Rangeview are currently developed in a style similar to a suburban-style business park, with office space or active uses facing the street and loading, shipping or outdoor storage areas located to the sides or rear of buildings. Parking is provided in surface parking lots to the front, rear and/or sides of buildings. Most buildings are setback from their adjacent street frontages with parking or landscaping between the building and the street.

Rangeview is well connected to surrounding major roads and highways, including Lakeshore Road East, an arterial road which frames the north boundary of the site. To the east and west Dixie Road, a regional major collector (scenic route), and Cawthra Road, a regional arterial, provide north-south connections from Lakeview Road to the broader City. In addition, the Queen Elizabeth Expressway ("QEW") is located approximately 2.3 kilometres north of the Rangeview and is accessible through the QEW and Cawthra Road interchange.

Rangeview Estates (1966) (Source: Region of Peel)

Rangeview Estates (2005) (Source: Google Earth)

From a public transit perspective, Rangeview is located in proximity to several existing transit options that provide connections throughout the Greater Toronto and Hamilton Area. These include the GO Transit's Lakeshore West line which is accessible via the Long Branch GO Station (1.6 kilometres radial distance to the east) and Port Credit GO Station (2.6 kilometres radial distance to the west) and provides service between Niagara Falls and Downtown Toronto. Local transit service, including the MiWay (Mississauga Transit) bus network and Toronto Transit Commission bus and streetcar network provide further connections between Rangeview and the surrounding communities.

Importantly, Rangeview is also located directly adjacent to the future Lakeshore Bus Rapid Transit Line ("BRT") which is planned for Lakeshore Road East between East Avenue in the west and Etobicoke Creek in the east. The two kilometre BRT line has received funding from multiple levels of governments and is expected to have an expedited development timeline. One of the stops on the Lakeshore BRT line is planned to be located directly adjacent to Rangeview Estates at the intersection of Lakeshore Road East and Lakefront Promenade.

Figure 3 - Rangeview Estates Precinct and Immediate Area

2.2 Surrounding Context

The land uses in the areas surrounding Rangeview include a mix of low-rise residential neighbourhoods, protected environmental areas, municipal infrastructure and future development lands.

To the immediate north of Rangeview Estates is Lakeshore Road East, along the north side of which is a mix of retail, commercial, service commercial and automotive uses. Further north is a low-rise residential neighbourhood that is predominantly comprised of one- and two-storey single detached dwellings. This neighbourhood extends north towards the rail corridor, adjacent to which is a mix of commercial and residential uses in a variety of built forms. The residential neighbourhood continues to the north towards the QEW and is interspersed with number of elementary and high schools, as well as several parks, open spaces and trails.

To the immediate east of Rangeview is Hydro Road. On the east side of Hydro Road are lands that form part of the “Ogden Green” precinct within the Lakeview Waterfront Major Node, followed by lands within the “Innovation Corridor” precinct. The Ogden Green lands along the south side of Lakeshore Road East were formerly part of a hydro corridor and were recently developed with a sales centre for the adjacent Lakeview Village development. The Innovation Corridor lands are currently developed with large-scale industrial buildings along the Lakeshore Road East frontage, with a gun club and shooting range located to the south. The G.E. Booth Wastewater Treatment Facility, owned and operated by the Region of Peel, forms the east and south border of the Innovation Corridor lands, while further east along Lakeshore Road East is the City owned “Small Arms Inspection Building” (now an arts and culture hub a leasable event space) and associated open space, followed by the City of Toronto’s Marie Curtis Park.

Lakeshore Road East at Ogden Avenue

Hydro Road Looking Southeast Towards Lake Ontario

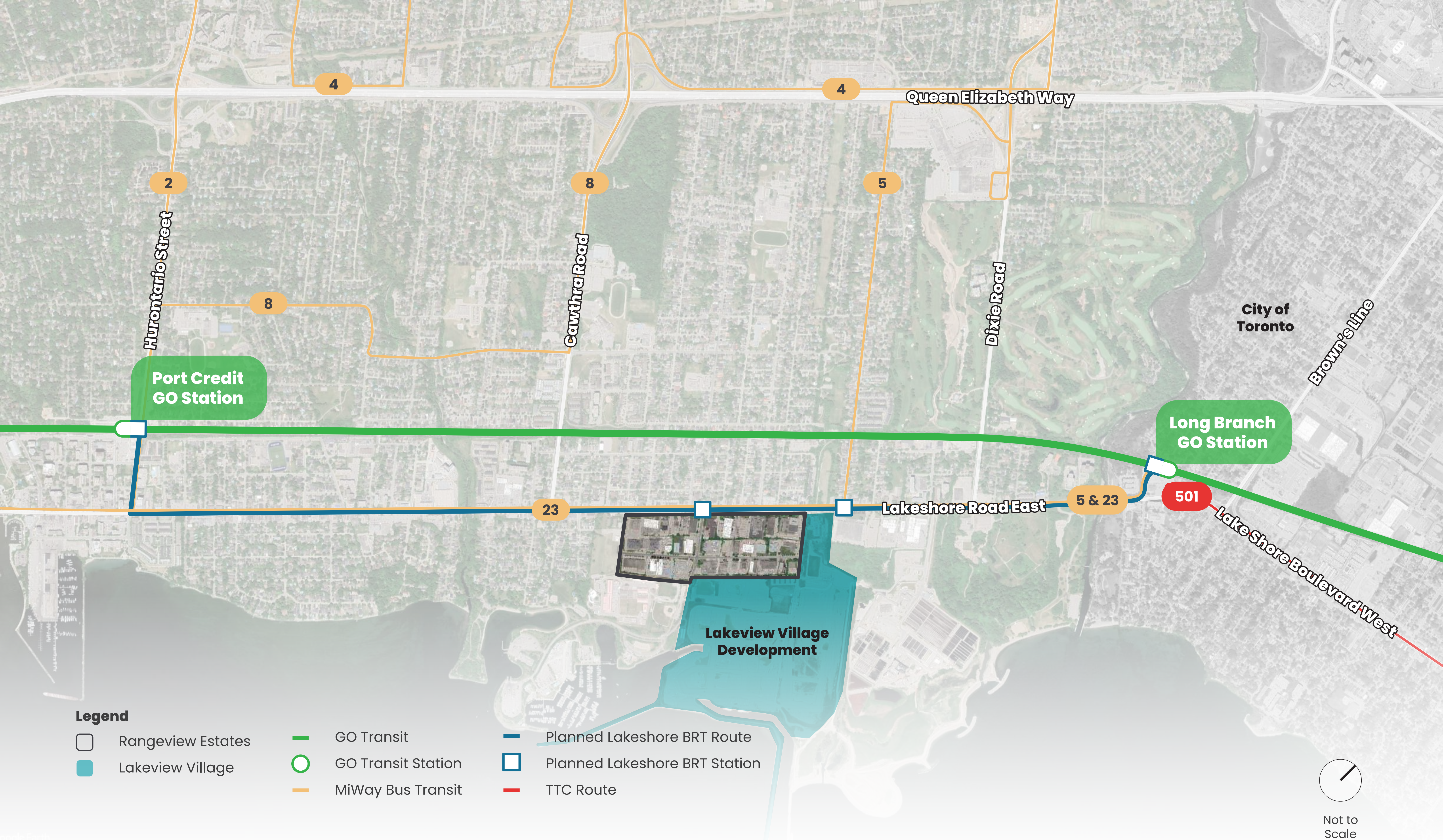


Figure 4 - Area Context

To the immediate south of Rangeview Estates, on the west side of Lakefront Promenade, is Peel Region's Lakeview Water Treatment Facility and Douglas Kennedy Park. To the east of Lakefront Promenade, Rangeview is bordered by lands within the Ogden Green Precinct which contain a portion of the existing Waterfront Trail and the former Lakeview Park, both of which are planned/in the process of being relocated as part of the Lakeview Village development. These lands are planned for a mix of low and mid-rise residential developments, including three taller building elements of 15, 12 and 18-storeys, as well as new public parkland. Further south is the remainder of the Lakeview Village development lands, including lands within the Ogden Green and Cultural Waterfront precincts, which are planned for a variety of built forms and uses, as well as public parks and new public roads.

To the immediate west of Rangeview is East Avenue, along the west side of which is an open field that previously contained the Byngmount Beach Public School. These former school lands are primarily reserved for the expansion of the adjacent regional water treatment facility; however, a portion of the north end of the site has been recently developed with a new satellite paramedic station. The lands fronting Lakeshore Road East on the west side of East Avenue currently contain two low-rise apartment buildings which are no longer occupied and which have approved official plan and zoning by-law amendments permitting the development of a 7-storey rental apartment building to be owned and operated by Peel Housing Corporation. Further west along Lakeshore Road East is a mix of low and mid-rise structures contains a variety of commercial and residential uses, with a low-rise residential neighbourhood to the south.

Lakefront Promenade Looking Southeast Towards Lake Ontario

East Avenue Looking Southeast Towards the Lakeview Water Treatment Plant

2.3 Inspiration Lakeview Master Plan

Inspiration Lakeview is the City of Mississauga's name for the multi-year master planning process undertaken for the former OPG generation station and adjacent employment lands (collectively the "Inspiration Lakeview lands"). The project began in 2010 with a visioning process, which was followed by a Memorandum of Understanding between the Province, OPG and the City in 2011. Inspiration Lakeview, which included extensive community consultation, culminated with the preparation of the Inspiration Lakeview Master Plan and its presentation to the community and Planning and Development Committee in June 2014.

The Inspiration Lakeview Master Plan was intended to act as a bridge between the visionary stage of the master planning process and the implementation of statutory approvals. The plan focuses on creating a new sustainable community comprised of a diversity of land uses, including residential, commercial, institutional and employment uses with a fine grain network of streets and blocks as well as a generous open space network. Ultimately, the Inspiration Lakeview lands were planned to accommodate approximately 8,000 residential units, 15,000 to 20,000 people, 7,000 to 9,000 jobs and 12 hectares of public parkland, among other deliverables.

The Inspiration Lakeview Master Plan identified six new neighbourhoods within the Inspiration Lakeview lands. Rangeview was identified as including both the Rangeview Estates and Lakeshore Neighbourhood areas. Within the Master Plan, these lands were intended to form a predominantly residential neighbourhood with a series of public and private open spaces and commercial and residential mixed-use building along Lakeshore Road East directly adjacent and wrapping around to the planned Ogden Avenue extension.

With respect to built form, the Inspiration Lakeview Master Plan identifies that within the plan area, 20% of all residential development will be low-rise townhouses, 55% will be mid-rise buildings, and 25% will be tall buildings up to 15-storeys. Within Rangeview, mid-rise buildings up to 8-storeys were envisioned along Lakeshore Road East, along the Ogden Avenue extension, along Hydro Road and along a transit greenway parallel to and just east of Lakefront Promenade. Taller buildings were envisioned for the intersections of Rangeview Road and the transit greenway and Rangeview Road and Hydro Road.

Figure 5 - Inspiration Lakeview Master Plan Document

2.4 Mississauga Official Plan Amendment 89

Following the release of the Inspiration Lakeview Master Plan, the City initiated work on an Official Plan Amendment to implement the direction of the Master Plan, subject to a number of key revisions, including, among others, the alignment of rapid transit service. The resulting Official Plan Amendment 89 ("OPA 89"), was enacted by Mississauga City Council in August 2018 through By-law 0169-2018. It is noted that all policy language and numbering in this sub-section is reflective of the original policies included in OPA 89 and does not reflect subsequent amendments as discussed in sub-section 2.5.

OPA 89 introduced a new Major Node Character Area for the Inspiration Lakeview lands identified as the Lakeview Waterfront Major Node on Schedule 9, Character Areas, of the Mississauga OP, as well as an associated section of node-specific policies in Chapter 13. In addition, OPA 89 implemented a series of changes to other schedules within the Mississauga OP including the following:

- land use designation changes for the entire node from Utility and Business Employment to Residential Medium Density, Mixed Use, Public Open Space, Institutional, Business Employment and Greenlands;
- the reorganization of the green system on Schedule 1a and the public and private open spaces on Schedule 4;
- the identification of a future public street network and associated right-of-way widths on Schedule 5 and Schedule 8 respectively; and
- the identification of a transit priority corridor along Lakefront Promenade a new east-west public street and Hydro Road on Schedule 6.

As set out in Section 13.4.3 of the Mississauga OP, as amended, the vision for the Lakeview Waterfront area is to be a model green, sustainable and creative community on the waterfront that is planned as a mixed use community with a vibrant public and private realm including generous open spaces, cultural and recreational amenities, and employment opportunities. Section 13.4.4 goes on to direct that, as a major node, the Lakeview Waterfront area is intended to be an area of intensification, with the lands adjacent to Lakeshore Road East being part of a planned higher order transit corridor, with a targeted gross density between 200 and 300 residents plus jobs combined per hectare, representing a targeted population and number of jobs of approximately 15,000 to 22,000 people and 7,000 to 9,000 jobs. To achieve this target density, a variety and range of building typologies are permitted; however, Section 13.4.4 specifies that these should be predominantly mid-rise in height and Table 1 indicates the following distribution of housing and units targets:

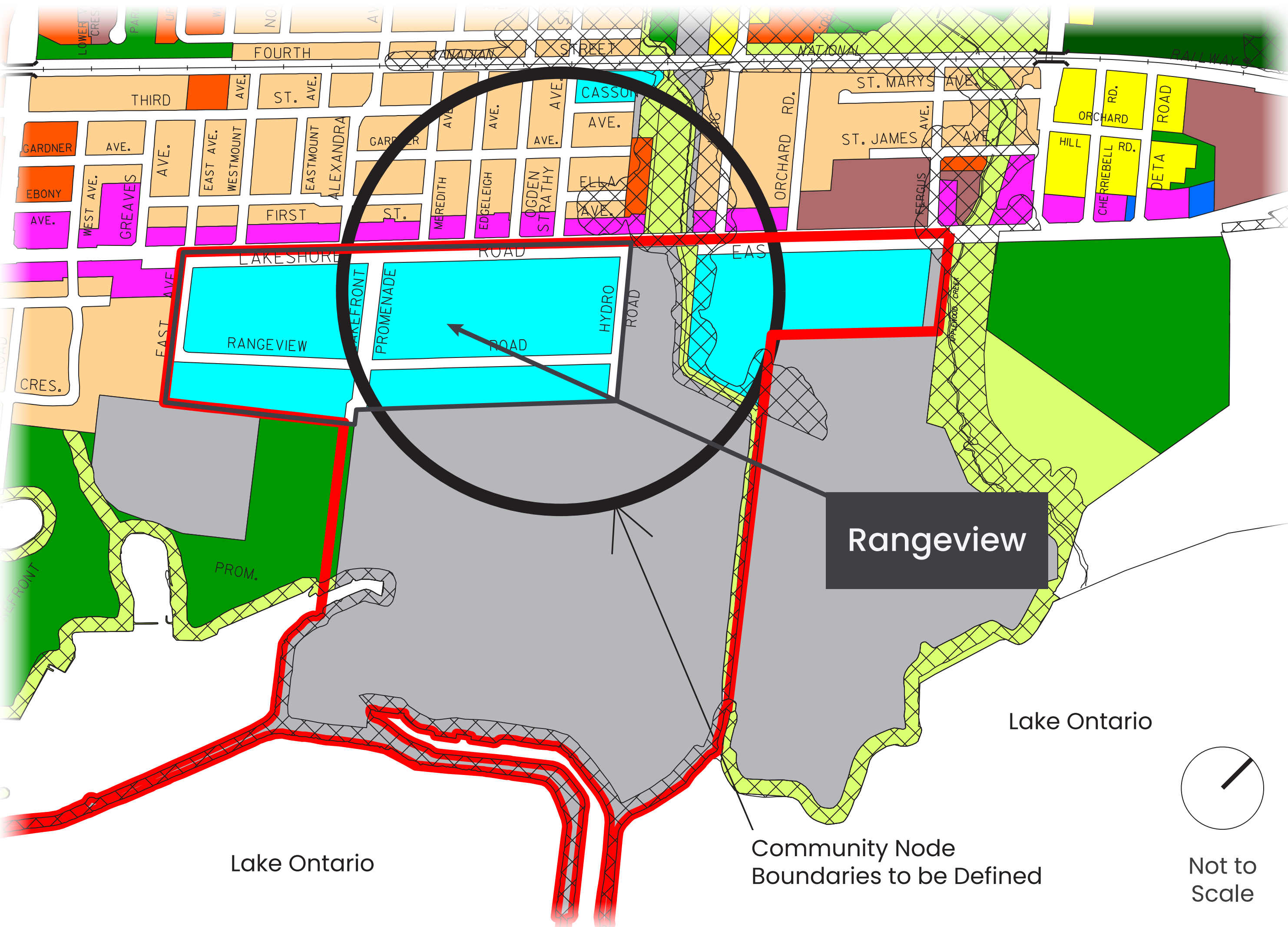
- Townhouses & Low-Rise Apartments: 1,945 units (19%);
- Mid-Rise Buildings: 5,250 units (50%); and
- Taller Buildings: 3,305 units (31%).

With respect to Rangeview Estates, Table 1 provides that the Rangeview Estates Precinct will be comprised of a total of 3,700 units with 25% townhouses, 50% mid-rise building and 25% taller buildings. In addition, Rangeview is subject to the following precinct-specific policies:

- 13.4.8.3.9: Mid-rise buildings will be required to front Lakeshore Road East and encouraged along future enhanced transit route and along Street 'I' (extension of Ogden Avenue);
- 13.4.8.3.10: Commercial uses are permitted along Lakeshore Road East and will be required between Lakefront Promenade and Hydro Road; and
- 13.4.8.3.11: Notwithstanding policy 13.4.8.3.9 freestanding commercial buildings may be less than 5 storeys.

Within the Lakeview Waterfront Major Node, taller buildings (9 to 15 storeys) may be considered based on the criteria for taller building heights established in Policy 13.4.8.3.8. This policy identifies that tall buildings may be considered in the following locations:

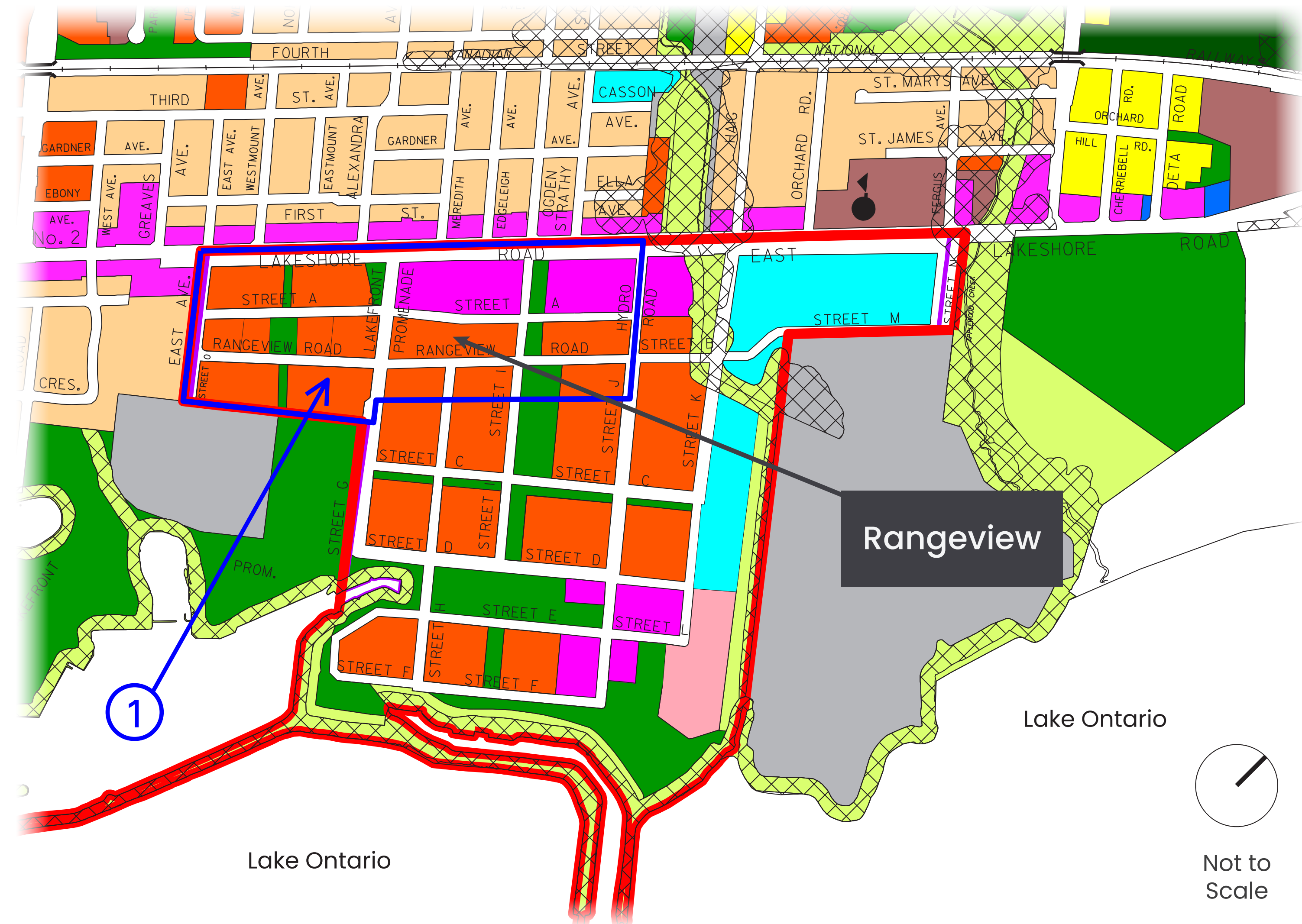
- in proximity to a Major Transit Station Area on Lakeshore Road East provided the taller building is located beyond a mid-rise building;
- at Ogden Avenue and Lakeshore Road East fronting Lakeshore Road East provided the taller building is located beyond a mid-rise building; and
- along future enhanced transit routes.



Legend

- Residential Low Density I
- Residential Low Density II
- Residential Medium Density
- Residential High Density
- Mixed Use
- Convenience Commercial
- Motor Vehicle Commercial
- Office
- Business Employment
- Industrial
- Airport
- Institutional
- Public Open Space
- Private Open Space
- Greenlands
- Parkway Belt West
- Utility
- Special Waterfront
- Natural Hazards
- Partial Approval Area
- Area of Amendment: Land Use Designations
- Lands subject to Employment Conversion through Peel's Municipal Comprehensive Review
- Public School
- Catholic School

Figure 7 - Mississauga Official Plan Amendment 89 - Existing



Legend

- Residential Low Density I
- Residential Low Density II
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- Mixed Use
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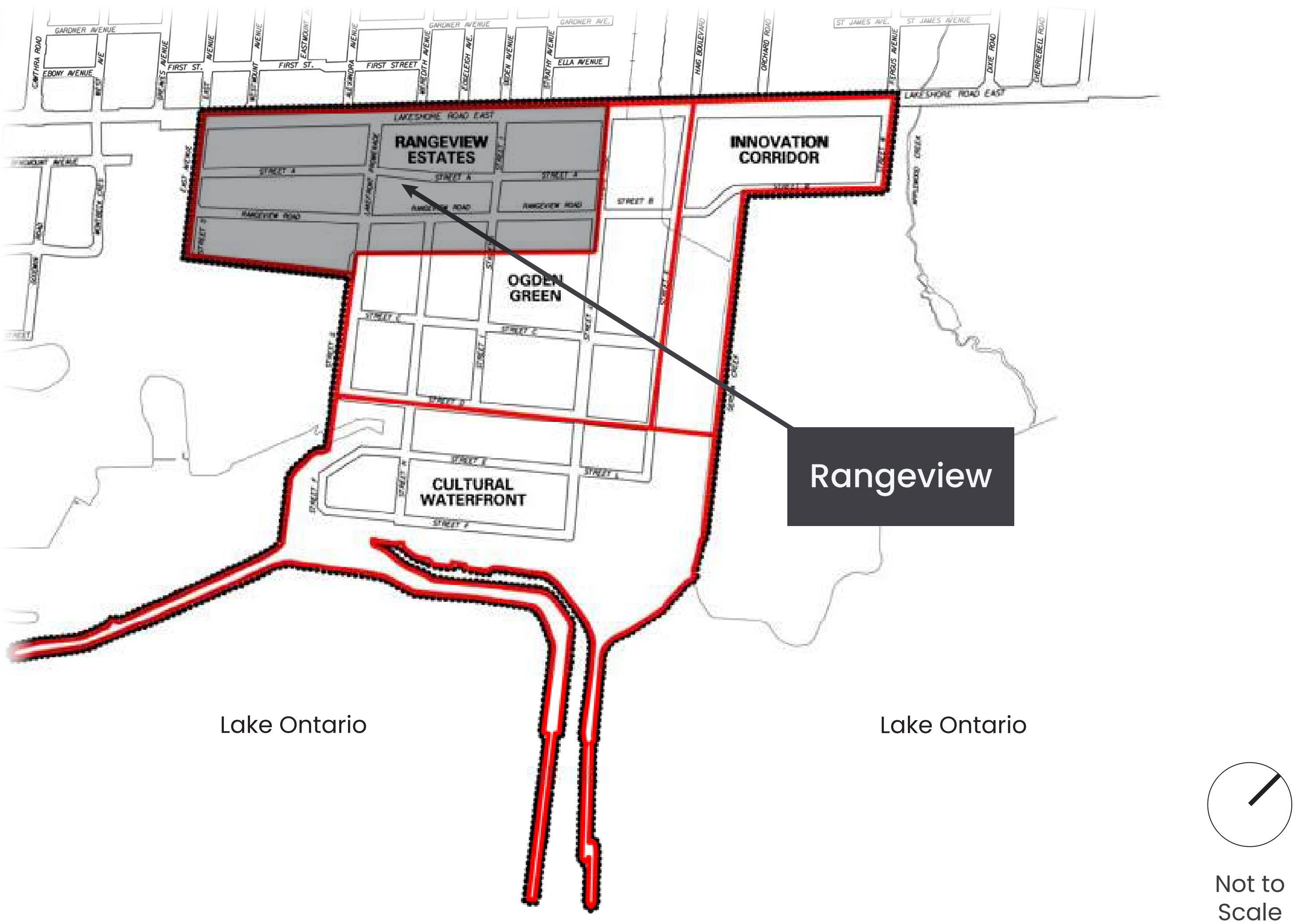
- Public School
- Catholic School

Figure 6 - Mississauga Official Plan Amendment 89 - Amended



Legend

- Major Node Boundary
- Precinct Boundaries

Figure 8 - Mississauga Official Plan Map 13 - 4.2 - Lakeview Waterfront Major Node Precincts

As set out above, through OPA 89 the land use designations for Rangeview were amended from the previous Business Employment designation. As a result, most of the land within Rangeview is now designated Residential Medium Density, with the exception of the properties fronting onto Lakeshore Road East between Lakefront Promenade and Hydro Road which are now designated Mixed Use and the identified parkland which is designated Public Open Space.

Section 13.4.10.2 identifies that within the Residential Medium Density designation, apartment dwellings of a low, mid-rise and taller built form will be permitted and that on lands fronting Lakeshore Road East, Street 'F' or Street 'I', commercial uses will be permitted on the ground level of buildings.

Section 13.4.10.3 provides direction for lands identified as Mixed Use and states that commercial used will be required on the ground level of buildings fronting Lakeshore Road East and Street 'J' and that single use residential buildings may be considered on lands not fronting Lakeshore Road East or Street 'J' (our emphasis).

While OPA 89 amended the land use designations for Rangeview Estates, because these lands were previously designated Business Employment under the Mississauga OP, an employment conversion through the Region of Peel Official Plan is required to allow residential uses. The current status of this City-initiated conversion request is provided in Section 2.6 of this report.

2.5 Lakeview Village Development Master Plan & Official Plan Amendment 125

The DMP for Lakeview Village was developed through an iterative process that was initiated in October 2018 following the adoption of OPA 89. As previously described, the Lakeview Village DMP provides a more detailed urban design direction for three of the four precincts of the Lakeview Waterfront Major Node: Ogden Green, Cultural Waterfront and Innovation Corridor. It is noted that the properties along Lakeshore Boulevard East that form part of the Innovation Corridor were not included in the Lakeview Village DMP. Following a series of revisions in response to the City's review process, the Lakeview Village DMP was endorsed by Planning and Development Committee in October 2019.

Key elements of the urban design framework within the Lakeview Village DMP include the development of a central north-south connection and gathering space through Ogden Park, maximizing views of the waterfront from both the public and private realms, and connecting the community through intimate and rationale streets and blocks to maximize land and create a balanced interface between apartment buildings and townhouse blocks. Overall, the endorsed Lakeview Village DMP accommodated a total of 8,026 units with 4% in townhouses, 65% in mid-rise buildings, 10% in taller buildings up to 15-storeys and 21% in taller buildings above 15-storeys.

Following Council's endorsement of the Lakeview Village DMP, an implementing Official Plan amendment application was submitted in December 2019 and was subsequently approved by Council on November 10, 2021, along with related Draft Plan of Subdivision and Rezoning applications. Among other matters, the approved and now in-force Mississauga OP Amendment 125 ("OPA 125") revised policies within Section 13.4 for the Lakeview Waterfront Major Node generally in alignment with the Lakeview Village DMP. In particular, the following amendments implemented through OPA 125 are noted and are of relevance to the Rangeview Estates DMP:

- Revisions to the future road network shown in Figure 4;
- The introduction of a height map indicating minimum and maximum heights for the Ogden Green and Cultural Waterfront Precincts;
- An increase in the total maximum number of units from 10,500 to 11,750;
- Revisions to the distribution of housing and unit targets in Table 1 for the Ogden Green and Cultural Waterfront Precincts including an increase in the number of units to 8,050 (from 6,800) with 6% in townhouses (was 15%), 40% in mid-rise buildings (was 50%) and 54% in taller buildings (was 35%);
- Additional criteria for taller building locations including along the central north-south park and at the eastern terminus of the east-west park adjacent to Street A; and
- A revision to Policy 13.3.10.2.2 for the Residential Medium Density designation specifying that apartment dwellings will be limited to a height of 12 storeys.

Figure 9 - Lakeview Village Development Master Plan

Figure 10 - Peel Official Plan Schedule E4 - Employment Areas

2.6 Peel Region Official Plan

The in-force Region of Peel Official Plan, as amended, was originally adopted by Regional Council and approved by the Minister of Municipal Affairs and Housing in 1996 (the "1996 Regional OP"). Following a number of appeals, the majority of the 1996 Regional OP came into force and effect in July 1998.

Employment Conversion

While the 1996 Regional OP does not include mapping or details identifying Employment Areas within Peel Region, Policy 5.6.2.6 states that it is the policy of Regional Council to protect and support employment areas for employment uses, as defined and designated in area municipal official plans. For Mississauga this included the following designations, among others: Business Employment; Industrial; Institutional; Mixed Use; or Office. Policy 5.6.2.8 goes on to provide the conversion of lands within employment areas to non-employment uses shall be permitted only through a municipal comprehensive review.

In May 2013, Peel Region initiated their Regional Official Plan and Municipal Comprehensive Review process. This process culminated in the April 2022 adoption of a new Region of Peel Official Plan (the "2022 Regional OP") by Regional Council. The 2022 Regional OP was subsequently submitted to the Ministry of Municipal Affairs and Housing for approval. On September 8, 2022, the Ministry submitted a notice suspending the 120-day review clock for the 2022 Regional OP; therefore, the anticipated approval date is not known at this time.

Through the municipal comprehensive review process, the conversion of Rangeview Estates from Employment Areas to non-employment uses was analyzed and recommended for approval. Among other rationale, Appendix XIV – Employment Conversion Analysis, January 2022 of the Peel 2051 Land Needs Assessment Report states that, while "there is no need for the conversion to meet the Region's residential supply needs…conversion is in the interest of strategic community development, i.e. a complete community in previously underutilized lands within the Lakeview Waterfront Major Node".

Unlike the 1996 Regional OP, the 2022 Regional OP includes a schedule (Schedule E-4) which identifies Employment Areas within Peel Region. Rangeview Estates is not identified on this schedule and the policies of the 2022 Regional OP have been updated to confirm that only those lands identified on Schedule E-4 are designated and protected Employment Areas and that local municipalities are to designated Employment Areas within their Official Plans in accordance with Schedule E-4.

Major Transit Station Areas

In addition to the conversion of Rangeview Estates from employment to non-employment uses, the 2022 Regional OP, as proposed, identifies Rangeview as being within a Primary Major Transit Station Area on Schedules E-2 (Strategic Growth Areas) and E-5 (Major Transit Station Areas).

Policy 5.6.19.10 of the 2022 Regional OP directs local municipalities to undertake comprehensive planning for Primary and Secondary Major Transit Station Areas to address the following matters among others: minimum density (option for maximum density), a minimum number of residential and jobs, permitted uses in each station to support complete communities and minimum height for land uses (option for maximum heights). Table 1 – Minimum Densities of Major Transit Station Areas identifies the Haig (Lakeview Waterfront) Primary Major Transit Station Area as having a required minimum density of 300 people and jobs per hectare.

In response to this direction, the City of Mississauga has drafted Official Plan Amendments addressing City-Wide Major Transit Station Areas which was favorably considered by Planning and Development Committee on August 8, 2022 and subsequently submitted to Peel Region for approval. It is noted these draft Official Plan Amendments and the accompanying staff report identify all Major Transit Station Areas in Mississauga as Protected Major Transit Station Areas in order to provide appeal protections for land-use, height and density policies.

As identified in the 2022 Regional OP, Rangeview Estates is located within the Haig Major Transit Station Area and has a permitted height range of 2 to 25-storeys as shown on proposed Schedule 11q. Table 5-2 confirms the minimum density target of 300 people and jobs combined per hectare and sets out a minimum floor space index of 1.0.

Figure 11 - Peel Official Plan Schedule E5 - Major Transit Station Areas

3

Vision & Organizing Elements

Rangeview Estates is envisioned as a vibrant, liveable and complete residential neighbourhood that will serve as a gateway for the entire Lakeview Waterfront Major Node from Lakeshore Road East to the shores of Lake Ontario. Rangeview will be planned as a compact, sustainable neighbourhood – offering a variety of housing typologies, local commercial opportunities and walkable pedestrian-oriented greenspaces.

A fundamental theme of the Rangeview DMP is connectivity. Rangeview will serve as an important puzzle piece that completes the planned pedestrian and active transportation circulation network between the existing community context and Lakeview Village. This will ensure that the entire Lakeview Waterfront Major Node has permeable connections throughout the entire community. Moreover, the Rangeview DMP also ensures that views and access to Lake Ontario and the adjacent waterfront are pronounced and easily accessible.

Overall, Rangeview intends on exhibiting its own unique and identifiable character, while still embodying the vision, principles and framework outlined in the Inspiration Lakeview Master Plan, the Mississauga OP and Lakeview Village DMP to create a cohesive community.

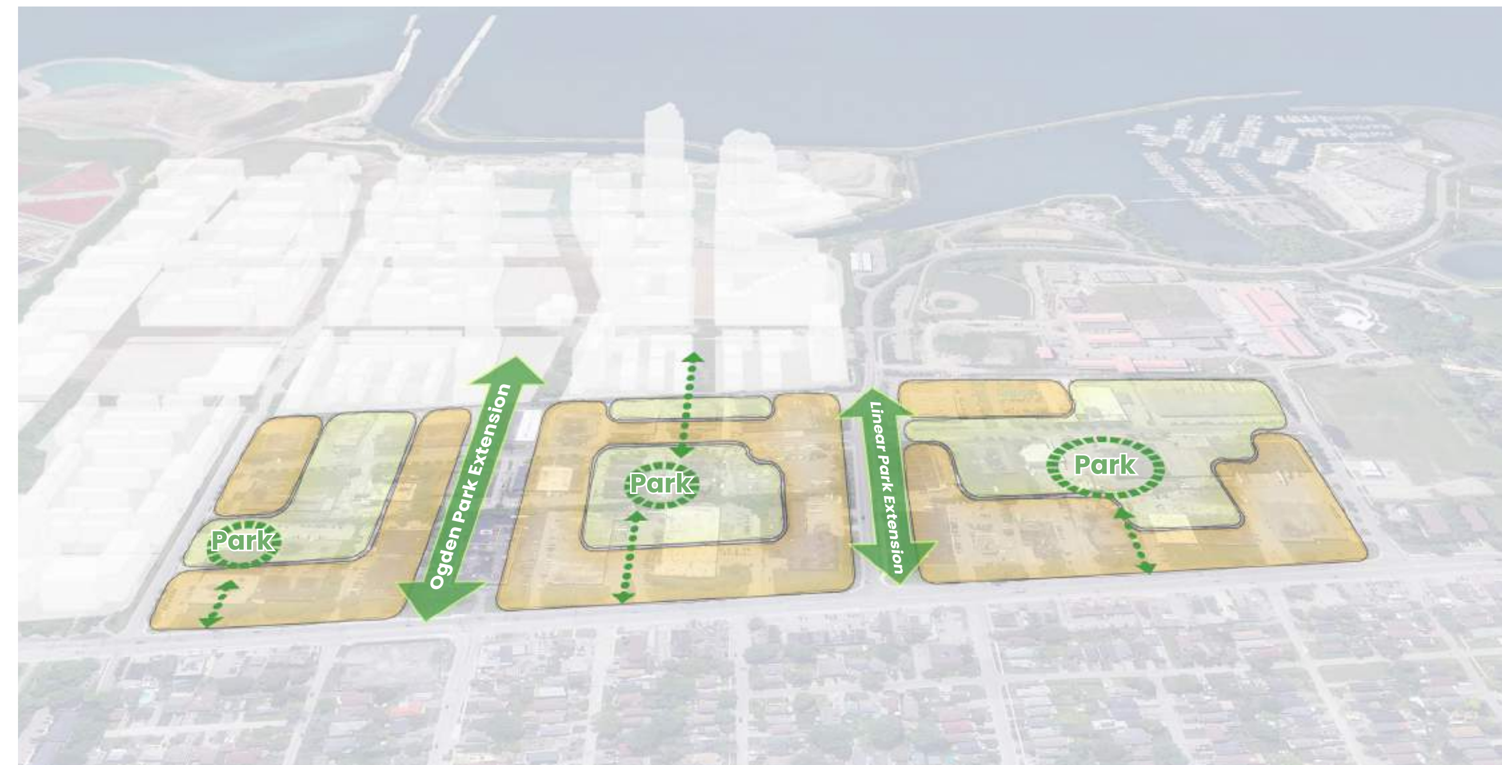
3.1 Design Principles

Building on the Vision Statement, the Rangeview DMP is based on the following principles:

A Predominantly Mid-rise Community

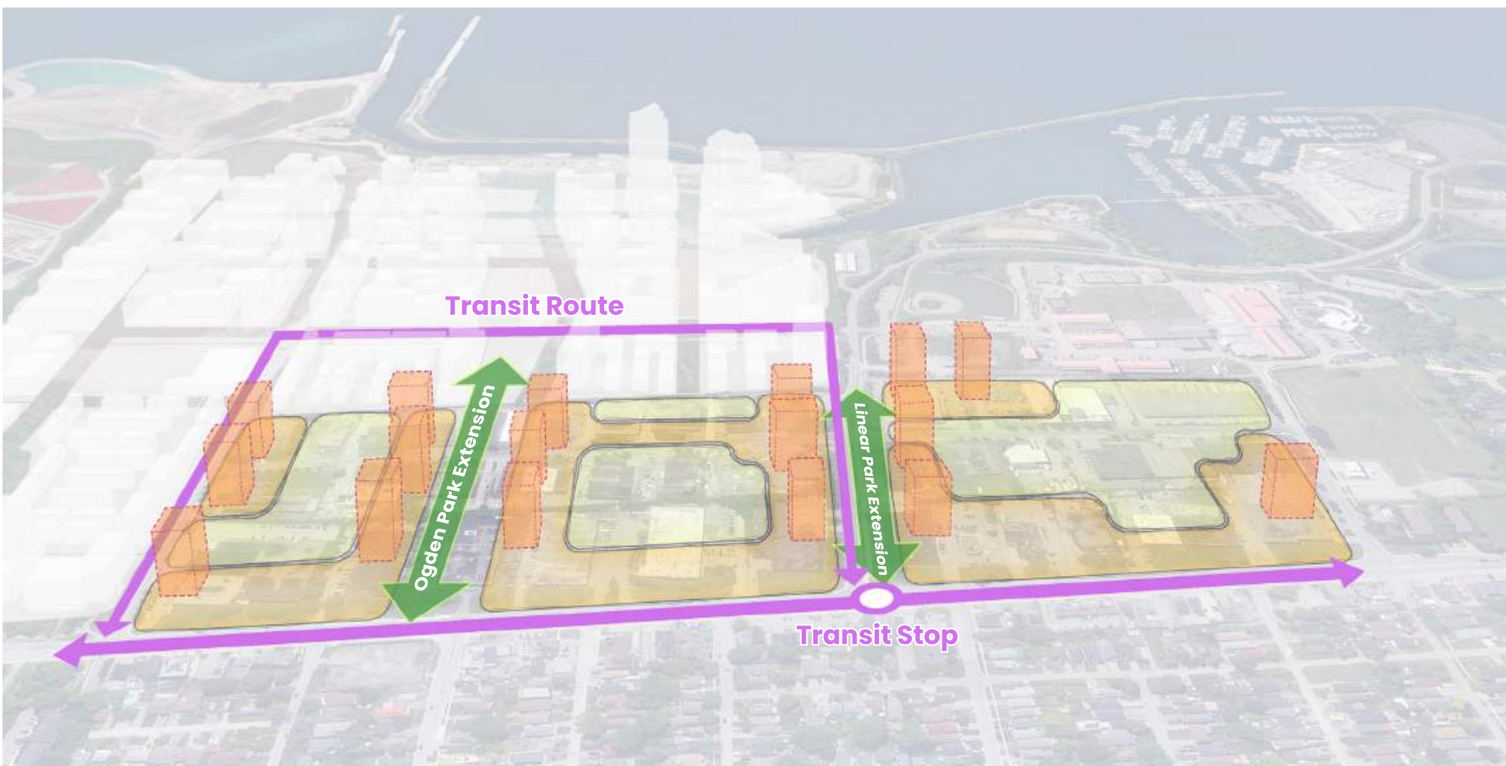
Following the Lakeview Waterfront Major Node policies of the Mississauga OP, the Rangeview DMP primarily consists of mid-rise built form – organized along the development block edges – to establish an urban setting along the public realm and maintain continuity with the built form pattern contemplated by Lakeview Village to the south. The low-rise buildings, designed to create pedestrian-scaled housing precincts that emphasize the residential neighbourhood character of Rangeview, will be located in the interior of each character area, framed by the mid-rise edges.

Well-connected Network of Public and Private Open Spaces



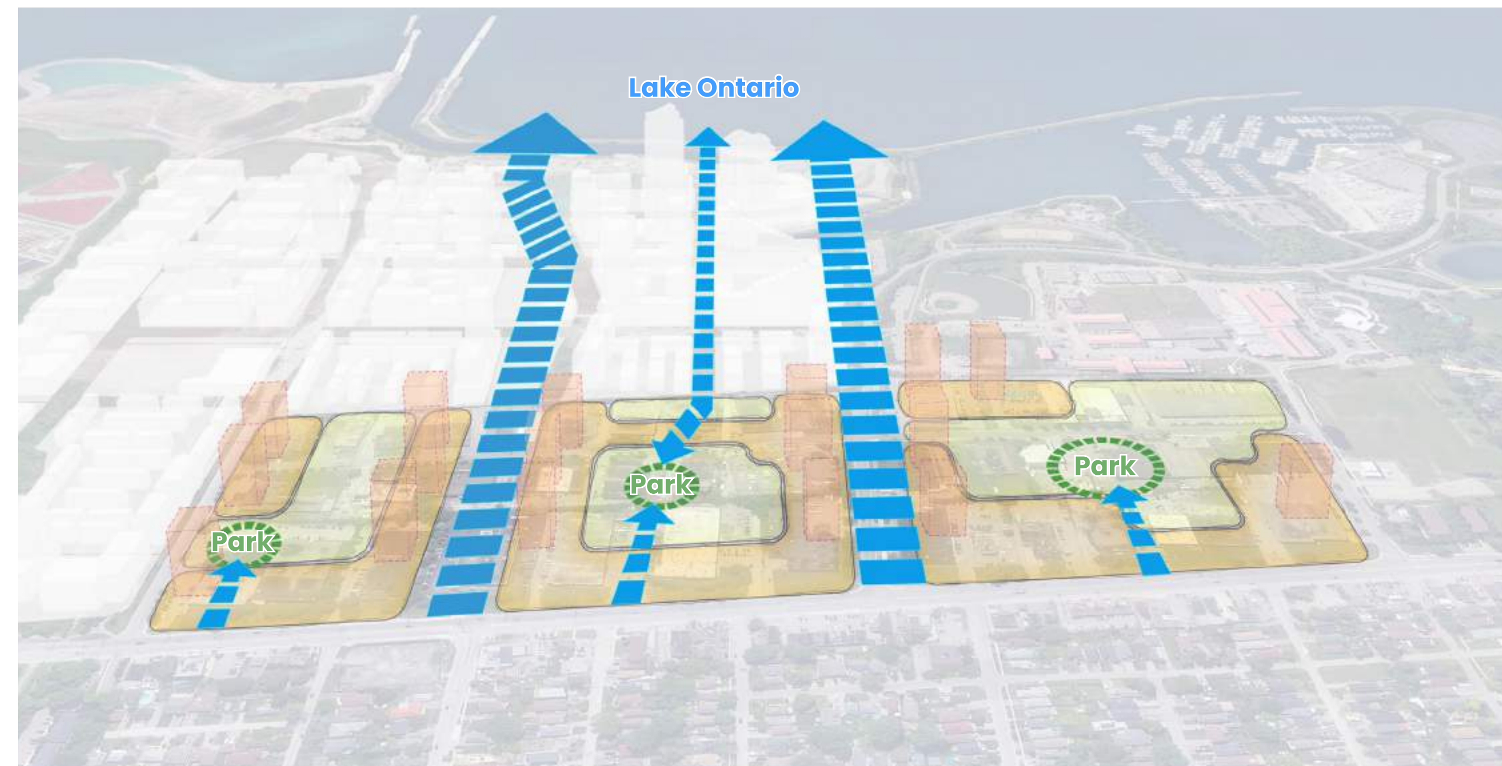
Building upon the Lakeview DMP, Rangeview will complete the planned Ogden Park by continuing its linear extension north towards Lakeshore Road East, providing pedestrian-oriented connections and unencumbered views towards Lake Ontario. Additional public parks and publicly accessible private open spaces have been strategically located within the DMP to serve the immediate Rangeview residents and connect seamlessly with the existing and planned open space network surrounding the Rangeview neighbourhood.

Tall Buildings at Strategic Locations



The Rangeview DMP strategically locates taller built forms along higher order transit and priority transit corridors to support the use of these future public transportation routes. Taller building forms have also been located along key intersections and open spaces in accordance with the in-force policies of the Mississauga OP, to emphasize primary gateways and corridors into the neighbourhood.

Enhanced Views, Access and Connections Towards Parks and the Water



Pronounced building edges and open spaces align primarily along the north-south streets to accentuate views and connections towards Lake Ontario. Additional north-south mid-block connections into Rangeview are introduced along Lakeshore Road East which provide pedestrian-oriented pathways towards terminating parks and to the waterfront.

Respecting the Existing Community, While Integrating with the Emerging Context

The Rangeview DMP concentrates the tallest building heights and density along primary transit corridors and streets, with a moderate maximum building height in order to provide a gradual transition in height from the lower-scaled neighbourhoods north of Lakeshore Road East to the taller development planned for Lakeview Village. Within Rangeview, variations in height within each character area provide appropriate transitions to low-rise precincts and neighbourhood-oriented parks, while the height distribution overall provides for an appropriate transition towards the existing low-rise neighbourhoods beyond East Avenue and Lakeshore Road East.

Figure 12 - Aerial View of Rangeview Estates Towards Lake Ontario

4

The Master Plan

The Rangeview DMP follows the planned public road network illustrated for Rangeview in the Mississauga OP, as amended. A new east-west local road (identified as Street 'L' in OPA 125) bisects the existing land parcels between Lakeshore Road East and Rangeview Road from East Avenue through to Hydro Road. The planned extension of Ogden Avenue (Street 'F') through Lakeview Village will continue through Rangeview and connect with the existing intersection of Ogden Avenue and Lakeshore Road East. An additional north-south local road connection between Lakefront Promenade and the planned Ogden Avenue is provided from Rangeview Road, extending south to the boundary between the Rangeview and Ogden Green Precincts (Street 'G').

A revised and enhanced parks and open space arrangement has been provided in the Rangeview DMP in order to improve connectivity throughout both Rangeview and Lakeview Village, and to provide local and intimate park spaces for Rangeview residents. The planned Ogden Park extension will continue north through Rangeview and terminate at Lakeshore Road East. Alongside Lakefront Promenade, a secondary linear park has been introduced as an additional gateway corridor to the water and green link to Douglas Kennedy Park. In addition, a series of parks and parkettes are centrally located between each of the north-south streets, serving as a local amenity specifically for residents of Rangeview Estates.

Finally, the Rangeview DMP introduces a mix of housing types at varying scales throughout the plan area. As previously mentioned, the predominant built form is mid-rise buildings which have been designed to frame primary streets and animate the adjacent public realm. Taller buildings, up to 15-storeys in height, are strategically located at key intersections, along transit corridors and along linear parks to emphasize gateway entrances into the neighbourhood and to provide ridership in support of future transit infrastructure. The interior of each of the proposed character areas has been designed to accommodate townhouses and low-rise apartments strengthening the residential neighbourhood character of Rangeview and creating a gradual transition to nearby low-rise communities.

Figure 13 - Rangeview Estates Master Plan

4.1 Character Areas

Rangeview Estates will be comprised of three character areas: (1) Rangeview West; (2) Lakeshore; and (3) Gateway. Each character area will exhibit its own identity which reflects its location within the Rangeview context, adjoining uses and its predominant built form typology.

Rangeview West

The Rangeview West character area is bordered by Lakeshore Road East, East Avenue, the Lakeview Water Treatment Plant and expanded Douglas Kennedy Park and Lakefront Promenade. This character area contains significant areas of townhouses which establish a low-rise residential character and which complement the existing low-rise neighbourhoods to the west of East Avenue. A large central park identified as Rangeview Park is located within this character area. Rangeview Park will include numerous active and passive programming opportunities within a low-rise setting to meet the needs of the new residents. Promenade Park, a linear park divided into three sections along Lakefront Promenade, will serve as a gateway to the larger Lakeview community and to Lake Ontario, as well as a green connection to the expanded Douglas Kennedy Park.

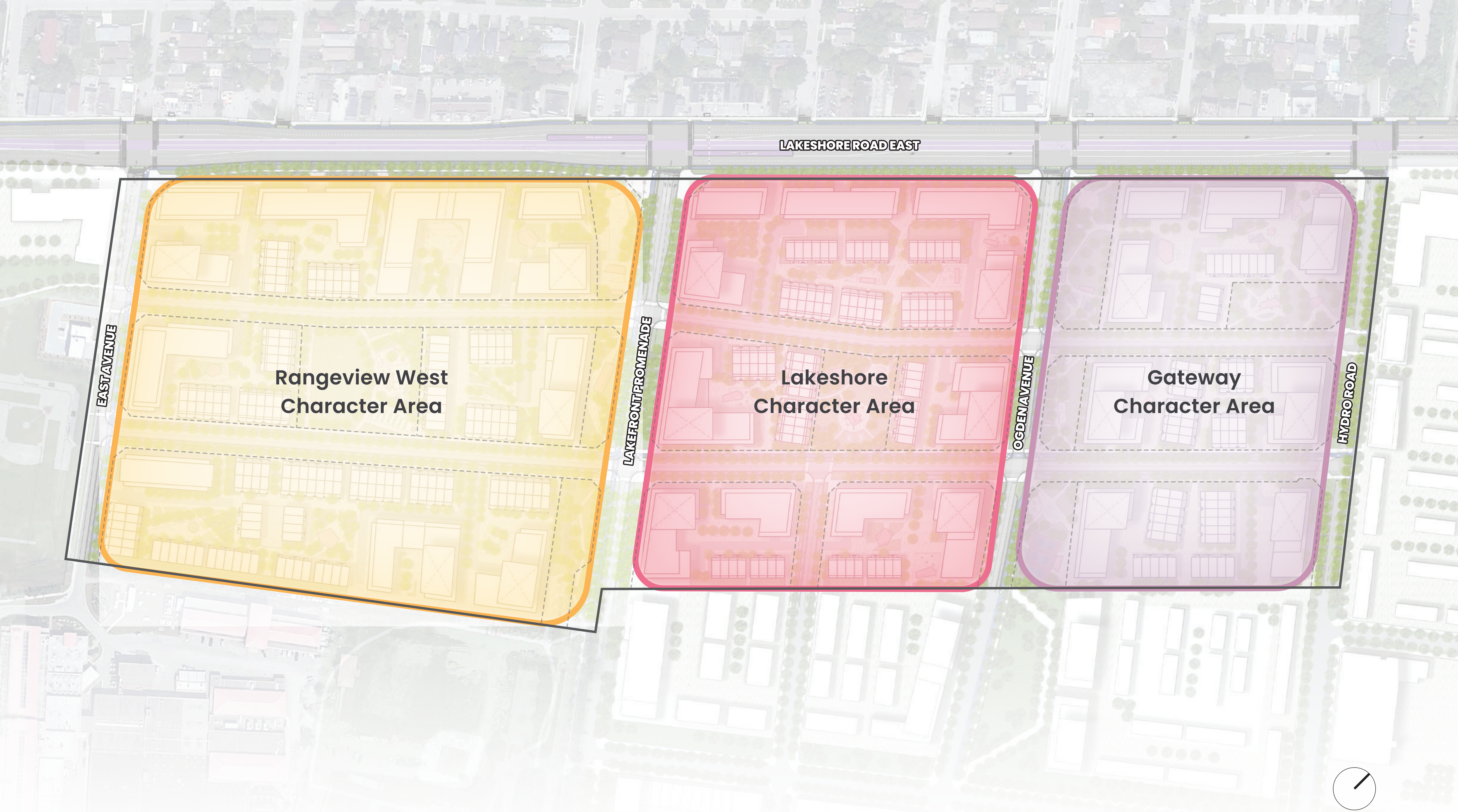
Lakeshore

The Lakeshore character area is bounded by Lakeshore Road East, Lakefront Promenade, the Ogden Green precinct of the Lakeview Village development and the planned Ogden Avenue extension. This character area serves as Rangeview's primary active, mixed-use frontage along Lakeshore Road East and has the highest density of all three character areas. The Lakeshore character area is primarily comprised of mid-rise and tall building forms fronting onto adjacent streets to create a defined edge and to animate the public realm. The interiors of the character area feature stacked townhouses which serve as a gradual transition down to a centrally located parkette. This parkette will incorporate active and passive amenities and will function as a terminus for pedestrians travelling south from Lakeshore Road East through a privately-owned publicly accessible mid-block connection, and those travelling north through Lakeview Village and the planned Street 'G' connection.

Gateway

The Gateway character area is bordered by Lakeshore Road East, the planned Ogden Avenue extension, the Ogden Green precinct of the Lakeview Village development and Hydro Road. This character area serves as the primary entrance into the entire Lakeview Waterfront Major Node as it is book-ended by two gateway corridors: Ogden Avenue with the adjoining Ogden Park and Hydro Road. The combined Ogden Avenue and Ogden Park alignment serves as a 'central spine' for the entire Lakeview Waterfront Major Node providing a direct physical and visual connection to waterfront. Hydro Road is also intended to operate as a gateway entrance from Lakeshore Road East towards the planned Lakeview Square along the waterfront. The Gateway character area also consists of a mix of building types and includes an intimately scaled parkette located on the west side of Hydro Road and the north side of the new Street 'L'.

Figure 14 - Character Areas



Legend

▢ Rangeview Estates

4.2 Street & Block Pattern

The street pattern demonstrated in Rangeview DMP aligns with the road network defined in the Mississauga OP. The resulting street network and block boundaries create a grid pattern which allow for efficient development patterns and excellent pedestrian, cycling and vehicular connections throughout Rangeview, the larger Lakeview Waterfront Major Node and the broader community.

Public Streets

A fine-grain pattern of public streets is planned throughout the Rangeview DMP. Not only will these streets offer corridors for movement throughout Rangeview and the Lakeview Village development, but they also provide animated public spaces for pedestrians.

Primary Streets

The Primary Streets within the Rangeview DMP are Lakeshore Road East, Lakefront Promenade, Ogden Avenue and Hydro Road. These streets will maintain a priority presence as they will be framed by a continuous 4 storey streetwall which will create a comfortable pedestrian environment and to provide animation and interest along the public street frontages.

Secondary Streets

Secondary Streets are intended to provide access to back-of-house facilities such as servicing, loading, garbage pick-up and vehicular access to enclosed parking. These streets will also maintain sidewalks and landscaping to create a safe and attractive public realm. Within the Rangeview DMP, secondary streets include East Avenue, Rangeview Road, Street 'L' and Street 'G'.

Figure 15 - Public Streets


LAKESHORE ROAD EAST
STREET 'L'
STREET 'L'
STREET 'L'
EAST AVENUE
LAKEFRONT PROMENADE
OGDEN AVENUE
HYDRO ROAD
RANGEVIEW ROAD
RANGEVIEW ROAD
RANGEVIEW ROAD
STREET 'G'
Not to Scale
Legend
Rangeview Estates
Primary Street
Secondary Street

Pedestrian and Cycling Routes

The Rangeview DMP supports active transportation by proposing a network of well-connected pedestrian and cycling routes that will contribute to the existing and planned network within the Lakeview Waterfront Major Node and beyond. Sidewalks are incorporated on both sides with all public street rights-of-way. Additional pedestrian clearways are provided within setbacks between buildings and adjacent property lines along the street. Parks and open spaces will include dedicated pedestrian and multi-use pathways. Privately owned pedestrian mews are provided mid-block between Lakeshore Road East and Street 'L' to allow for more north-south permeability through each of the development blocks. Dedicated two-way cycle tracks are offered within Hydro Road, Rangeview Road and Lakefront Promenade to minimize conflicts with vehicles and pedestrians. Protected bicycle parking and potential bike sharing stations are contemplated along the dedicated cycling routes to emphasize the active transportation network not only in Rangeview but in entire Lakeview Waterfront Major Node.

Figure 16 - Pedestrian and Cycling Routes

Legend

Rangeview Estates

Pedestrian Circulation

Cycling Routes

Block Boundaries

The proposed street network creates appropriately scaled development blocks that are pedestrian oriented and can accommodate a mix of building typologies. The Rangeview DMP is comprised of 21 development blocks, 12 of which are primarily for residential development, resulting in a total developable area of approximately 16.58 hectares. The remaining nine (9) blocks, with an area of 2.62 hectares, are reserved for parkland which will be conveyed to the City of Mississauga.

Figure 17 - Block Pattern & Boundaries

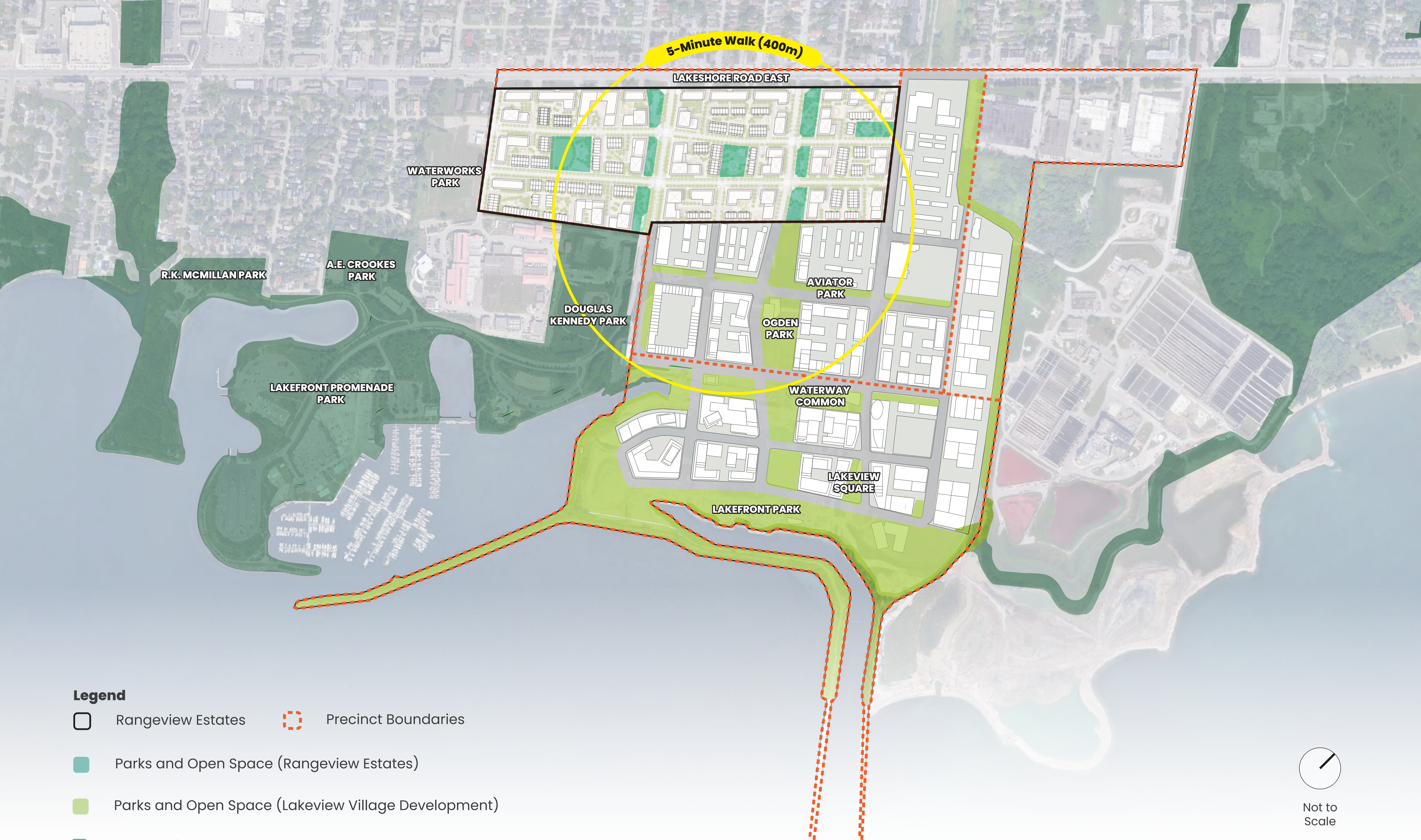
Legend

- Rangeview Estates
- Development Blocks
- Parkland Blocks

4.3 Public Realm & Open Space Network

The Rangeview DMP provides a series of public and private open spaces that contribute to the overall parks and open space network planned throughout the entire Lakeview Waterfront Major Node community. The proposed parks and open spaces will define the public realm network, offering a range of seasonal active and passive recreational opportunities that are within walking distance of one another. The interconnected street system will serve as arteries that link these parks and open spaces together and provide additional opportunities for animated frontages, active transportation routes and sustainable landscaping. Together, these elements will form part of the neighbourhood character and identity of Rangeview Estates.

Figure 18 - Public Realm & Open Space Network



Legend

Rangeview Estates

Precinct Boundaries

Parks and Open Space (Rangeview Estates)

Parks and Open Space (Lakeview Village Development)

Surrounding Parks and Open Space
(Schedule 4 - Mississauga Official Plan)

Public Parks

The Rangeview DMP provides a total of 2.62 hectares of public parkland distributed between five new parks. This equates to a parkland dedication of 13.6% (net of public roads). They are strategically located throughout the neighbourhood and set out a framework for the development of a robust, vibrant and connected parks and public realm network for new residents, visitors, workers and the larger community. The approach to public parkland for Rangeview is based on an extensive review of the parkland and conceptual programming being considered within the Lakeview Village development in order to ensure a complementary system of public open space that knits together the two neighbourhoods.

The Rangeview DMP establishes a hierarchy of different park typologies that offer a variety of seasonal active and passive recreational opportunities based on their setting, function and configuration in order to provide a series of distinct and diverse recreational experiences. These typologies include: (1) Destination Park; (2) Community Park; and (3) Neighbourhood Parkette.

The park designs illustrated in the Rangeview DMP are conceptual and are intended to demonstrate how specific passive and active recreational opportunities can potentially be organized within each park typology. The exact designs and details for each park will be determined in consultation with City of Mississauga staff at a later stage in the development approvals process.

In this respect, the parkland element of the Rangeview DMP represents what 'could be' and not necessarily what 'will be' constructed as time unfolds. It is our understanding that the City of Mississauga will be responsible for park design and construction in the future and that the proposed park designs may not be implemented as described below. This parkland concept for Rangeview was prepared to demonstrate how the proposed placement, organization, programming and dimensioning of the various park blocks within Rangeview could result in a vibrant and accessible recreation amenity that would appropriately service the needs of the future population of this area.

The Destination Park is designed to serve the wider Lakeview Waterfront Major Node area. This park typology will function as a public realm anchor for the entire community, attracting both local residents and visitors from other areas of Mississauga and beyond. The Destination Park will be designed as a central focus point and is sized to incorporate many active and passive recreational opportunities at various scales.

The Community Park is designed to be a focal point for the immediate neighbourhood. It is intended to serve primarily the residents of Rangeview Estates. In comparison with the Destination Park, the Community Park provides a mix of active and passive recreational opportunities at a more local, neighbourhood scale.

The Neighbourhood Parkette is a small scale, centrally located park space which will ensure that all Rangeview Estates residents will be within walking distance of a park. This typology offers predominantly passive and minor active recreational opportunities. The Neighbourhood Parkette is intended to enhance connectivity within the neighbourhood and complement the Destination and Community Parks.

Figure 19 – Public Parks

Legend

- Rangeview Estates
- Destination Parks
- Community Park
- Neighbourhood Parkettes

Ogden Park

Ogden Park – through both Rangeview and the Lakeview Village development – will function as the primary Destination Park for the entire Lakeview Waterfront Major Node and will complete a key circulation link between Lakeshore Road East and the waterfront. It will include scaled neighbourhood level of service features along with pedestrian priority and cycling facilities. The section of Ogden Park through Rangeview Estates is comprised of three blocks and completes the overall vision originally contemplated by the Lakeview Village DMP, being a central "river of green".

Located alongside the proposed Ogden Avenue extension, Ogden Park will provide an extended view corridor towards Lake Ontario from Lakeshore Road East. The northern portion of Ogden Park, nearest Lakeshore Road East, will incorporate a gateway space with public art to announce the main entrance to the park and the overall community. A network of pathways and planting areas through all three blocks of Ogden Park will define specific areas for active and passive recreational opportunities. Recreational opportunities contemplated for Ogden Park in the Rangeview DMP include play zones, fitness pods, games tables, water play areas, pickle ball courts, open and sheltered seating areas, gardens and open lawn areas. Overall, Ogden Park will be a major destination for the residents of the City of Mississauga and will serve as an important addition to the City's network of parks and open spaces.

Figure 20 - Ogden Park Plan

Figure 21 - Aerial View of Ogden Park Towards Lake Ontario

Figure 22 - Ogden Park Gateway at Lakeshore Road East and Ogden Avenue

Figure 23 - Retail Interface with Ogden Park Along Lakeshore Road East

Lakefront Greenway

The Lakefront Greenway will serve as a secondary Destination Park within Rangeview Estates, functioning as an additional gateway entrance to both Rangeview and the Lakeview Village development. Oriented parallel to Lakefront Promenade, it is designed as a linear park that physically and visually connects to Douglas Kennedy Park. It complements Ogden Park by providing residents and visitors additional views and access to the waterfront.

Comprised of three blocks, the Lakefront Greenway will serve as an extension of the Lakefront Promenade public realm. It will stimulate pedestrian activity and provide animation through a series of active and passive recreational opportunities situated between pathways and planting areas. Recreational opportunities contemplated for the Lakefront Greenway in the Rangeview DMP include play zones, a fitness pod, a water feature (winter ice rink), open and sheltered seating areas, performance area and open lawn area.

The northern block of the Lakefront Greenway (Block 2) is envisioned as an urban plaza – serving as a community gathering space that is linked to the planned Lakeshore BRT stop at the intersection of Lakefront Promenade and Lakeshore Road East. Public art and a large water feature – which could be converted to an ice rink in the winter months – will reinforce this corner as a community gateway and promote a sense of arrival for BRT passengers.

Figure 24 - Lakefront Greenway Plan

Figure 25 - Aerial View of the Lakefront Greenway Towards Lake Ontario

Figure 26 - Lakefront Greenway Gateway Plaza at Lakeshore Road East and Lakefront Promenade

Rangeview Park

Rangeview Park will be a vibrant Community Park that is designed to serve the residents of Rangeview Estates. It will function as an important focal point and gathering space for the immediate neighbourhood. Rangeview Park will be anchored by a large open field area which is sized to accommodate a 5 vs 5 soccer pitch, but can also accommodate other flexible unstructured active recreational uses. The open field area will be bordered by walkways, sustainable landscaping and other localized amenities such as play zones, a water play area, a sheltered gathering space and community gardens. To reinforce the neighbourhood scale of Rangeview Park, the space will be framed by low-rise development to enclose the park at a human-scale and provide excellent sun exposure.

Figure 27 - Rangeview Park Plan

Figure 28 - Community Garden Feature within Rangeview Park

Figure 29 - Aerial View of Rangeview Park Looking Northwest Towards Street ‘L’

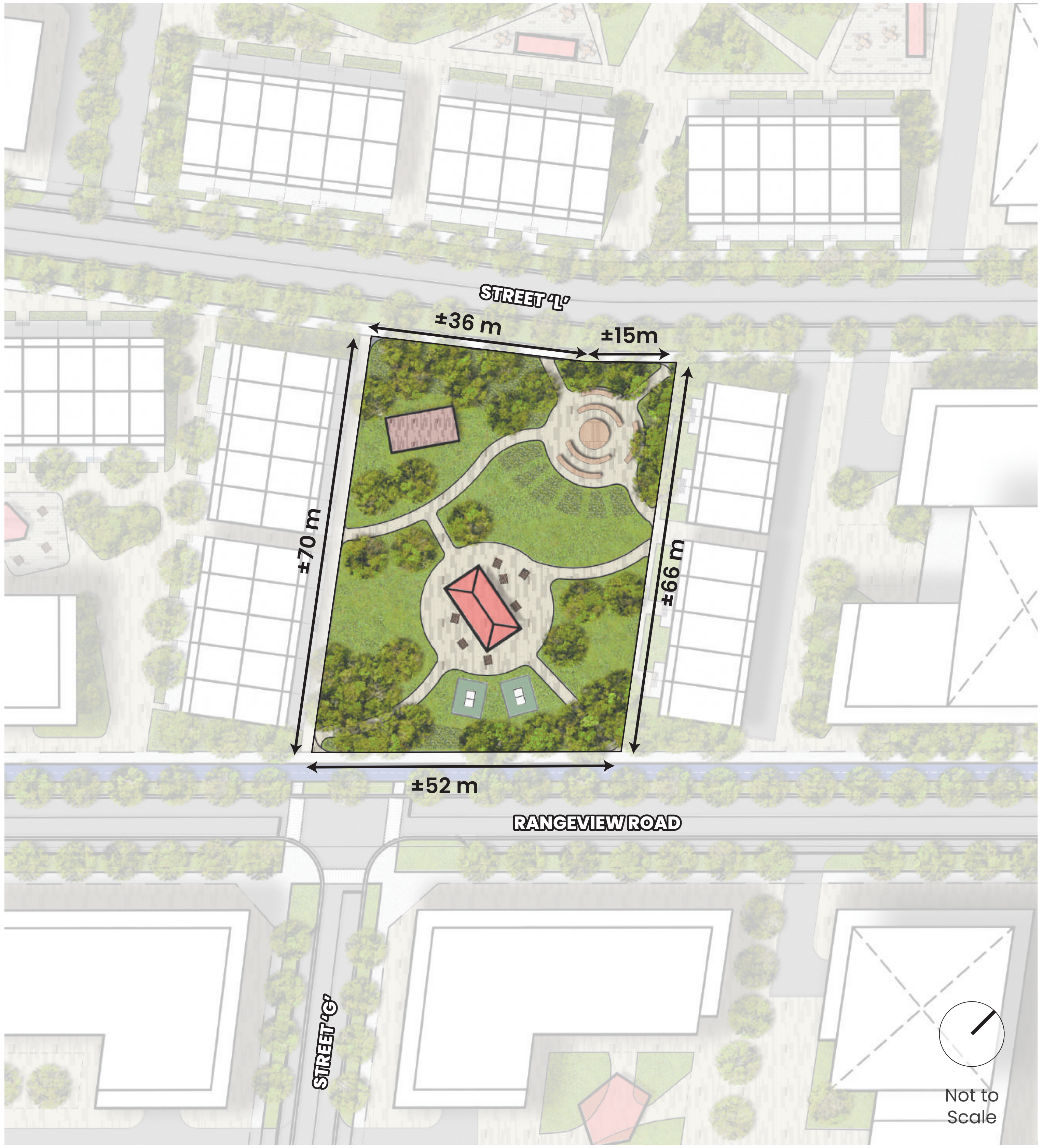


Figure 30 - Central Square Plan

Central Square

Central Square will serve as one of two Neighbourhood Parkettes within Rangeview Estates. It functions as a centrally located terminus and gathering area – providing an open space connection between a pedestrian walkway from Lakeshore Road East to Street 'L', and the proposed Street 'G' that connects from Lakeview Village. Overall, Central Square acts as an important anchor for this extended mid-block connection that bisects Rangeview Estates and provides pedestrians an alternative route towards the Lakeview Village development and the waterfront. In the Rangeview DMP, Central Square is primarily contemplated for passive and minor active recreational opportunities, including community gardens, a gathering area, an outdoor yoga space, open and sheltered seating, an open lawn area and games tables.


Figure 31 - Neighbourhood Gathering Space within Central Square

Figure 32 - Aerial View of Central Square Looking Northwest Towards Street 'L'

Hydro Common

Located at the corner of Hydro Road and the new Street 'L', Hydro Common is the second of two Neighbourhood Parkettes within Rangeview Estates. It provides a visual break along the continuous 4-storey streetwall which defines the Rangeview Estates boundary along Hydro Road. Hydro Common will assist in emphasizing Hydro Road as a gateway corridor for the Lakeview Waterfront Major Node, and towards Lakeview Square on the waterfront. Similar to Central Square, Hydro Common will be primarily comprised of passive and minor active recreational opportunities, which could include open and sheltered seating areas, games tables, gardens and an off-leash pet area.

Figure 33 - Hydro Common Plan

Figure 34 - Aerial View of Hydro Common At Hydro Road and Street 'L'

Private Open Space

Complementing the public realm network, private open spaces will be strategically distributed throughout the Rangeview Estates neighbourhood. These open spaces will provide additional opportunities for intermittent, sustainable landscaping, areas for passive recreation and connections between the defined public parks. The Rangeview DMP proposes two types of private open space: (1) Privately Owned Public Spaces; and (2) Outdoor Amenity Areas. The location and design of the private open spaces demonstrated in this DMP are conceptual, with the exact details to be addressed at a later planning application process when each property is advanced for redevelopment.

Privately Owned Public Spaces (“POPS”)

Privately Owned Public Spaces (“POPS”) are privately owned and managed outdoor spaces that are accessible to non-residents and open to the public. The Rangeview DMP proposes several POPS which will provide mid-block connections to facilitate additional linkages and access through the planned development parcels between Lakeshore Road East and Street ‘L’. Furthermore, these POPS connections will provide view termini towards the internal public park spaces within the Rangeview neighbourhood and visual breaks along the streetwall on Lakeshore Road East.

Outdoor Amenity Areas

Outdoor Amenity Areas are communal use spaces that incorporate active and passive recreational opportunities and are to be available for exclusive use by the residents of an associated development. The Rangeview DMP proposes Outdoor Amenity Areas to be centrally located within each the development parcel, as appropriate, with high visibility from the adjacent public realm.

Figure 35 - Private Open Spaces

Legend

- Rangeview Estates
- Privately Owned Public Spaces
- Potential At-grade Amenity Areas

Public Art

The addition of public art within the Rangeview public realm will help enhance and reinforce the vibrant character and identity of the neighbourhood. The Rangeview DMP contemplates public art elements throughout each of the five new parks. More importantly, public art will primarily be located along Lakeshore Road East, as it intersects with Lakefront Promenade, the proposed Ogden Avenue extension and Hydro Road. Each of these locations serves as a gateway into Rangeview and public art will enhance this function and serve as markers to celebrate the arrival to Rangeview, and subsequently, Lakeview Village. The precise location and design of public art elements will be determined as part of the future parkland planning and design process.

5th Street Square, Calgary AB (Source: Richard Valenzona)

South Bank Parklands, Brisbane QL (Source: Richard Valenzona)

Empress Lawn, Singapore (Source: Richard Valenzona)

Figure 36 - Potential Location of Public Art

LAKESHORE ROAD EAST
STREET 'L'
STREET 'L'
STREET 'L'
EAST AVENUE
LAKEFRONT PROMENADE
OGDEN AVENUE
HYDRO ROAD
RANGEVIEW ROAD
RANGEVIEW ROAD
RANGEVIEW ROAD
STREET 'G'
Not to Scale
Legend
Rangeview Estates
Potential Location of Public Art

Streetscape Design

The Rangeview DMP proposes a network of fine-grain streets that follows the structure outlined in the Mississauga OP and considers the right-of-way designs proposed by the Lakeview Village development. This will ensure that a cohesive streetscape plan and design is ultimately built for the entire Lakeview Waterfront Major Node community.

Figure 37 - Streetscape Typology


LAKESHORE ROAD EAST
STREET 'L'
STREET 'L'
STREET 'L'
EAST AVENUE
LAKEFRONT PROMENADE
OGDEN AVENUE
HYDRO ROAD
RANGEVIEW ROAD
RANGEVIEW ROAD
RANGEVIEW ROAD
STREET 'G'
Legend
Rangeview Estates
Future Major Collector Road
Future Minor Collector Road
Future Local Roads
Existing Local Roads
Not to Scale

Lakeshore Road East

Lakeshore Road East is an existing arterial road with a designated right-of-way width of 44.5 metres. The segment of Lakeshore Road East adjacent to Rangeview is currently being reviewed in several studies which will define the ultimate right-of-way design that includes a dedicated BRT lane. Regarding the Rangeview Estates interface with Lakeshore Road East, the DMP envisions mid-rise buildings with a maximum height of 8-storeys and a 4-storey streetwall condition which are setback from the property line to allow for additional patio and café seating, retail spill-out areas, double-row of trees and sustainable landscaping to establish a 'main street' character.

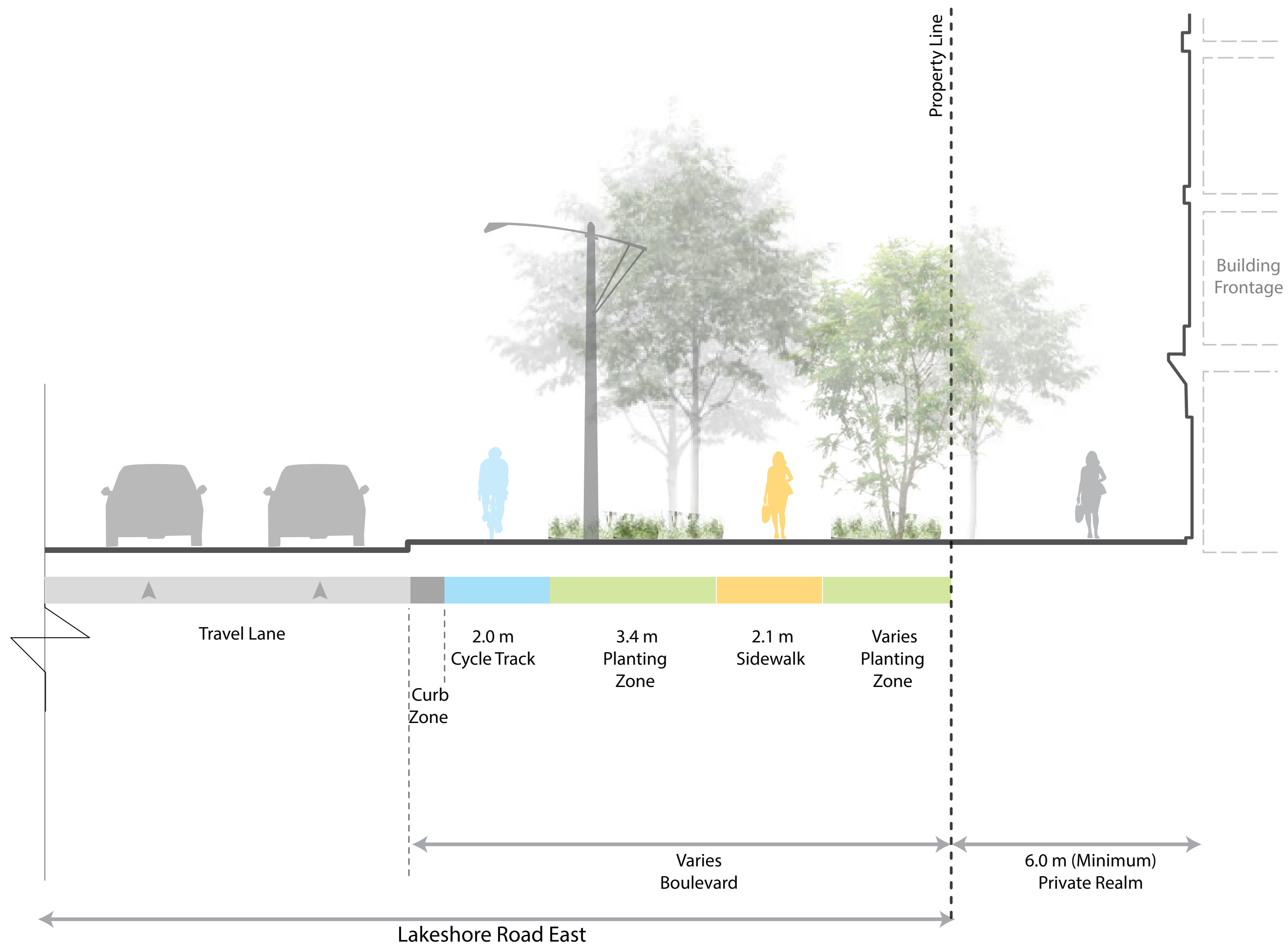


Figure 38 - Lakeshore Road East Interface with Rangeview Estates

Street 'L'

Street 'L' is a future local road with a designed right-of-way width of 19.05 metres. Street 'L' will primarily function as a local service road, providing access to buildings fronting onto Lakeshore Road East. The right-of-way is tree-lined and will include two lanes of traffic, with sidewalks and native boulevard planting on both sides of the roadway.

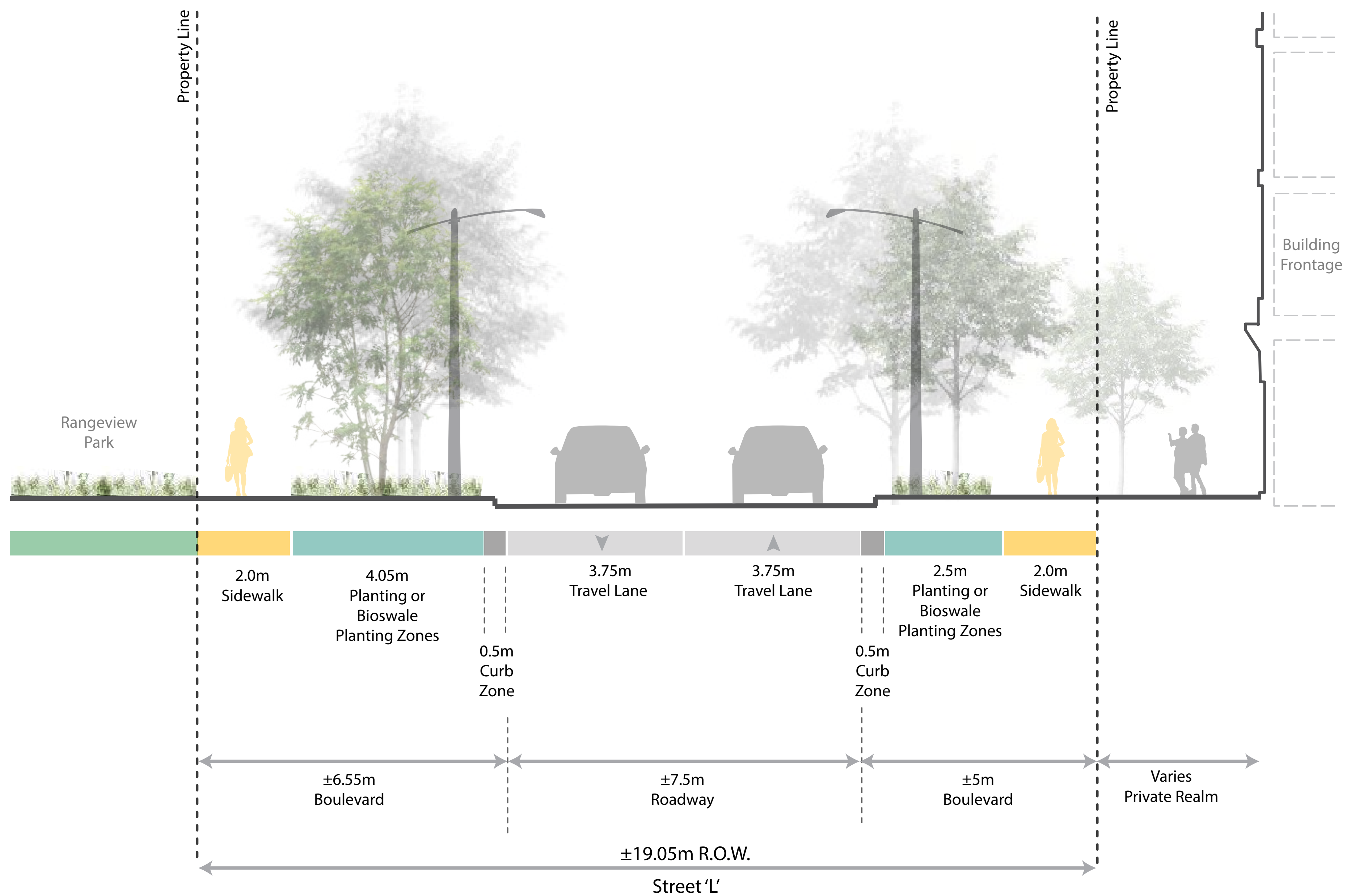


Figure 39 - Street 'L' Streetscape Section

Rangeview Road

Rangeview Road is an existing local road with planned right-of-way width of 22.25 metres. It will function as a hybrid street – providing access to back-of-house elements for buildings fronting onto Rangeview Road and important pedestrian and cycling connections through the neighbourhood. The right-of-way is tree-lined and will include two lanes of traffic, one side of on-street parking atop a bio-retention facility, a dedicated two-lane cycle track and sidewalks and native boulevard planting on both sides of the street.

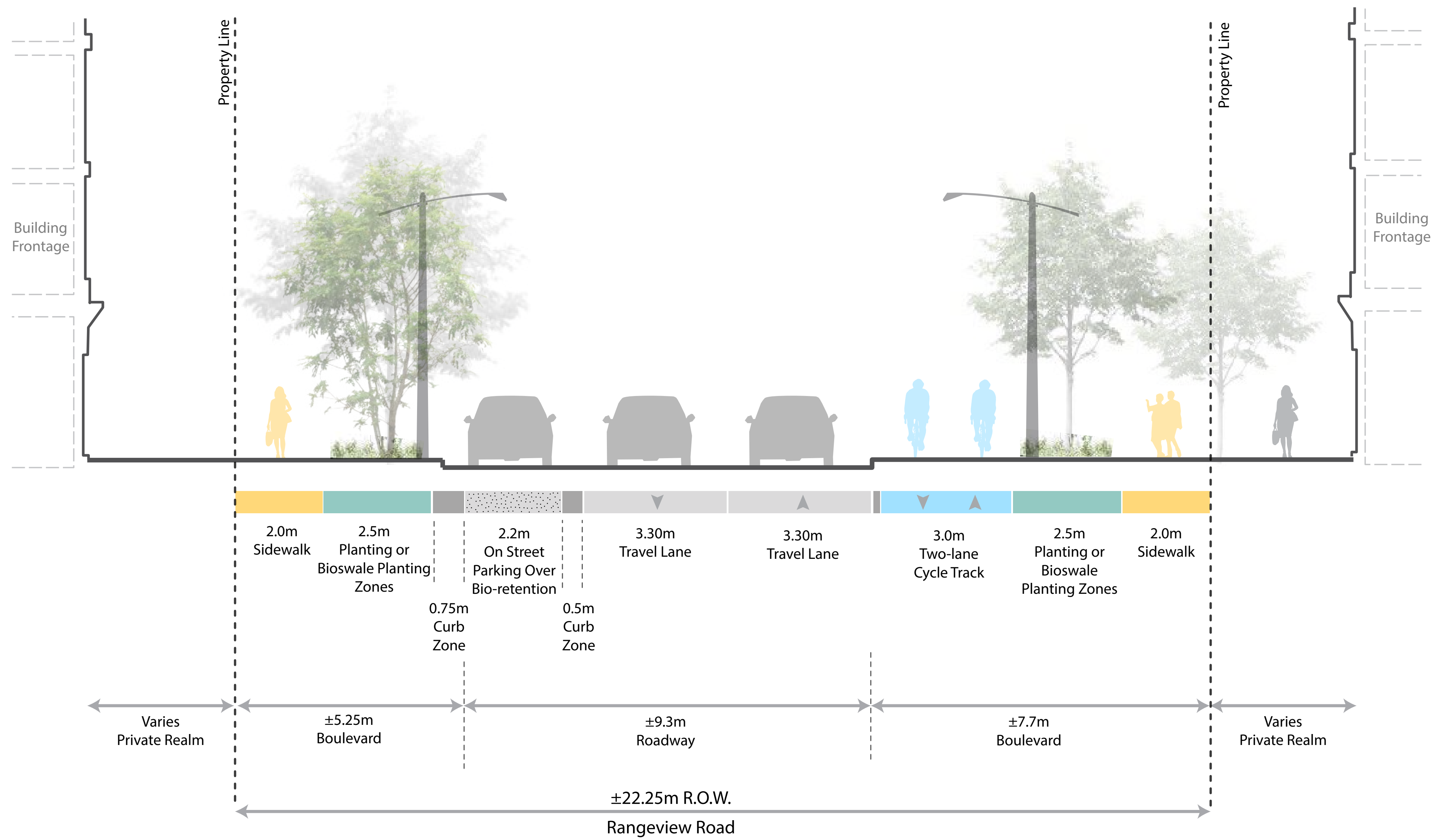


Figure 40 - Rangeview Road Streetscape Section

East Avenue

East Avenue is an existing local road with a planned right-of-way width of 23.05 metres. It will also function as a hybrid street – providing access to back-of-house elements for buildings, as well as pedestrian and cycling connections through the neighbourhood. The right-of-way is tree-lined and will include two lanes of traffic, one side of on-street parking atop a bio-retention facility, a dedicated two-lane cycle track, native boulevard planting and sidewalks on both sides of the street. A dedicated bioswale zone is incorporated within the right-of-way to treat stormwater runoff.

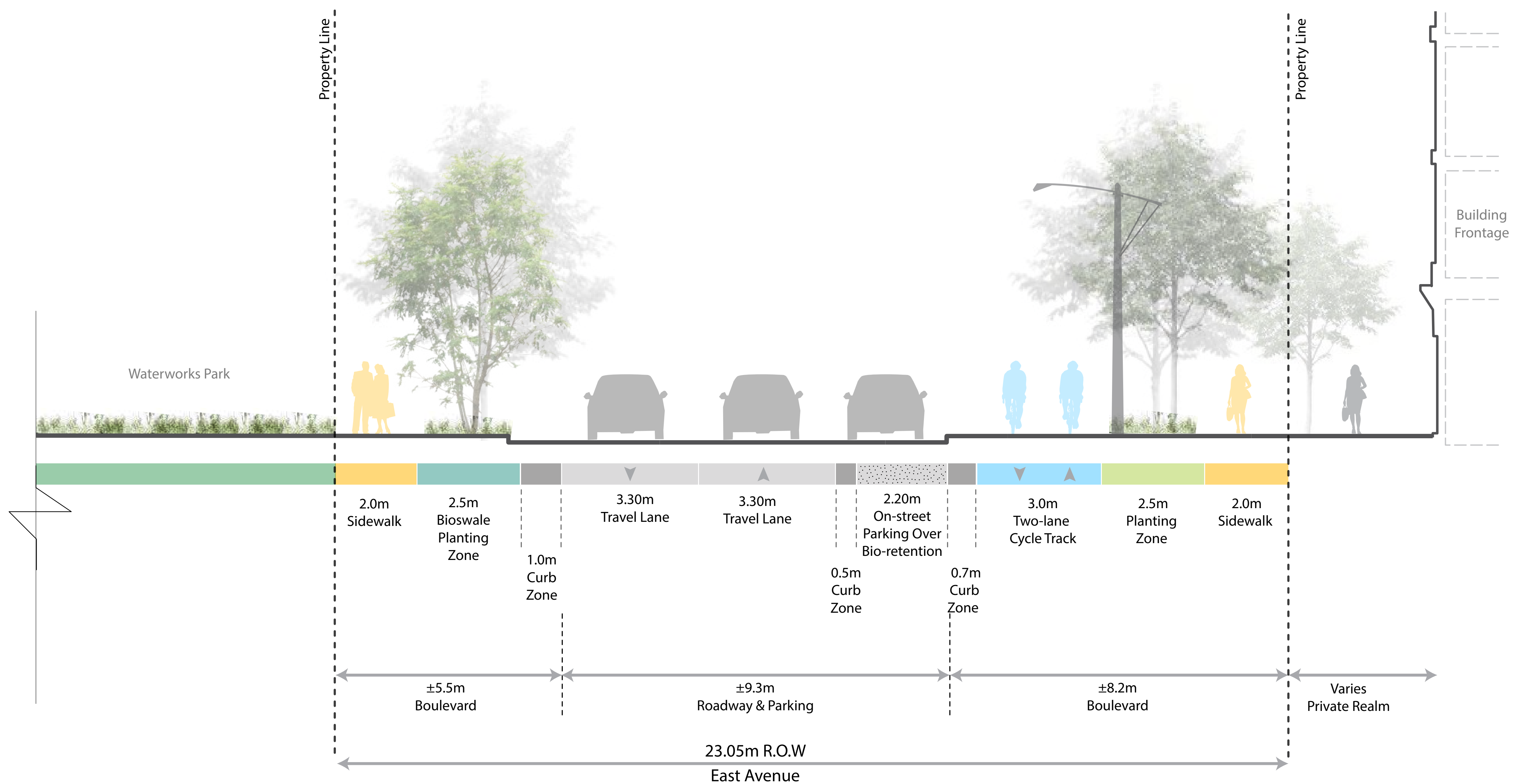


Figure 41 - East Avenue Streetscape Section

Lakefront Promenade

Lakefront Promenade is a future major collector road with a planned right-of-way width of 30.38 metres. It will function as an important gateway street into the Lakeview Waterfront Major Node community. Moreover, Lakefront Promenade provides direct vehicular, pedestrian and cycling connections towards Douglas Kennedy Park and the waterfront. At Lakefront Promenade and Lakeshore Road East, a dedicated left-turn lane and share through/right lane is provided to manage additional traffic capacity. The right-of-way is tree-lined and will include two lanes of traffic, a dedicated two-lane cycle track and sidewalks on both sides of the roadway. In terms of landscaping, bioswale planting zones and native boulevard planting will be provided on both sides of the street.

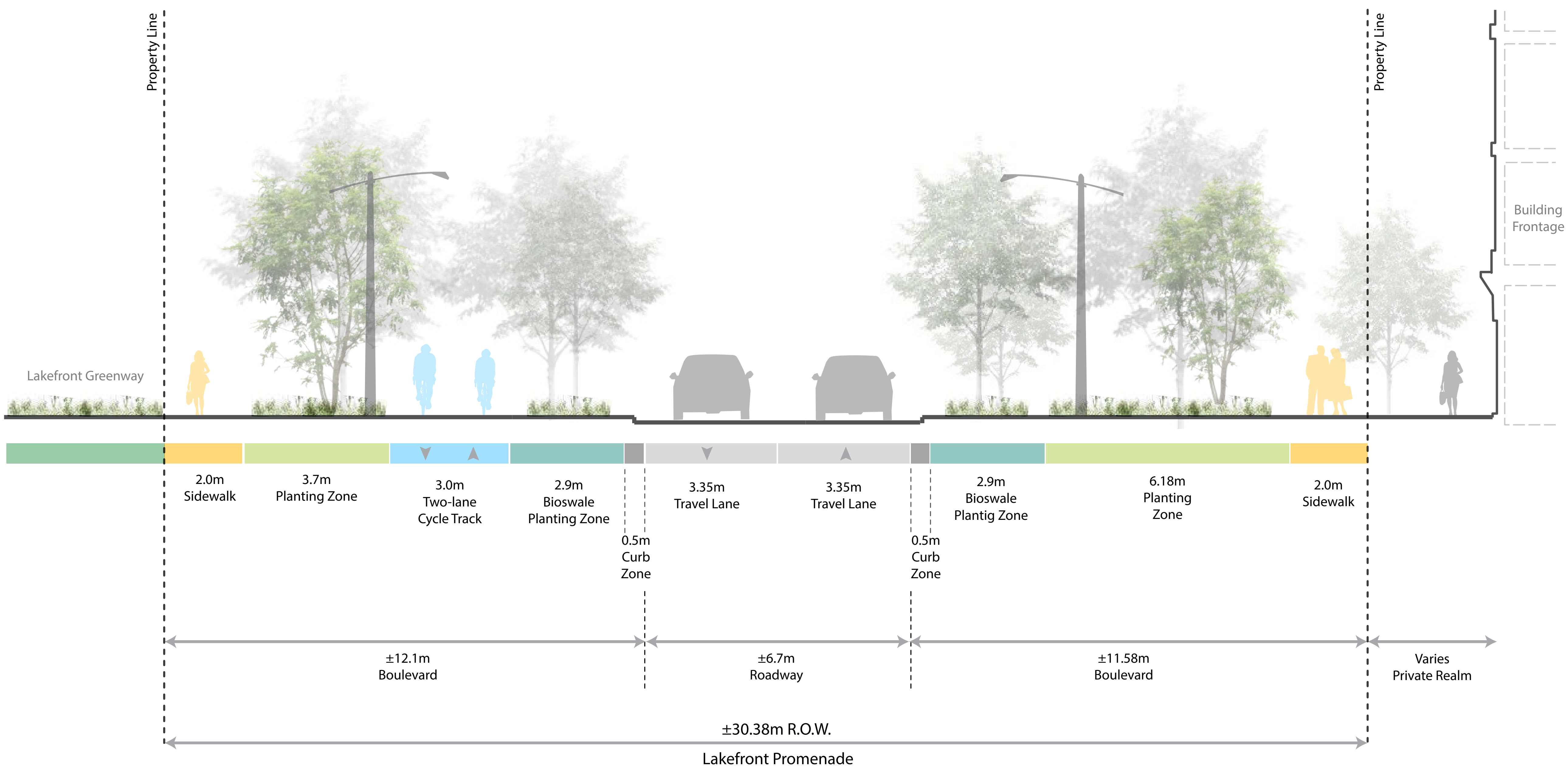


Figure 42 - Lakefront Promenade Streetscape Section

Street 'G'

Street 'G' is a future local road with a planned right-of-way width of 19.05 metres. Street 'G' will provide local access and a direct connection to the Lakeview Village development. The right-of-way is tree-lined and will include two lanes of traffic, one side of on-street parking atop a bio-retention facility and sidewalks and native boulevard planting on both sides.

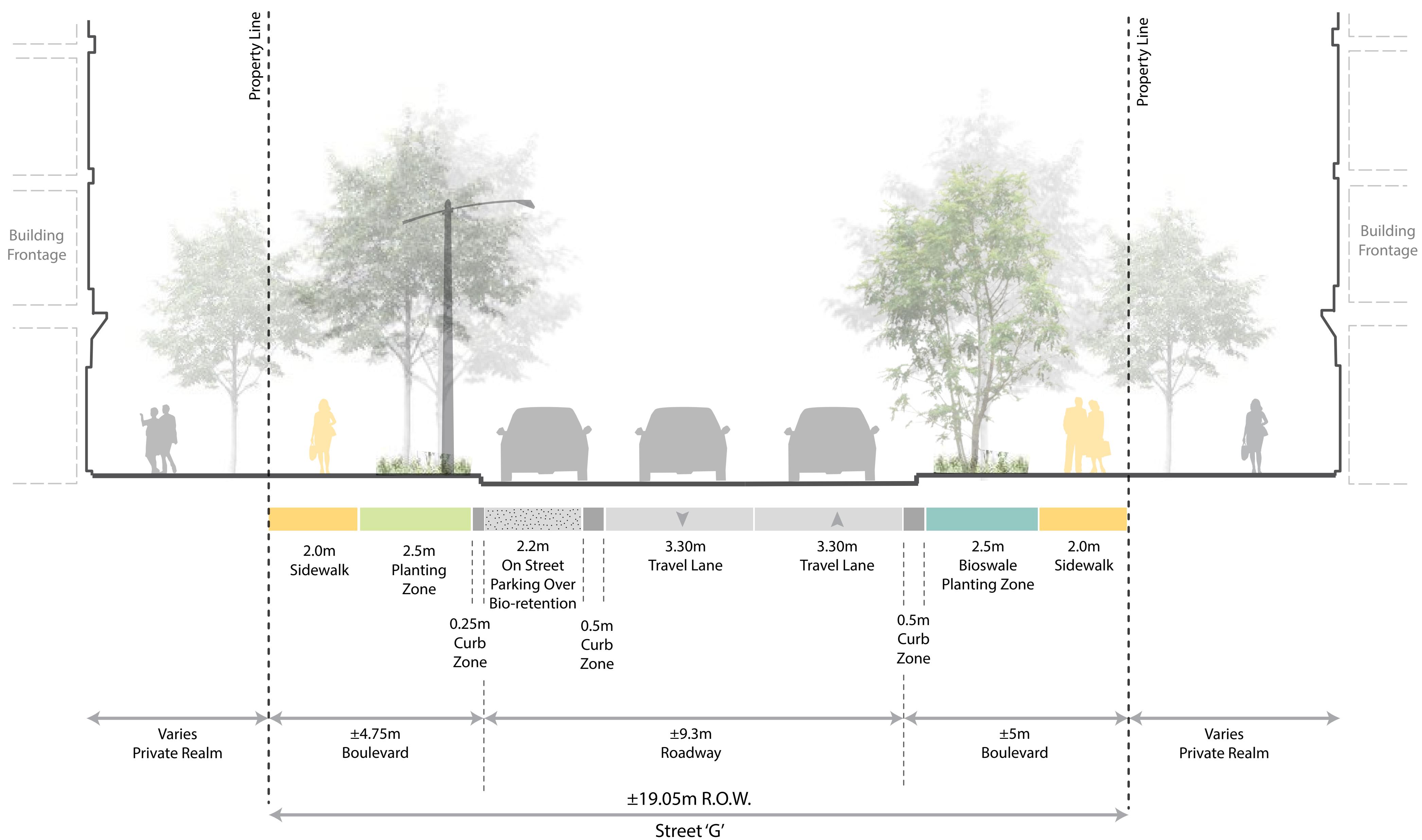


Figure 43 - Street 'G' Streetscape Section

Ogden Avenue

Ogden Avenue is a future minor collector road with a designed right-of-way width of 23.05 metres. It will function as an important gateway street into the Lakeview Waterfront Major Node community and will complement the parallel Ogden Park. Similar to Lakefront Promenade, Ogden Avenue will provide direct vehicular, pedestrian and cycling connections to the waterfront. The right-of-way is tree-lined and will include two lanes of traffic, one side of on-street parking atop a bio-retention facility, a dedicated two-lane cycle track and sidewalks and native boulevard planting on both sides of the street.

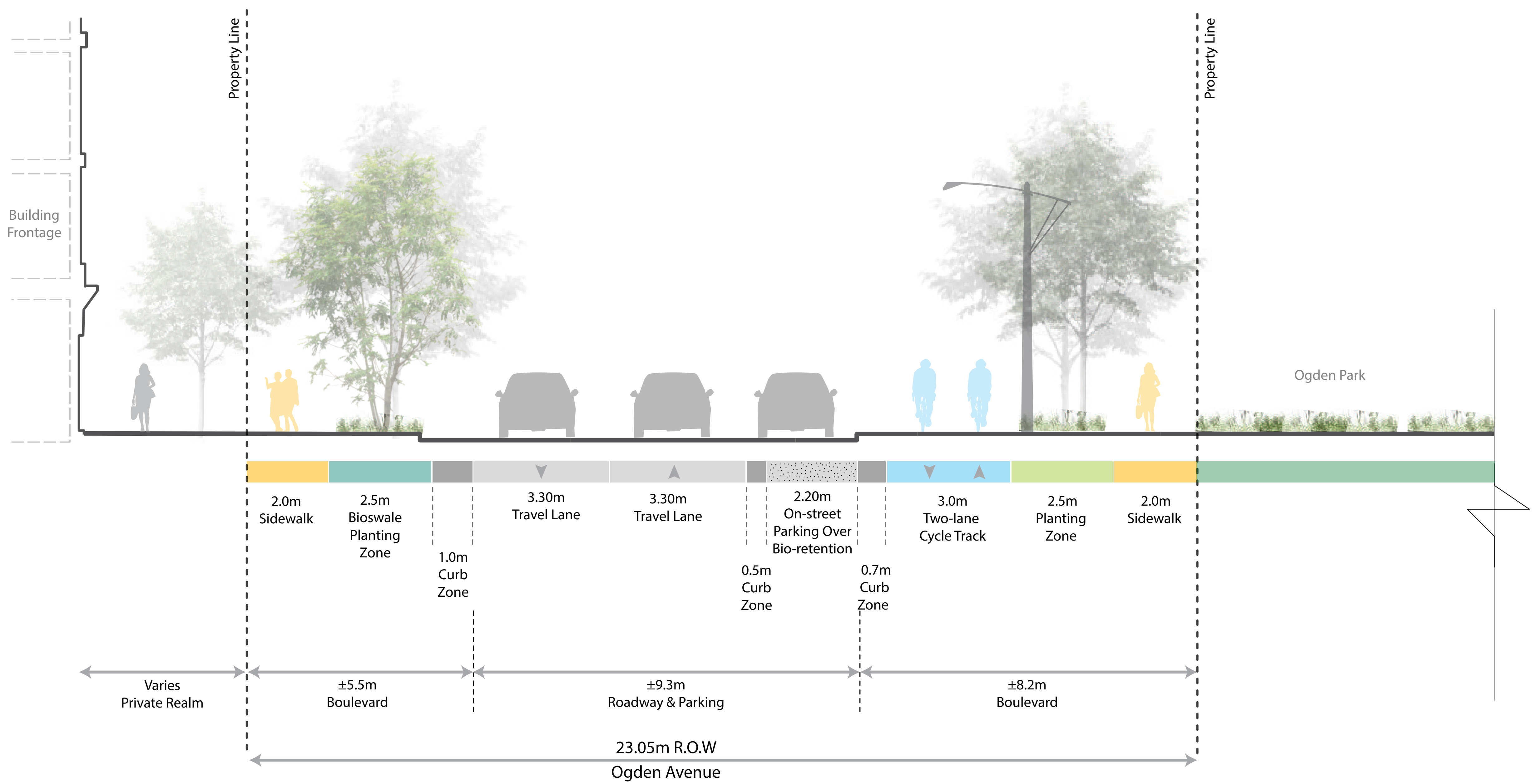


Figure 44 - Ogden Avenue Streetscape Section

Hydro Road

Hydro Road is a future major collector road with an updated right-of-way width of 25.40 metres. It will function as an important gateway street into the Lakeview Waterfront Major Node community. Hydro Road will provide direct vehicular, pedestrian and cycling connections towards the waterfront – specifically terminating at Lakeview Square along the water. The right-of-way is tree-lined and will include two lanes of traffic, one side of on-street parking atop a bio-retention facility, a dedicated two-lane cycle track, sidewalks, native boulevard planting and a bioswale planting zone. The western edge of Hydro Road will introduce enhanced paving and landscaping to emphasize the importance of this street as a gateway into the community.

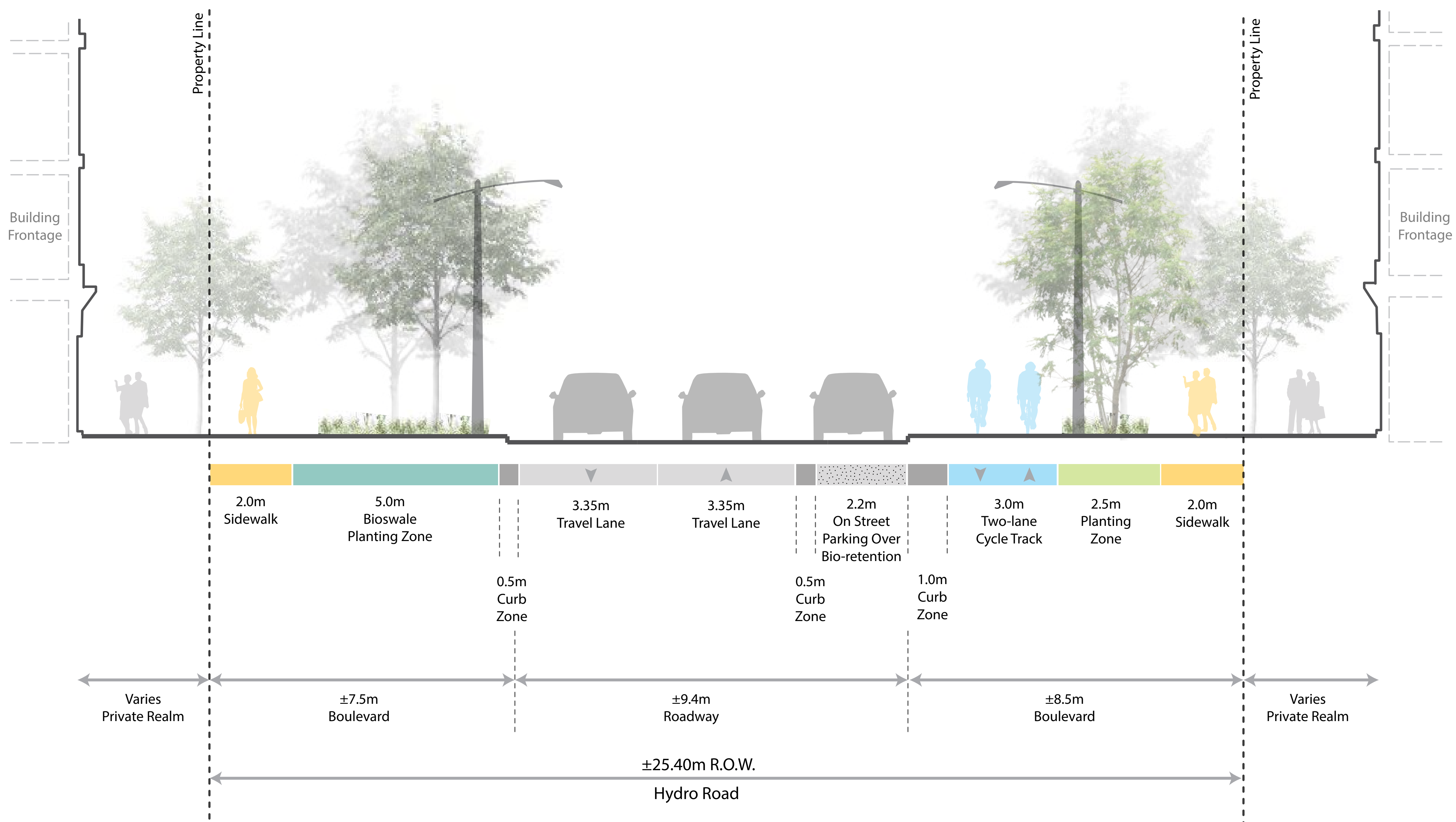


Figure 45 - Hydro Road Streetscape Section

4.4 Built Form

The organization of, and proposed building forms within, Rangeview Estates will serve as the most distinct elements with the neighbourhood fabric. They will create a sense of enclosure along the public realm, frame important views and corridors towards the lake and contribute to the residential neighbourhood character envisioned for Rangeview Estates. The Rangeview DMP is primarily composed of mid-rise built forms, with a mix of lower scaled and tall building elements to provide a mix of typologies throughout the neighbourhood. The variety building types will support a wide range of economic levels, household sizes and age groups. Not only will these building typologies contribute to and complement the emerging built form context of the Lakeview Village development but will also respond to the broader surrounding built form context given the transitional location of Rangeview between existing neighbourhoods and the planned waterfront community.

Figure 46 - Built Form Typology

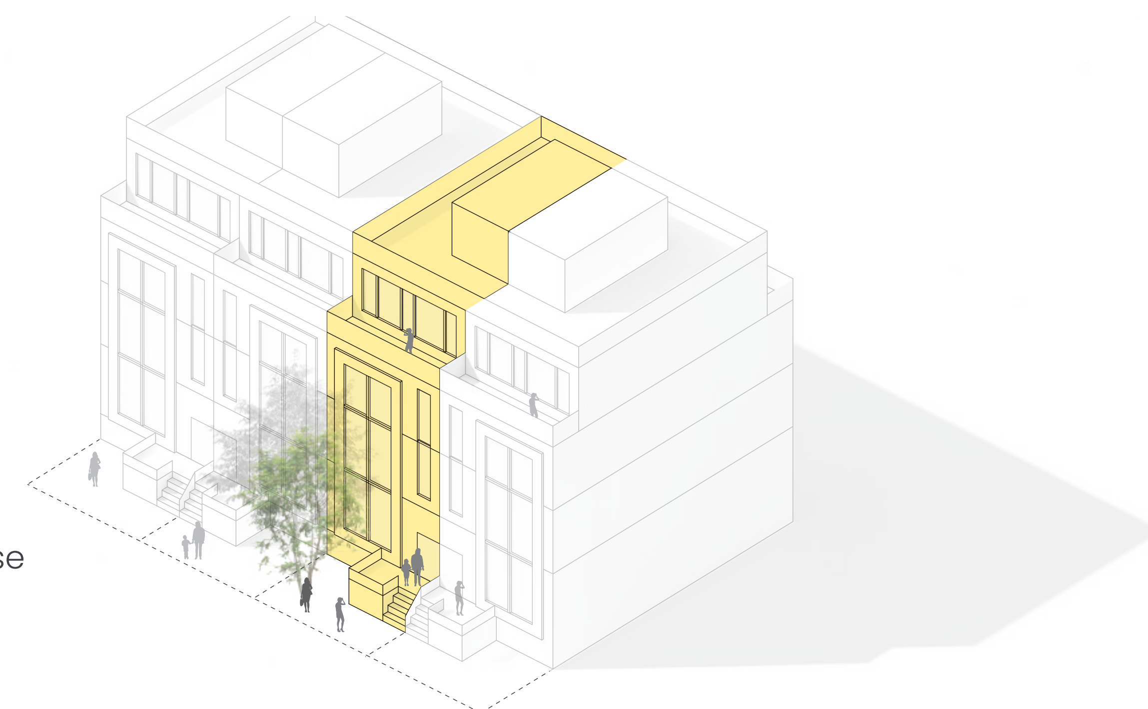
Legend

- Rangeview Estates
- Low-rise Buildings (Up to 4-storeys)
- Mid-rise Buildings (5- to 8-storeys)
- Tall Buildings (9- to 15-storeys)

Building Typology

The building typologies and associated heights proposed within Rangeview Estates align with the policies and guidelines outlined in the Mississauga OP. These typologies include: (1) Low-rise buildings up to 4-storeys; (2) Mid-rise buildings between 5- and 8-storeys; and (3) Taller Building Elements between 9- and 15-storeys. The Rangeview DMP demonstrates a conceptual massing, height and scale for each of these building typologies. The exact design and architectural details of these buildings will be further developed at a later stage in the development approvals process.

Traditional Townhouse



Stacked Townhouse

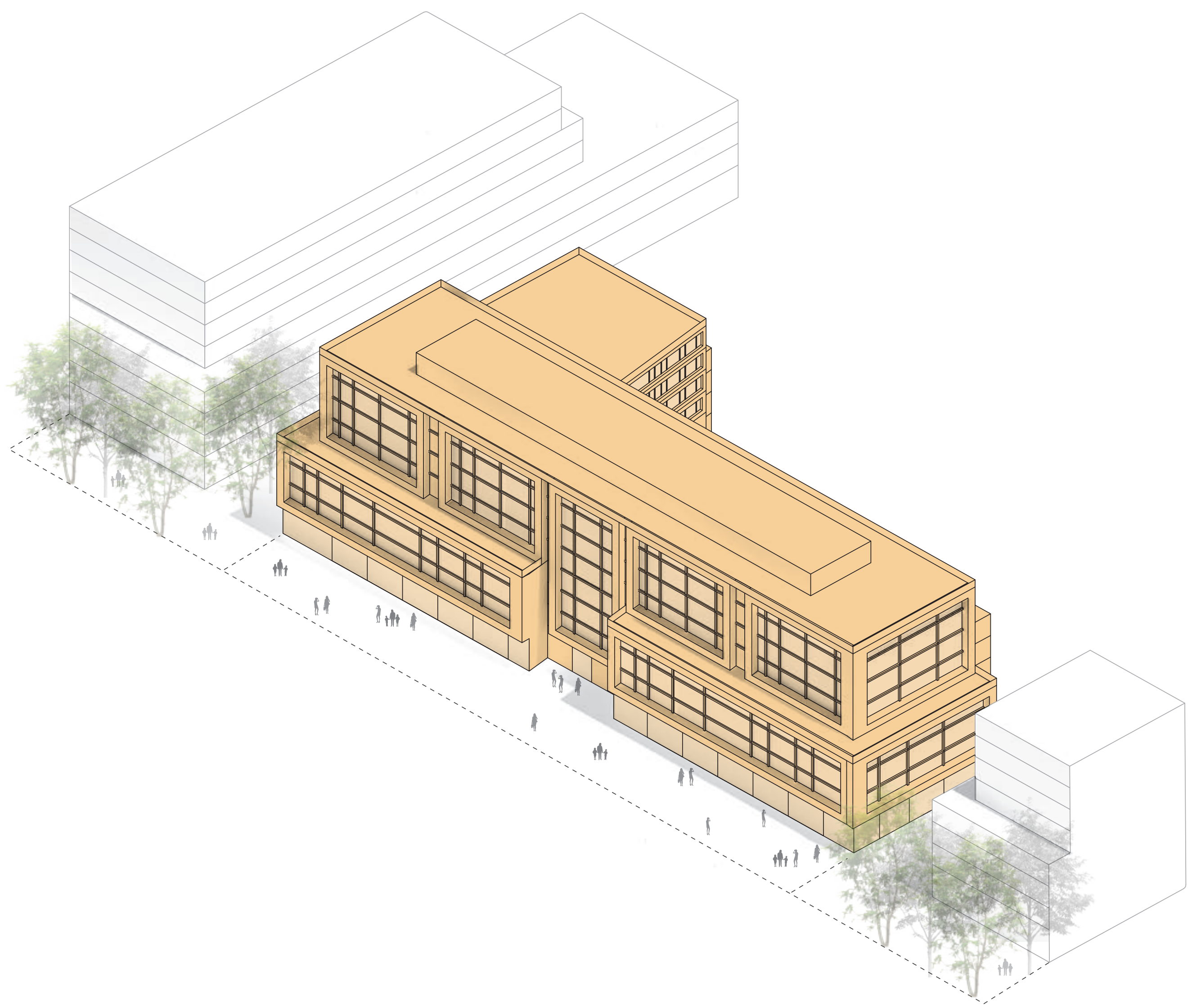
Low-Rise Buildings

The Rangeview DMP contemplates several forms of low-rise buildings, including:

- Three-storey townhouses;
- Three-storey back-to-back townhouses;
- Four-storey stacked townhouses;
- Four-storey stacked back-to-back townhouses; and
- Four-storey apartment buildings.

Three-storey townhouse structures share a sidewall with an adjacent unit and typically consist of a front and rear yard (or rear lane vehicular access). Three-storey back-to-back townhouse structures share a side and rear wall with adjoining units. They contain two primary frontages with each unit having their own entrance at ground level. Four-storey stacked townhouse structures have similar qualities to three-storey townhouses, but also include units stacked vertically atop one another. Four-storey stacked back-to-back townhouse structures have similar qualities with three-storey back-to-back townhouses, but also feature units stacked vertically atop one another. Four-storey apartment buildings are comprised of units stacked vertically that share a primary entrance and internal corridor with units on either side.

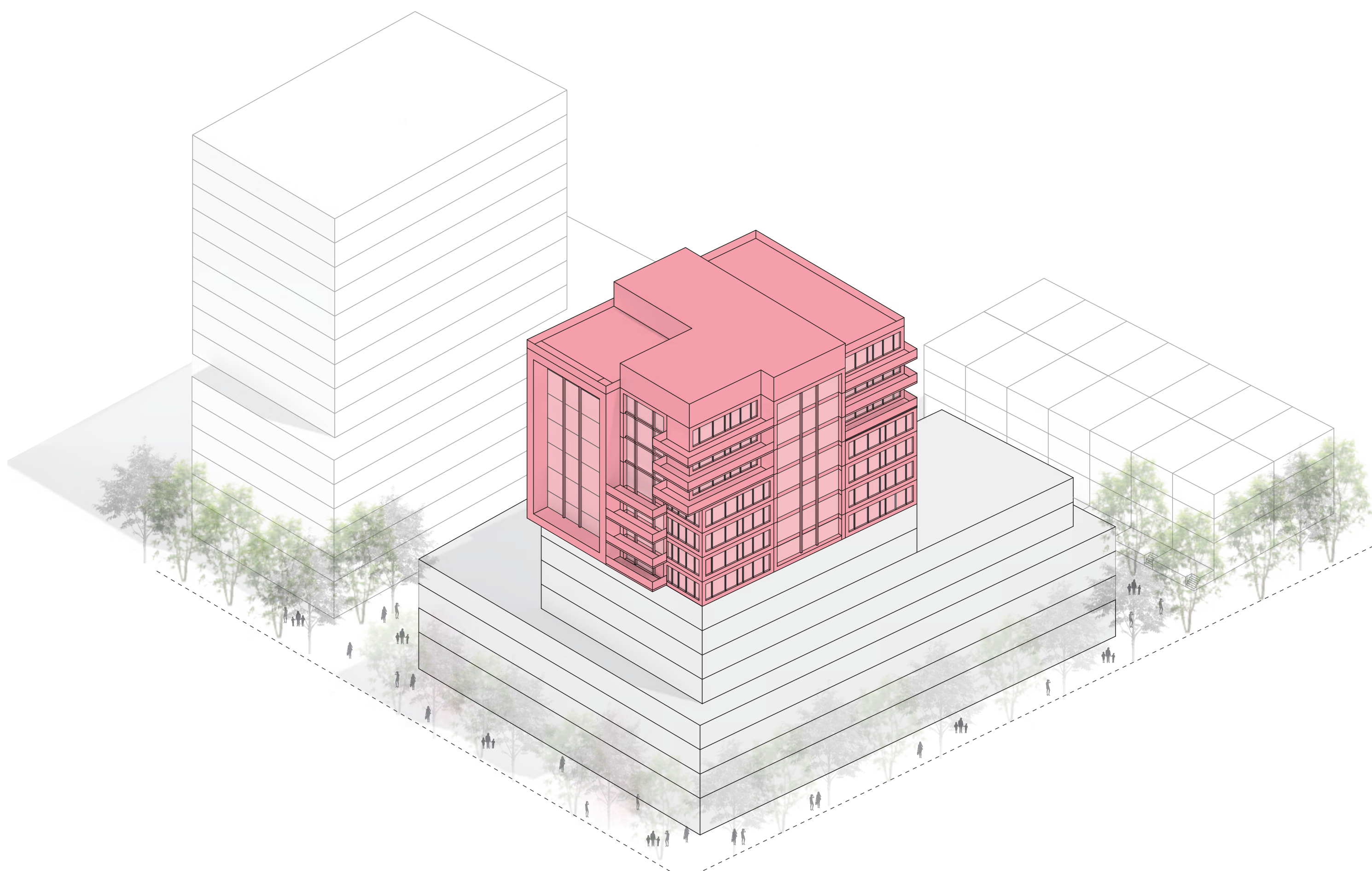
These low-rise buildings will assist in reinforcing the residential neighbourhood character of Rangeview Estates. They are designed to be at a human-scale and maintain compatibility with the existing and planned adjacent low-rise neighbourhoods. As described, low-rise buildings will generally be organized within the interior of each character area and will frame the proposed public parks to maintain an intimate scale for residents and ensure ample access to sunlight. Primary entrances and potential porches of low-rise buildings will generally front directly onto the adjacent public realm to provide for activation and animation.



Mid-Rise Buildings

As mentioned, Rangeview Estates is envisioned as a predominantly mid-rise neighbourhood. The Rangeview DMP contemplates an appropriate quantity of mid-rise forms at varying scales and heights to fulfill this vision. Generally, the demonstrated mid-rise buildings are articulated with a 4-storey streetwall to maintain a human-scale presence along adjacent public realms and to complement nearby low-rise built forms. The overall building heights will generally respond to the width of the adjacent street right-of-way or to the immediate context which may be more appropriate. The proposed mid-rise buildings can take in the form of a free-standing structure, or as a base building (podium) with a taller building element as described in the following subsection).

The ground floor of the mid-rise buildings will provide animation at grade through the incorporation of either retail space (primarily along Lakeshore Road East and the northern portions of both Destination Parks) or residential units with their associated primary entrances and potential front porches and landscaping.



Tall Buildings

Tall buildings are comprised of the tower element atop a base building (podium) – in particular, mid-rise base buildings. Where applicable, the tower element will be appropriately stepped back from the top floor of the base building to create a discernible visual break between the two forms. This will maintain a human-scale relationship between adjacent street and the base building streetwall. The floorplate size of the tower element will be designed with appropriate dimensions so as to minimize the perception of mass and mitigate shadow and wind impacts onto the public realm.

The Rangeview DMP contemplates tall buildings beyond the mid-rise streetwall along Lakeshore Road East, alongside planned transit routes to support transit use, adjacent to Destination Parks to provide animation and along the Hydro Road entrance corridor to emphasize its importance as a primary entrance for the Lakeview Waterfront Major Node. As in many instances these locations overlap, the overall number of taller buildings within Rangeview is relatively limited which helps to preserve its mid-rise character. Tall buildings within Rangeview Estates will serve as a transition in height between existing buildings adjacent to the Rangeview neighbourhood, and the much taller buildings contemplated within the Lakeview Village development.

It is noted that the Mississauga OP policies for the Lakeview Waterfront Major Node include permissions for tall buildings beyond 15-storeys subject to the completion of a detailed height study. At this time the Rangeview LOG has decided not to pursue tall building heights beyond 15-storeys as is reflected in the current master plan concept.

Height and Density Strategy

As stated, Rangeview Estates will have a predominantly mid-rise built form with an integrated mix of low-rise and tall buildings at varying heights and scales to provide visual diversity and interest and to ensure housing options for all stages of life. The development blocks with the highest densities have been strategically sited along Lakeshore Road East and along primary streets (including Lakefront Promenade, Ogden Avenue and Hydro Road).

Residents of these higher density blocks will be able to take advantage of the features associated with these locations, in particular, access to transit service including the planned Lakeshore BRT, a main street environment along Lakeshore Road East, the north-south Destination Parks and primary north-south corridors down to the waterfront. Development blocks with lower densities are situated west of Lakefront Promenade to complement and provide an appropriate transition to the existing low-rise neighbourhood beyond East Avenue.

With respect to height, the Rangeview DMP provides building heights and locations consistent with the Mississauga OP for each built form typology, where applicable. As noted previously, a mid-rise built form frames Lakeshore Road East and primary streets to reinforce the vision of a predominantly mid-rise community. Taller buildings are sited beyond the mid-rise street wall along Lakeshore Road East, as well as adjacent to transit service, Destination Parks and north-south streets that have direct views of the lake. Low-rise built forms are located within the centre of character areas and frame Community Parks and Neighbourhood Parkettes. Low-rise buildings are proposed near East Avenue to complement and provide an appropriate transition to the existing low-rise neighbourhood beyond the Rangeview Estates boundary.

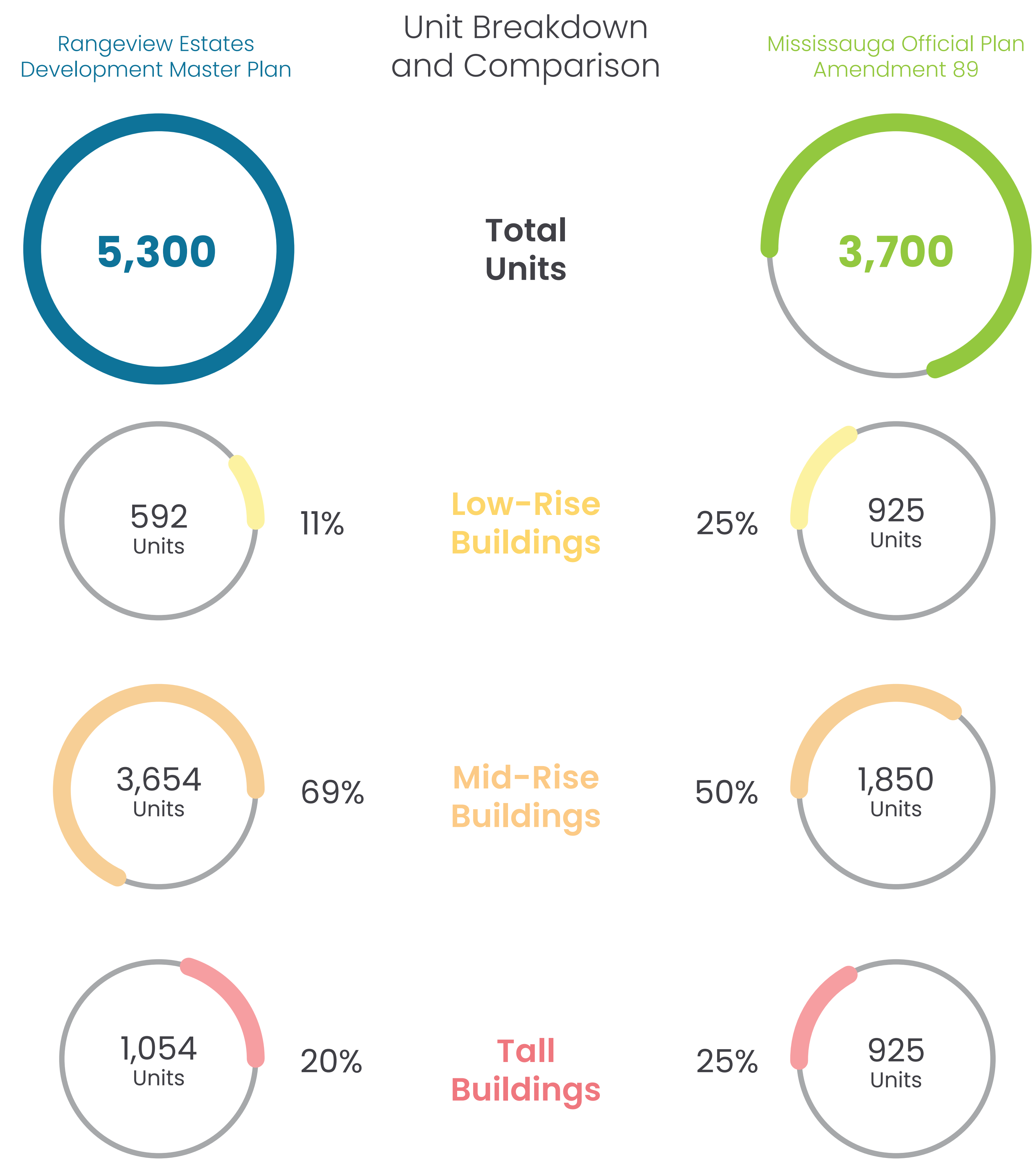
Figure 47 - Axonometric Height Map

Unit Count

The Rangeview DMP proposes an increase in the overall unit count for the Rangeview Precinct set out in Section 13.4 of the Mississauga OP. It is our opinion that this increased unit count continues to reflect the vision for Rangeview set out in the Mississauga OP policies which was based on the initial master planning exercises, however it expands and improves upon the optimal use for Rangeview Estates in light of the current Provincial and planned regional planning framework. Additional mid-rise units are required to fulfill the Lakeview Waterfront Major Node vision of a predominantly mid-rise scaled community and to achieve the minimum density targets of the proposed Haig PMTSA. As the Rangeview DMP makes provision for tall buildings at all locations permitted within the Lakeview Waterfront Major Node policies, the unit count has also increased slightly for this built form typology.

Notwithstanding these changes and the overall increase in units, the Rangeview DMP maintains a unit distribution between the three built form typologies that generally conforms to the distribution set out in the Mississauga OP for the Rangeview Estates Precinct. In particular, the Rangeview DMP provides around 11% of all units in low-rise buildings, 69% of units in mid-rise buildings and 20% of all units in taller buildings.

Based on these considerations, among other design directions outlined herein, the Rangeview DMP proposes an updated unit count of 5,300 units. Unit count assumptions for the 4-storey apartment building, mid-rise buildings and taller buildings are based on a 95% efficiency rate and an average unit size of 80 square metres. The efficiency percentage and average unit size numbers are generally reflective of building statistics from development proposals within the immediate area.



Design Criteria

The principles and criteria outlined below provide urban design direction and guidance to achieve a high-quality built form for Rangeview that corresponds seamlessly with the adjacent existing and planned public realm. As Rangeview Estates is currently comprised of a variety of landowners, the following principles and criteria will ensure the entire precinct will develop cohesively and result in an ultimate built form pattern that implements the vision of the Rangeview DMP.

Appropriate Siting and Relationship with the Public Realm

a. Orient primary building facades and entrances towards the street or parks and open spaces to frame the edges of the public realm.

b. Provide appropriate setbacks from property lines to allow for additional private amenity and landscaping opportunities to further enhance and activate the adjacent street or parks and open spaces.

Minimize Presence of Back-of-House Facilities

a. Integrate back-of-house elements – such as servicing, loading, garbage collection, access to underground parking, etc. – into the building. If not feasible, locate these elements internal to the development parcel and minimize their presence from the public realm with attractive screening and landscaping.

Suitable Massing to Maintain a Human-scale Built Form

a. For mid-rise and taller building forms, incorporate a 4-storey streetwall to reinforce a pedestrian scale and complement the heights of nearby proposed low-rise buildings.

b. Provide additional step backs strategically above the 4-storey streetwall to minimize the perception of mass and height at ground level.

Consideration for Adjacent Buildings and the Surrounding Context

a. Ensure appropriate separation distances are provided at grade between adjacent buildings to maintain access to sunlight and to mitigate issues related privacy and overlook. For taller buildings, generally maintain a 30-metre separation distance between towers.

b. Provide lower-scaled buildings near existing neighbourhoods with an established low-rise context to complement the scale and to provide a height transition towards mid-rise and taller building forms.

Achieving Architectural Design Excellence

a. Integrate active uses – such as retail, primary building entrances, indoor amenity areas, etc. – that are highly transparent, and visible on the ground floor to animate the adjacent public realm.

b. Incorporate a variety of high-quality materials within the architectural design of the building.

c. Articulate the built form horizontally and vertically to minimize the perception of mass, scale and height.

d. For mid-rise and taller building forms, minimize the presence of the rooftop mechanical penthouse by either integrating it into the top of the building, or setting it back a significant distance from the edge of the roof line.

5

Servicing

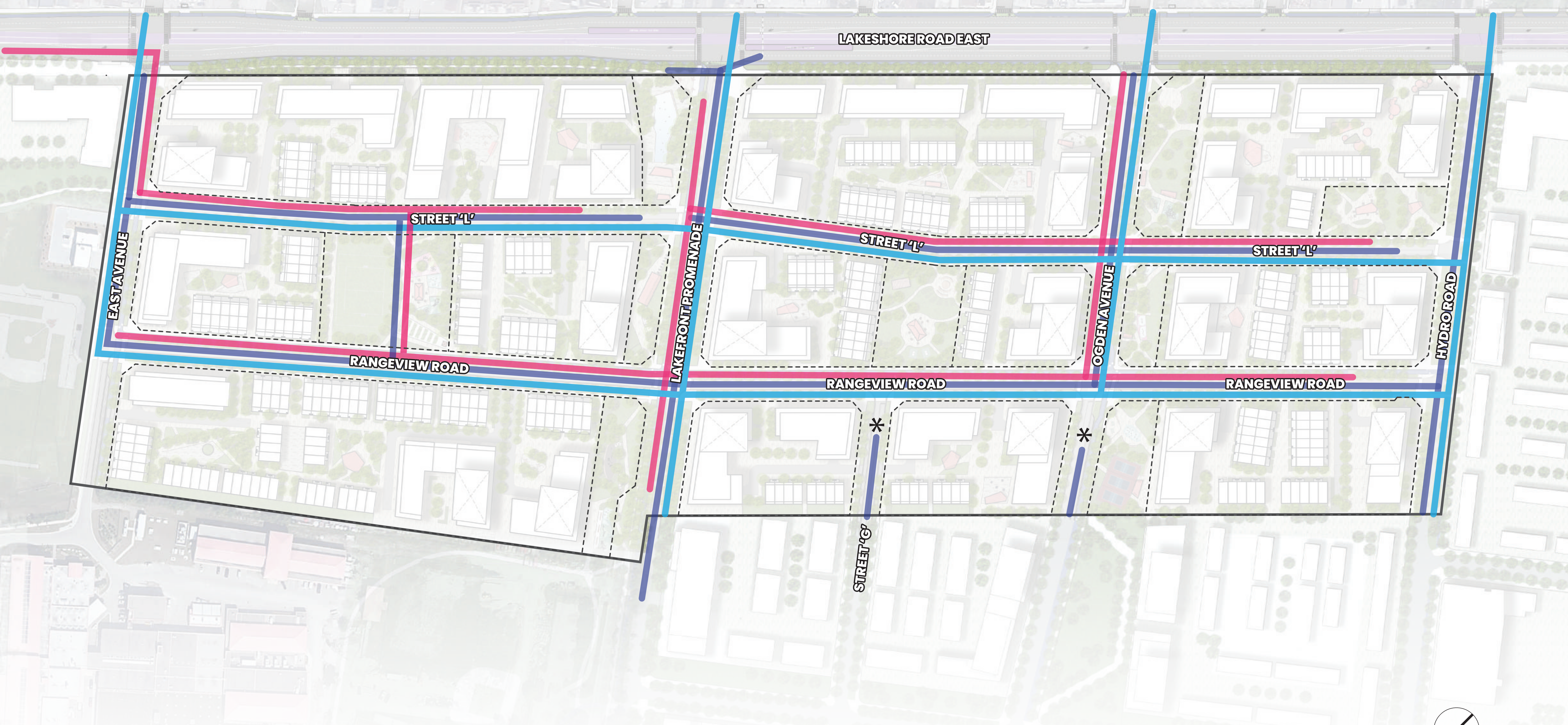
Schaeffers Consulting Engineers has been retained to determine the comprehensive servicing strategy for Rangeview Estates. The municipal servicing strategy has been proposed to satisfy the City of Mississauga and Credit Valley Conservation Authority (CVC) guidelines. The proposed servicing scheme is aligned with the neighbouring Lakeview Village development.

The water supply servicing will include connections to existing watermains along Lakeshore Road East, Rangeview Road and East Avenue. Moreover, 400-millimetre diameter watermains along Lakefront Promenade and Hydro Road are proposed as part of the Lakefront Community development. The proposed watermains include a 300-millimetre diameter watermain along Street 'L' that extends from East Avenue to Hydro Road, a 300-millimetre diameter watermain along Ogden Avenue that connects to the existing 600-millimetre diameter watermain along Lakeshore Road East and an existing 250-millimetre diameter watermain along Rangeview Road. Two interim conditions have been proposed to provide flexibility for phasing.

The sanitary servicing will connect to the future subtrunk sewer along Lakeshore Road East. A downstream sanitary capacity analysis has been completed to analyze the sewers during the Ultimate Servicing Plan. Upgrades will be required for the existing sewers along Rangeview Road. The proposed interim sanitary solution will provide flexibility for phasing and reduce the "throw away" cost.

Stormwater quantity control is proposed for the development parcels where sites are to be controlled to the 10-year event. The right-of-way minor system is designed to convey the 10-year event, while full capture locations are proposed at grading low-points. Quality controls will be provided within each development parcel to meet the enhanced level of treatment. For the public right-of-way, a tree pit filtration/infiltration strategy will be proposed with an end of pipe oil/grit separators (OGS) to achieve 80% total suspended solids (TSS) removal. The proposed interim sanitary solution with the non-participating lands has been designed such that it functions for the final development of all parcels. The 5-millimetre volumetric control will be provided through the proposed tree pits via filtration.

Figure 48 - Servicing Plan



Legend

- Rangeview Estates
- Proposed Storm Sewer
- Proposed Watermain
- Proposed Sanitary Sewer
- * Only Required to Support Road Construction

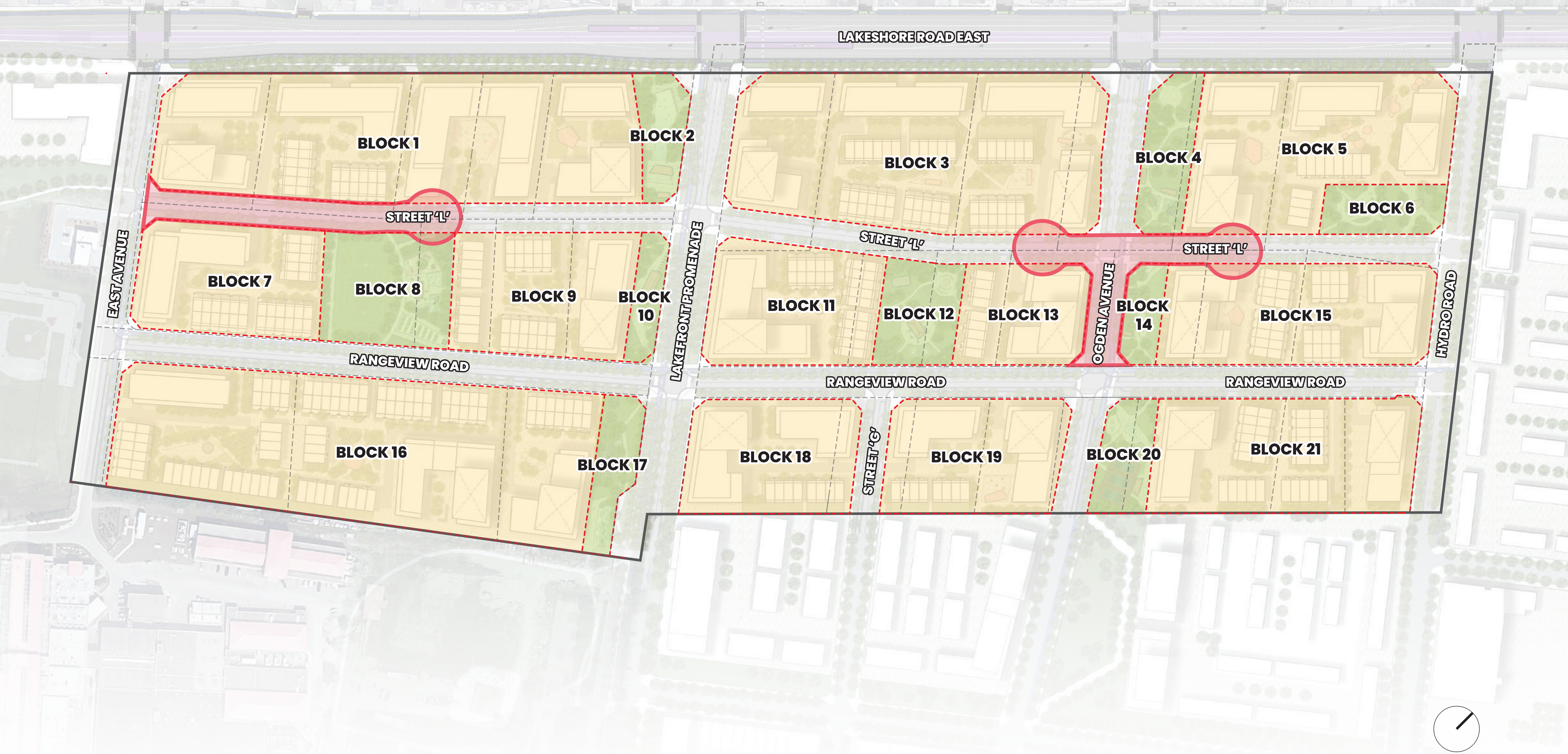
Not to Scale

6

Phasing

As Rangeview Estates is comprised of several landowners, the phasing has been designed to allow each existing parcel to develop independently and at a different time from other adjacent parcels. This is particularly important in establishing a functional road network and, accordingly, the Rangeview DMP proposes an interim phase that will establish a partial road network providing each landowner with interim access to its property so it can develop without affecting an adjacent parcel: this approach is particularly important for those parcels that are mid-block along Lakeshore Road East. The interim phase includes a partially built Street 'L', extending from East Avenue and terminating in a temporary cul-de-sac centrally located between Lakefront Promenade and East Avenue. A partially built Ogden Avenue, north of Rangeview Road, will be introduced, also terminating in terminating temporary cul-de-sacs that will eventually be extended as Street 'L' between Lakefront Promenade and Hydro Road. When an individual parcel plans to develop, the public road and, or parkland associated with that parcel – as defined in this DMP – will be conveyed to the City of Mississauga in order to ensure that the overall vision demonstrated within Rangeview DMP can be achieved.

Figure 49 - Phase 1 - Interim Public Road Condition

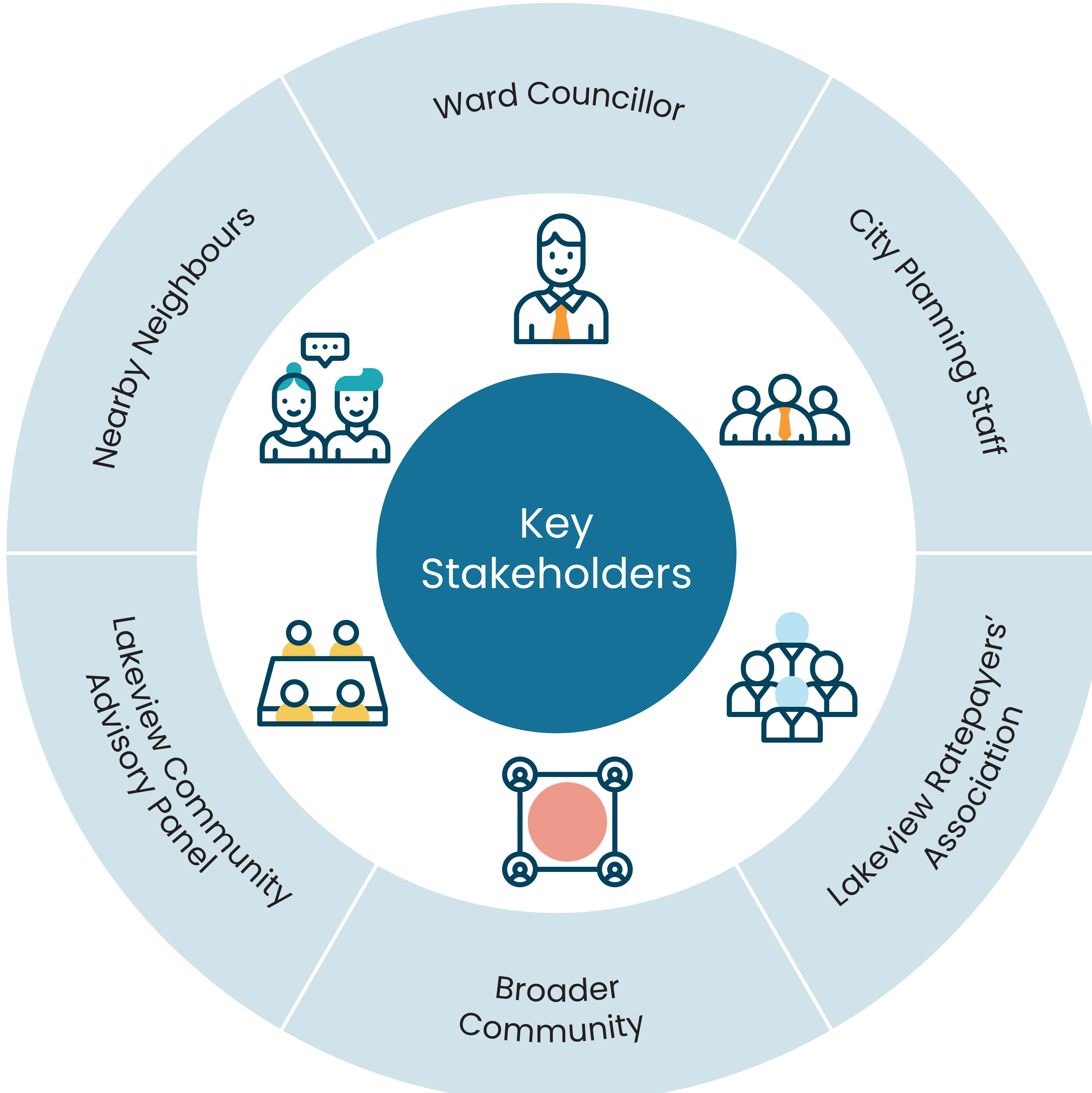


Legend

Rangeview Estates | Phase 1 - Interim Public Road | Existing Parcel Lines | Proposed Parcel Lines

7 Engagement Strategy

The Rangeview LOG is committed to working with the community throughout the planning process of the Rangeview DMP. To date, the primary objective has been to inform interested members of the community about the master plan, as well as understanding preliminary feedback. In advance of the DMP submission, communication has taken place with the Ward Councillor, City staff, board members from the Lakeview Ratepayers' Association and other members of the broader Lakeview community. The Rangeview LOG's intention is to continue to engage and remain accessible to those who are interested in the proposal.


Ward Councillor
City Planning Staff
Lakeview Ratepayers' Association
Broader Community
Lakeview Community Advisory Panel
Nearby Neighbours
Key Stakeholders

7.1 Pre-application Consultation

Community Meetings

Two meetings with a group of interested community members were held in December 2021. These meetings were an opportunity for participants to view preliminary drafts of the Rangeview DMP, ask questions and offer their insights. A summary of the meetings and the feedback therein is provided below.

Meeting #1
December 2, 2021

27 members of the community attended the event, including Councillor Dasko, several board members from the Lakeview Ratepayers Association and Lakeview Advisory Panel, local residents, and local business owners. Following an overview presentation by the consulting team, participants asked questions, contributed ideas, expressed their concerns, and demonstrated an interest in future engagement and sharing key learnings from past studies conducted as part of the Inspiration Lakeview planning process.

Meeting #2
December 20, 2021

A meeting was held to discuss the Lakeshore East Corridor Study, Lakeview Legacy Project and Inspiration Lakeview Master Plan, with a smaller number of participants than the first meeting. The consulting team was given an overview of the findings from these prior initiatives, and a discussion ensued on how particular tenets of the Lakeview plan could be implemented in a future iteration of the Rangeview Estates DMP.

Summary of Feedback

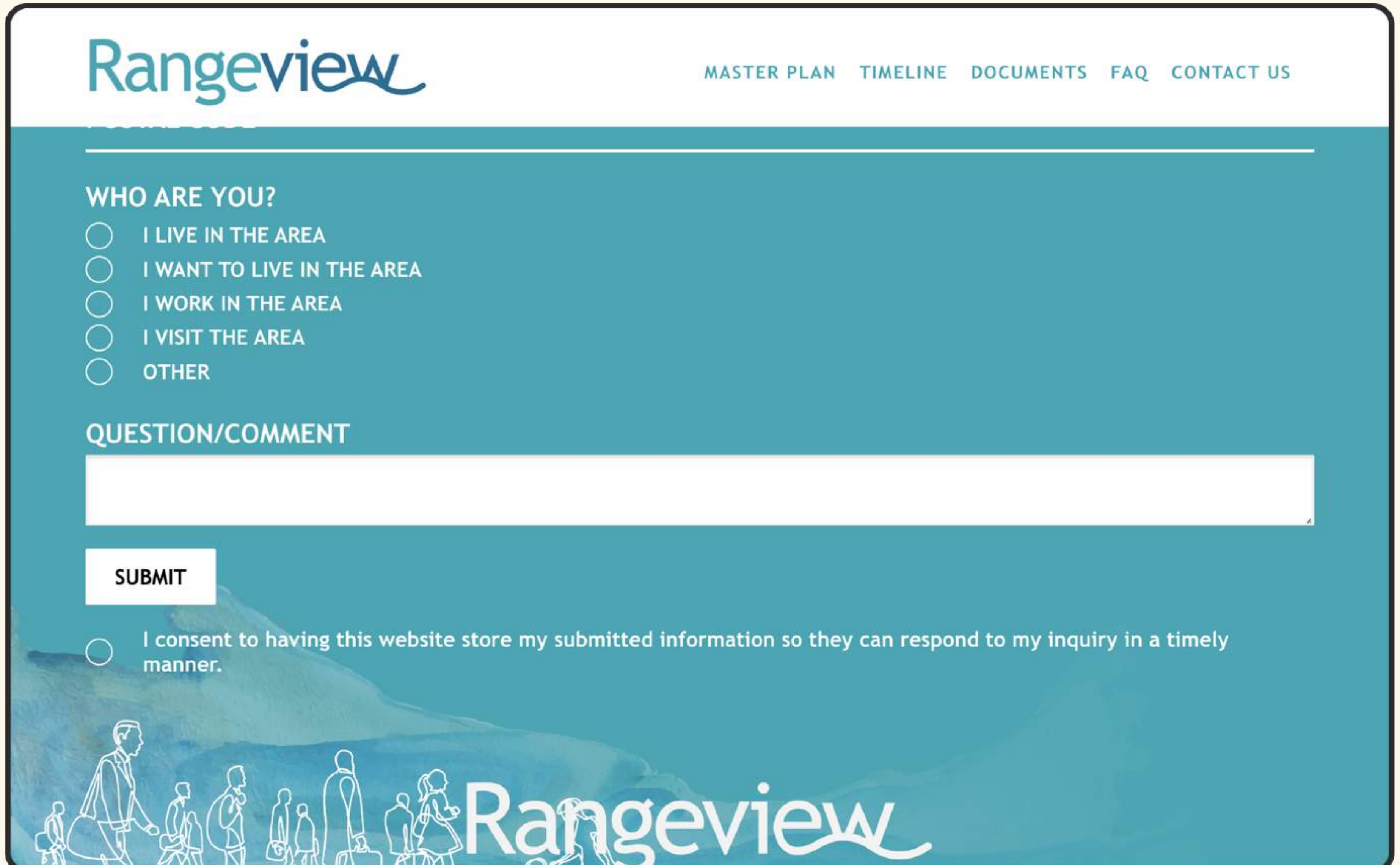
In addition to the above meetings with interested community members, the Rangeview LOG has also engaged in a number of discussions with the proponents of the Lakeview Village Development.

Summary of Topics & Questions

- Built form
- Density and building height
- Location of the residential towers
- Landowners Group and property ownership

Summary of Comments

- A need to keep Rangeview unique, but also integrated with Lakeview Village
- Desire to make Rangeview a walkable, green, public space, which is attractive to visitors
- Avoiding congestion and planning for active transportation
- Maintaining Rangeview as a mixed-use, accessible and affordable place for existing residents and visitors
- Support engagement with the community and the city
- Desire a mix of retail/commercial spaces on a main street
- Suggestions for built form and open spaces
- Support for pedestrianized/low-traffic streets
- Desire to maintain heritage, cultural landscapes and gateway landmarks



This Image is for Illustration purposes only.

7.2 Project Website

The Rangeview LOG and consultant team is in the process of creating a dedicated community engagement website, www.PlanRangeview.com, which will be launched in the near future. The purpose of the website is to provide information on the Rangeview DMP, including renderings and statistics, as well as information on project processes and upcoming consultation opportunities.

A 'contact us' webform will be linked to the e-mail address, info@PlanRangeview.com. Through this tool, the consultant team will be able to respond to inquiries from the community on an ongoing basis.

7.3 Next Steps for Engagement

The Rangeview LOG and their consultant team would like to continue discussions with the community, the City and the Councillor as part of the overall planning process for Rangeview Estates. The website will serve as a key tool given that it will be updated with information on upcoming engagement opportunities.

Throughout the public consultation process for this proposal, information collected from various communications and meetings will be summarized to reveal recurring topics, which can be used to inform future iterations of the Rangeview DMP.

8

Sustainability Strategy

A Sustainability Strategy has been prepared by Urban Equation in response to the City of Mississauga's Terms of Reference for Sustainability Strategy and aligns with local policies such as "Our Future Mississauga" and the "Climate Change Action Plan". The Sustainability Strategy uses the ten principles of the One Planet Living (OPL) Framework - refer to **Figure 51** - to organize sustainability goals, performance measures, and strategies for development. Rangeview Estates will showcase exceptional design quality that will embrace holistic sustainability by addressing healthy environmental, social and economic practices. It will contribute to achieving local climate action ambition in Mississauga and respond to relevant sustainability policy. Key initiatives outlined in the Sustainability Strategy include:

- Car dependency reduction,
- Access to transit,
- Increased walkability and bikeability,
- Water friendly landscaping,
- The use of recycled/reclaimed materials,
- Reduced light pollution,
- Reduced heat island effect,
- Access to parks and open spaces,
- Mix of housing types and sized, and
- Affordable housing.

The detailed Sustainability Strategy report can be found in **Appendix C** of this DMP document.

Health and happiness	Encouraging active, social, meaningful lives to promote good health and wellbeing
Equity and local economy	Creating safe, equitable places to live and work which support local prosperity and international fair trade
Culture and community	Nurturing local identity and heritage, empowering communities and promoting a culture of sustainable living
Land and nature	Protecting and restoring land for the benefit of people and wildlife
Sustainable water	Using water efficiently, protecting local water resources and reducing flooding and drought
Local and sustainable food	Promoting sustainable humane farming and healthy diets high in local, seasonal organic food and vegetable protein
Travel and transport	Reducing the need to travel, encouraging walking, cycling and low carbon transport
Materials and products	Using materials from sustainable sources and promoting products which help people reduce consumption.
Zero waste	Reducing consumption, re-using and recycling to achieve zero waste and zero pollution
Zero carbon energy	Making buildings and manufacturing energy efficient and supplying all energy with renewables

Figure 50 - The One Planet Living Framework

9

Conclusion

The Rangeview Development Master Plan provides urban design direction and guidance that implement the intended vision for the precinct as a vibrant, liveable and complete residential neighbourhood – serving as a gateway for the entire Lakeview Waterfront Major Node from Lakeshore Road East to the shores of Lake Ontario. Rangeview Estates is envisioned as a predominantly mid-rise community – with a mix of low and high-density residential uses and retail and other non-residential uses at strategic locations. A variety of parks and open spaces are proposed throughout Rangeview Estates in order to provide opportunities for both passive and active recreation, and to facilitate pedestrian connectivity from Lakeshore Road East south to Lake Ontario. Overall, Rangeview Estates will provide its own unique and identifiable character within the Lakeview Waterfront Major Node area, while continuing to embody the vision, principles and framework outlined in the Inspiration Lakeview Master Plan, the Mississauga Official Plan and Lakeview Village Development Master Plan to create a cohesive community.

A

Appendix:
Urban Transportation Considerations Report

RANGEVIEW ESTATES

Urban Transportation Considerations
City of Mississauga
Official Plan Amendment (OPA)

Prepared For: Rangeview Landowners Group Inc.

November 2022

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TABLE OF CONTENTS

TABLE OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

1.0 EXECUTIVE SUMMARY

Introduction & Background

BA Group was retained by the Rangeview Landowners Group to provide transportation consulting services related to a proposed mixed-use development on a site known as Rangeview Estates (herein referred to as “the Site” and “Rangeview”), in the City of Mississauga. The Site is generally bounded by East Avenue to the west, Lakeshore Road East to the north, Hydro Road to the east and the land parcels located beyond the south side of Rangeview Road. Rangeview Landowners Group Incorporated (LOG) currently represents 9 landholders within Rangeview Estates. The LOG currently owns 21/33 (64%) privately held properties within Rangeview.

This Transportation Considerations Report was prepared as part of the **Development Master Plan (DMP)** and the **Official Plan Amendment (OPA),** application being submitted to the City of Mississauga.

Official Plan Amendment (OPA) 89 to the Mississauga Official Plan was enacted and passed on July 4, 2018. The purpose of OPA 89 was to add a new Major Node Character Area to the OP, the Lakeview Waterfront Major Node, and update land use designations to include residential development. Within OPA 89, the Site is located within the Lakeview Waterfront Major Node with the Rangeview lands being permitted to develop 3,700 residential dwelling units. The Lakeview Waterfront Major Node Character Area will be designed to encourage multi-modal transportation with an emphasis on transit and active transportation. The Lakeview Waterfront Major Node Character Area, the lands adjacent to Lakeshore Road East, including Rangeview, will become part of a higher-order transit corridor and transit-oriented community.

Official Plan Amendment (OPA) 125 to the Mississauga Official Plan was passed on November 10, 2021. The purpose of OPA 125 was to revise policies pertaining to the Lakeview Waterfront Major Node Character Area that reflect planning associated with the lands south and east of the Site. OPA 125 included a revised block structure and a revised planned road network, including a southward extension of Ogden Avenue across Rangeview. With the approval of OPA 125, Rangeview continues to be permitted to develop 3,700 residential dwelling units, while Lakeview Village is permitted to develop 8,050 residential units.

Proposed Development

The Site is currently occupied by a mix of commercial, industrial, retail and services with vehicle access provided through Lakeshore Road East, Rangeview Road, East Avenue, Lakefront Promenade and Hydro Road. The proposed development concept for Rangeview includes consideration for up to 5,300 residential units, as well as a total of 95,000 ft^2 GFA of retail and office uses. The detailed traffic analysis for this study also considered the travel demands of the adjacent lands to the south and east, inclusive of Lakeview Village (8,050 residential units, along with up to 2.1 million ft^2 GFA of non-residential uses) and Serson (449,000 ft^2 GFA of non-residential uses).

Area Street Network

The Site is directly adjacent to Lakeshore Road East (arterial road) with convenient road connections across the City, Peel Region and the Greater Toronto Area (GTA). The public street network surrounding Rangeview includes a hierarchy of road connections that range from arterial roads to local roads and is located just over 2.0 kilometres from the Queen Elizabeth Way (QEW).

The approval of the Lakeview Village development has resulted in planned changes to the local street network that align with the future road network within OPA 125. As part of Rangeview, additional components of the OPA 125 road network are being proposed. The proposed Rangeview road network considers active transportation, ease of access & connectivity for all travel modes, Complete Streets and conformity with the planned Lakeview Village road network. The Rangeview proposal includes functional plans and cross-sections for the planned road network, inclusive of East Avenue, Lakefront Promenade, Street F (extension of Ogden Avenue from Lakeshore Road East to the property line, just south of Rangeview Road), Hydro Road, Street L, Rangeview Road and Street G.

Area Transit Network

The Site's northern boundary is adjacent to the two MiWay surface transit routes, which provide direct connections to area destinations including Dixie Outlet Mall, Port Credit and Long Branch GO stations. With a transfer at the Long Branch GO Station, the Site is connected to GO Transit (Lakeshore West Line) and TTC bus / streetcar service in the east. The plans for a dedicated Bus Rapid Transit (BRT) service along Lakeshore Road East (adjacent to Rangeview), from East Avenue to Etobicoke Creek, are well underway with a current completion date of 2027.

Area Cycling Network

The existing cycling network within 500 metres of the Site area consists of multi-use trails, park trails, and signed bike routes along all sides of the Site perimeter. These cycling connections provide convenient travel opportunities for residents, employees and visitors of the surrounding area, specifically to travel using non-automobile means. The Lakeshore Connecting Communities Transportation Master Plan (TMP), proposes to incorporate uni-directional, off-road cycling facilities in each boulevard along the Lakeshore Road East corridor. Within OPA 125, as part of the planned street network, a series of "Primary Off-Road Routes" and "Primary On-Road / Boulevard Routes" are included primarily within Lakeview Village. The proposed Rangeview street network includes cycling facilities that provide connectivity to the Lakeview Village cycling facilities, as well as to Lakeshore Road East, for travel beyond the Site.

Area Pedestrian Network

The Site is within 500 metres of numerous parks, various restaurants and services, along the Lakeshore Road corridor that can be reached by walking as Lakeshore Road East includes sidewalks on both sides of the road. The Rangeview proposal includes a planned street network with a high quality urban pedestrian environment with wide sidewalks on most of the proposed streets and pedestrian mews areas to generate pedestrian activity. The proposal for a new traffic signal on Lakeshore Road East at Hydro Road, will provide additional protected crossing opportunities for pedestrians. The pedestrian network proposed for Rangeview will connect to the Lakeview Village pedestrian network, with connectivity to Lake Ontario and beyond.

Transportation Demand Management (TDM)

The TDM strategies incorporated into the development proposal will encourage people to take fewer and shorter vehicle trips in order to support transit and active transportation, as well as enhance public health and reduce harmful environmental impacts. TDM measures have been incorporated into the design and future operations of the proposed Site to include strategies such as the development of a community with a range of land uses with connectivity provided for active modes of travel, convenient connections to transit, cycling facilities & bike repair stations, on-site car/ bike/ scooter sharing facilities and a reduced parking supply for residents and visitors

Potential for a New GO Station

As a result of the advancement of GO Transit in the Greater Toronto & Hamilton Area, there is potential to improve GO Transit in the vicinity of the Site with the addition of a new GO Station. Based on the proximity to local multi-modal connections and distance to nearby existing GO Stations on the Lakeshore West Line (approximately 2.5 km from Port Credit GO Station and approximately 2.5 km from Long Branch GO Station), a potential location for a new station would be east of Cawthra Road and north of Lakeshore Road East.

The relevance of a potential Cawthra GO Station for this study is that it would greatly enhance the multi-modal transportation options available to future residents and visitors to both Rangeview and Lakeview Village. It is important to note however that the traffic analysis undertaken for this report confirms that the future transportation network, even **without** a new GO Station in the area, can acceptably accommodate the expected travel demands of the Rangeview Site with 5,300 residential units, along with the travel demand generated by Lakeview Village and Serson.

Travel Demand & Traffic Analysis

To develop the traffic analysis scenarios for this study, a number of development thresholds were tested for Rangeview to better understand the traffic-related impacts on the overall area road network. As summarized in Table 1**,** each scenario considered the total number of residential units for both Rangeview and Lakeview Village, the total non-residential GFA for Rangeview and Lakeview Village, and the road network and intersection improvements that would be in place at the time of development.

TABLE 1 TRAFFIC ANALYSIS SCENARIOS

Development	Scenario 1 (2031): No Ogden No Haig (with road improvements)[1]	Scenario 2 (2041): Phase 1 + Ogden connected to Lakeshore Road	Scenario 3A (2041): Phase 2 + Haig connected to Lakeshore Road	Scenario 3B (2041): Phase 2 + Dual NBL turns at Lakefront Promenade / Lakeshore Road (Haig not connected)
Rangeview	2,500 units + 0% non-residential	3,700 units + 100% non-residential	5,300 units + 100% non-residential	5,300 units + 100% non-residential
Lakeview Village	7,500 units + 1.0M ft^2 non-residential	8,050 units + 1.5M ft^2 non-residential	8,050 units + 1.5M ft^2 non-residential	8,050 units + 1.5M ft^2 non-residential
Serson	0%	0%	100%	0%
Total	**10,000 units**	**11,750 units**	**13,350 units**	**13,350 units**

The traffic analysis for this study considered two long-term horizons (2031 and 2041) and generally aligns with the methodology of The Municipal Infrastructure Group's (TMIG) April 2021 Traffic Considerations Report Addendum ("the 2021 April TMIG report") completed for Lakeview Village. As part of the travel demand assessment for the BA Group report, the future travel mode share applied to Rangeview considered that with the implementation of BRT along Lakeshore Road East, the auto driver mode share is expected to decrease from the existing 60% (AM peak)/ 61% (PM peak) to a future 50%, during both peak periods of the day. BA Group adjusted the travel mode shares used in the April 2021 TMIG report to include a future 2% cyclist travel mode share.

To determine the background traffic volumes for this study, traffic volume layers, inclusive of site traffic volumes and background traffic volumes, were taken from the April 2021 TMIG Report. Traffic volume layers were then created for both the Rangeview and Lakeview Village sites that could be added to the future background layers. A key component of the background travel demand assessment included a corridor reduction exercise that estimated how the planned BRT along Lakeshore Road could be expected to reduce traffic volumes.

Scenario 1: Rangeview with 2,500 units

In consideration of Rangeview with 2,500 residential units and Lakeview Village with 7,500 residential units + 67% development of the non-residential, the combined sites are expected to generate a total of 2,890 and 3,054 two-way vehicle trips, during the morning and afternoon peak period, respectively. The Scenario 1 road network includes only the list of minor road improvements to be undertaken along Lakeshore Road.

All signalized intersection movements within the study area are expected to operate at v/c equal to, or less than 1.0. All unsignalized intersection movements within the study area are expected to operate at v/c equal to, or less than 1.0, with the exception of the southbound left/through/right movement at Lakefront Promenade & Rangeview Road and the southbound through/right movement, during the afternoon peak hour. As the concerns noted at the unsignalized intersections occur as part of the interim road network condition, it is expected that when Ogden Avenue is connected, and the road network is built-out as development progresses, operations at the unsignalized intersections noted above would improve.

Based on the foregoing, the traffic related to the Scenario 1 development proposal can be acceptably accommodated on the future transportation network.

Scenario 2: Rangeview with 3,700 units + Ogden connected

In consideration of Rangeview with 3,700 residential units + 100% development of the non-residential and Lakeview Village with 8,050 residential units + 100% development of the non-residential, the combined sites are expected to generate a total of 3,841 and 4,229 two-way vehicle trips during the morning and afternoon peak period, respectively. The Scenario 2 road network includes the improvements along Lakeshore Road related to Scenario 1, in addition to the connection of Ogden Avenue to Lakeshore Road.

All signalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0. All unsignalized intersection movements within the study area are expected to operate at v/c equal, to or less than 1.0, with the exception of the northbound left/through/right movement operates at Ogden Avenue & Street L and the northbound left/through/right movement, during the morning and afternoon peak hour. It is recommended that these unsignalized intersections be assessed in the future when updated traffic volume data is available, in order to determine if traffic signals are warranted or if two-way stop control could be implemented, in combination with a controlled pedestrian crossing (i.e. intersection pedestrian signal or pedestrian crossover) on the major street.

Based on the foregoing, the traffic related to the Scenario 2 development proposal can be acceptably accommodated on the future transportation network.

Scenario 3A: Rangeview with 5,300 units + Ogden + Haig

In consideration of Rangeview with 5,300 residential units + 100% development of the non-residential and Lakeview Village with 8,050 residential units + 100% development of the non-residential and 100% of the Serson lands developed, the combined sites are expected to generate a total of 4,337 and 4,739 two-way vehicle trips, during the morning and afternoon peak period, respectively. The Scenario 3A road network includes the improvements along Lakeshore Road related to Scenario 1, in addition to the connection of Ogden Avenue to Lakeshore Road and the connection of Haig Boulevard to Lakeshore Road.

All signalized intersection movements within the study area are expected to operate at v/c equal to, or less than 1.0, with the exception of the southbound right-turn movement at Dixie Road & Lakeshore Road and the northbound through/left movement at Lakeshore Road & Haig Boulevard, during the afternoon peak hour. In a busy urban environment, it is typical that particular movements will operate at, or slightly over capacity, during the peak periods of the day. It is also likely that traffic will divert and rebalance in the future as traffic patterns evolve. Minor improvements on the north leg of Haig Boulevard at Lakeshore Road could also improve traffic operations, hence this location should be monitored in the future as development progresses. It is however important to note that as no Rangeview-related volumes have been assigned to the intersection of Lakeshore Road & Haig Boulevard, the traffic concerns at this intersection are related only to the traffic generated by

Lakeview Village and Serson. All unsignalized intersection movements within the study area are expected to operate at v/c equal to, or less than 1.0.

Based on the foregoing, the traffic related to the Scenario 3A development proposal can be acceptably accommodated on the future transportation network.

Scenario 3B: Rangeview with 5,300 units + Ogden + Northbound Dual Left-Turn (no Haig)

In consideration of Rangeview with 5,300 residential units + 100% development of the non-residential and Lakeview Village with 8,050 residential units + 100% development of the non-residential, the combined sites are expected to generate a total of 4,138 and 4,517 two-way vehicle trips, during the morning and afternoon peak period, respectively. The Scenario 3B road network includes the improvements along Lakeshore Road related to Scenario 1, in addition to the connection of Ogden Avenue to Lakeshore Road, and the northbound dual left-turn implemented on Lakeshore Road at Lakefront Promenade. The connection of Haig Boulevard to Lakeshore Road is not included as part of Scenario 3B.

All signalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0, with the exception of the southbound right-turn movement at Dixie Road and Lakeshore Road, during the afternoon peak hour. In a busy urban environment, it is typical that particular movements will operate at, or slightly over capacity, during the peak periods of the day. It is also likely that traffic will divert and rebalance in the future as traffic patterns evolve. All unsignalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0, with the exception of a number of intersections along Street L, as well as at Ogden Avenue & Rangeview Road and at Hydro Road & Rangeview Road. It is recommended that these intersections be assessed in the future when updated traffic volume data is available, in order to determine if traffic signals are warranted or if two-way stop control could be implemented with a controlled pedestrian crossing on the major street.

Based on the foregoing, the traffic related to the Scenario 3B development proposal can be acceptably accommodated on the future transportation network.

Conclusions

The traffic analysis indicated that the future transportation network, with BRT along Lakeshore Road East, can acceptably accommodate the travel demands of the Rangeview Site with 5,300 residential units and 95,000 ft^2 GFA of non-residential uses, if the road network includes the planned upgrades along Lakeshore Road, in addition to the extension of Ogden Road from Lakeshore Road East to Rangeview Road, and **either** the connection of Haig Boulevard to Lakeshore Road East **or** a dual northbound left-turn on Lakefront Promenade at Lakeshore Road East.

2.0 INTRODUCTION

BA Group has been retained by the Rangeview Landowners Group to provide transportation consulting services related to a proposed mixed-use development on a site known as Rangeview Estates (herein referred to as “the Site” and “Rangeview”), in the City of Mississauga. The Site is generally bounded by East Avenue to the west, Lakeshore Road East to the north, Hydro Road to the east and the land parcels located beyond the south side of Rangeview Road. All land parcels on the south side of Rangeview Road that have frontage on Rangeview Road are included as part of the Site.

Rangeview Landowners Group Incorporated (LOG) currently represents 9 landholders within Rangeview Estates. The LOG currently owns 21/33 (64%) privately held properties within Rangeview. The LOG ownership map is provided in **Appendix A**.

This Transportation Considerations Report has been prepared as part of the **Development Master Plan (DMP)** and the **Official Plan Amendment (OPA),** application being submitted to the City of Mississauga.

The location of the Site is illustrated in **Figure 1.**

2.1 EXISTING SITE CONTEXT

The Site is currently occupied by a mix of commercial, industrial, retail and services with vehicle access provided through Lakeshore Road East, Rangeview Road, East Avenue, Lakefront Promenade and Hydro Road.

The existing context of the Site is illustrated in **Figure 2**.

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Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographies, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 1 SITE LOCATION

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Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographies, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 2 SITE CONTEXT

2.2 PROPOSED DEVELOPMENT CONCEPT

The proposed development concept includes the following key elements:

- Redevelopment of the Site as a mixed-use area that includes residential and commercial uses.

- The implementation of a road network that facilitates multi-modal connectivity and advances place-making initiatives.

- Redevelopment that is consistent, congruent and supportive of the ongoing Lakeview Village development that is to occur directly south of the Site, given that many of the proposed road network connections are mutually beneficial to both redevelopment proposals.

- As per Official Plan Amendment 89 (OPA 89) to the City of Mississauga Official Plan, the Site is permitted to develop 3,700 residential dwelling units. As part of this application, it is proposed to increase the development allowance on the Site to 5,300 residential dwelling units.

- Consideration for a recommendation that Metrolinx evaluate the potential to introduce a Cawthra Road GO Station along the Lakeshore West GO Train Line, to further facilitate higher order transit access for the Site, as well as the Lakeview Village development.

The Master Plan development concept proposed for Rangeview is illustrated in **Figure 3**. Since the development proposals for the combined lands south of Lakeshore Road, inclusive of Rangeview, Lakeview Village and Serson, were considered as part of the detailed traffic analysis for this study, **Table 2** includes a development summary for the combined lands. It is important to note however that this application only relates to the approvals related to Rangeview at this time. Reduced scale architectural plans of the Rangeview development proposal are included in **Appendix B**.

TABLE 2 PROPOSED DEVELOPMENT CONCEPT (COMBINED LANDS)

Land Use	Proposed Statistics
Rangeview	
Residential	3,700 to 5,300 units
Retail & Office	95,000 ft^2
Adjacent Lands	
Lakeview Village	
Residential	8,050 units
Retail, Office, Research & Development, School & Daycare, Hotel, Community Centre (GFA)	2.1 million ft^2
Serson	
General Office/ Research & Development Centre (GFA)	449,000 ft^2

Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographies, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

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FIGURE 3 RANGEVIEW MASTER PLAN DEVELOPMENT CONCEPT

2.3 STUDY SCOPE

The study will be completed in accordance with the City of Mississauga's Traffic Impact Study Guidelines.

A summary of BA Group's review of the urban transportation elements of the development proposal includes the following:

- Review of the relevant transportation planning and policy context;
- Review of the area transportation context;
- Transportation Demand Management (TDM) strategy, inclusive of a vehicle parking strategy;
- Preliminary assessment of the viability of a Cawthra Road GO Station;
- Proposed road network & right-of-ways (ROW);
- Confirmation of the multi-modal travel demand expected to be generated by the combined site; and
- Comprehensive traffic analysis of four different development scenarios.

3.0 TRANSPORTATION PLANNING & POLICY CONTEXT

Public policy with respect to mobility and development planning has changed over recent years with sustainable growth at the forefront of many policy initiatives. Provincial and municipal-wide directives set a planning framework that increasingly aims to mitigate and reduce vehicle traffic through the promotion and facilitation of non-auto trips and the improvement of public transit access and active modes of travel. Greater priority is now being placed on the movement and experience of people, as opposed to vehicle traffic and auto use.

Common themes across provincial and municipal policies and guidelines include:

Planning transit from a network perspective

Public transit is being transformed to achieve an interconnected network of high-order public transit service. Planning and funding efforts are being undertaken by all levels of government to achieve this vision.

Designing streets and public realm for people

While the efficient movement of automobiles has previously been the focus in transportation planning, this is no longer a primary focus. The enjoyment, safety and efficiency of pedestrians has become the primary focus of mobility planning at the regional and municipal levels.

Connecting and expanding cycling infrastructure

The City of Mississauga (and Peel Region) is focusing efforts on expanding their active transportation network. Plans are comprised of a primary network of multi-use trails and a secondary network of shorter local neighbourhood connections that create a continuous network of recreational facilities throughout the City.

Increasing multi-modal mobility options

In addition to public transit and active transportation, shared mobility options such as car-sharing, bike-sharing and ride-sharing, are becoming increasingly common in other parts of the GTA and help reduce the need for individuals to own a private vehicle. These services allow individuals to conveniently and affordably have access to a private vehicle when needed.

Reducing automobile reliance

Regional and municipal policies (Official Plans, Transportation Master Plans, etc.) are placing emphasis on mixed-use developments centered around transit in order to promote non-auto based travel. Transportation Demand Management strategies within new developments also facilitate the efficiency of existing and planned transportation infrastructure.

3.1 PROVINCIAL PLANNING

The **Growth Plan for the Greater Golden Horseshoe (2020)** outlines the importance of supporting the achievement of complete communities through a more compact built form, designed to provide a mix of uses to meet people's daily needs, facilitating aging in place, reducing automobile reliance and promoting non-auto modes. Planning for growth and optimizing infrastructure along transit and transportation corridors, adopting minimum density targets and reduced parking standards in major station areas, and integrating active transportation within the existing and planned street network are priorities.

The **2020 Provincial Policy Statement** encourages the provision of Transportation Demand Management strategies within new developments to increase the efficiency of existing and planned transportation infrastructure. It also encourages transit-oriented development and higher density that adopts a mix of uses to promote non-auto based travel.

The **Metrolinx 2041 Regional Transportation Master Plan** supports intensification in accordance with sustainable transportation objectives. Additional rapid transit options, greater pedestrian connections, and mixed-use density should be considered for the City of Toronto and the surrounding region, including the City of Mississauga.

The **Connecting the GGH: A Transportation Plan for the Greater Golden Horseshoe** (February 2022) provides a 30-year vision (i.e. to 2051) to building a more sustainable and resilient transportation system in the Greater Golden Horseshoe (GGH) to enable transit-oriented communities. Planned rapid transit infrastructure expansion is included and outlined in greater detail in **Section 4.2.2**.

3.2 REGIONAL PLANNING

The **Region of Peel Official Plan (OP)** promotes sustainable forms of transportation through Regional Intensification Corridors, which in turn support sustainable development through efficient use of land, densities supportive of transit and pedestrian mobility, and complete urban communities containing living, working and recreational opportunities. Regional Intensification Corridors are characterized by Urban Growth Centres linked by public transit, high intensity, compact urban form with an appropriate mix of uses, transit-supportive and pedestrian-oriented urban forms, and opportunities for higher order transit.

The **Peel Region Sustainable Transportation Strategy (STS)**, approved by Peel Region Council in February 2018, is a framework outlining policies, programs and infrastructure in order to enable and grow the sustainable transportation modes in Peel Region. Most notably, the STS sets a goal for 50% of the morning peak period trips in the Region to be made by sustainable transportation modes by 2041, up from the current 37% sustainable mode share. The STS identifies sustainable transportation modes as trips made by walking, cycling, transit, and carpool as well as trips avoided through teleworking.

Over fifty actions items are identified in the STS, consisting of both short-term and long-term recommendations. The short-term priorities of the STS are supported by two accompanying five-year implementation plans, the 2018-2022 Active Transportation Implementation Plan (ATIP) and the 2018-2022 Transportation Demand Management Implementation Plans (TDMIP). Examples of short-term priorities include encouraging and supporting cycling and walking from transit hub and other community destinations as well as identifying the locations of new and upgraded walking and cycling infrastructure.

3.3 CITY OF MISSISSAUGA & LOCAL PLANNING

3.3.1.1 City of Mississauga Official Plan (OP) (Consolidated October 21, 2021):

The City of Mississauga Official Plan (OP) sets the planning policy framework to guide the future growth and development of the City. It recognizes that new growth will take place primarily through infilling and redevelopment of appropriate areas that can benefit from growth and change. A key priority identified within the OP is to support a strong public transportation system in the City and address the City's long-term sustainability. General support is also indicated for providing more opportunity for transit and active transportation choices to create a more sustainable, multi-modal city.

Major Nodes are intended to be prominent centres of mixed-use activity with a variety of employment opportunities, higher-density housing, and active transportation choices that achieve a high-quality urban environment. The Site is located within the Rangeview Estates precinct of the Lakeview Waterfront Major Node Character Area identified in the City of Mississauga OP. This designation came about through Official Plan Amendment (OPA) 89 and 125 which are discussed in further detail below.

3.3.1.2 City of Mississauga Official Plan: Official Plan Amendment (OPA) 89

Official Plan Amendment (OPA) 89 to the Mississauga Official Plan was enacted and passed on July 4, 2018 through By-law 0169-2018. The purpose of OPA 89 was to add a new Major Node Character Area to the OP, the Lakeview Waterfront Major Node, and update land use designations to include residential development. As a result of OPA 89, the Site is located within the Lakeview Waterfront Major Node and further, the Rangeview lands were permitted to include 3,700 residential dwelling units.

The Lakeview Waterfront Major Node Character Area, specifically, will be designed to encourage multi-modal transportation with an emphasis on transit and active transportation to reduce traffic delays, congestion, energy consumption, and pollution. The community will have a highly-connected network of streets and routes for active transportation to support walking and cycling. Overall, the community will design a mobility system that encourages all transportation modes and innovative parking solutions.

Furthermore, within the Lakeview Waterfront Major Node Character Area, the lands adjacent to Lakeshore Road East, including the Site, will become part of a higher-order transit corridor and transit-oriented community once the enhanced transit route planned along the Lakeshore Road East is complete.

3.3.1.3 City of Mississauga Official Plan: Official Plan Amendment (OPA) 125

Official Plan Amendment (OPA) 125 to the Mississauga Official Plan was enacted and passed on November 10, 2021 through By-law 0231-2021. The purpose of OPA 125 was to revise policies pertaining to the Lakeview Waterfront Major Node Character Area reflecting planning associated with the lands to the south and east of the Site, as outlined in **Section 3.3.2**. Key within OPA 125 was a revised block structure (see **Exhibit 1** below) and a revised planned road network (see **Exhibit 2** below), notably including a southward extension of Ogden Avenue (Street F) into the Rangeview Lands and further south).

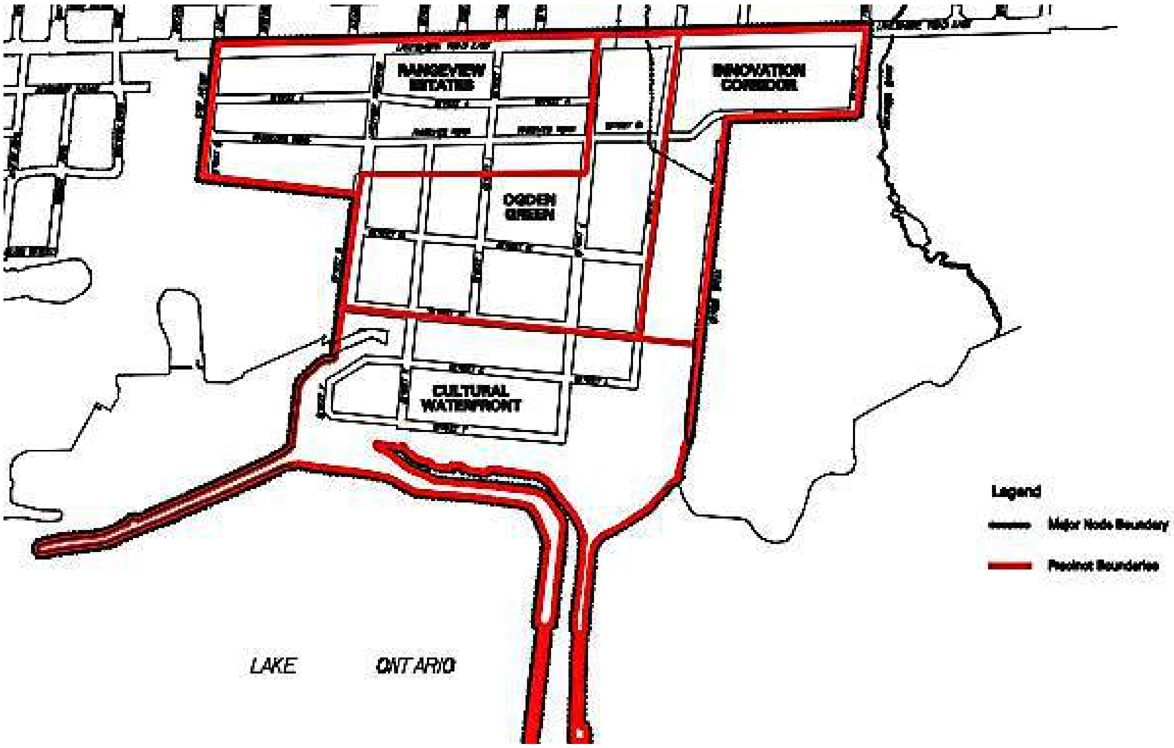


EXHIBIT 1: LAKEVIEW WATERFRONT MAJOR NODE CHARACTER AREA PRECINCTS (CITY OF MISSISSAUGA OFFICIAL PLAN: MAP 13-3-2)

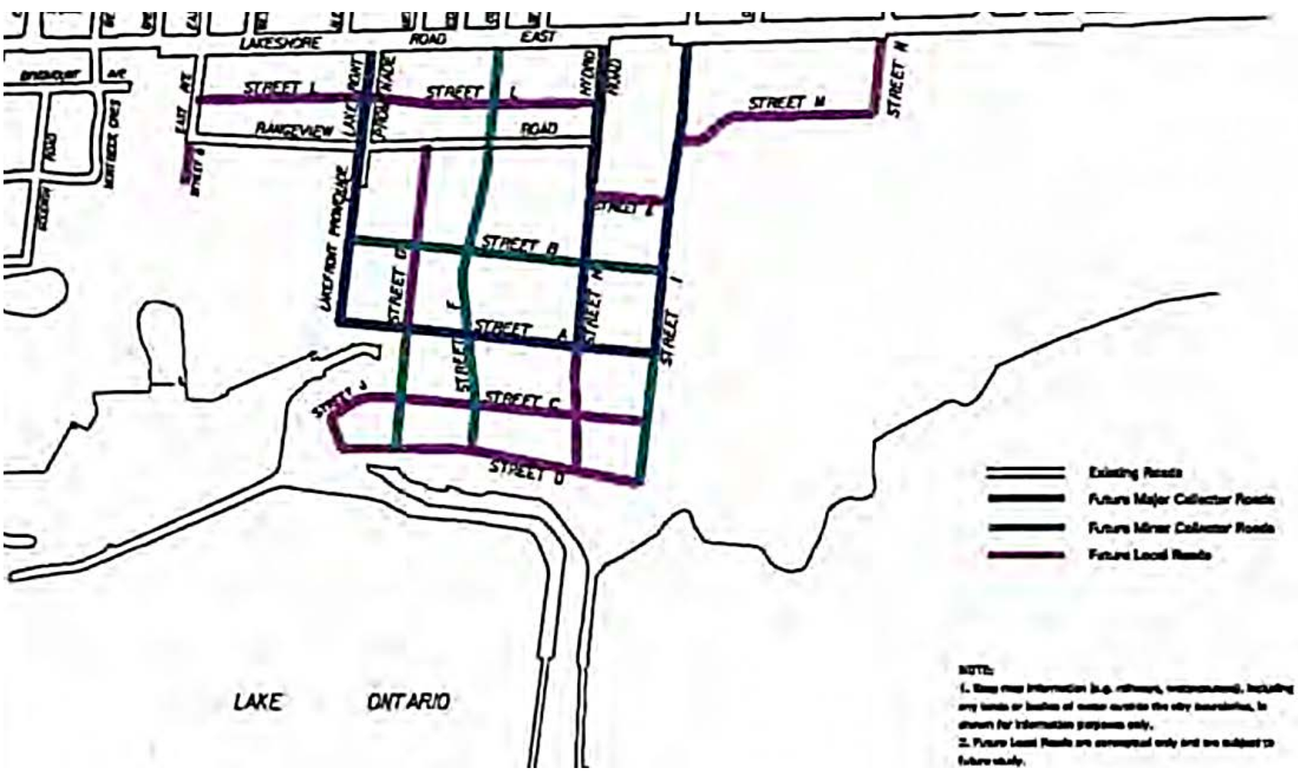


EXHIBIT 2: LAKEVIEW WATERFRONT MAJOR NODE CHARACTER AREA FUTURE ROADS (CITY OF MISSISSAUGA OFFICIAL PLAN: SECTION 13.3, FIGURE 4)

Conditions of Approval were provided within OPA 125, that pertain to the area street network and other improvements, that will be necessary to accommodate the planned development of both Lakeview Village and Rangeview, and are listed as follows:

> *42.0 The applicant/owner shall make satisfactory arrangements with the Region of Peel and City of Mississauga for mitigation measures and external road improvements as described in the Transportation Considerations Report, including all addendums as prepared by The Municipal Infrastructure Group Ltd. to support full build-out of the proposed development. The mitigation measures prior to full build-out are as follows:*
>
> *a. Construction of westbound right-turn lane at Cawthra Road and Lakeshore Road East;*
> *b. Construction of westbound right-turn lane at Dixie Road and Lakeshore Road East;*
> *c. Construction of eastbound right-turn lane at Lakefront Promenade and Lakeshore Road East;*
> *d. Northbound lanes reconfigured at Lakefront Promenade and Lakeshore Road East to include a dedicated left-turn lane and share through/right lane;*
> *e. Construction of eastbound right-turn lane at Hydro Road and Lakeshore Road East;*
> *f. Northbound lanes reconfigured at Hydro Road and Lakeshore Road East to include a dedicated left-turn lane and a shared left/through/right lane;*
> *g. Signalization of Hydro Road and Lakeshore Road East intersection, as per Lakeshore Connecting Communities BRT roll plan drawings.*
>
> *Further considerations may include:*
>
> *h. Ogden Avenue and Haig Boulevard road extensions, and the implementation of the Lakeshore Connecting Communities Bus Rapid Transit (BRT) being completed;*
> *i. Construction of eastbound right-turn lane at Haig Boulevard and Lakeshore Road East;*
> *j. Northbound lanes at Ogden Avenue and Lakeshore Road East configured to include a dedicated left-turn lane and a shared through/right lane;*
> *k. Northbound lanes at Haig Boulevard and Lakeshore Road East configured to include a dedicated left-turn lane and a shared through/right lane; and,*
> *l. Southbound lanes reconfigured at Dixie Road and Lakeshore Road East to include a dedicated right-turn lane and a shared left/through lane.*

The comprehensive traffic analysis for the proposed development (**Section 8**) of the Rangeview Lands have assumed the mitigation measures assumed within Conditions of Approval as part of future scenarios.

3.3.1.4 Lakeshore Connecting Communities Transportation Master Plan (TMP)

The Lakeshore Connecting Communities Transportation Master Plan (TMP), endorsed by City Council in June 2019, sets out a long-term vision for transit and corridor improvements along Lakeshore Road from 2020 to 2041 that will support waterfront development. The TMP envisions the Lakeshore Road corridor as an area that supports all modes of transportation, connects people to places, and moves goods to market.

Of the transit network alternatives considered in the TMP, the preferred transit solution for the 2041 horizon year is express bus / bus rapid transit (BRT) along the extent of Lakeshore Road in Mississauga; more detail is provided within **Section 4.2.2**. In addition to provisions for rapid transit, continuous separated/protected bike lanes and sidewalks on both sides of the street are planned through the extent of the route. In January 2021, it was announced that the City of Mississauga would receive federal and provincial funding for transit infrastructure through the Investing in Canada Infrastructure Program (ICIP) to fund projects including the Lakeshore BRT. At this time, completion of the Lakeshore BRT is targeted for 2027.

3.3.2 Lakeview Village

Lakeview Community Partners Limited together with the City, the Region, relevant external agencies, and the community undertook a multi-year process of creating the Lakeview Waterfront Development Master Plan, applicable to the lands (Lakeview Village) immediately south and east of Rangeview, which culminated with Council's endorsement of the Plan on November 6, 2019. Plan of subdivision (illustrated in **Exhibit 3**), rezoning and Official Plan Amendment (OPA) applications were all submitted and have since been approved; By-law 0119-2022 was passed, amending City of Mississauga Zoning By-law 0225-2007, but remains under appeal at the time of writing of this report. As described above, OPA 89 and OPA 125 include Lakeview Village.

Lakeview Village is being planned as a mixed-use development. The following development statistics have been approved to date:

- 8,050 dwelling units (inclusive of low-rise, mid-rise, and high-rise multifamily housing)
- 191 hotel rooms
- 435,856 ft^2 recreational community centre GFA
- 745,316 ft^2 office GFA
- 745,316 ft^2 research & development centre GFA
- 202,718 ft^2 retail GFA (38,793 ft^2 retail GFA is considered to be ancillary)
- 850 student capacity elementary school
- 39 child capacity day care centre

From a transportation perspective, the development of Lakeview Village is inter-related with the proposed redevelopment of the Rangeview Site. As illustrated in the Plan of Subdivision (**Exhibit 3**), much of the street network is shared between the two sites, notably including existing and planned Major and Minor Collector Roads (i.e. Lakefront Promenade, the planned Ogden Avenue extension and Hydro Road).

The planned street network for both Rangeview and Lakeview Village, will provide north-south connections to Lakeshore Road East, as well as key east-west connections across both sites. In addition to the shared road network, the existing residential development unit count permissions for Rangeview and Lakeview Village were jointly outlined in OPA 89 and updated in OPA 125, as follows:

- Rangeview (referred to as Rangeview Estates): 3,700 units
- Lakeview Village (referred to as Ogden Green, Cultural Waterfront): 8,050 units

The Lakeview Waterfront Major Node Character Area, inclusive of Rangeview and Lakeview Village, is currently permitted to include a total of 11,750 residential units.

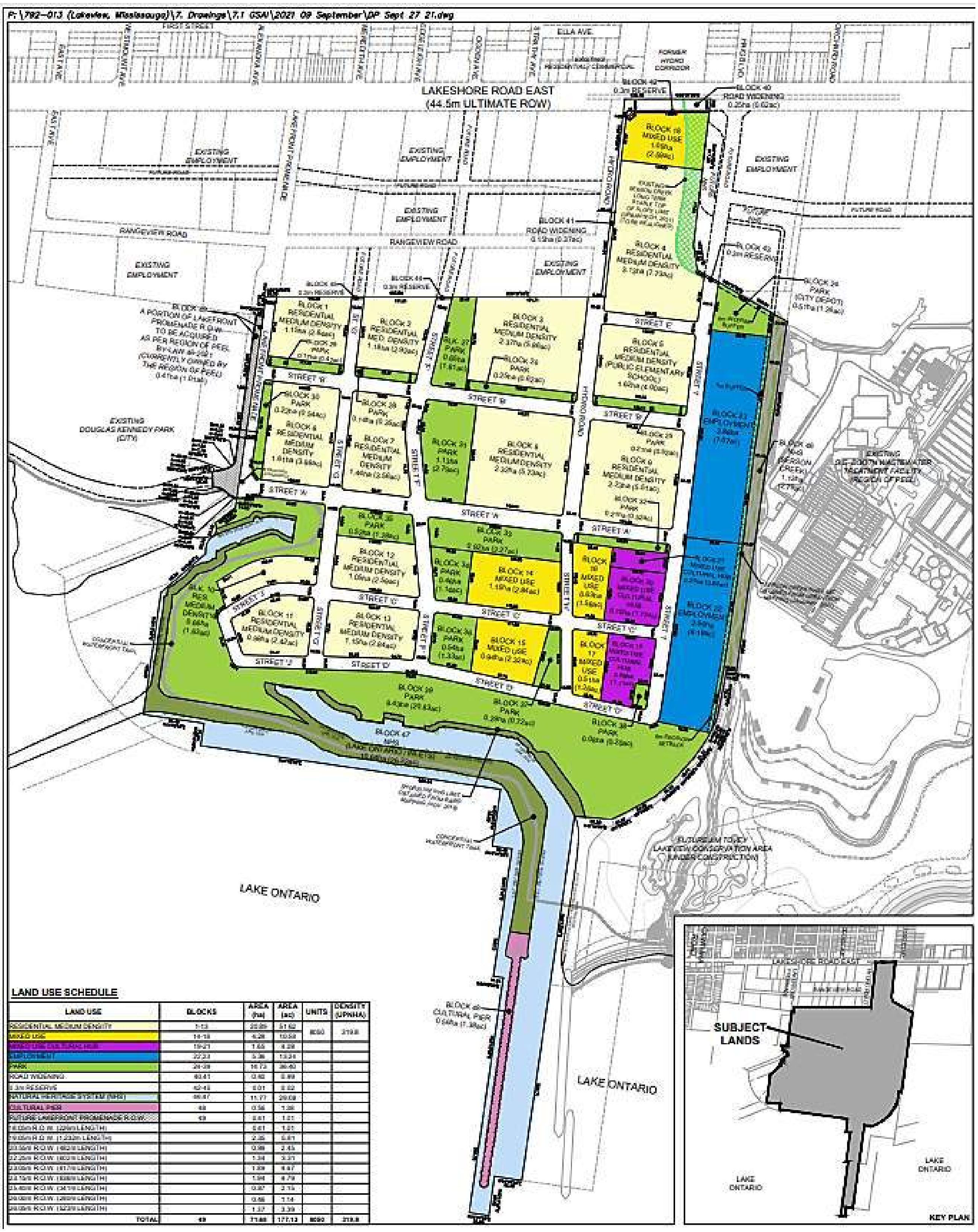


EXHIBIT 3: LAKESHORE LANDS DRAFT PLAN OF SUBDIVISION (LAKEVIEW COMMUNITY PARTNERS LIMITED / GLEN SCHNARR & ASSOCIATES INC. – SEPTEMBER 27, 2021)

By-law 0119-2022

Within Site-specific By-law 0119-2022 (*under appeal at the time of writing this report*), a number of Holding provisions were imposed on Lakeview Village as part of the rezoning approval which restrict the use of the lands (i.e. maximum residential development of 8,050 dwelling units) until relevant conditions are satisfied. Relevant to transportation conditions, the following are including:

- H2: maximum of 6,800 dwelling units are permitted until such time as *"submission of a transportation study and confirmation that the necessary traffic infrastructure improvements have been <u>secured</u> to adequately accommodate increased traffic volumes to the satisfaction of the Region of Peel ("Region") and the City."*
- H3: maximum of 7,500 dwelling units are permitted until such time as *"submission of a transportation study and confirmation that the necessary traffic infrastructure improvements have been <u>constructed</u> to adequately accommodate increased traffic volumes to the satisfaction of the Region and the City."*
- H6: maximum of 92,900 m^2 non-residential GFA are permitted until such time as *"submission of a satisfactory transportation study and confirmation that the necessary traffic infrastructure improvements have been <u>constructed</u> to adequately accommodate increased traffic volumes all to the satisfaction of the Region and the City."*

It is noted that 92,900 m^2 non-residential GFA is nearly equivalent to 1,000,000 ft^2 non-residential GFA.

4.0 TRANSPORTATION CONTEXT

4.1 AREA STREET NETWORK

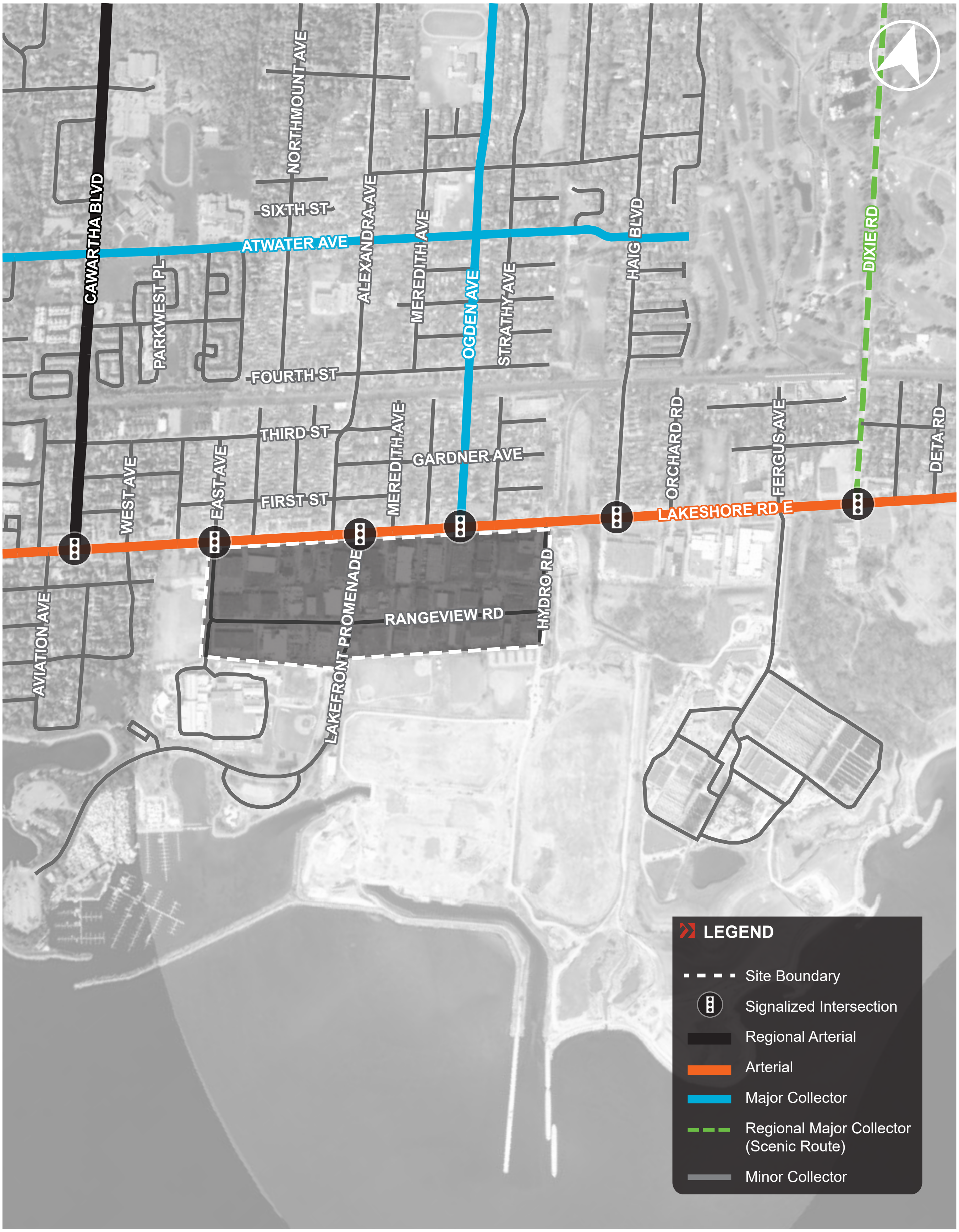
4.1.1 Existing Area Street Network

The Site is well-located relative to roadway connections provided across the City, Peel Region, and the Greater Toronto Area (GTA). The public street network surrounding the Site includes a hierarchy of road connections ranging from arterial roads to local roads. The Site is also located just over 2.0 kilometres from the Queen Elizabeth Way (QEW).

The existing area road network is illustrated in **Figure 4** and a detailed description of the area road network is provided in **Table 3**. Additionally, various local roads north of Lakeshore Road East, provide connections adjacent to the Site (i.e. to Lakeshore Road East). These local roads include the north-south roads, Westmount Avenue, Alexandra Avenue, Meredith Avenue, Edgeleigh Avenue and Strathy Avenue.

TABLE 3 EXISTING AREA STREET NETWORK

Type		Street Name	Description
Regional Arterial	N-S	Cawthra Road	A regional arterial road, generally running in a north-south direction from Lakeshore Road East in the south to the Queen Elizabeth Way (QEW) / Highway 403 interchange in the north. Near the Site area, the roadway has a four-lane cross section, two lanes in each direction, and left turn lanes at major intersections. The posted speed limit is 50 km/h.
		Dixie Road	A regional arterial road, generally running in a north-south direction from Lakeshore Road East in the south, providing a connection to the Queen Elizabeth Way (QEW), after which it continues north beyond the City limits. Near the Site area, the roadway has a three-lane cross section, one lane in each direction, including a centre two-way left turn lane. The posted speed limit is 50 km/h.
Major Arterial	E-W	Lakeshore Road East	A major arterial road, generally running in an east-west direction from Front Street in the west (where it continues west as Lakeshore Road West) to the City limits in the east (where it continues as Lake Shore Boulevard through the City of Toronto). Near the Site area, the roadway has a five-lane cross section, two lanes in each direction, including a centre two-way left turn lane. There are left turn lanes at major intersection and the posted speed limit is 50 km/h.
Major Collector	N-S	Ogden Avenue	A major collector road, generally running in a north-south direction from Lakeshore Road East in the south to South Service Road in the north. Near the Site area, the roadway has a two-lane cross section, one lane in each direction. The assumed speed limit is 50 km/h.
Minor Collector	N-S	Haig Boulevard	A minor collector road, generally running in a north-south direction from Lakeshore Road East in the south to South Service Road in the north. Near the Site area, the roadway has a two-lane cross section with one lane in each direction. The assumed speed limit is 50 km/h.
Local Road	N-S	Hydro Road	A local road, generally running in a north-south direction from Lakeshore Road East in the north to Lakeview Promenade (i.e. Lake Ontario) in the south. The roadway has a two-lane cross section with one lane in each direction. The assumed speed limit is 50 km/h.
		East Avenue	A local road, generally running in a north-south direction from Third Street in the north to the Lakeview Water Treatment Plant in the south. The roadway has a two-lane cross section with one lane in each direction. The assumed speed limit is 50 km/h.
		Lakefront Promenade	A local road, generally running in a north-south direction from Lakeshore Road East in the north to the Lakefront Promenade Marina in the south. The roadway has a two-lane cross section with one lane in each direction. The assumed speed limit is 50 km/h, however, south of Rangeview Road, the speed limit reduces to 25 km/h.
	E-W	Rangeview Road	A local road, generally running in an east-west direction from East Avenue in the west to Hydro Road in the east. The roadway has as two-lane cross section with one lane in each direction. The assumed speed limit is 50 km/h.



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Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 4 EXISTING AREA ROAD NETWORK

4.1.2 Planned Area Street Network

As outlined in **Section 3.3**, the advancement of the Lakeview Village development has resulted in planned changes to the local street network, including within the Rangeview Site, that are reflected in OPA 125. As part of the proposed OPA, details pertaining to the street network within the Rangeview Site are being advanced. Further, the approved Lakeshore Connecting Communities TMP includes planned changes to Lakeshore Road, including within the vicinity of the Site, which have been considered as part of the comprehensive traffic analysis for this report. **Figure 5** illustrates the planned street network, including planned and proposed changes derived from each of the three above-noted processes.

4.1.2.1 Lakeshore Connecting Communities Transportation Master Plan

As outlined in **Section 3.3**, the Lakeshore Connecting Communities TMP, a Bus Rapid Transit (BRT) facility with a dedicated right-of-way, is planned with a completion date of 2027 on Lakeshore Road East, in the vicinity of the Site. Exhibit 5 includes a roll plan excerpt for the right-of-way adjacent to the Site.

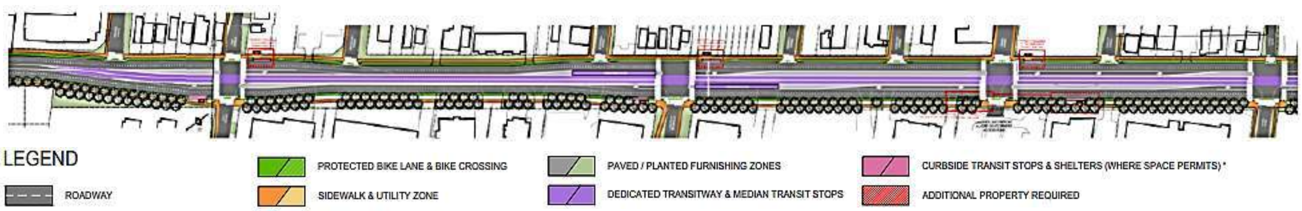

EXHIBIT 4: LAKESHORE ROAD EAST – ROLL PLAN EXCERPT (LAKESHORE CONNECTING COMMUNITIES TRANSPORTATION MASTER PLAN: CITY OF MISSISSAUGA / HDR)

Key elements of the planned changes to the Lakeshore Road East right-of-way include:

- Two vehicle travel lanes in each direction, including left-turn lanes at signalized intersections (East Avenue, Lakefront Promenade, Ogden Avenue and Hydro Road);
- Minor side streets to have right-in/ right-out access;
- Dedicated bus-only lanes in the centre of the right-of-way;
- Express bus stop located at Lakefront Promenade;
- Protected cycling lanes (both sides) & pedestrian crossings; and
- Sidewalks & paved/planted furnishing zones.

4.1.2.2 Planned Area Street Network: OPA 125 & Inspiration Lakeview

As outlined in **Section 3.3**, a new street network is planned for the entirety of the OPA 125 lands, which includes Rangeview and Lakeview Village. Within **Table 4**, details pertaining to the proposed new streets (within Lakeview Village) and adjustments to existing streets are outlined. The names of the proposed streets are listed in **Table 4** as referred to by the Inspiration Lakeview project materials.

Notably, some existing streets are planned to have modified classification. Lakefront Promenade, north of the planned Street L, is to be converted from a local road to a Major Collector Road. Hydro Road, north of the planned Street L, is to be converted from a local road to a Major Collector Road.

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Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographies, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 5 FUTURE AREA ROAD NETWORK

Table 4 OPA 125 / Lakeview Village Street Network Details

Street[1]	Right-of-Way Width (m)[2]	Road Classification	Pavement Width (m)	Dual Cycle Tracks	Sidewalks (2.0m)	Layby Parking
Lakefront Promenade	26.0	Major Collector	6.7	West boulevard	Both sides	--
Street A	26.05	Major Collector (Street H to Street K)	6.7	South boulevard	Both sides	North side
	23.15	Minor Collector (Street I to Street H)	6.7	South boulevard	Both sides	North side
Street B	22.25	Minor Collector	6.6	North boulevard	South side	Both sides
Street C	19.05	Local Road	6.6	--	Both sides	South side
Street D	20.55	Local Road	6.6	South boulevard	North side	North side
Street E	19.05	Local Road	6.6	--	Both sides	South side
Street F	23.05	Minor Collector	6.6	East boulevard	Both sides	East side
Street G	23.05	Minor Collector (Street L to Street D)	6.6	West boulevard	Both sides	East side
	19.05	Local Road (north of Street L)	6.6	--	Both sides	West side
Hydro Road (Street H)	25.4	Major Collector (Lakeshore Road to Street L)	6.6	East boulevard	Both sides	East side
	18.05	Local Road (south of Street L)	6.6	--	Both sides	East side
Street I	23.15	Minor Collector (north of Street L)	6.7	East boulevard	Both sides	West side
	23.15	Local Road (south of Street L)	6.6	East boulevard	Both sides	West side
Street J	19.05	Local Road (west of Street G)	6.6	--	Both sides	Inside curve

Notes:
1. Refer to **Figure 5** for location of streets.
2. Source: Inspiration Lakeview Village draft plan of subdivision materials (The Municipal Infrastructure Group Ltd.)

4.1.2.3 Proposed New Street Network (Rangeview Lands)

Within Rangeview, it is proposed to advance upgrades to the local street network that reflect the planned road network contained within OPA 125. Within this section, greater detail is provided pertaining to proposed changes to the local street network within Rangeview. The names of the proposed streets are as identified in OPA 125. **Exhibit 6** illustrates how the planned Rangeview road network will connect to the planned Lakeview Village road network. The functional road plan is also provided in **Appendix C.**

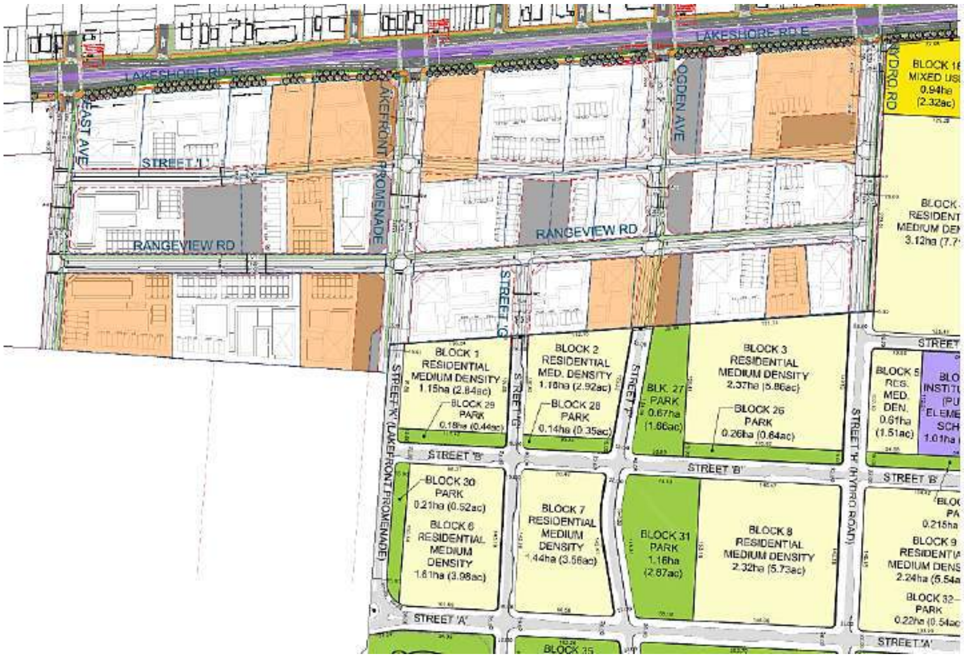


Exhibit 5: Planned Rangeview Road Network Connecting to Lakeview Village Road Network

Key Street Design Objectives

<u>Consideration for all road users</u>:
Enhancements to the existing street network elements, will support the movement for all users (vehicles, pedestrians, cyclists) and be designed in a way to minimize road conflicts and encourage alternative modes of travel and active transportation.

<u>Ease of access</u>:
The new street network will facilitate convenient connections from the proposed development to / from the broader area network. The proposed street design is intended to service and support pedestrian and cycling permeability and maintain vehicle capacity at all times of the day.

<u>Complete Streets</u>:
The improved and proposed roads within the site have been designed with the policies of Complete Streets at the forefront. The City of Mississauga is undertaking the “Changing Lanes” project (scheduled to be complete in 2023) which will update, develop, and implement new tools to ensure that streets are safe and convenient for all users. It will deliver a Complete Streets Guide for streets in Mississauga and representing an updated approach to street planning and design for the City.

<u>Conformity with Lakeview Village street design</u>:
Given that many of the streets in the local area located south of Lakeshore Road East are shared between Lakeview Village and the Rangeview, and that the approvals process is substantially advanced for the former,

the proposed street network for the latter is proposed to reflect many of the design conditions (e.g. rights-of-way, etc.) planned for Lakeview Village. The objective is for the streets to have a consistent design both in terms of transportation elements and ultimately, urban design.

Intersections south of Lakeshore Road East:
All intersections south of Lakeshore Road East (excluding driveways) are proposed to be unsignalized with all-way stop-control, with all vehicle movements permitted. All street descriptions below and the traffic analysis reflect this condition. As development progresses and updated traffic counts become available, the all-way stop control could be reviewed to determine if any intersection warrants traffic signals or two-way stop control with a controlled pedestrian crossing on the major street. All intersections between north-south streets and Rangeview Road could be converted to signalized intersections and conversely, all intersections between north-south streets and Street L could be converted to side street stop control with east-west controlled pedestrian crossings.

East Avenue

East Avenue is an existing north-south public street running from Lakeshore Road East in the north to Lakeview Water Treatment Plant in the south. It is the western boundary of Rangeview. The functional plan and proposed cross-section for East Avenue are provided in **Figure 6**.

Cross Section:
East Avenue will have a 23.05m right-of-way (ROW) consisting of the following:

- One 3.3m travel lane in each direction (6.6m roadway) and 2.2m lay-by on the east side.
- On the east side of the roadway, a 3.0m two-way, protected cycle track is provided.
- The boulevard on each side of the roadway will contain 2.0m sidewalks and 2.5m planting zones.
- Appropriate buffers are provided between ROW elements.

Intersections:
East Avenue will have intersections with Lakeshore Road East, the proposed Street L, and Rangeview Road.

- The intersection with Lakeshore Road East retains the existing traffic signal location and will continue to be a signalized intersection with all vehicle movements permitted. The proposed configuration of East Avenue at this intersection will remain similar (i.e. no turning lanes). All pedestrian movements will be facilitated with crosswalks and appropriate connection will be provided between the East Avenue & Lakeshore Road East cycling facilities, to be confirmed as part of the Lakeshore Connecting Communities TMP.
- The intersection with Street L will be unsignalized and all-way stop-controlled, with all vehicle movements permitted. All pedestrian movements will be facilitated with crosswalks.
- The intersection with Rangeview Road will be unsignalized and all-way stop-controlled, with all vehicle movements permitted. All pedestrian movements will be facilitated with crosswalks and appropriate connections will be provided between the East Avenue & Rangeview Road cycling facilities.

Lakefront Promenade

Lakefront Promenade is an existing north-south public street running from Lakeshore Road East in the north to the Lakefront Promenade Marina in the south. The functional plan and proposed cross-section for Lakefront Promenade are provided in **Figure 7**.

<u>Cross-Section</u>:
Lakefront Promenade will have a 30.38m right-of-way (ROW) south of Lakefront Promenade consisting of the following:

- One 3.35m travel lane (6.7m roadway) in each direction.
- On the west side of the roadway, a 3.0m two-way, protected cycle track is provided.
- The boulevard on each side of the roadway will contain 2.0m sidewalks, planting zones ranging from 3.7-6.18m, and 2.9m bioswale plant zones.
- Appropriate buffers are provided between ROW elements.

<u>Intersections</u>:
Lakefront Promenade will have intersections with Lakeshore Road East, the proposed Street L, and Rangeview Road.

- The intersection with Lakeshore Road East retains the existing traffic signal location and will continue to be a signalized intersection with all vehicle movements permitted. The roadway will be expanded at this intersection with dedicated left- and right-turn lanes. All pedestrian movements will be facilitated with crosswalks and appropriate connection will be provided between the Lakefront Promenade & Lakeshore Road East cycling facilities, to be confirmed as part of the Lakeshore Connecting Communities TMP.
- The intersection with Street L will be unsignalized and all-way stop-controlled, with all vehicle movements permitted. All pedestrian movements will be facilitated with crosswalks.
- The intersection with Rangeview Road will be unsignalized and all-way stop-controlled, with all vehicle movements permitted. All pedestrian movements will be facilitated with crosswalks and appropriate connection will be provided between the Lakefront Promenade & Rangeview Road cycling facilities.

Street F (Ogden Avenue Extension from Lakeshore Road East to Rangeview Road)

Street F is the proposed southerly extension of Ogden Avenue, from north of Lakeshore Road East, which will eventually connect to the property line, just south of Rangeview Road. The functional plan and proposed cross-section for Street F (Ogden Avenue) are provided in **Figure 8**.

<u>Cross Section</u>:
Ogden Avenue will have a 23.05m right-of-way (ROW) south of Lakeshore Road East consisting of the following:

- One 3.3m travel lane in each direction and 2.2m layby on the east side. In total, where layby is provided, a 8.8m roadway will be provided.
- On the east side of the roadway, a 3.0m two-way, protected cycle track is provided.
- The boulevard on each side of the roadway will contain 2.0m sidewalks and 2.5m planting zones.

- Appropriate buffers are provided between ROW elements.

<u>Intersections</u>:
Ogden Avenue will have intersections with Lakeshore Road East, the proposed Street L, and Rangeview Road.

- The intersection with Lakeshore Road East retains the existing traffic signal location (currently a driveway for 1036 Lakeshore Road East on the south side) and will continue to be a signalized intersection with all vehicle movements permitted. The roadway will be expanded at this intersection with dedicated left-turn, through, and right-turn lanes. All pedestrian movements will be facilitated with crosswalks and appropriate connection will be provided between Ogden Avenue & Lakeshore Road East cycling facilities, to be confirmed as part of the Lakeshore Connecting Communities TMP.
- The intersection with Street L will be unsignalized and all-way stop-controlled, with all vehicle movements permitted. All pedestrian movements will be facilitated with crosswalks.
- The intersection with Rangeview Road will be unsignalized and all-way stop-controlled, with all vehicle movements permitted. All pedestrian movements will be facilitated with crosswalks and appropriate connection will be provided between the Ogden Avenue & Rangeview Road cycling facilities.

Hydro Road

Hydro Road is an existing north-south public street running from Lakeshore Road East in the north to the Waterfront Trail in the south. The functional plan and proposed cross-section for Hydro Road are provided in **Figure 9**.

<u>Cross Section</u>:
Hydro Road will have a 25.4m right-of-way (ROW) consisting of the following:

- One 3.35m travel lane in each direction (6.7m roadway) and 2.2m layby (which will serve as a bio-retention area) on the east side.
- On the east side of the roadway, a 3.0m two-way, protected cycle track is provided.
- The boulevard on each side of the roadway will contain 2.0m sidewalks. On the west side, there will be a 5.0m bioswale planting zone and on the east side, there will be 2.5m planting zone.
- Appropriate buffers are provided between ROW elements.

<u>Intersections</u>:
Hydro Road will have intersections with Lakeshore Road East, the proposed Street L, and Rangeview Road.

- The intersection with Lakeshore Road East is unsignalized but is proposed to be a signalized intersection with all vehicle movements permitted. The proposed configuration of Hydro Road at this intersection will remain similar (i.e. no turning lanes). All pedestrian movements will be facilitated with crosswalks and appropriate connection will be provided between the Hydro Road & Lakeshore Road East cycling facilities, to be confirmed as part of the Lakeshore Connecting Communities TMP.
- The intersection with Street L will be unsignalized and all-way stop-controlled, with all vehicle movements permitted. All pedestrian movements will be facilitated with crosswalks.
- The intersection with Rangeview Road will be unsignalized and all-way stop-controlled, with all vehicle movements permitted. All pedestrian movements will be facilitated with crosswalks and appropriate connection will be provided between the Hydro Road & Rangeview Road cycling facilities.

Street L

Street L is not an existing street. It is proposed to operate in an east-west direction from East Avenue in the west to Hydro Road to the east, to the north of, and parallel to Rangeview Road. The functional plan and proposed cross-section for Street L are provided in **Figure 10**.

Cross Section:
Street L will have a 19.05m right-of-way (ROW) consisting of the following:

- One 3.75m travel lane in each direction. In total, a 7.5m roadway will be provided.
- The boulevard on each side of the roadway will contain 2.0m sidewalks and tree planting zones ranging from 2.5-4.05m.
- Appropriate buffers are provided between ROW elements.

Intersections:
Street L will have intersections with East Avenue, Lakefront Promenade, Ogden Avenue and Hydro Road. All intersections with Street L will be unsignalized and all-way stop-controlled, with all vehicle movements permitted. All pedestrian movements will be facilitated with crosswalks.

Rangeview Road

Rangeview Road is an existing east-west public street running from East Avenue in the west to Hydro Road to the east. The functional plan and proposed cross-section for Rangeview Road are provided in **Figure 11**.

Cross Section:
Rangeview Road will have a 22.25m right-of-way (ROW) consisting of the following:

- One 3.30m travel lane in each direction (6.6m roadway) and 2.2m layby on the south side (which will serve as a bio-retention area).
- On the north side of the roadway, a 3.0m two-way, protected cycle track is provided.
- The boulevard on each side of the roadway will contain 2.0m sidewalks and 2.5m planting zones.
- Appropriate buffers are provided between ROW elements.

Intersections:
Rangeview Road will have intersections with East Avenue, Lakefront Promenade, Ogden Avenue and Hydro Road. All intersections with Rangeview Road will be unsignalized and all-way stop-controlled, with all vehicle movements permitted. All pedestrian movements will be facilitated with crosswalks and appropriate connection will be provided between the Rangeview Road & north-south street cycling facilities.

Street G

Street G is not an existing street. It is proposed to operate in a north-south direction from Rangeview Road in the north the south (within Lakeview Village) near Lake Ontario. Notably, Street G is named Street H within OPA 125. The functional plan and proposed cross-section for Street G are provided in **Figure 12**.

Cross Section:
Street G will have a 19.05m right-of-way (ROW) consisting of the following:

- One 3.3m travel lane in each direction (6.6m roadway) and 2.2m layby on the west side.
- The boulevard on each side of the roadway will contain 2.0m sidewalks and 2.5m planting zones.
- Appropriate buffers are provided between ROW elements.

Intersection:
Street G will have an intersection within Rangeview at Rangeview Road (it has other intersections within Lakeview Village). The intersection with Rangeview Road will be unsignalized and all-way stop-controlled, with all vehicle movements permitted. All pedestrian movements will be facilitated with crosswalks.

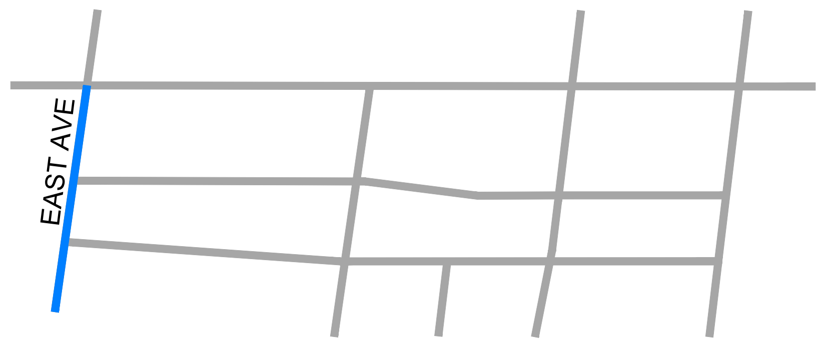
4.1.2.4 Summary of Rangeview Proposed Street Network

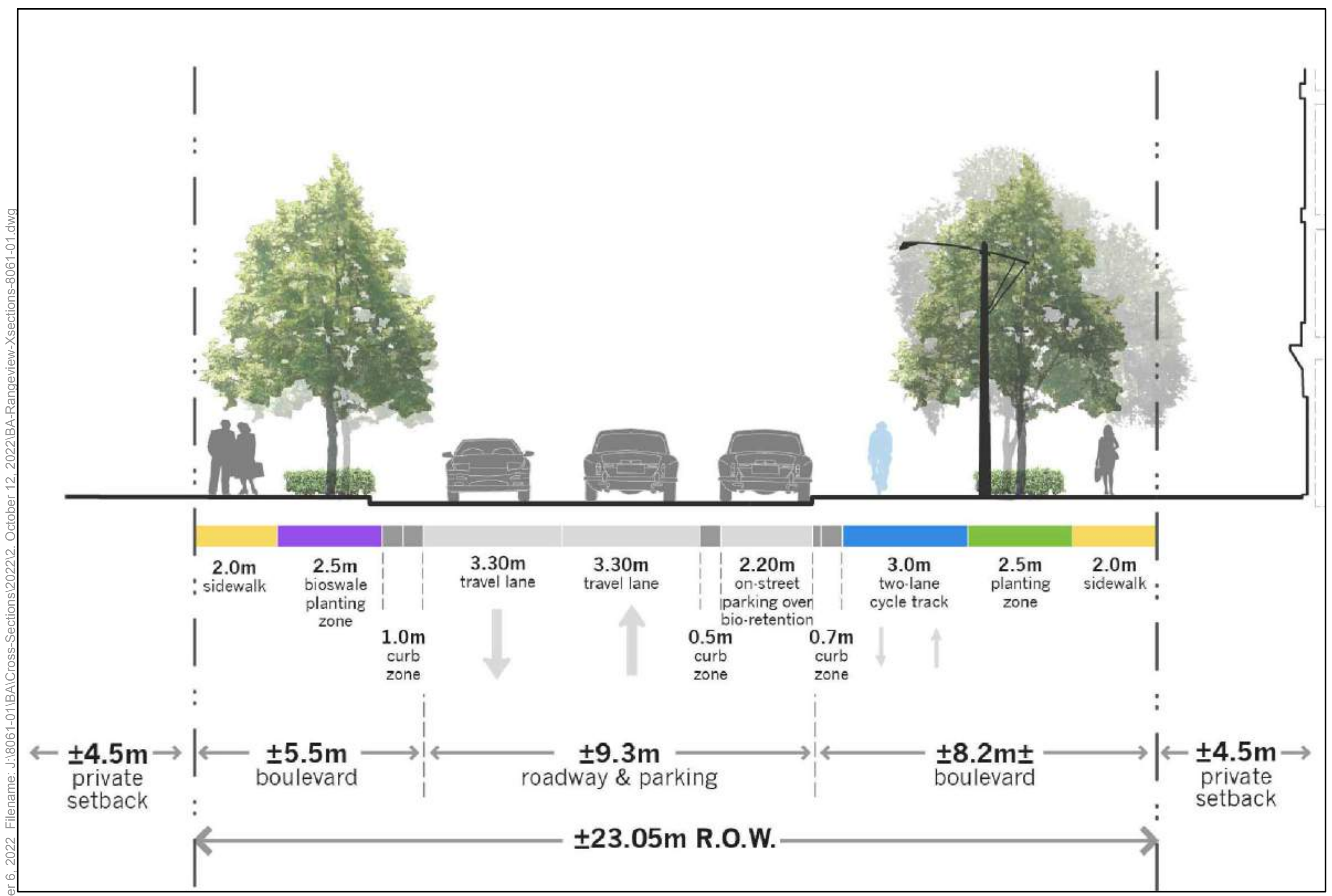
A summary of the proposed street network for Rangeview is provided in **Table 5**.

TABLE 5 PROPOSED RANGEVIEW STREET NETWORK – DESIGN SUMMARY

Street[1]	Right-of-Way Width (m)	Road Classification	Pavement Width (m)	Dual Cycle Tracks	Sidewalks (2.0m)	Layby Parking
East Avenue	23.05	Minor Collector	6.6	East boulevard	Both sides	East side
Lakefront Promenade	30.38	Major Collector	6.7	West boulevard	Both sides	--
Street F (Ogden Avenue Extension from Lakeshore Road East to property line, just south of Rangeview Road)	23.05	Minor Collector	6.6	East boulevard	Both sides	East side
Hydro Road	25.40	Major Collector	6.7	East boulevard	Both sides	East side
Street L	19.05	Local	7.5	--	Both sides	--
Rangeview Road	22.25	Minor Collector	6.6	North boulevard	Both sides	South side
Street G	19.05	Local	6.6	--	Both sides	West side

Notes:
1. Refer to **Figure 5** and **Appendix C** for location of streets.





23.05m MINOR COLLECTOR

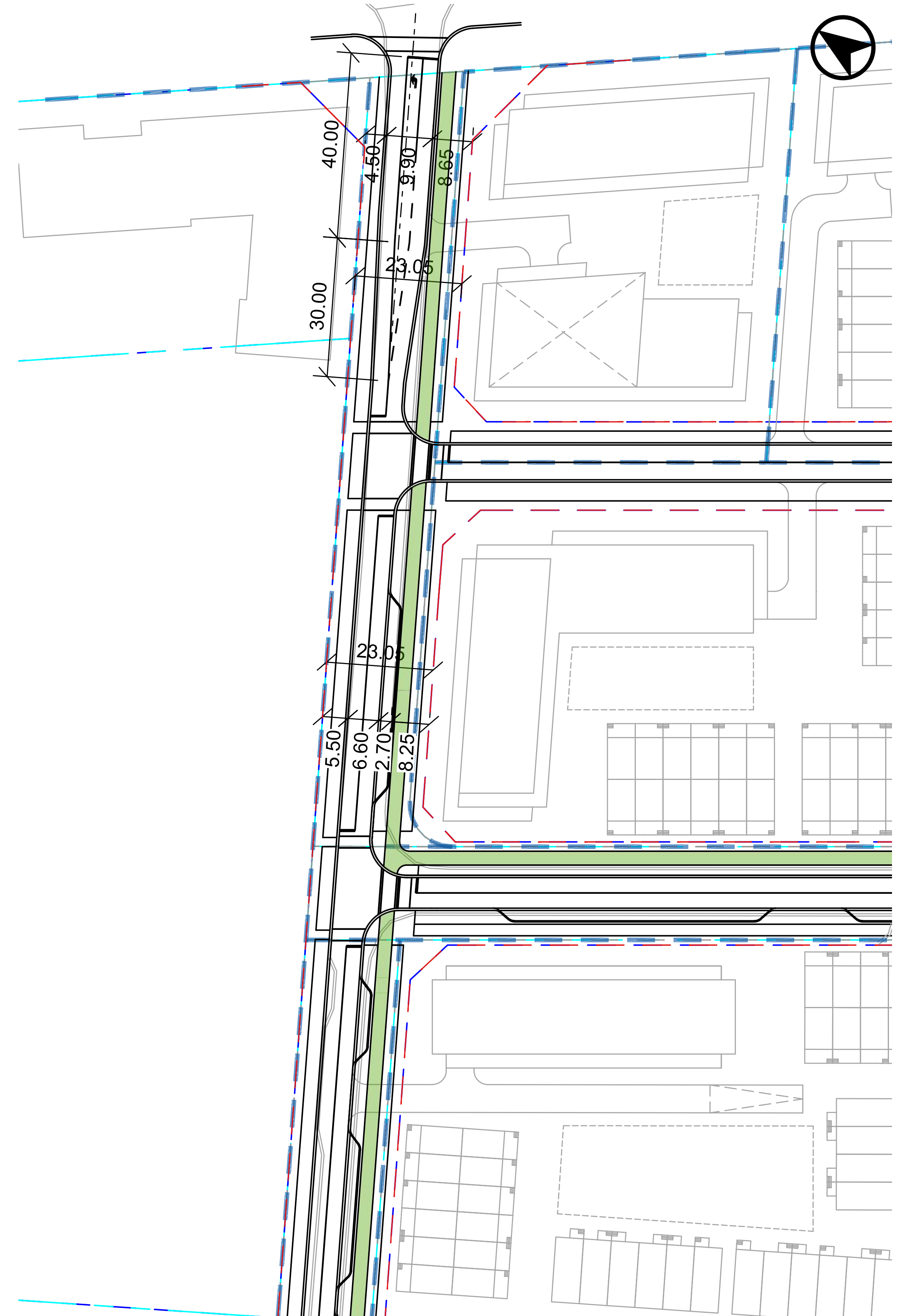
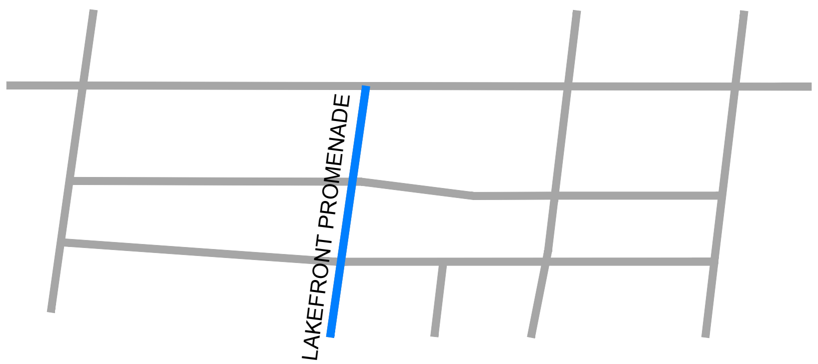
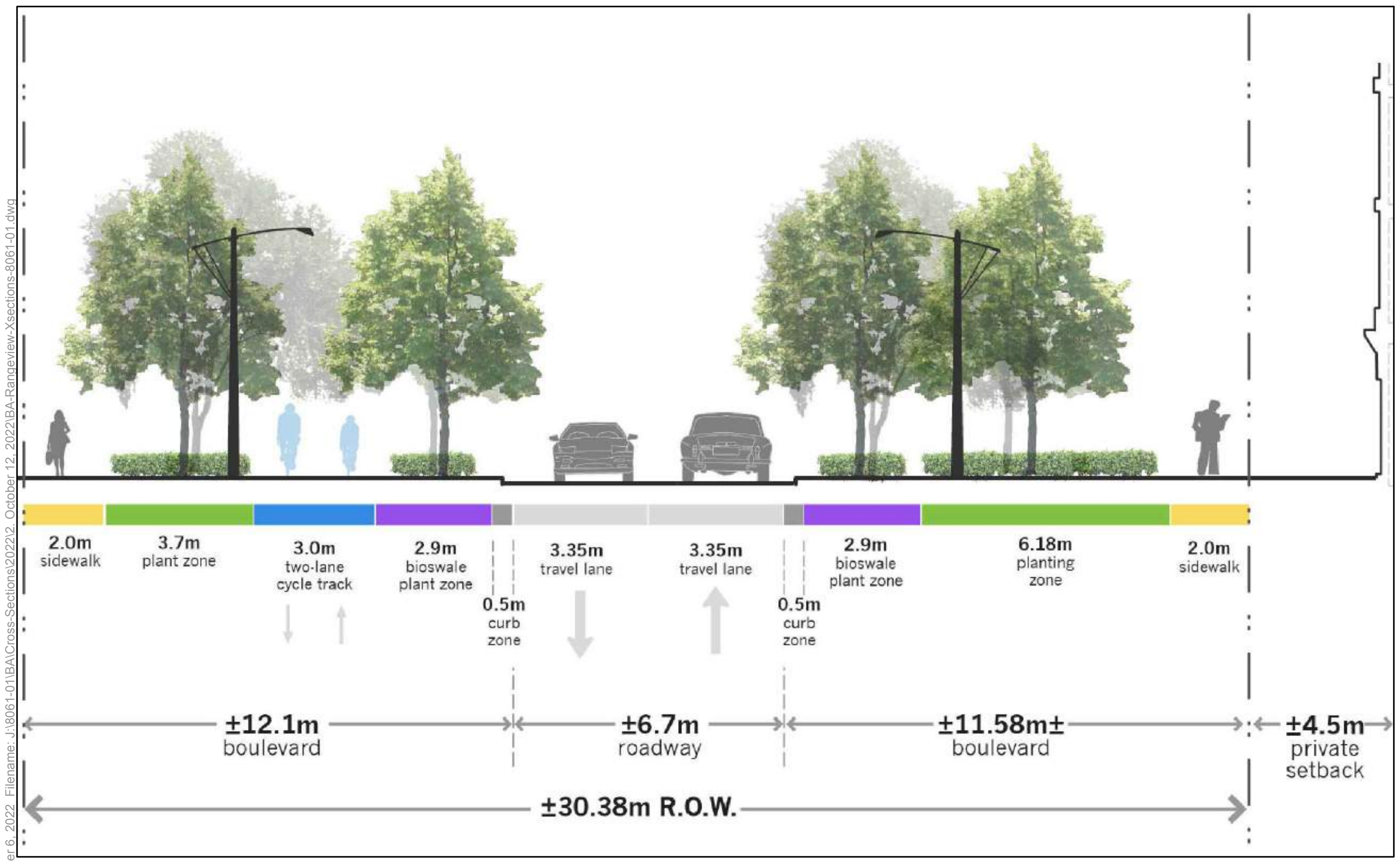


FIGURE 6 EAST AVENUE - FUNCTIONAL PLAN & CROSS-SECTIONS





30.38m MAJOR COLLECTOR

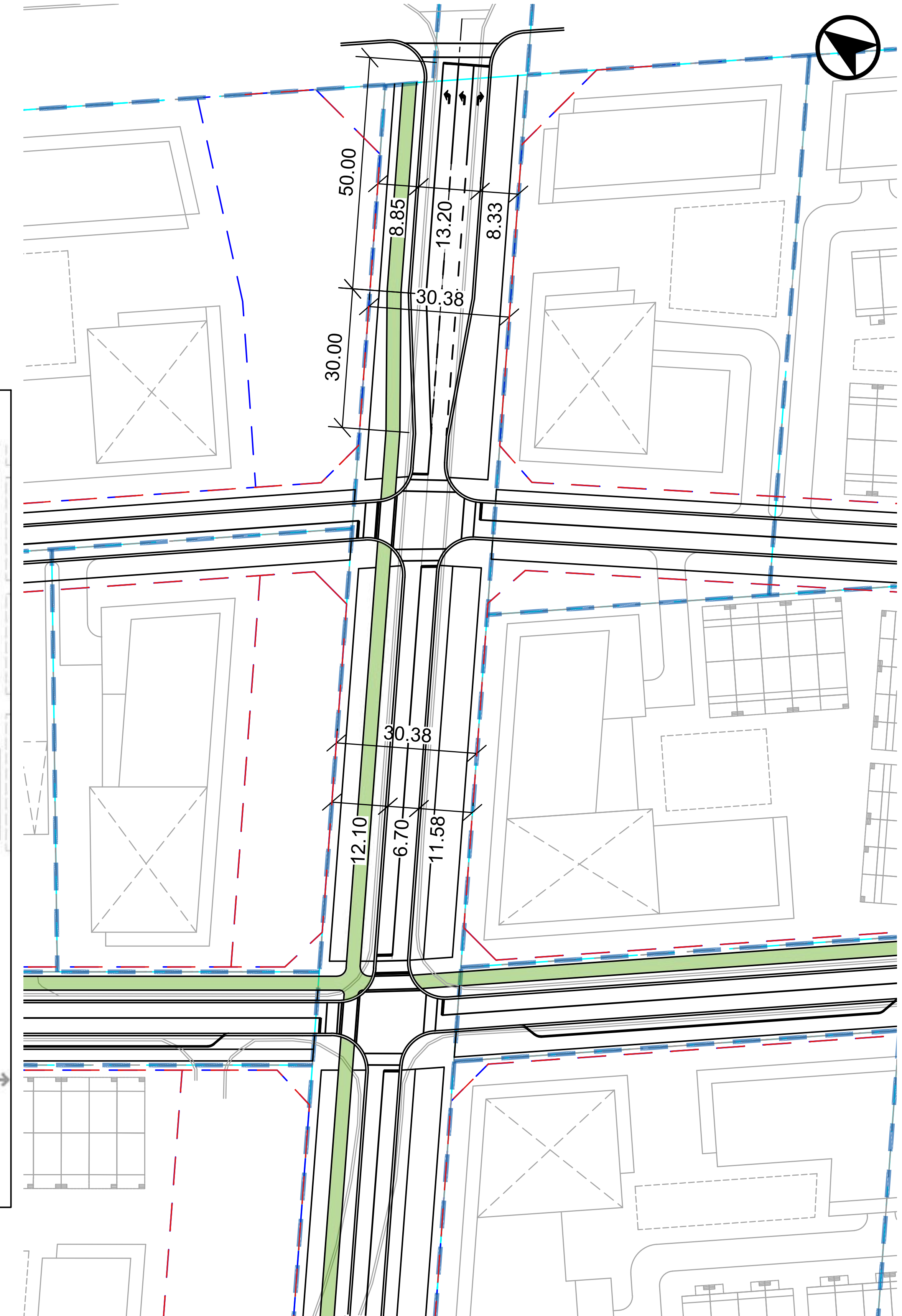
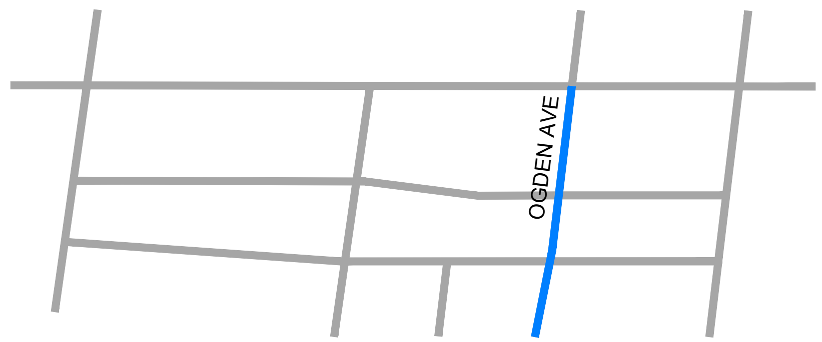
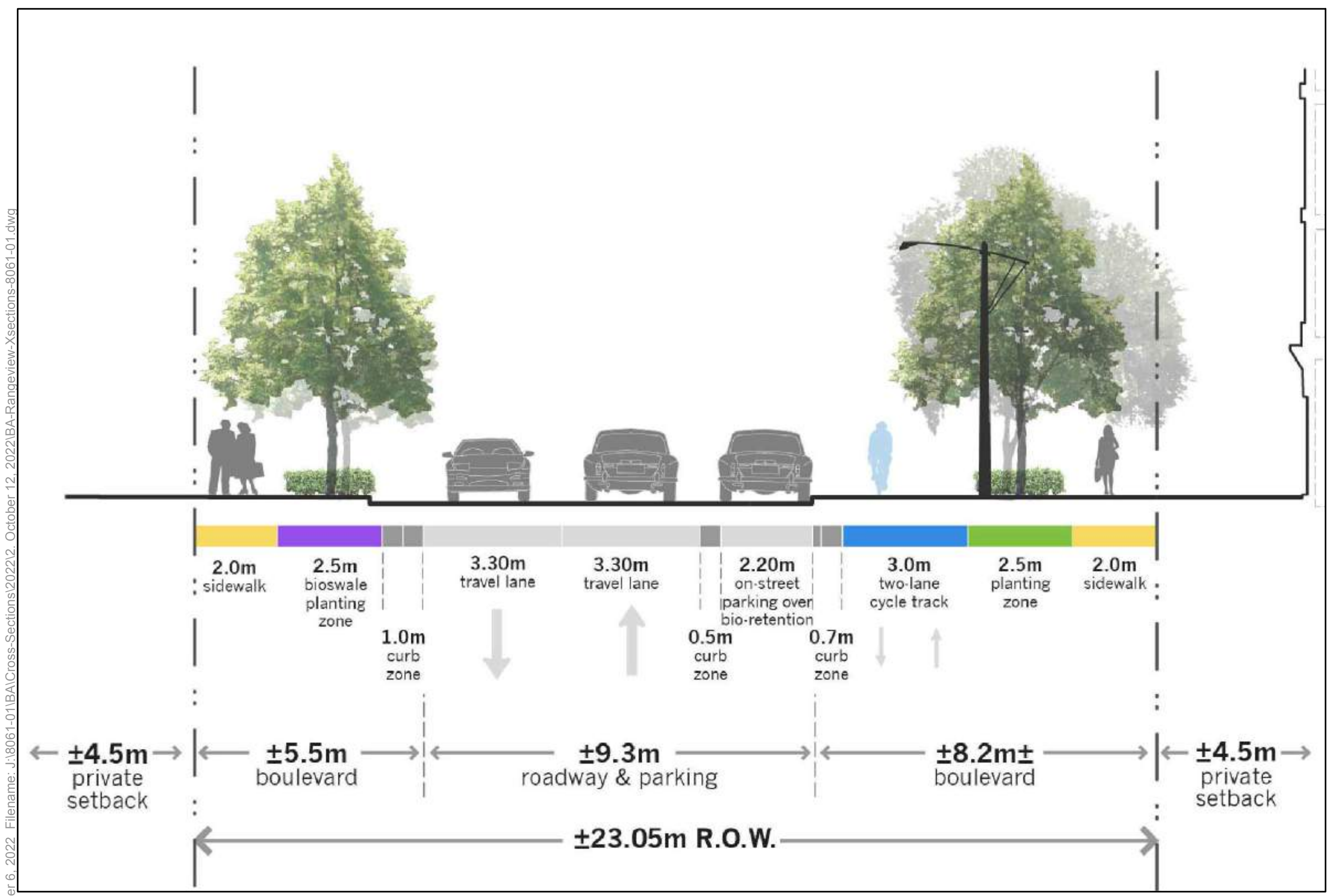


FIGURE 7 LAKEFRONT PROMENADE - FUNCTIONAL PLAN & CROSS-SECTIONS





23.05m MINOR COLLECTOR

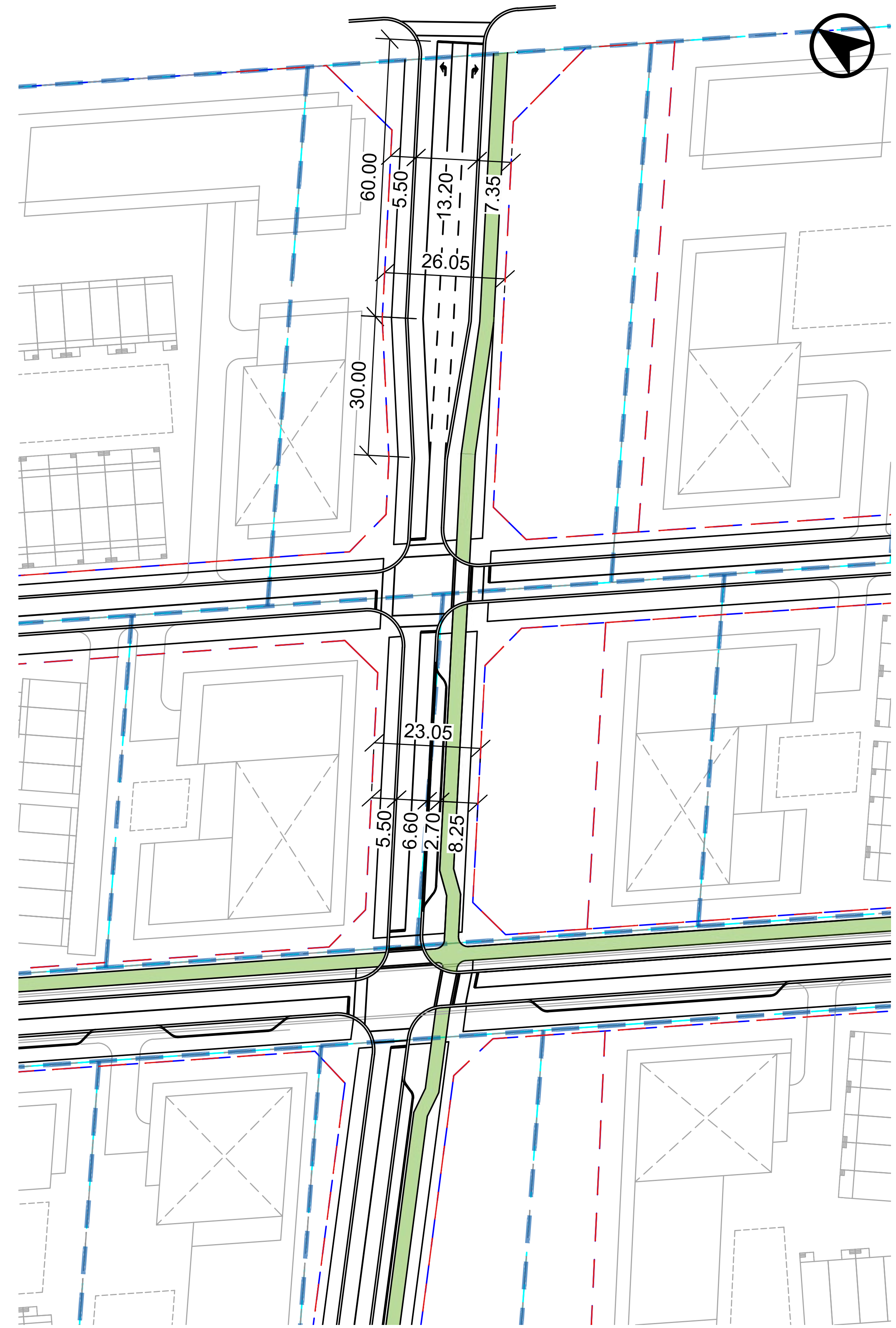


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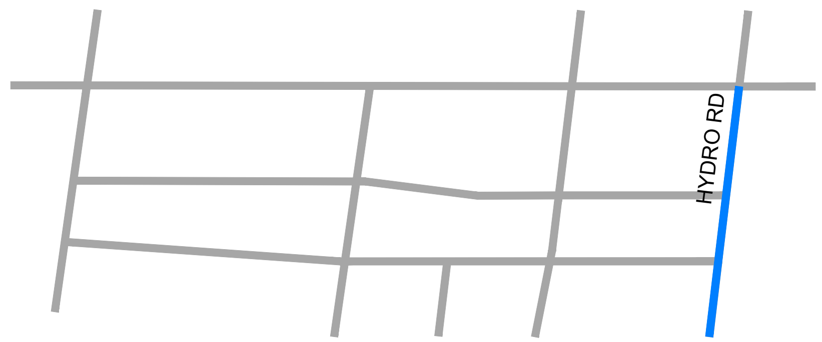
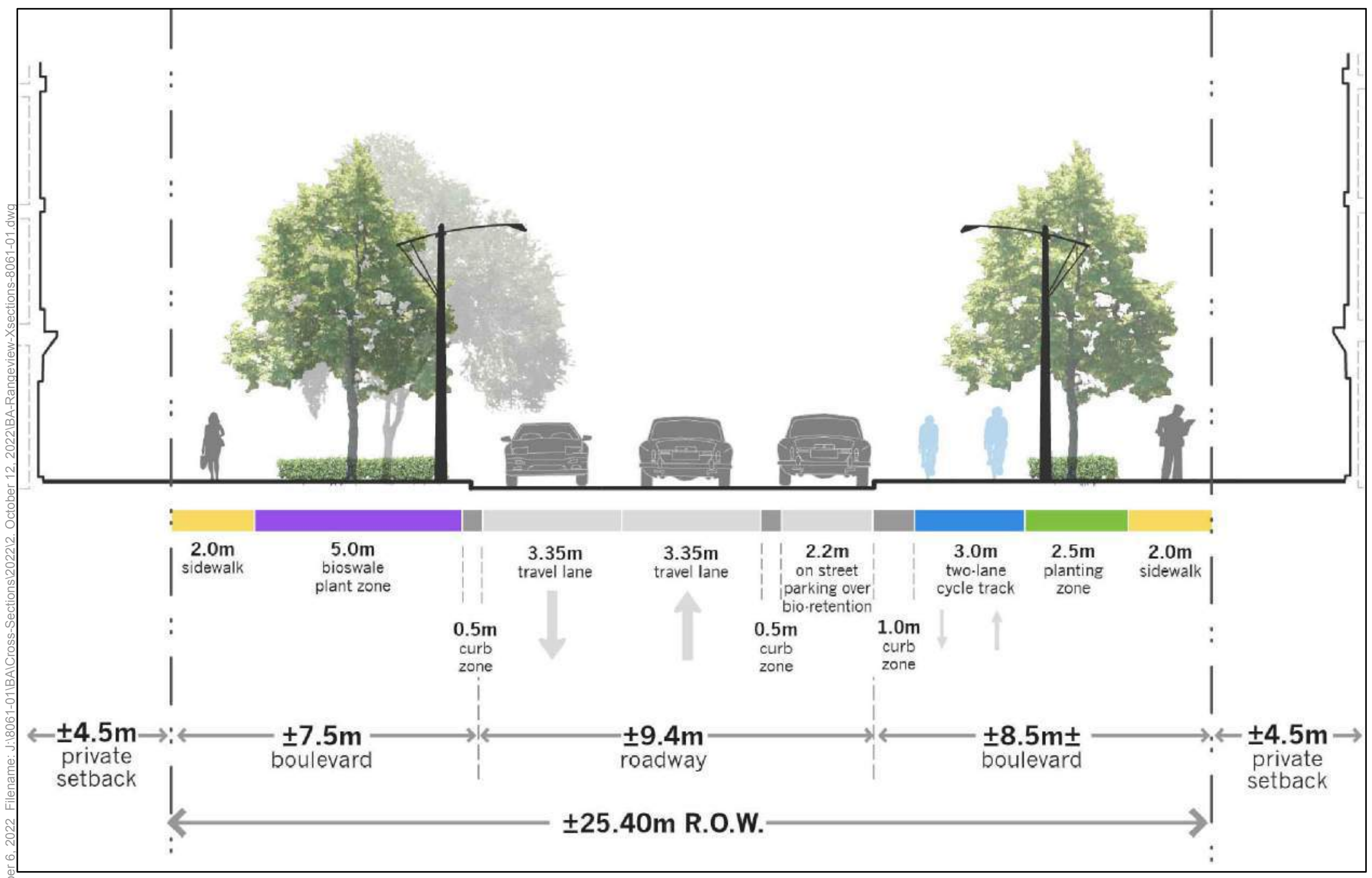
FIGURE 8 PROPOSED OGDEN AVENUE EXTENSION - FUNCTIONAL PLAN & CROSS-SECTIONS





25.4m MAJOR COLLECTOR

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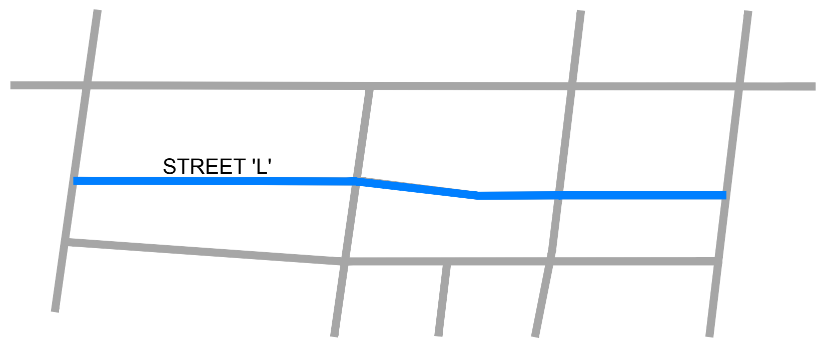
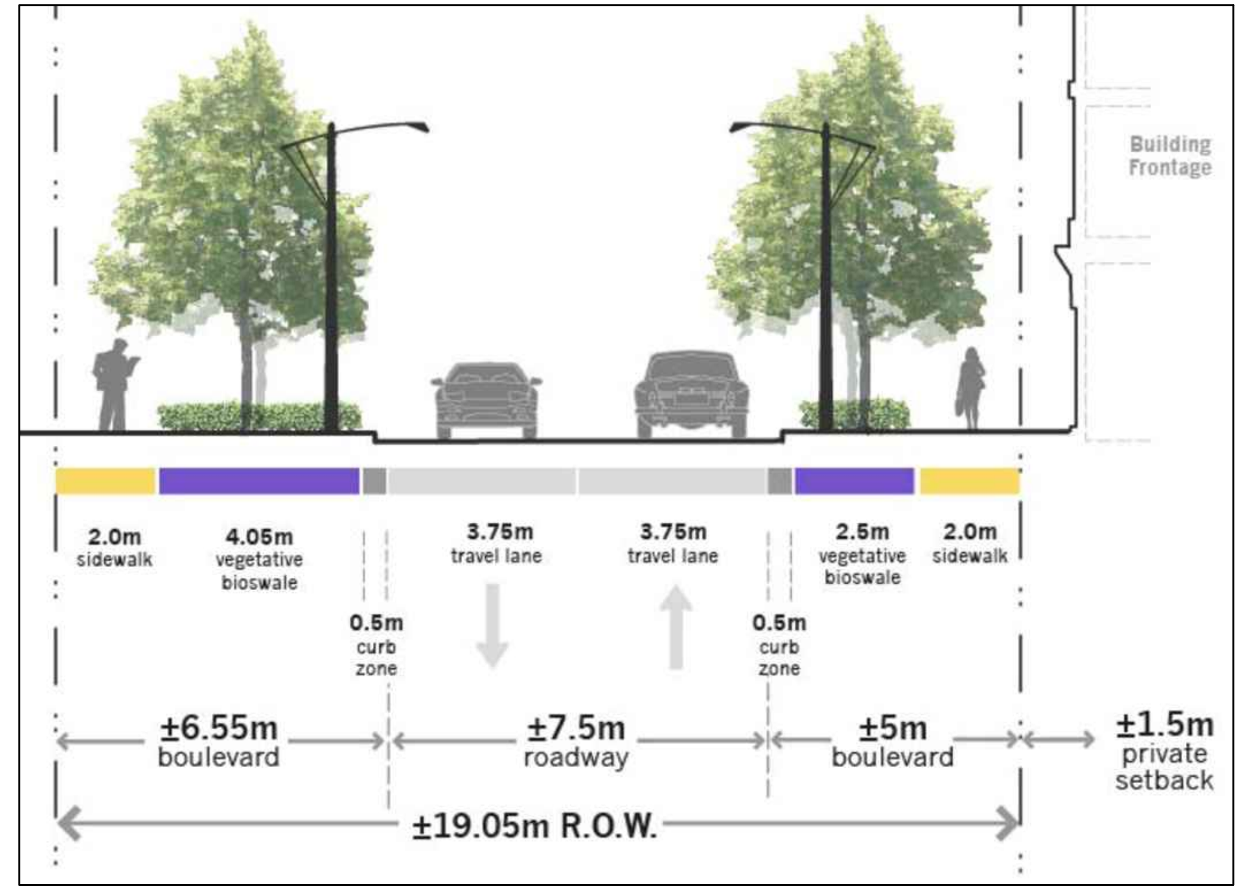
FIGURE 9 HYDRO ROAD - FUNCTIONAL PLAN & CROSS-SECTIONS





19.05m LOCAL ROAD

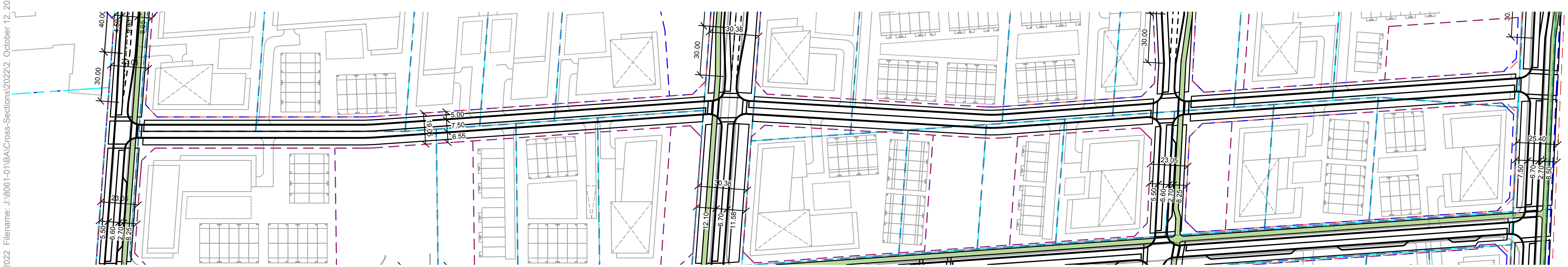
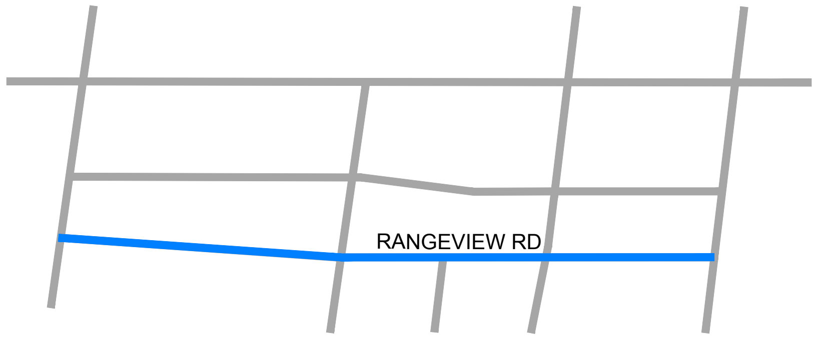
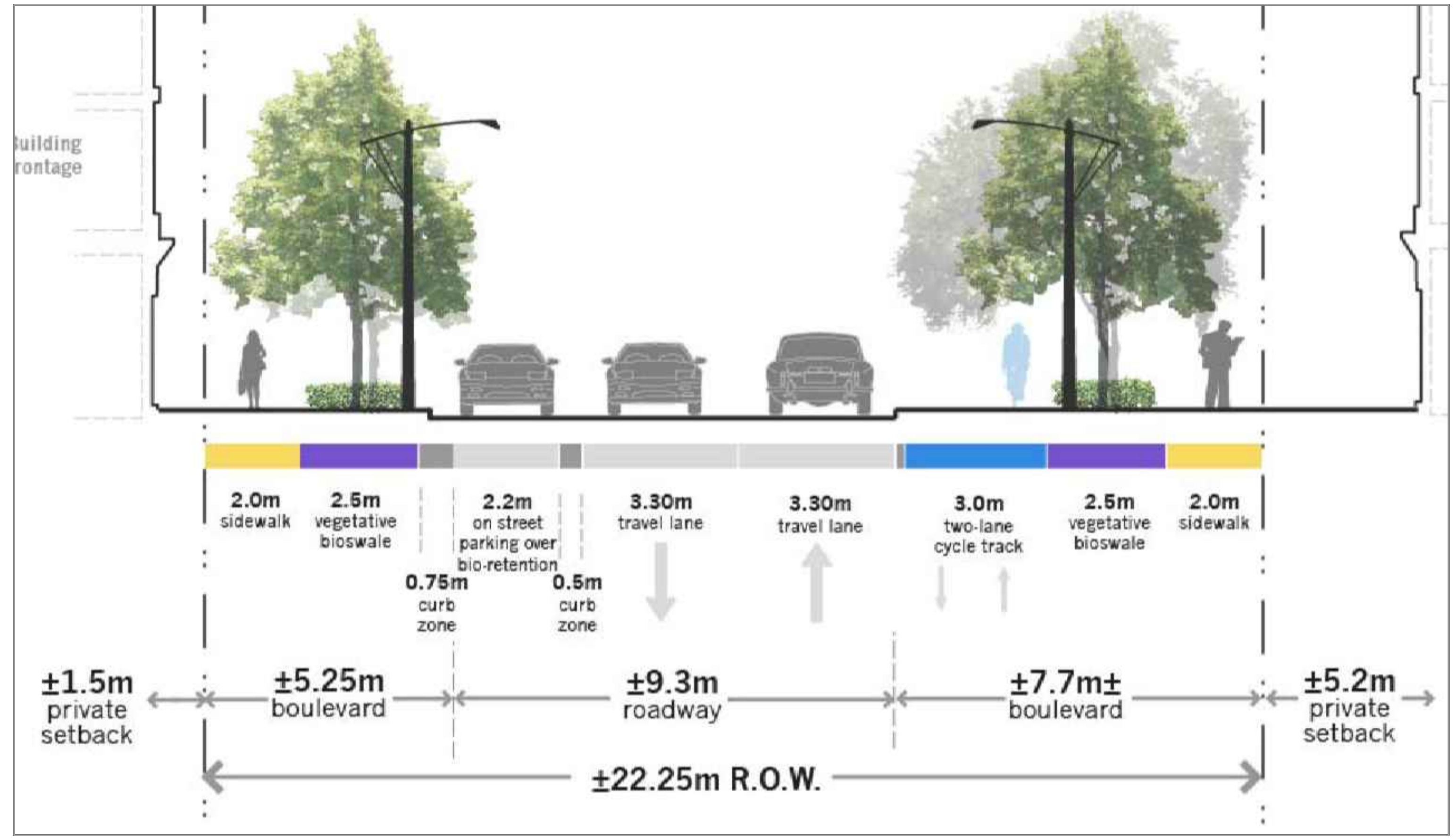


FIGURE 10 PROPOSED STREET 'L' - FUNCTIONAL PLAN & CROSS-SECTIONS





22.25m MINOR COLLECTOR

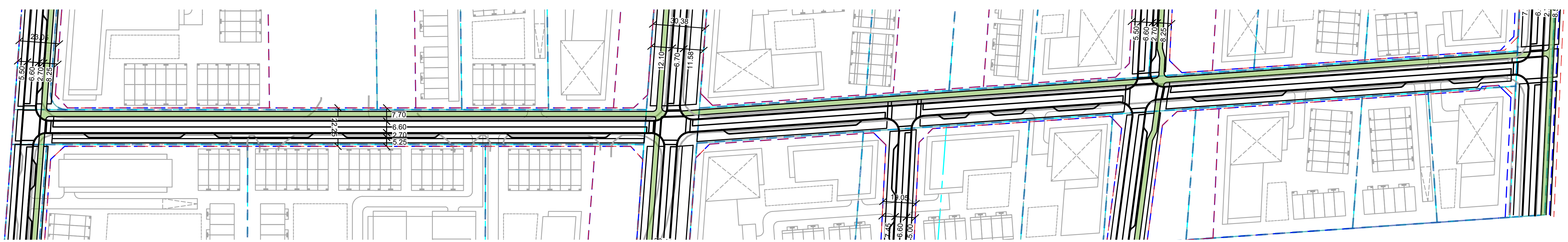


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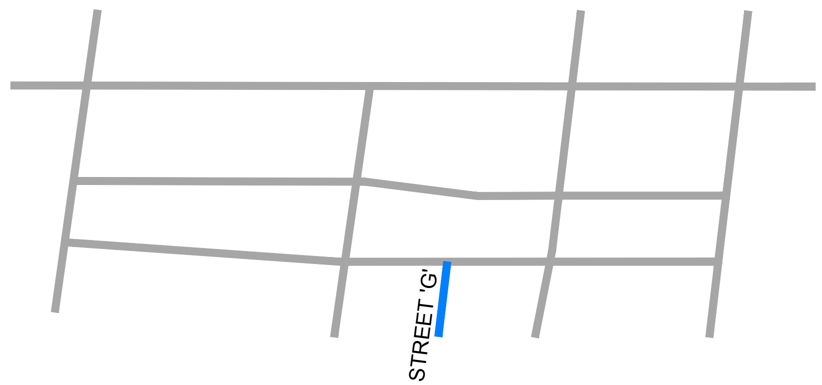
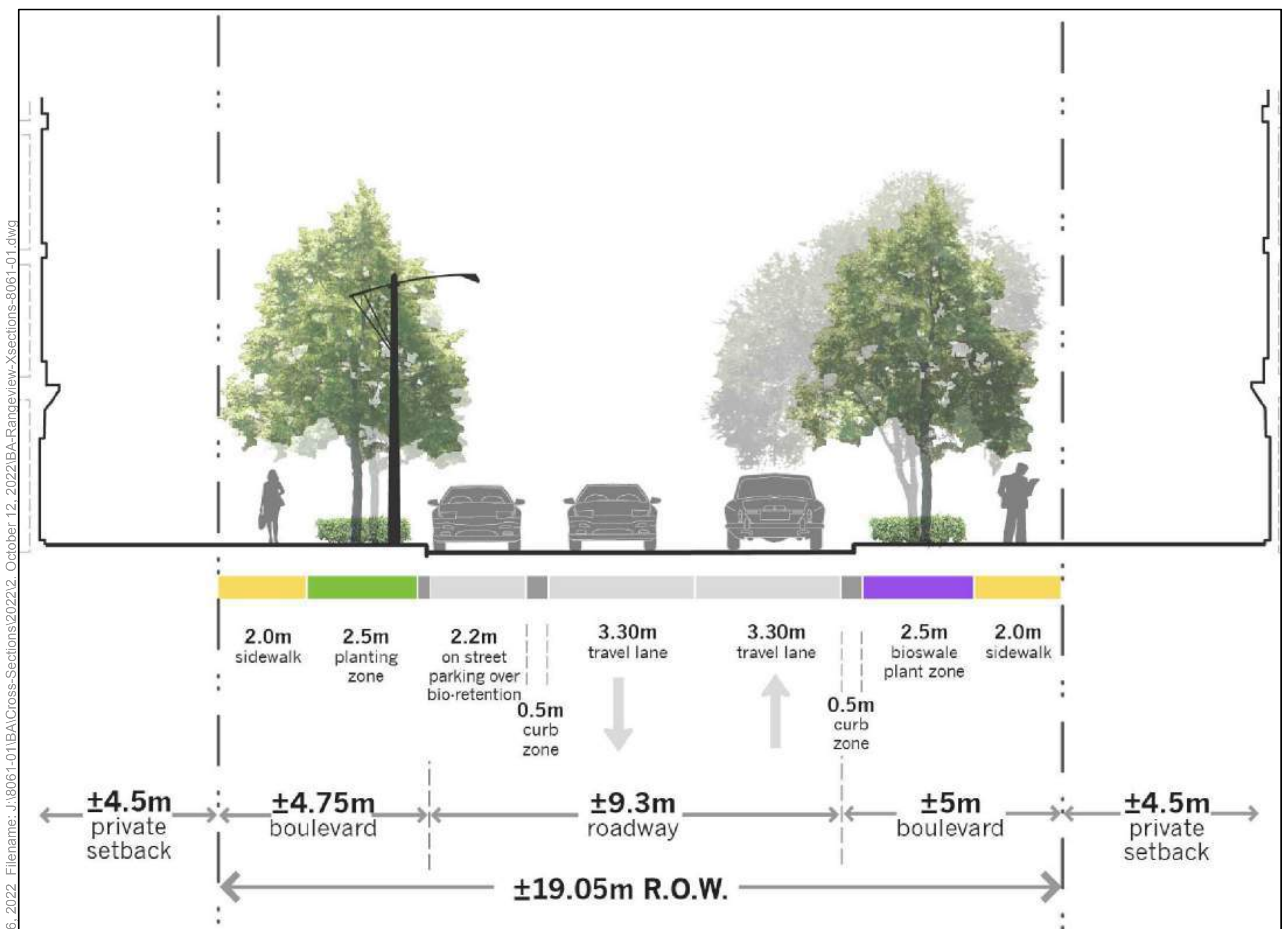
FIGURE 11 RANGEVIEW ROAD - FUNCTIONAL PLAN & CROSS-SECTIONS





19.05m LOCAL ROAD

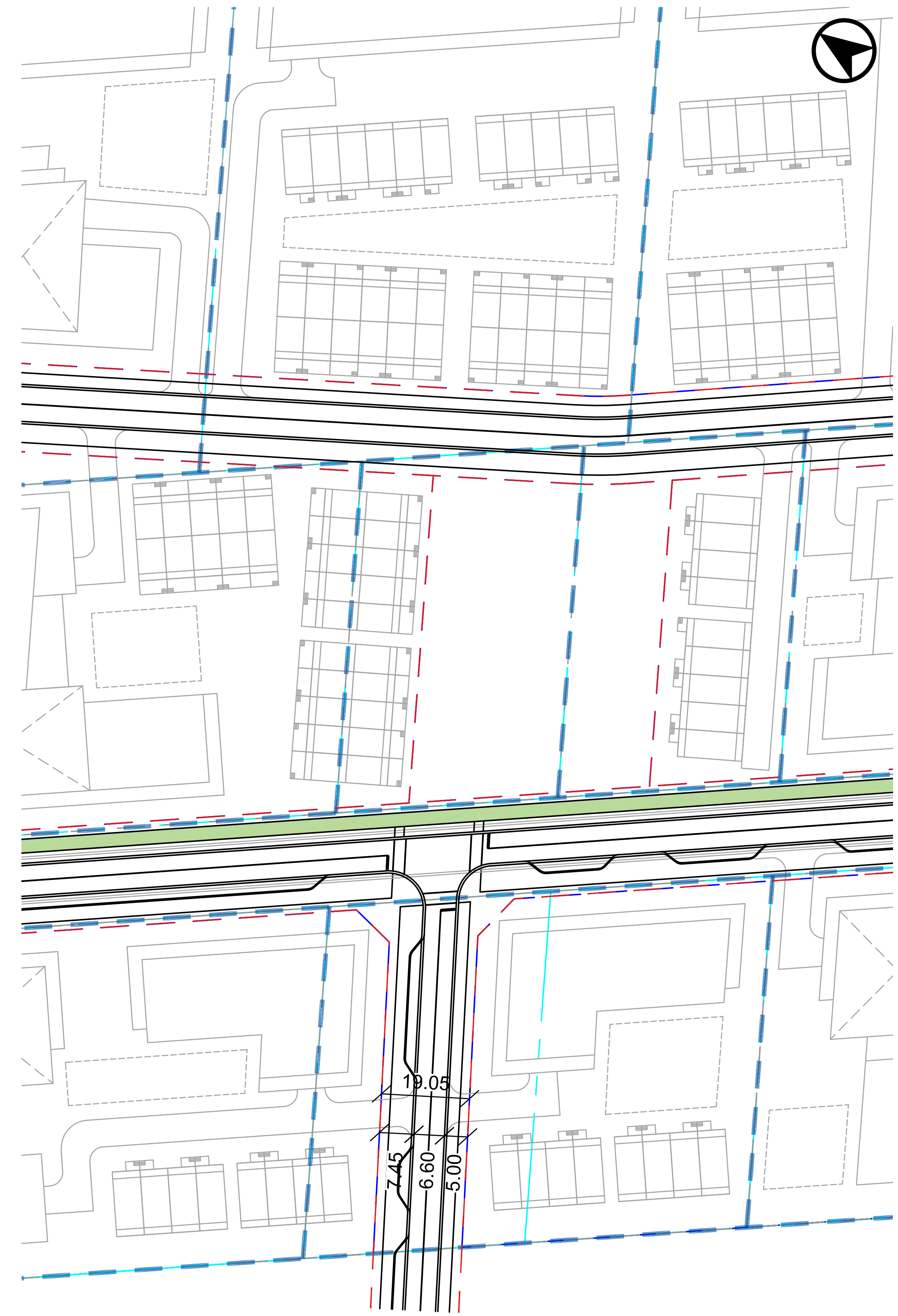


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FIGURE 12 PROPOSED STREET 'G' EXTENSION - FUNCTIONAL PLAN & CROSS-SECTIONS

4.2 AREA PUBLIC TRANSIT NETWORK

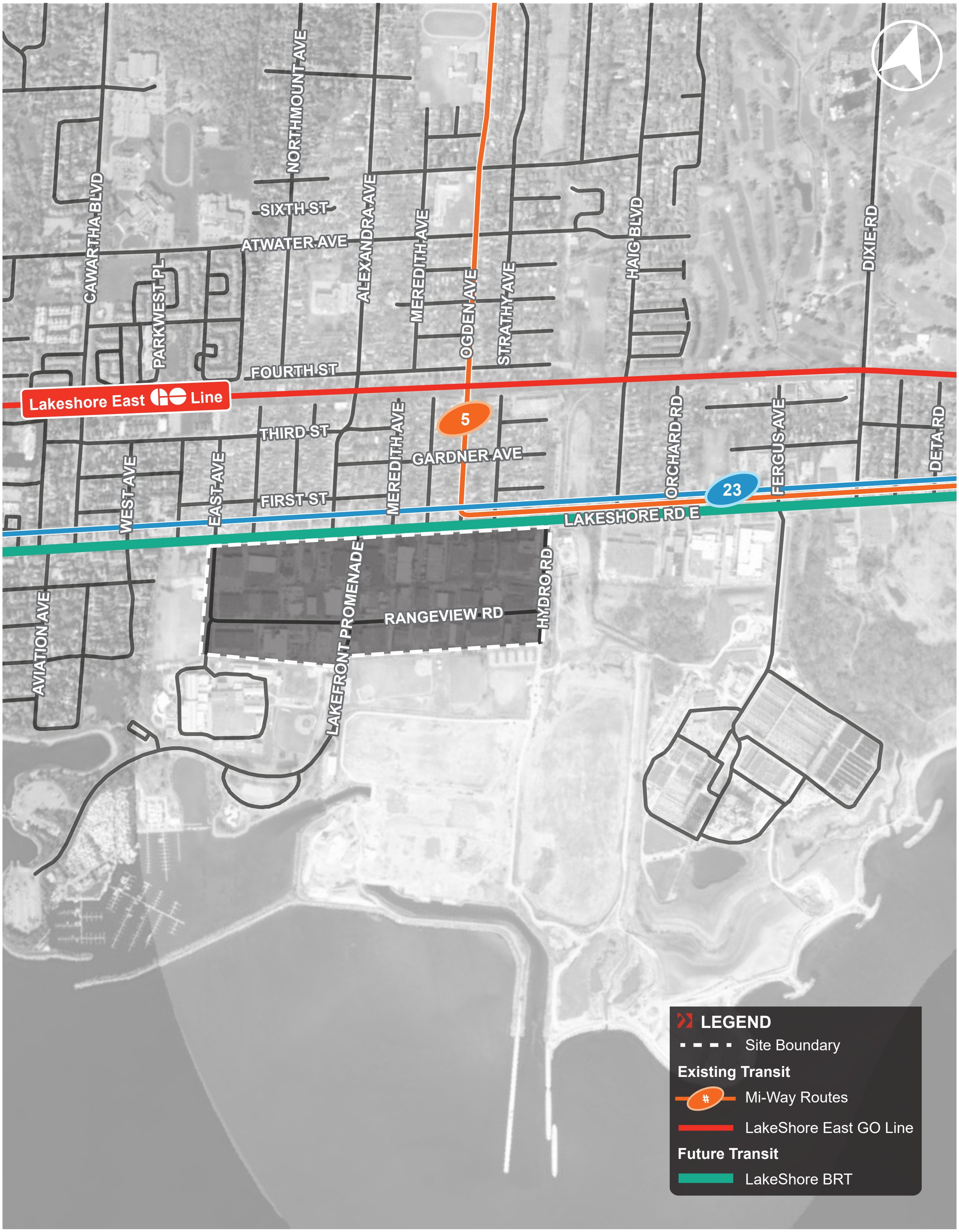
4.2.1 Existing Public Transit Network

The Site's northern boundary is located immediately adjacent to the two MiWay surface transit routes which provide direct connections to area destinations including Dixie Outlet Mall, Port Credit, and Long Branch GO station. With a transfer at the Long Branch GO Station, the Site is connected to GO Transit (Lakeshore West Line) and TTC bus / streetcar service in the east.

Details regarding the area's existing transit options are provided in **Table 6** and illustrated in **Figure 13**.

TABLE 6 AREA TRANSIT NETWORK

Number / Name of Service Line		Closest Stop Location	Description
Bus	23 Lakeshore (MiWay)	Several stops along Lakeshore Road East	Route 23 Lakeshore is a local bus route operating primarily along Lakeshore Road East / West, on all days, between the Clarkson GO Station and Long Branch GO Station. Route 23 runs every 17-21 minutes during weekday peak periods. This route connects with numerous other GO Transit, MiWay, and TTC routes.
	5 Dixie (MiWay)		Route 5 Dixie is a local bus route operating primarily along Dixie Road, on all days, between Cardiff Boulevard / Khalsa Drive and the Long Branch GO Station. Route 5 runs every 7-12 minutes during weekday peak periods. This route connects with numerous other GO Transit, MiWay, and TTC routes.



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Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographies, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 13 EXISTING AND FUTURE AREA TRANSIT NETWORK

4.2.2 Planned Public Transit Network

4.2.2.1 Lakeshore Connecting Communities Bus Rapid Transit (BRT)

As described in **Section 3.3**, The Lakeshore Connecting Communities TMP sets out a long-term vision for transit and corridor improvements along Lakeshore Road from 2020 to 2041 that will support waterfront development.

Of the transit network alternatives considered in the TMP, the preferred transit solution for the 2041 horizon year is express bus / bus rapid transit (BRT) along the extent of Lakeshore Road in Mississauga (illustrated in **Exhibit 5**). Between East Avenue and Etobicoke Creek (and thus adjacent to the Rangeview Lands), a dedicated right-of-way BRT service is planned within the centre of the Lakeshore Road East ROW. The Lakeshore BRT is planned to be completed in 2027.

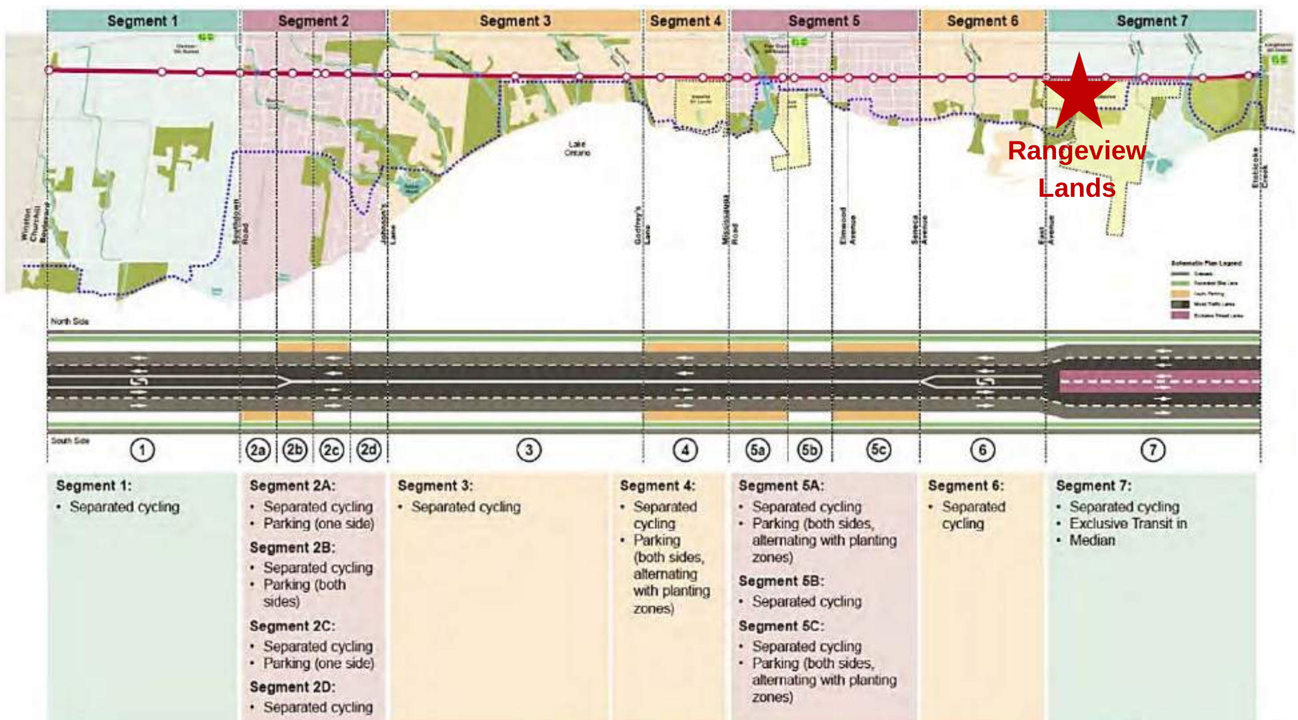


EXHIBIT 5: LAKESHORE BRT PREFERRED RIGHT-OF-WAY (LAKESHORE CONNECTING COMMUNITIES TRANSPORTATION MASTER PLAN: CITY OF MISSISSAUGA / HDR)

The preferred transit solution beyond the 2041 horizon year is an extension of the Toronto Transit Commission (TTC) Waterfront West LRT (or "streetcar") this is the recommended "ultimate solution." The streetcar would be extended from Long Branch GO Station to Mississauga Road following a similar alignment (i.e. dedicated ROW to East Avenue; operating in mixed traffic west of East Avenue).

4.2.2.2 Official Plan Transit Network

As part of OPA 89, transit provisions south of Lakeshore Road East were identified, as illustrated below in **Exhibit 6**.

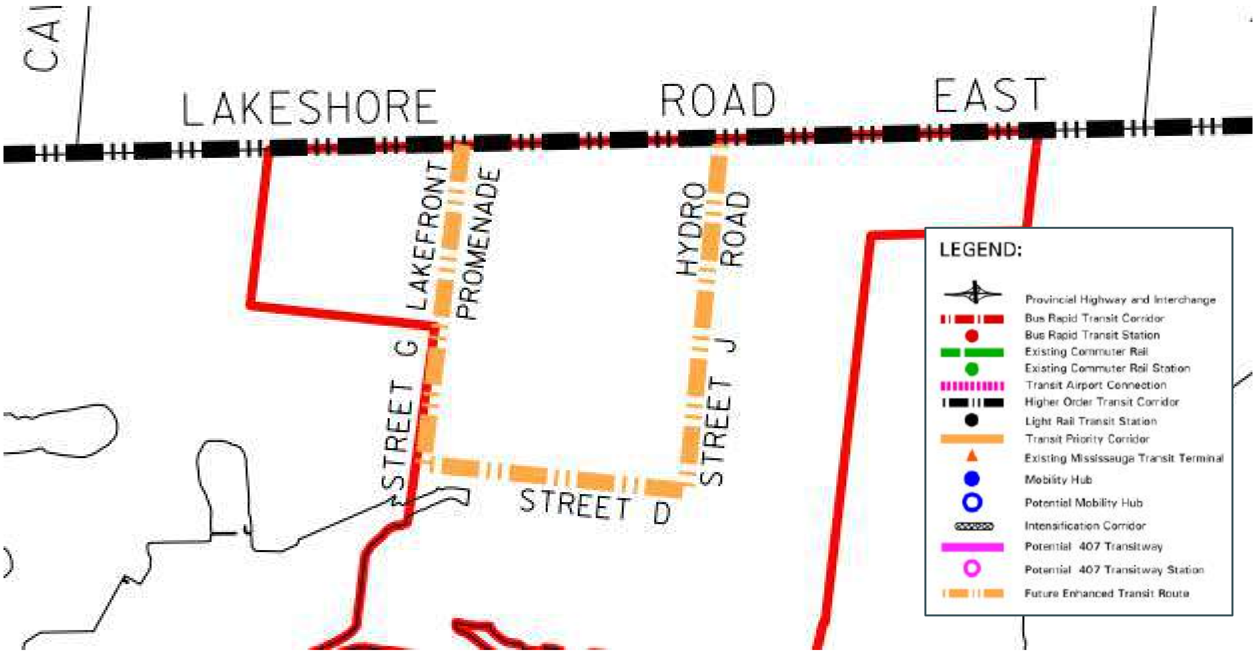


EXHIBIT 6: LAKEVIEW CHARACTER NODE LONG-TERM TRANSIT NETWORK (CITY OF MISSISSAUGA OFFICIAL PLAN: PART OF SCHEDULE 6 FROM OPA 89)

A route that passes through Rangeview, including Lakefront Promenade and Hydro Road, is identified as a "Future Enhanced Transit Route."

4.3 AREA CYCLING NETWORK

4.3.1 Existing Area Cycling Network

The existing cycling network within 500 metres of the Site area consists of multi-use trails, park trails, and signed bike routes along all sides of the Site perimeter. These cycling connections provide convenient travel opportunities for residents, employees and visitors of the surrounding area, specifically to travel using non-automobile means.

The existing and future area cycling network is described in **Table 7** and is illustrated in **Figure 14**.

TABLE 7 AREA CYCLING INFRASTRUCTURE

	Route	Type of Cycling Infrastructure	Description
North-South	Ogden Avenue	Signed Bike Route	Signed bike route, shared between cyclists and motorists, that travels along Ogden Avenue from Lakeshore Road East to near South Service Road. Via the Ogden-Isley Pedestrian Bridge, the route continues north via Stanfield Road, accessing The Queensway, Dundas Street East, Bloor Street, Burnhamthorpe Road East, and Eastgate Parkway.
East-West	Waterfront Trail	Park Trail	Park trail that travels along the waterfront, generally south of Lakeshore Road East, providing an east-west connection from Winston Churchill Boulevard, near the City's west limits, to the City of Toronto, beyond the City's east limits.

4.3.2 Planned Area Cycling Network

4.3.2.1 Lakeshore Connecting Communities TMP

The Lakeshore Connecting Communities Transportation Master Plan (TMP), introduced in **Section 3.3**, proposes to incorporate uni-directional, off-road cycling facilities in each boulevard along the Lakeshore Road East corridor. The Site area is located in Segment 7 of the study corridor and the preferred ROW alternative is to construct separated 2.0 metre bike lanes along both sides of the Lakeshore corridor with a 0.5 metre buffer from the vehicular travel lane.

It is noted that the City of Mississauga Cycling Master Plan 2018 also includes this route.

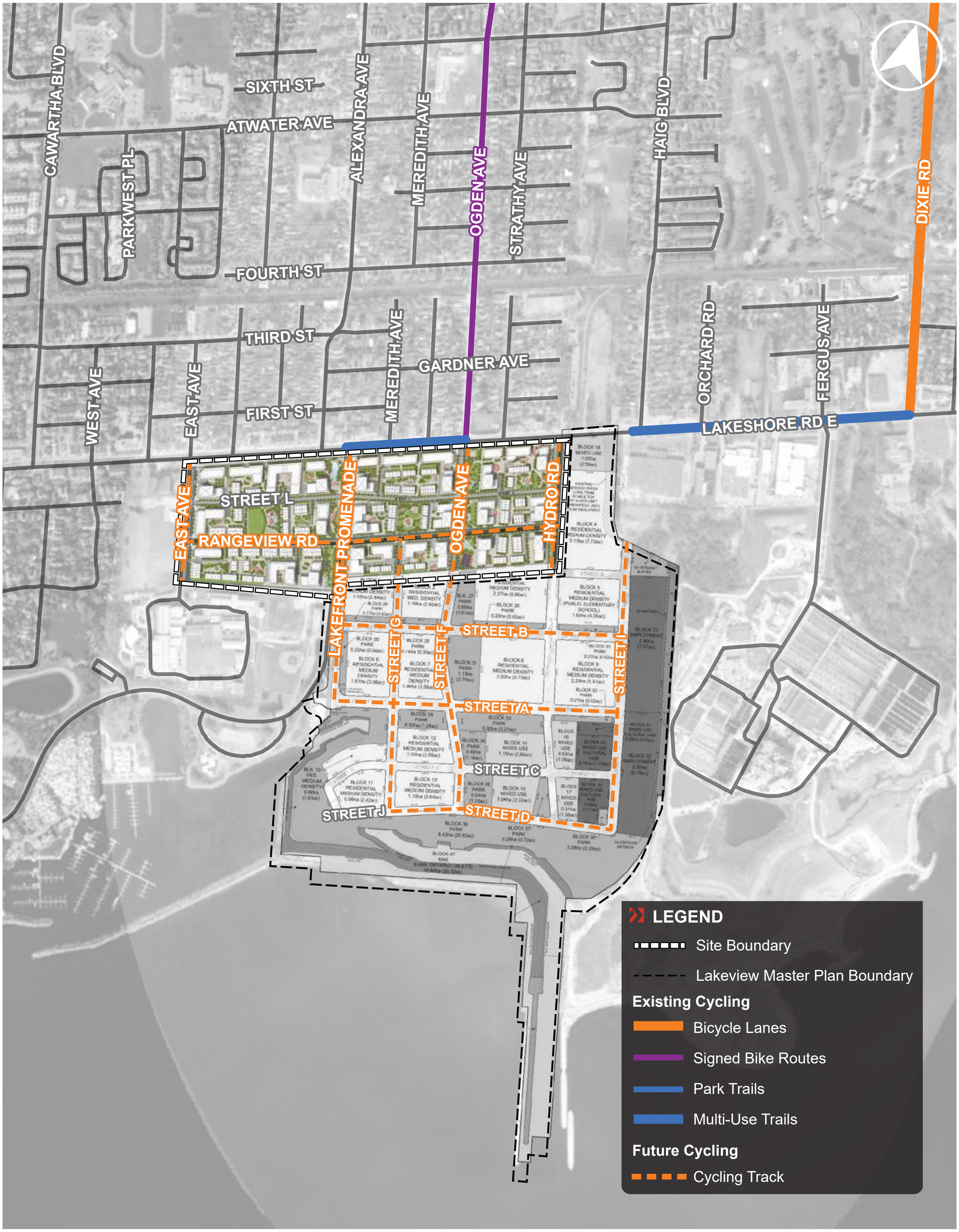


FIGURE 14 EXISTING AND FUTURE AREA CYCLING NETWORK

4.3.2.2 City of Mississauga OPA 125

As part of OPA 125, cycling route provisions south of Lakeshore Road East were identified, as illustrated below in **Exhibit 7**. Within OPA 125, a series of 'Primary Off-Road Routes' and 'Primary On-Road / Boulevard Routes' are illustrated primarily within Lakeview Village as part of the street network planned for the latter.

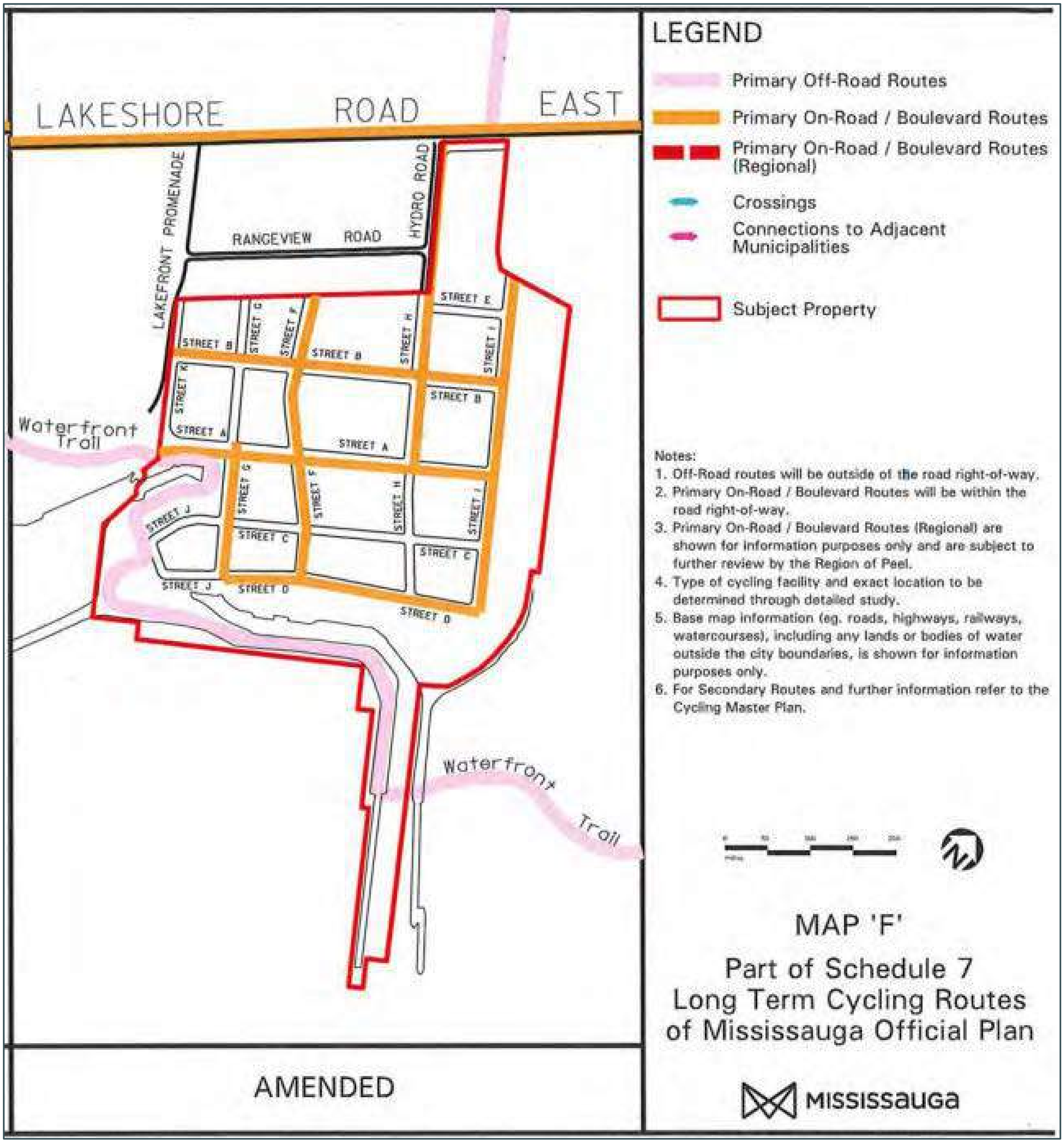


EXHIBIT 7: LAKEVIEW VILLAGE CHARACTER NODE LONG-TERM CYCLING ROUTES (CITY OF MISSISSAUGA OFFICIAL PLAN: PART OF SCHEDULE 7 FROM OPA 125)

4.4 AREA PEDESTRIAN CONTEXT

4.4.1 Existing Pedestrian Context

Within a 500-metre radius of the Site, numerous parks, such as the Douglas Kennedy Park and volleyball courts, can be accessed as well as various amenities along the Lakeshore corridor such as a dentist, pharmacy, convenience store, health centre, fast food outlets and restaurants, among other retail services. The Site is also within walking distance of a plaza which includes a drug store, Canada Post outlet, and multiple eateries, the Lakeside Montessori School, and various places of worship. The remainder of the Site area includes commercial buildings and warehouses oriented towards automobile repair services, industrial manufacturing and self-storage.

In the vicinity of the Site, the existing pedestrian environment facilities pedestrian movements with efficient connections. Lakeshore Road East has sidewalks on both sides of the roadway, although the sidewalks along the south side are directly adjacent to vehicle travel lanes. There is opportunity to improve the pedestrian facilities along the local roads within and bounding the Site, including Rangeview Road, Hydro Road, Lakefront Promenade, and East Avenue, as each of these roads only have sidewalk facilities on one side of the roadway. Moreover, signalized intersections and marked pedestrian crossings are provided along Lakeshore Road East at East Avenue and Lakefront Promenade, but not at Hydro Road. All sidewalks within and bounding the Site have curb cuts at intersections.

4.4.2 Planned Pedestrian Context

The Site includes a proposed street network that will develop an urban pedestrian environment with wider sidewalk widths on most of the proposed streets and pedestrian mews areas to generate pedestrian activity. Further detail pertaining to the planned street network including detailed design and cross-sections is included in **Section 4.1.2.3**.

Moreover, the planned Lakeview Village development, introduced in **Section 3.3**, will also provide a high quality, fine-grain pedestrian environment to the south of the Site.

The proposal for a new traffic signal on Lakeshore Road East at Hydro Road, will provide additional protected crossing opportunities for pedestrians. The pedestrian network proposed for Rangeview will connect to Lakeview Village's pedestrian network, with connectivity to Lake Ontario and beyond.

5.0 OPPORTUNITY: CAWTHRA GO TRANSIT STATION

Given the evolution and advancement of GO Transit in the Greater Toronto & Hamilton Area, there is potential to improve GO Transit in the vicinity of the Site with the addition of a new GO Station. Based on the proximity to local multi-modal connections and equidistance between nearby existing GO Stations on the Lakeshore West Line (approximately 2.5 km from Port Credit GO Station and approximately 2.5 km from Long Branch GO Station), a reasonable location for a new station would be east of Cawthra Road and north of Lakeshore Road East.

Within this section, a summary of ongoing GO Transit network and station planning is provided as context for the concept to introduce a GO Station to the local area which could be named Cawthra GO Station. The relevance of a potential Cawthra GO Station is that it would greatly enhance the multi-modal transportation options available to future residents and visitors to both Rangeview and Lakeview Village.

It is important to note however that as outlined in **Section 8.0**, the traffic analysis undertaken for this report confirms that the future transportation network, even **without** a new GO Station in the area, can acceptably accommodate the expected travel demands of the Rangeview Site with 5,300 residential units, along with the travel demand generated by Lakeview Village and Serson.

5.1 CAWTHRA GO STATION HISTORY

Between 2013 and 2015, Metrolinx undertook a study to identify new stations to add to the regional rail network. At this time, a “Cawthra Road GO Station” was on a list of approximately 120 “possible stations” that were analyzed. Possible Stations were scored based on three criteria: 1) transportation connectivity; 2) plans and land use; and 3) technical (construction & design). By March 2015, the list was reduced to 50 stations and Cawthra Road GO Station was no longer in consideration.

5.2 GO TRANSIT EXPANSION / ELECTRIFICATION UPDATE

Metrolinx is undertaking a “GO Expansion” project (formerly “Regional Express Rail”) to convert most existing rail lines (including Lakeshore West) to electric trains. The project will enable all-day, two-way service with 15-minute headways or better. A key benefit of electrification is quicker acceleration/deceleration which unlocks the potential to add more stations to electrified lines. In February 2022, Metrolinx and Infrastructure Ontario announced “Onxpress Transportation Partners” (consortium including Aecon, FCC Construcción S.A., (FCC), Deutsche Bahn, and Alstom) as the winning proponent of the program. Onxpress won the bid due to a proposal with service levels exceeding the 2018 Metrolinx Business Case Analysis, including:

- During weekday daytime periods, between 8-18 trains per hour (or 3-8 minute headways) on the busiest routes, like Lakeshore West; and
- During evenings and weekends, most stations will have 6-15 minute headways.

Construction is expected to begin in 2023, with incremental improvements to service beginning in 2025-2026.

5.3 EXISTING DEMAND FOR A CAWTHRA GO STATION

Of the three criteria utilized by Metrolinx to assess new stations from 2013-2015, a potential Cawthra GO Station merits new assessment based on two: “Transportation Connectivity” and “Plans and Land Use”.

5.3.1.1 Transportation Connectivity

As is outlined in this report in **Section 3.3** and Section **4.2.2**, a BRT in a dedicated right-of-way within Lakeshore Road East adjacent to the Site is expected to be substantially completed by 2027. There is potential for the BRT and the parallel GO Transit line to be complimentary and together, to influence travel behaviour and reduce vehicle trips.

5.3.1.2 Plans and Land Use

As is outlined in **Section 3.3**, the Lakeview Waterfront Major Node Character Area in the City of Mississauga Official Plan was recently amended in November 2021 (OPA 125). Current development provisions include 11,750 residential units, 750,000 SF office GFA, 750,000 SF research & development GFA, 165,000 SF retail GFA, 850 student elementary school, 39 student daycare, approved “as-of-right.” There is substantial ridership potential if a GO Station was located in close proximity to this area.

6.0 TRANSPORTATION DEMAND MANAGEMENT PLAN

The 2020 Ontario Provincial Policy Statement (PPS) and the City of Mississauga Official Plan encourage Transportation Demand Management (TDM) as a strategy and embrace a range of TDM measures. TDM strategies will be incorporated into the Site to align with operational and functional needs including consideration for broader area infrastructure requirements.

As per the Region of Peel Sustainable Transportation Strategy, 2018-2022, TDM is: “Transportation demand management (TDM) measures encourage people to take fewer and shorter vehicle trips to support transit and active transportation choices, enhance public health and reduce harmful environmental impacts.”

The City of Mississauga Official Plan includes the following policies regarding TDM:

- 8.1.8: “To better utilize existing infrastructure, Mississauga will encourage the application of transportation demand management (TDM) techniques, such as car-pooling, alternative work arrangements and shared parking.”
- 8.4.7(f): “coordinating parking initiatives with transportation demand management (TDM) programs in order to effectively link transit planning, parking and other related issues in a comprehensive manner”
- 8.5.2: “Mississauga will work with other levels of government, agencies and the private sector to encourage TDM measures.”
- 8.5.7: “Prior to approval of development applications, particularly those that will generate significant employment opportunities, a TDM plan may be required …”

6.1 OBJECTIVE & GOALS

Transportation Demand Management (TDM) strategies have been developed for the proposed development to guide the provision of viable alterative personal transportation options beyond the single occupant, private automobile. The overarching goals of the TDM strategy are to:

- Significantly reduce the number of private automobile-based trips made to/from the site;
- Promote the use of more active and sustainable modes of transportation;
- Increase travel efficiency and transit linkages;
- Emphasize internal trips by non-auto modes of travel; and
- Reduce climate change emissions, air quality and overall health.

To achieve the objective and goals, a series of mobility strategies and corresponding TDM measures are outlined and have been incorporated into the design and future operations of the proposed Site.

6.2 STRATEGIES

TDM strategies include the application of various site design elements and operational policies that have the goal of redistributing and reducing the travel demand of a project, specifically that of single occupancy private vehicles. The proposed TDM objectives can be achieved by influencing mobility choice and patterns through the following site plan strategies:

- Create a Complete Connected Community
- Enhance the Public Realm and Pedestrian Mobility
- Facilitate and Increase Transit Use
- Encourage Cycling Use
- Provide Last-Mile solutions (micro-mobility)
- Low Minimum Parking Requirements
- Encourage Reduced Auto Ownership and Use

Several of TDM strategies identified above (i.e. public transit fare integration and the implementation of a bike share and/or scooter share network) require additional support at the Municipal, Regional, and / or Provincial levels to truly enable a shift in travel behaviour for residents, visitors and employees of the site.

This comprehensive framework has been developed to serve as a guideline for the implementation of effective TDM strategies at the master plan level and will continue to be refined through the site design stage and in its operations following the full redevelopment of the property.

6.3 PROPOSED TDM MEASURES

6.3.1 Create a Complete Connected Community

The proposed development incorporates a mix of mutually-supportive land uses, inclusive of residential and retail, located adjacent to significant employment land uses within Lakeview Village, that are integrated by a new street network that has been designed to facilitate and encourage transit and active modes of travel throughout the Site.

The provision of mutually-supportive land uses fosters a relationship across the Site that allows each use to serve and support one another. This represents a substantial shift from the existing building form to a more walkable, urban, mixed-use neighbourhood. This dynamic combination of uses encourages the “internalization” of site trips, both within the site and within the neighbourhood; there will be many trips that could be made within walking / cycling distance. The need for residents, employees, and visitors to make trips outside of the site and surrounding area to address daily needs will be reduced, thereby, reducing the need for trips to be made utilizing automobiles.

Furthermore, the design of the street network takes into account the needs of all modes of travel and ensures the development of a complete network. The proposed street network creates fine-grain street and block connections, creating a level of porosity across the site that will enable efficient pedestrian and active travel.

Numerous park / open spaces are also proposed throughout the site which will improve the at-grade permeability of the area and integrate the site with the local pedestrian system.

Finally, the proposed density, mix of uses, and enhanced street network provides opportunities to support micro mobility options that provide strong non-auto connections to the surrounding area.

TDM Considerations

- Complimentary mix of land uses will result in the internalization of daily trips within the site and neighbourhood that can be made by foot / bike, reducing the need for a personal automobile;
- Design of a fine-grained, permeable street network that supports all modes of travel; and
- Proposed density and mix of land uses provide greater opportunities to support local area transit services and other micro-mobility options that encourage non-auto modes of travel to the surrounding area.

6.3.2 Enhance Public Realm and Pedestrian Mobility

The Site, in its current orientation, was designed to prioritize the movement of vehicles with an emphasis on large surface parking lots serving automobile-oriented retail and automotive uses. For the most part, the surrounding streets are less desirable places to walk with limited pedestrian crossing opportunities and sidewalks generally only on one side of the road.

The proposed plan contains elements that aim to emphasize the pedestrian realm. Enhanced pedestrian facilities (wide sidewalks, attractive boulevards) and off-street connections through the Site will make walking a more attractive option.

Streetscape improvements will improve pedestrian comfort; these could include (but are not limited to) expanding sidewalk widths, increasing crossing opportunities, and providing street furniture and landscaping.

Convenient and direct pedestrian connections to area transit stops will be prioritized in the development of the Master Plan to ensure that public transit remains the preferable mode for trips that are to be made outside the local neighbourhood.

As much as possible, access to loading and parking facilities will be strategically located and consolidated in the site plan to minimize interference with the vibrant pedestrian realm.

Ultimately, each of these measures that will be integrated into Site plan designs will increase and facilitate pedestrian activity emanating from the site.

TDM Considerations

- Streetscape improvements will improve pedestrian comfort.
- The proposed street network and development blocks have been designed keeping in mind the need for direct and convenient pedestrian connections throughout the site.
- Access to loading and parking facilities will be minimized and strategically located in the Site Plan to minimize interference with the vibrant pedestrian realm.

6.3.3 Facilitate and Increase Transit Use

The northern boundary of the Site is adjacent to the planned Lakeshore BRT which will facilitate access across the extent of Mississauga's waterfront and several GO Stations. Given the size of the Site, providing strong active linkages and other last-mile solutions are essential to connect residents and visitors across the site to the area transit network. The proposed street and active network for the Site was designed to facilitate transit access for all users by emphasizing the public realm and creating direct pedestrian connections.

The integration of local transit from the onset of development is a high priority for the Site in order to encourage residents and visitors to utilize transit as a primary mode of travel and build travel behaviours that are supportive of the TDM Plan.

To this end, transit incentives (i.e. pre-loaded PRESTO cards) will be offered to first-time occupants of residential units to persuade them to use public transit for a period of time and establish this modal choice as a habit.

Notwithstanding that the Site is located along the Lakeshore Road corridor and therefore in proximity to the TTC at Long Branch Station, there is currently no fare integration between these transit agencies (i.e. MiWay and TTC). In order to encourage transit as a viable (and affordable) mode choice, Peel Region, the City of Mississauga and the City of Toronto should consider possible fare integration to promote transit use.

Lastly, as outline in **Section 5.0**, the opportunity to locate a new GO Station east of Cawthra Road along the Lakeshore West GO Transit rail line should be considered.

TDM Considerations

- Facilitate connections to and from public transit (along the Lakeshore Road East corridor) from the on-set of development to achieve desired modal shift.
- Provide a well-connected pedestrian network facilitating transit access for all users.
- Provide pre-loaded PRESTO cards to all first-time occupants of residential units.
- Encourage Peel Region, the City of Mississauga, and City of Toronto to consider possible fare integration opportunities to promote regional transit use.

6.3.4 Encourage Cycling Usage

To encourage cycling as a viable mode of travel for residents and visitors of the proposed development, significant infrastructure investments have been considered (cycling lanes, bicycle parking, bicycle repair facilities).

Most of the proposed street network will include two-way, in-boulevard cycle tracks (see **Section 4.1.2.3**) and connect to an external street (Lakeshore Road East) that is planned to be a cycling corridor as part of the Lakeshore Connecting Communities BRT (see **Section 4.3.2**).

Each development block is intended to include secure bicycle parking for residents and employees and at-grade or below grade bicycle parking for visitors. Bicycle parking provisions will be consistent with the minimum bicycle parking requirements of Zoning By-law 0225-2007 which were recently updated in 2022 as a result of the *Parking Regulations Study*.

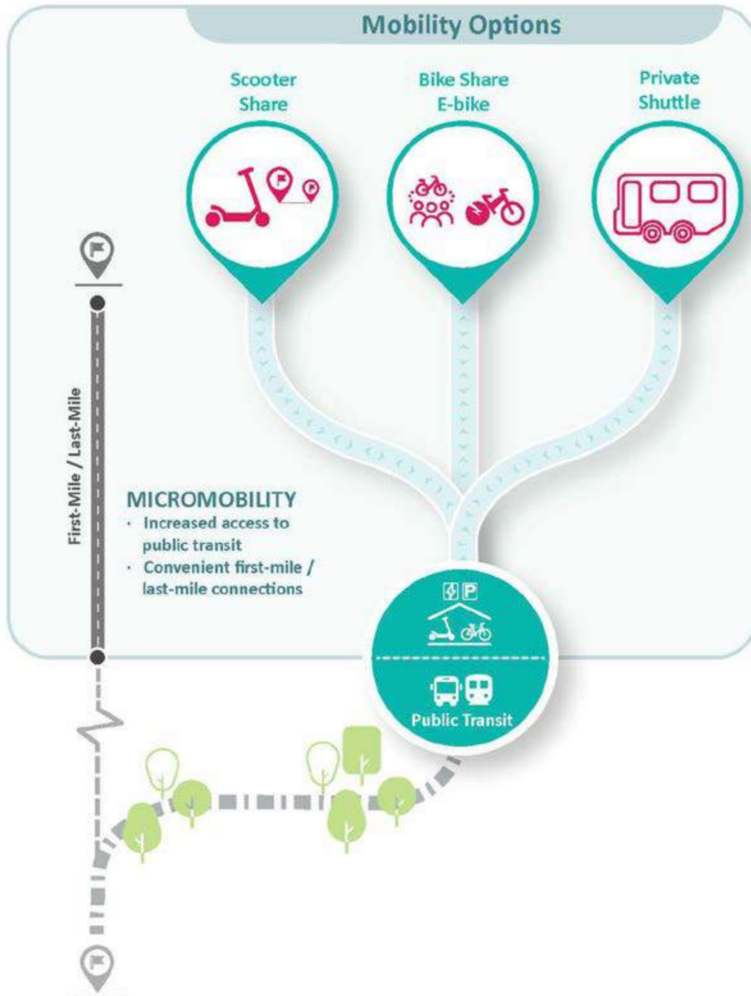
Bicycle repair facilities may be provided within each development's bicycle parking facility. With cycling uptake expected to be high, providing infrastructure to assist with quick and easy bicycle repairs would add convenience for prospective cyclists.

TDM Considerations

- Two-way, in-boulevard cycle tracks are provided along internal streets that will connect to the planned regional cycling network.
- Secure bicycle parking will be provided for residents and at-grade bicycle parking for visitors throughout the site.
- Bicycle repair facilities will also be integrated into each development block in order to facilitate quick and easy bicycle repairs.

6.3.5 Micro-Mobility

In order to shift travel behaviour towards more sustainable modes of travel, the provision of convenient first-mile / last-mile trip connections to public transit or local amenities are required. These solutions help fill gaps in the area transportation network that otherwise would result in people opting for a private vehicle (i.e. needing to walk over a kilometre to a transit stop).



Bicycle and scooter sharing form part of the overall Mobility Strategy to maximize connections to transit and encourage sustainable local travel. This type of shared system, if deployed, would provide excellent opportunities to connect area residents to future rapid transit along Lakeshore Road East (and a potential Cawthra GO Station). Longer distance cycling trips to destinations like Long Branch GO station would be achievable with the planned implementation of a continuous cycling corridor on Lakeshore Road East connecting the site with the train station.

The City of Mississauga is currently undertaking an "E-Scooter Pilot" including "*studying how a shared program of publically available bicycles, pedal-assist bicycles (e-bikes) or electric scooters (e-scooters) could be used for travel in Mississauga*." In December 2020, City Council approved the implementation of an interim e-scooter strategy intended to operate within the five-year e-scooter pilot program launched by the Province of Ontario. In Mississauga, e-scooters are permitted to operate on public roadways with a posted speed limit of 50km/h or less and on cycling infrastructure, but not within parks or off-road trails.

The provision of micro mobility solutions (including bike share, scooter share, bicycle parking) should be strategically located throughout the site within smaller hub areas to ensure proximate access for residents and visitors.

TDM Considerations

- Reduced resident parking ratios that are reflective of contemporary parking policy in Canada, good transportation planning, and the good transit afforded to the site (planned Lakeshore BRT).
- Provision of a shared pool of visitor parking will help maximize efficiency of parking across the site.

6.3.6 Reduced Parking Provisions

An effective TDM measure that can be applied to the proposed development is the constraint of on-site vehicular parking supply. Appropriate vehicle parking management and the provision of an extensive suite of TDM measures are mutually supportive. If vehicle parking is oversupplied across the Site, residents and visitors would have less incentive to utilize the alternative, non-auto options that are available to them due to the site's favourable location and that are enhanced as part of this project. Likewise, a modest parking supply without appropriate TDM measures would negatively affect local traffic and place undue parking demand on the surrounding area.

Culminating in 2022, the City of Mississauga reviewed and updated the off-street parking regulations of Zoning By-law 0225-2007. Notably, precinct areas were introduced to stipulate different minimum parking requirements based on location within the City, influenced by proximity to higher order transit service and other factors.

The Site was identified as Precinct Area 3 and therefore, some of the following minimum parking requirements are relevant:

- Condominium Apartment, residents: 1.0 parking space per unit
- Rental Apartment, residents: 0.90 parking spaces per unit
- Apartments, visitors: 0.2 parking spaces per unit

Notably, other cities in Canada have updated minimum parking requirements in their Zoning By-laws resulting in the following:

- London (2008): Zero parking minimum downtown
- Ottawa (2016 & 2018): Zero parking minimum downtown & at LRT Stations; minimum 0.5 spaces per unit in "urban" & "inner suburban" areas
- Edmonton (2020): Zero parking minimum city-wide
- Brampton (2021): Zero parking minimum downtown and rapid transit corridors
- Vaughan (2021): minimum 0.4 spaces per unit in Vaughan Metropolitan Centre area
- Toronto (2021): Zero parking minimum city-wide

A reduced parking supply compared to the new requirements of Zoning By-law 0225-2007 will be pursued as part of future applications reflecting contemporary advancements in parking policy across Canada and reflecting good transportation planning as part of this TDM Plan.

The adoption of shared parking spaces between non-residential uses (residential visitors, commercial, retail, etc.) to maximize efficiency based on typical parking utilization patterns will also be advanced.

TDM Consideration

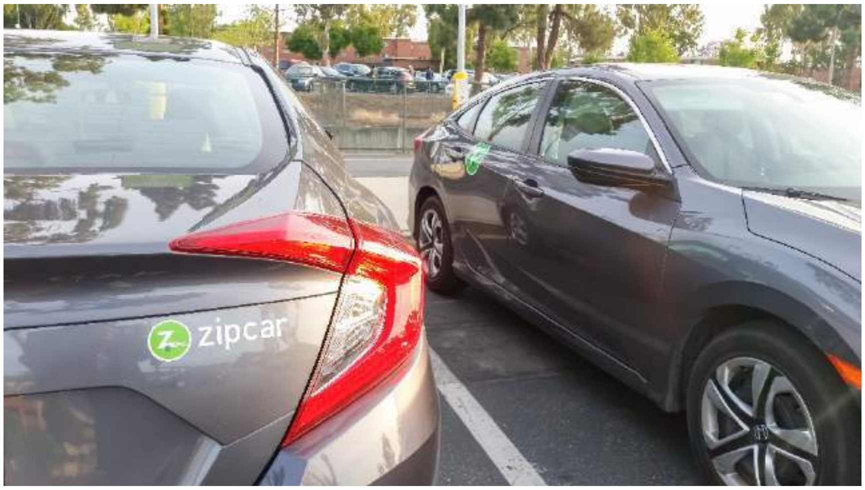
- Support the provision of bicycle and/or scooter sharing on-site to connect residents / visitors to local transit or area amenities.

6.3.7 Encourage Reduced Auto Ownership & Use

The provision of car-sharing programs is an important TDM measure because it allows residents to use automobiles as needed without requiring them to own a vehicle. By nature, this means that they make less vehicular trips, directly reducing the amount of vehicular travel emanating from the site.

While there are currently minimal car-sharing services provided in Mississauga, should these services become available, the Site would be an excellent candidate for these services.

Car-share vehicles on-site will be supported, affording an attractive alternative to vehicle ownership for future residents.



TDM Considerations

- Supporting the provision of car-share vehicles on-site to facilitate vehicle trips, as needed, as an alternative to car ownership.

7.0 MULTI-MODAL TRAVEL DEMAND FORECASTING

7.1 TRAFFIC ANALYSIS SCENARIOS

7.1.1 Summary of Traffic Analysis Scenarios

To develop the traffic analysis scenarios for this study, a number of development thresholds were tested for Rangeview to better understand the traffic-related impacts on the overall area road network. Each scenario tested was based on BA Group's understanding of the approvals for the Lakeview Village site and reflected the timing of the construction of key north-south roadway links (i.e. the extension of Ogden Avenue from Lakeshore Road East to the property line, just south of Rangeview Road and the connection of Haig Boulevard to Lakeshore Road East), along with new internal roads.

As summarized in **Table 8,** each scenario considered the total number of residential units for both Rangeview and Lakeview Village, the total non-residential GFA for Rangeview and Lakeview Village, and the road network and intersection improvements that would be in place at the time of development. The development of the Serson lands was only considered as part of Scenario 3A, with the connection of Haig Boulevard. The details of the multi-modal travel demand assessment for each scenario are provided in the following sections. The details of the traffic capacity analysis are provided in **Section 8.0**.

TABLE 8 TRAFFIC ANALYSIS SCENARIOS

Development	Scenario 1 (2031): No Ogden No Haig (with road improvements)[1]	Scenario 2 (2041): Phase 1 + Ogden connected to Lakeshore Road	Scenario 3A (2041): Phase 2 + Haig connected to Lakeshore Road	Scenario 3B (2041): Phase 2 + Dual NBL turns at Lakefront Promenade / Lakeshore Road (Haig not connected)
Rangeview	2,500 units + 0% non-residential	3,700 units + 100% non-residential	5,300 units + 100% non-residential	5,300 units + 100% non-residential
Lakeview Village	7,500 units + 1.0M ft^2 non-residential	8,050 units + 1.5M ft^2 non-residential	8,050 units + 1.5M ft^2 non-residential	8,050 units + 1.5M ft^2 non-residential
Serson	0%	0%	100%	0%
Total	**10,000 units**	**11,750 units**	**13,350 units**	**13,350 units**

7.1.2 Proposed Road Improvements

A summary of the road improvements considered for each scenario is outlined below. It is important to note that in consideration of the traffic capacity analysis, in addition to the road improvements planned for Phase 1 and 2 (extension of Ogden Avenue from Lakeshore Road East to Rangeview Road), **either** the connection of Haig Boulevard (Scenario 3a) **or** the dual northbound left-turn phase at Lakeshore Road East at Lakefront Promenade (Scenario 3b), would be required to accommodate 13,350 residential units.

Scenario 1

The road improvements considered to be complete as part of Scenario 1 are as follows:

- BRT on Lakeshore Road East;
- Construction of westbound right-turn lane at Cawthra Road and Lakeshore Road East;
- Construction of westbound right-turn lane at Dixie Road and Lakeshore Road East;
- Construction of eastbound right-turn lane at Lakefront Promenade and Lakeshore Road East;
- Northbound lanes reconfigured at Lakefront Promenade and Lakeshore Road East to include a dedicated left-turn lane and share through/right lane;
- Construction of eastbound right-turn lane at Hydro Road and Lakeshore Road East;
- Northbound lanes reconfigured at Hydro Road and Lakeshore Road East to include a dedicated left-turn lane and a shared left/through/right lane;
- Signalization of Hydro Road and Lakeshore Road East intersection, as per Lakeshore Connecting Communities BRT roll plan drawings.

Scenario 2

The road improvements considered to be complete as part of Scenario 2 include the road improvements proposed as part of Scenario 1, in addition to the completion of the extension of Ogden Avenue from Lakeshore Road East to Rangeview Road.

Scenario 3A

The road improvements considered to be complete as part of Scenario 3A include the road improvements proposed a part of Scenario 1 & 2, in addition to the completion of the connection of Haig Boulevard to Lakeshore Road East.

Scenario 3B

The road improvements considered to be complete as part of Scenario 3A include the road improvements proposed a part of Scenario 1 & 2, in addition to the implementation of a dual northbound left-turn phase on Lakeshore Road East at Lakefront Promenade.

7.2 APPROACH & METHODOLOGY

7.2.1 Study Horizons

The traffic analysis methodology for this study generally aligns with the methodology within The Municipal Infrastructure Group's (TMIG) April 2021 Traffic Considerations Report Addendum ("the 2021 April TMIG report"). The 2031 and 2041 horizons were used for the traffic analysis in order to be consistent with the 2021 April TMIG report. As the actual timing of the developments is expected to vary, the roadway improvements, along with the overall number of residential units to be developed, are the key components of the analysis.

7.2.2 Area Travel Mode Share

The existing area travel mode share does not consider the implementation of the BRT along Lakeshore Road while the future area travel mode share includes the implementation of the BRT as summarized in **Table 9** and **Table 10,** respectively. It is noted that with the implementation of the BRT, the auto driver mode share is expected to decrease from 60% (AM peak)/ 61% (PM peak) to 50% during both peak periods of the day.

Although the future travel mode share for cycling is stated as 0% in **Table 10**, for the purpose of this travel demand assessment, the future cycling travel mode share has been adjusted to 2% to account for cycling trips that would likely be generated by the sites being considered. As part of this adjustment, the auto passenger travel mode share has been reduced by 2% for each time period. The cycling travel mode share can be updated in the future when more accurate travel mode information is available. The updated future area travel mode share that includes the BA Group adjustments is provided in **Table 11**.

TABLE 9 AREA TRAVEL MODE SHARE (BEFORE BRT)

Mode of Travel	Lakeview		Port Credit		Average	
	AM	PM	AM	PM	AM	PM
Transit	11%	21%	28%	33%	20%	27%
Auto Driver	59%	61%	61%	61%	60%	61%
Auto Passenger	27%	14%	6%	4%	16%	9%
Walk	3%	4%	5%	2%	4%	3%
Cycle	0%	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Note:
1. Source:TMIG April 2021 report, Table 3.1, Page 17.

TABLE 10 AREA TRAVEL MODE SHARE (WITH BRT)

Mode of Travel	2016 TTS Average		50% Auto Driver		Difference	
	AM	PM	AM	PM	AM	PM
Transit	20%	27%	25%	35%	5%	8%
Auto Driver	60%	61%	50%	50%	-10%	-11%
Auto Passenger	16%	9%	20%	11%	4%	2%
Walk	4%	3%	5%	4%	1%	1%
Cycle	0%	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**0%**	**0%**

Note:
1. Source: TMIG April 2021 report, Table 2.3, Page 87.

TABLE 11 ADJUSTED AREA TRAVEL MODE SHARE[1] (WITH BRT)

Mode of Travel	2016 TTS Average		50% Auto Driver		Difference	
	AM	PM	AM	PM	AM	PM
Transit	20%	27%	25%	35%	5%	8%
Auto Driver	60%	61%	50%	50%	-10%	-11%
Auto Passenger	14%	7%	18%	9%	4%	2%
Walk	4%	3%	5%	4%	1%	1%
Cycle	2%	2%	2%	2%	2%	2%
Total	**100%**	**100%**	**100%**	**100%**	**0%**	**0%**

Note:
1. BA Group adjusted Table 2.3 in the TMIG April 2021 report and increased the cycling mode share to 2% for all time periods and decreased the auto passenger share by 2% for all time periods.

7.2.3 Existing Traffic Volumes

The traffic analysis for the purpose of this study did not include an assessment of existing conditions.

7.2.4 Background Traffic Volumes

To determine the background traffic volumes for this study, traffic volume layers, inclusive of site traffic volumes and background traffic volumes, were taken from the April 2021 TMIG Report. These traffic volume layers were then adjusted based upon the following:

- Development statistics considered by scenario;
- Driveway removals; and
- Proposed road network/ access points.

Traffic volume layers were then created for both the Rangeview and Lakeview Village sites that could be added to the future background layers.

A key component of the background travel demand assessment included a corridor reduction exercise that estimated how the planned BRT along Lakeshore Road could be expected to reduce traffic volumes. As part of this exercise, a total of 200 vehicles per hour were removed from through traffic volumes along Lakeshore Road, in the peak direction only, for both the morning and afternoon peak hour. The traffic volumes were then balanced and diverted as appropriate, depending on the road network being included for each scenario, thus the diversion and balancing undertaken differs by scenario.

7.3 MULTI-MODAL TRAVEL DEMAND

In order to determine the travel demand for each scenario, trip rates were established from the April 2021 TMIG report. Relevant excerpts from the April 2021 TMIG report are provided in **Appendix D**. Once the number of vehicle trips was determined, the future travel mode shares (with BRT) from **Table 11**, were applied to each scenario to establish the multi-modal travel demand. It is important to note that the travel demand for the BA Group traffic analysis is conservative as it considers Lakeview Village with a total non-residential GFA of 2.1 million ft^2, inclusive of the proposed recreational community centre GFA of 436,000 ft^2, in order to align with the traffic volume layers included with the April 2021 TMIG study. Since completion of the April 2021 TMIG report, as per TMIG's discussions with City Staff, it was agreed that these uses would be off-peak generators and traffic related to the recreational community centre has not been included in TMIG's most analysis update.

7.3.1 Multi-Modal Travel Demand: Scenario 1 – 2,500 Rangeview Residential Units

As summarized in **Table 12**, in consideration of Rangeview with 2,500 residential units and Lakeview Village with 7,500 residential units + 67% development of the non-residential, the combined sites are expected to generate a total of 2,890 and 3,054 two-way vehicle trips during the morning and afternoon peak period, respectively.

TABLE 12 VEHICLE TRIPS: SCENARIO 1 – 2,500 RANGEVIEW UNITS

Land Use	Number of Units / % Non-residential	AM Peak Hour			PM Peak Hour		
		In	Out	2-Way	In	Out	2-Way
Rangeview							
Residential	2,500 units	56	413	469	293	112	405
Office	0%	0	0	0	0	0	0
Retail	0%	0	0	0	0	0	0
	Total	**56**	**413**	**469**	**293**	**112**	**405**
Lakeview Village							
Residential	7,500 units	185	1,283	1,468	938	379	1,317
Non-Residential[1]	67% (1.4M ft^2)	669	285	953	496	835	1,331
	Total	**854**	**1,568**	**2,422**	**1,434**	**1,215**	**2,649**
Serson							
Office	0%	0	0	0	0	0	0
Research	0%	0	0	0	0	0	0
	Total	**0**	**0**	**0**	**0**	**0**	**0**
All Sites Combined							
	Total	**910**	**1,980**	**2,890**	**1,728**	**1,326**	**3,054**

Notes:
1. 67% of the total Lakeview Village non-residential development of 2.1 million ft^2 is 1.4 million ft^2.

Figures that illustrate the Scenario 1 traffic volumes are provided as follows:

- **Figure 15**: Scenario 1: 2031 Rangeview Site Traffic Volumes (2,500 units)
- **Figure 16**: Scenario 1: 2031 Lakeview Village Site Traffic Volumes (7,500 units)
- **Figure 17**: Scenario 1: 2031 Rangeview + Lakeview Village Site Traffic Volumes (10,000 units)
- **Figure 18**: Scenario 1: 2031 Future Total Traffic Volumes (10,000 units)

As summarized in **Table 13**, Scenario 1 (2,500 Rangeview units) is expected to generated 1,445 and 2,138 two-way transit trips, during the morning and afternoon peak period respectively. There are expected to be 1,040 and 550 two-way auto passenger trips, during the morning and afternoon peak period respectively and 289 and 244 two-way walking trips, during the morning and afternoon peak period respectively. With the adjusted travel mode shares for cycling trips, there are expected to be 116 and 122 two-way cycling trips, during the morning and afternoon peak period respectively.

TABLE 13 MULTI-MODAL TRAVEL DEMAND: SCENARIO 1 – 2,500 RANGEVIEW UNITS

Mode of Travel	Morning			Afternoon		
	In	Out	2-Way	In	Out	2-Way
Transit	455	990	1,445	1,209	928	2,138
Auto Driver	910	1,980	2,890	1,728	1,326	3,054
Auto Passenger	328	713	1,040	311	239	550
Walk	91	198	289	138	106	244
Cycle	36	79	116	69	53	122
Total	**1,820**	**3,961**	**5,781**	**3,455**	**2,653**	**6,108**

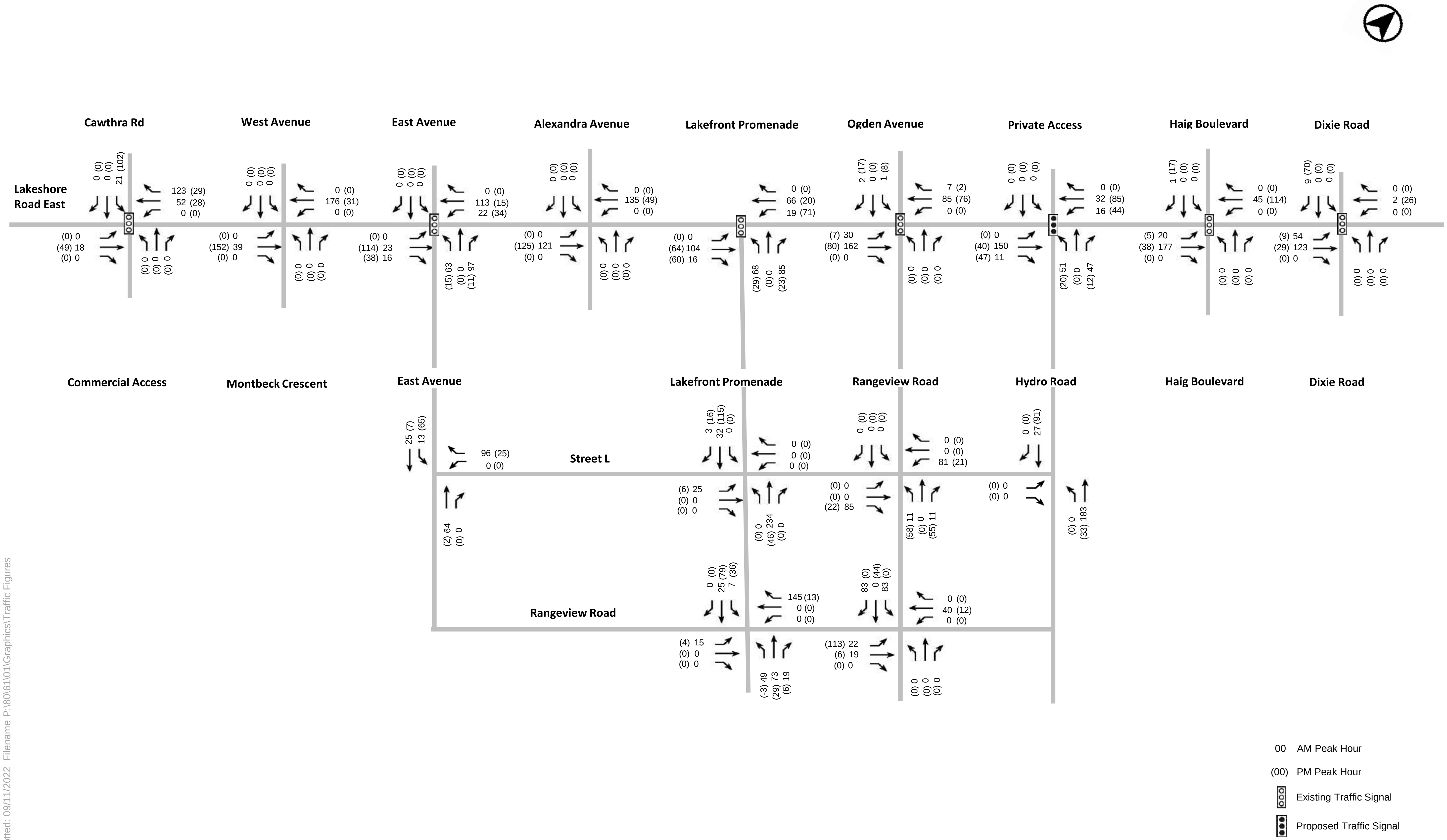


FIGURE 15 - SCENARIO 1 2031 RANGEVIEW SITE TRAFFIC VOLUMES (2,500 UNITS)

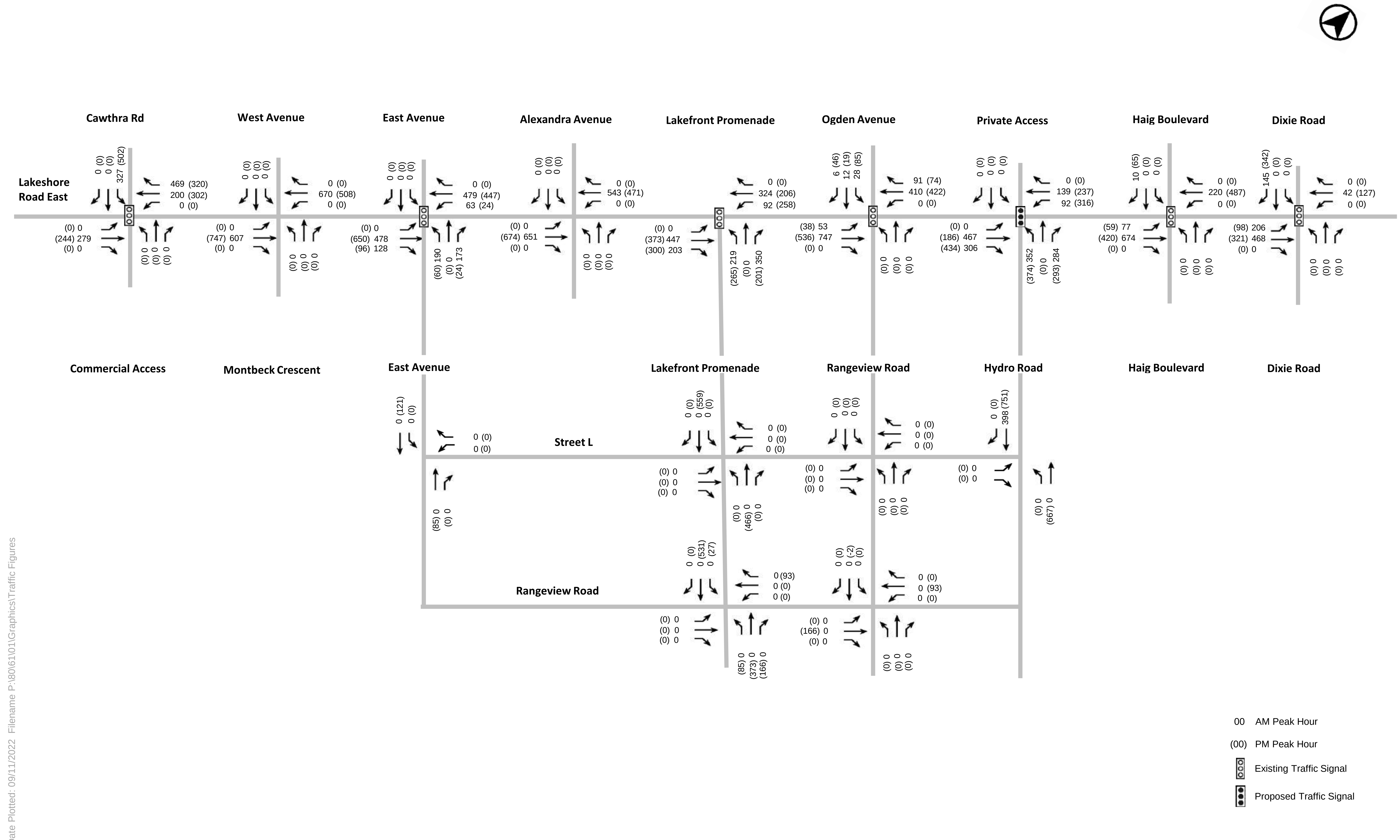


FIGURE 16 - SCENARIO 1 2031 LAKEVIEW VILLAGE SITE TRAFFIC VOLUMES (7,500 UNITS)

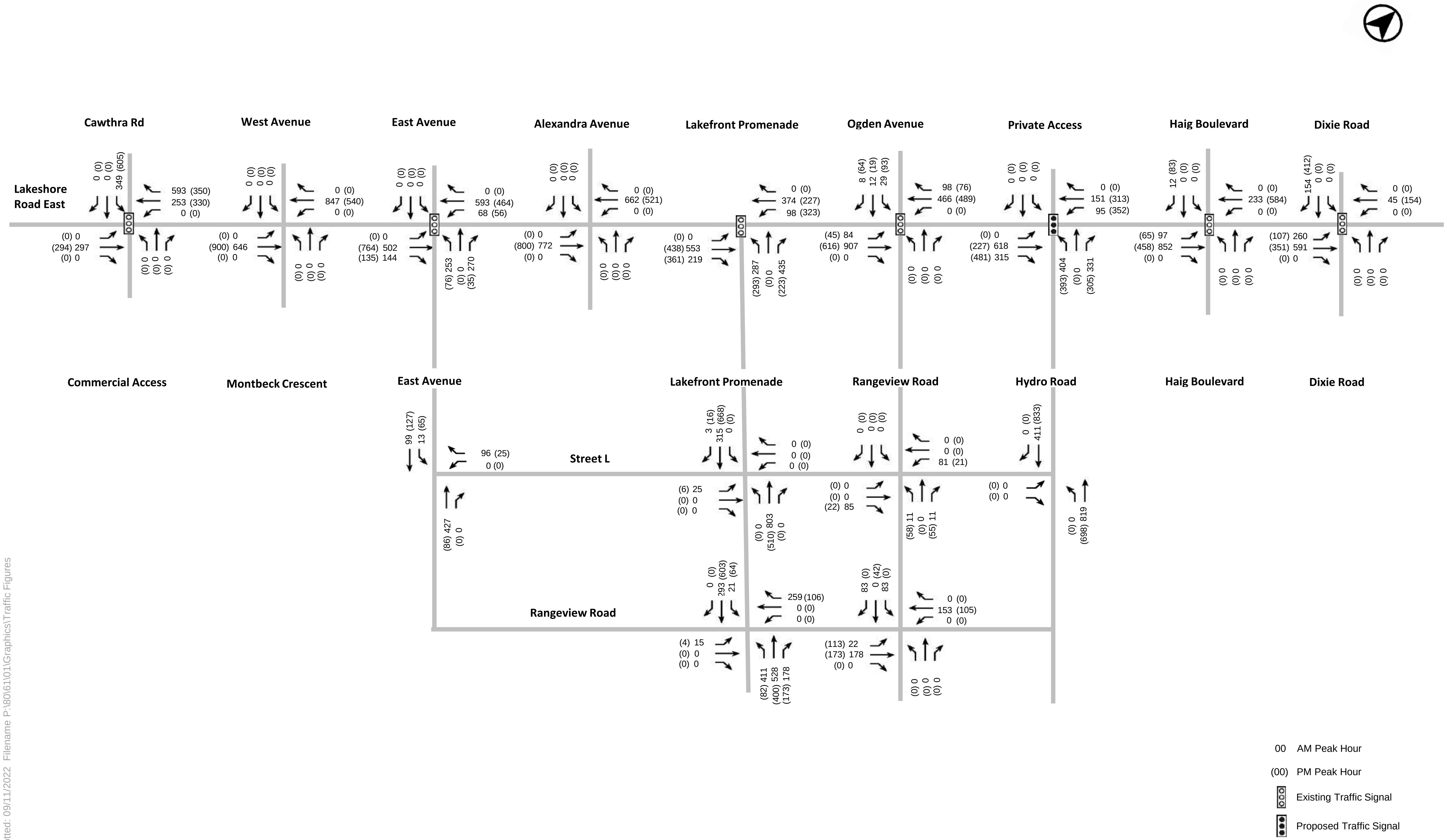


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FIGURE 17 - SCENARIO 1 2031 RANGEVIEW + LAKEVIEW VILLAGE SITE TRAFFIC VOLUMES (10,000 UNITS)

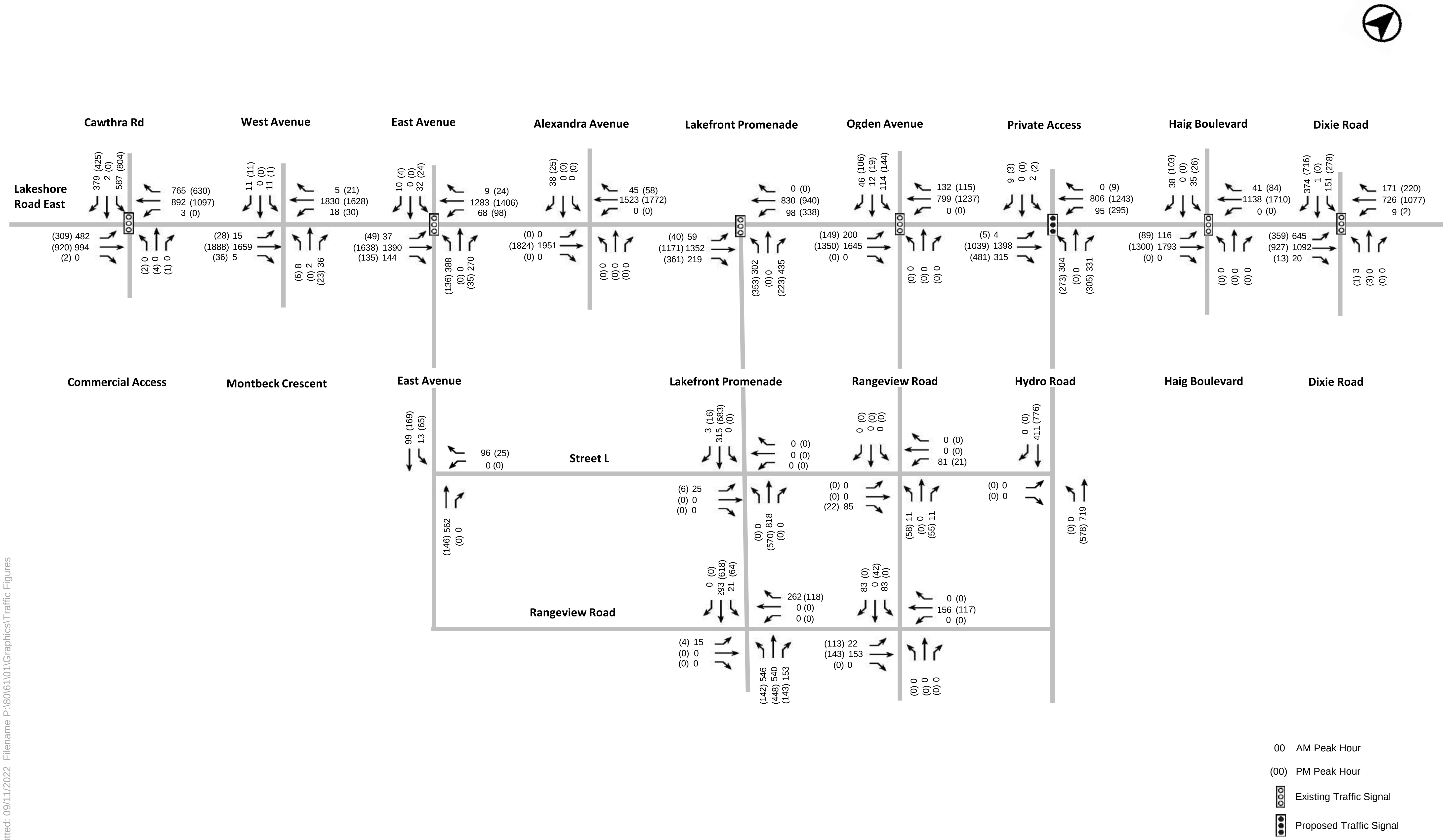

FIGURE 18 - SCENARIO 1 2031 FUTURE TOTAL TRAFFIC VOLUMES (10,000 UNITS)

7.3.2 Travel Demand: Scenario 2 – 3,700 Rangeview Residential Units (with Ogden)

As summarized in **Table 14**, in consideration of Rangeview with 3,700 residential units + 100% development of the non-residential and Lakeview Village with 8,050 residential units + 100% development of the non-residential,
the combined sites are expected to generate a total of 3,841 and 4,229 two-way vehicle trips during the morning and afternoon peak period, respectively.

TABLE 14 VEHICLE TRIPS: SCENARIO 2 – 3,700 RANGEVIEW UNITS (WITH OGDEN)

Land Use	Number of Units / % Non-residential	AM Peak Hour			PM Peak Hour		
		In	Out	2-Way	In	Out	2-Way
Rangeview							
Residential	3,700 units	83	611	694	449	172	621
Office	100% (47,500 ft^2)	33	4	37	1	22	23
Retail	100% (47,500 ft^2)	64	40	104	91	84	174
	Total	**179**	**656**	**835**	**540**	**278**	**818**
Lakeview Village							
Residential	8,050 units	199	1,377	1,576	1,007	407	1,414
Non-Residential	100% (2.1M ft^2)	1,003	427	1,430	744	1,253	1,997
	Total	**1,202**	**1,804**	**3,006**	**1,751**	**1,660**	**3,411**
Serson							
Office	0%	0	0	0	0	0	0
Research	0%	0	0	0	0	0	0
	Total	**0**	**0**	**0**	**0**	**0**	**0**
All Sites Combined							
	Total	**1,381**	**2,460**	**3,841**	**2,291**	**1,938**	**4,229**

Figures that illustrate the Scenario 2 traffic volumes are provided as follows:

- **Figure 19**: Scenario 1: 2041 Rangeview Site Traffic Volumes (3,700 units)
- **Figure 20**: Scenario 1: 2041 Lakeview Village Site Traffic Volumes (8,050 units)
- **Figure 21**: Scenario 1: 2041 Rangeview + Lakeview Village Site Traffic Volumes (11,750 units)
- **Figure 22**: Scenario 1: 2041 Future Total Traffic Volumes (11,750 units)

As summarized in **Table 15**, Scenario 2 (3,700 Rangeview units) is expected to generated 1,921 and 2,961 two-way transit trips, during the morning and afternoon peak period respectively. There are expected to be 1,383 and 761 two-way auto passenger trips, during the morning and afternoon peak period respectively and 384 and 338 two-way walking trips, during the morning and afternoon peak period respectively. With the adjusted travel mode shares for cycling trips, there are expected to be 154 and 169 two-way cycling trips, during the morning and afternoon peak period respectively.

TABLE 15 MULTI-MODAL TRAVEL DEMAND: SCENARIO 2 – 3,700 RANGEVIEW UNITS (WITH OGDEN)

Mode of Travel	Morning			Afternoon		
	In	Out	2-Way	In	Out	2-Way
Transit	691	1,230	1,921	1,604	1,357	2,961
Auto Driver	1,381	2,460	3,841	2,291	1,938	4,229
Auto Passenger	497	886	1,383	412	349	761
Walk	138	246	384	183	155	338
Cycle	55	98	154	92	78	169
Total	**2,763**	**4,919**	**7,682**	**4,582**	**3,876**	**8,459**

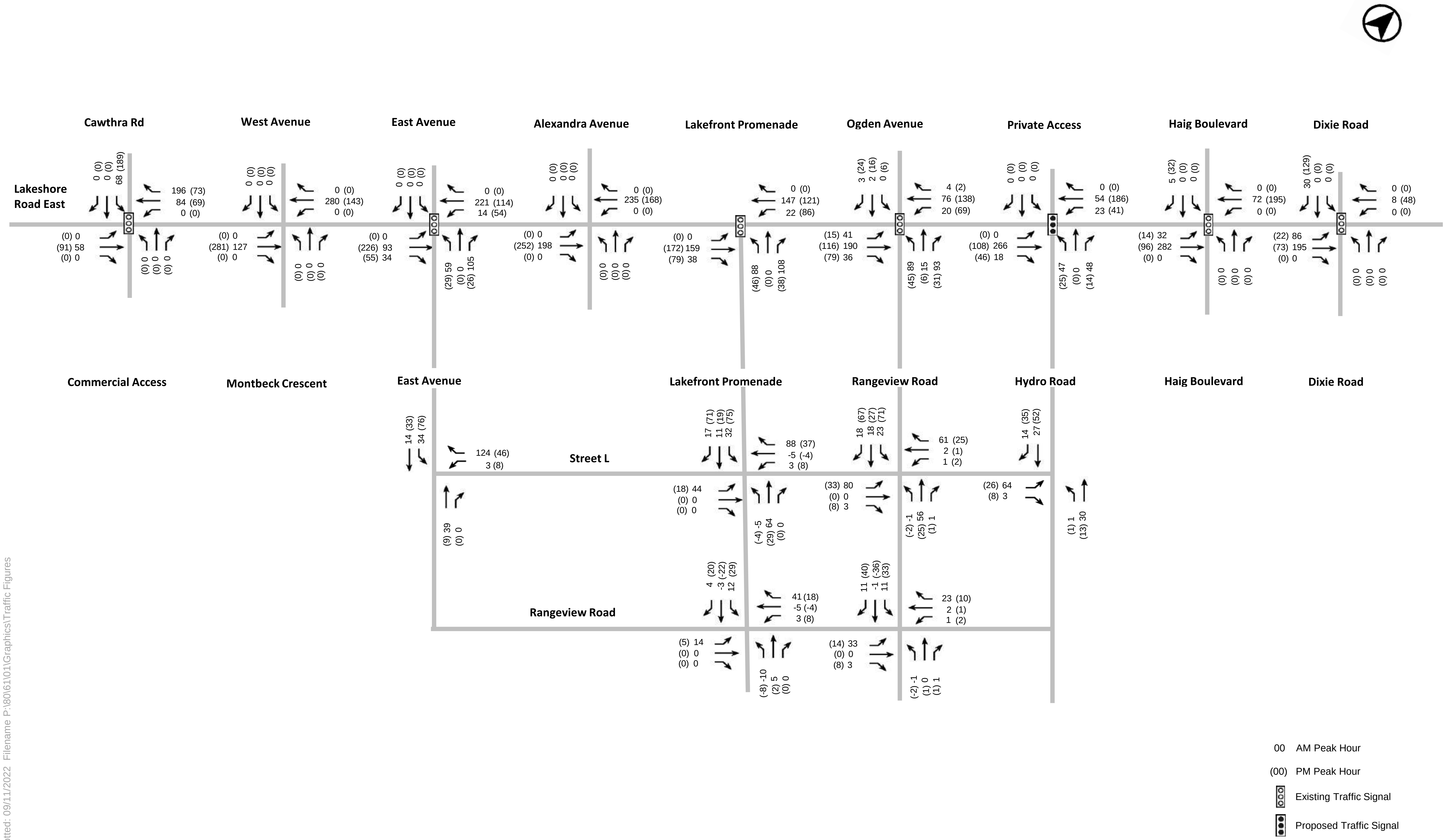

FIGURE 19 - SCENARIO 2 2041 RANGEVIEW SITE TRAFFIC VOLUMES (3,700 UNITS)

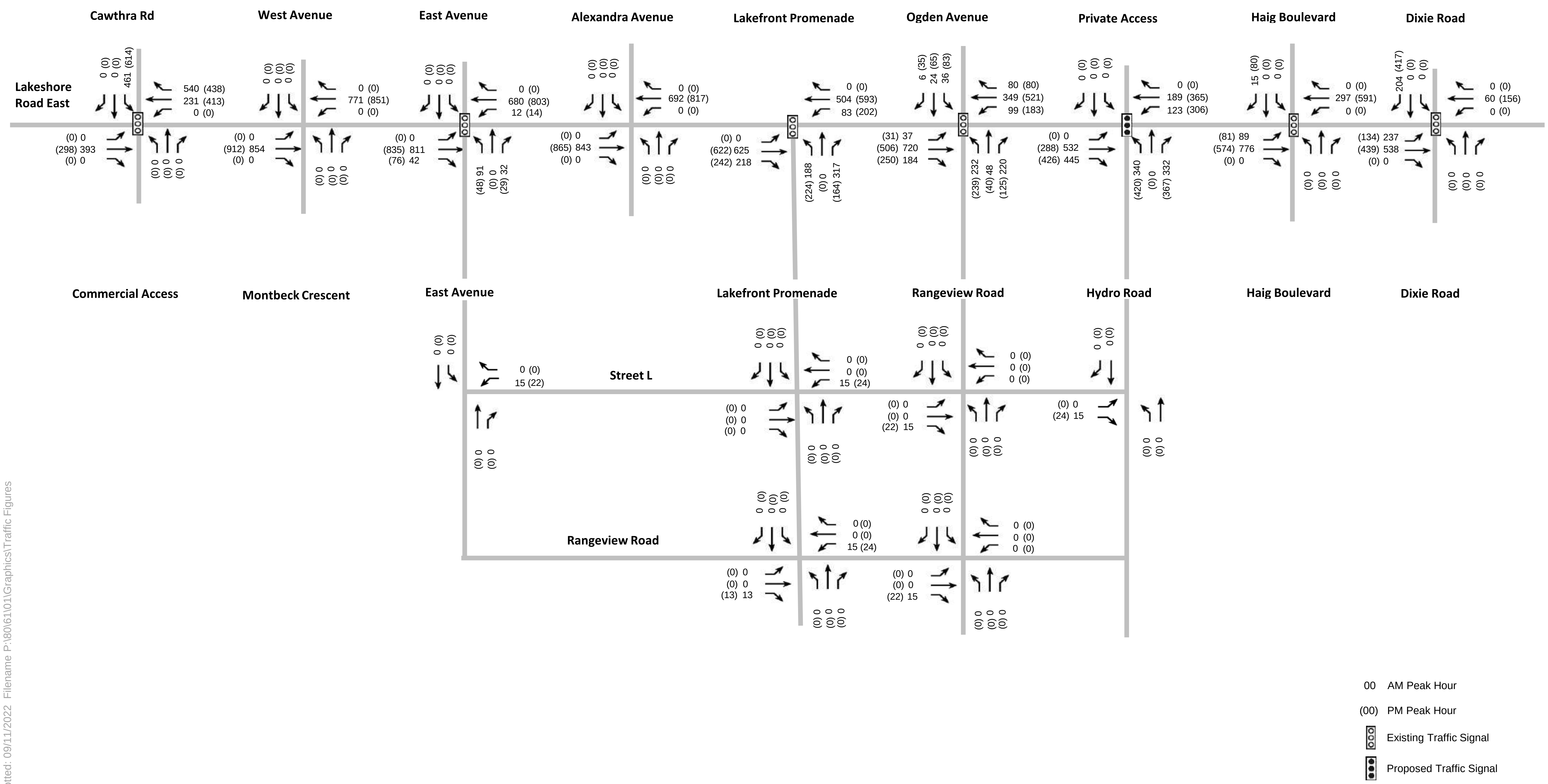

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FIGURE 20 - SCENARIO 2 2041 LAKEVIEW VILLAGE SITE TRAFFIC VOLUMES (8,050 UNITS)

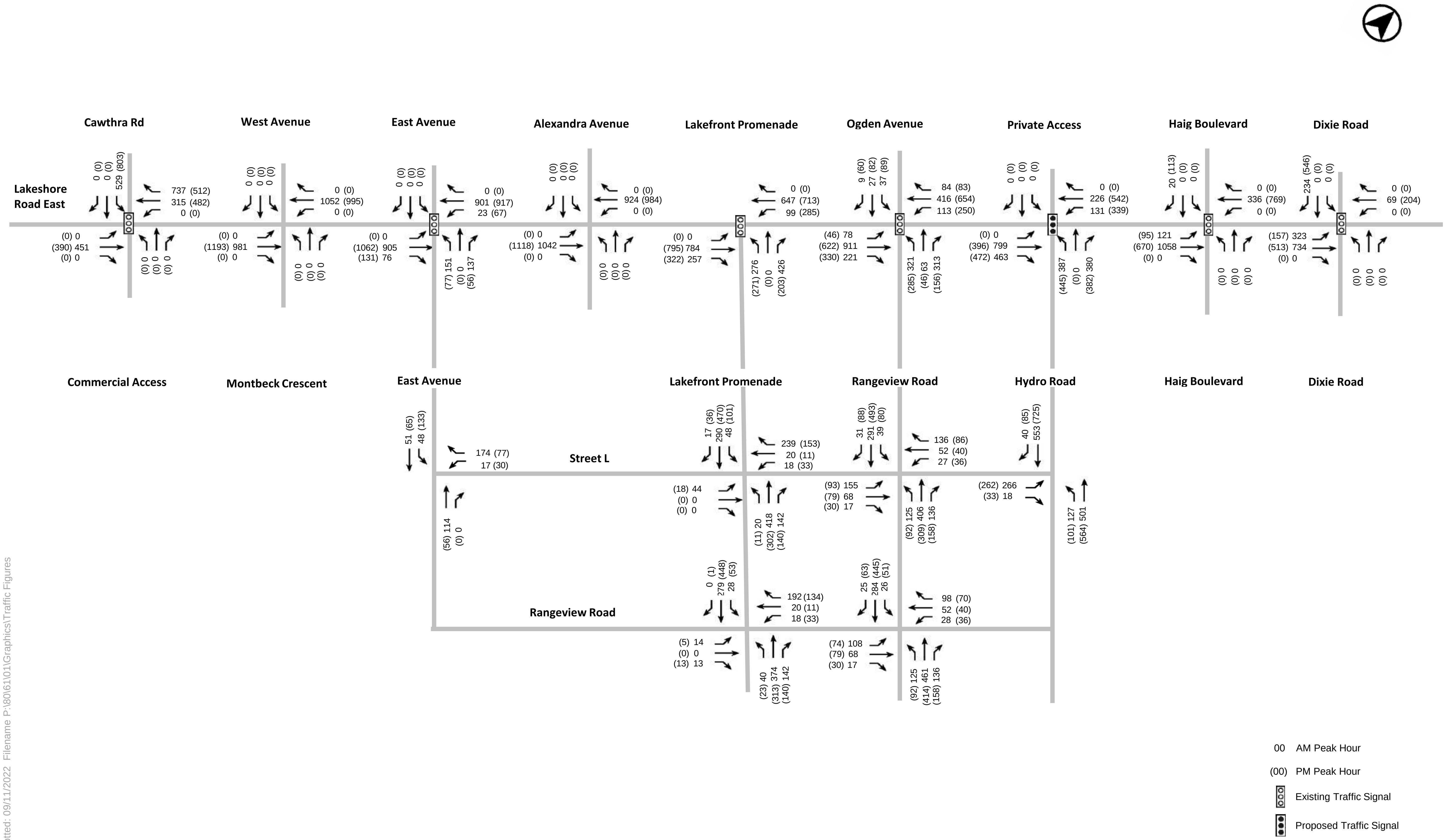

FIGURE 21 - SCENARIO 2 2041 RANGEVIEW + LAKEVIEW VILLAGE SITE TRAFFIC VOLUMES (11,750 UNITS)

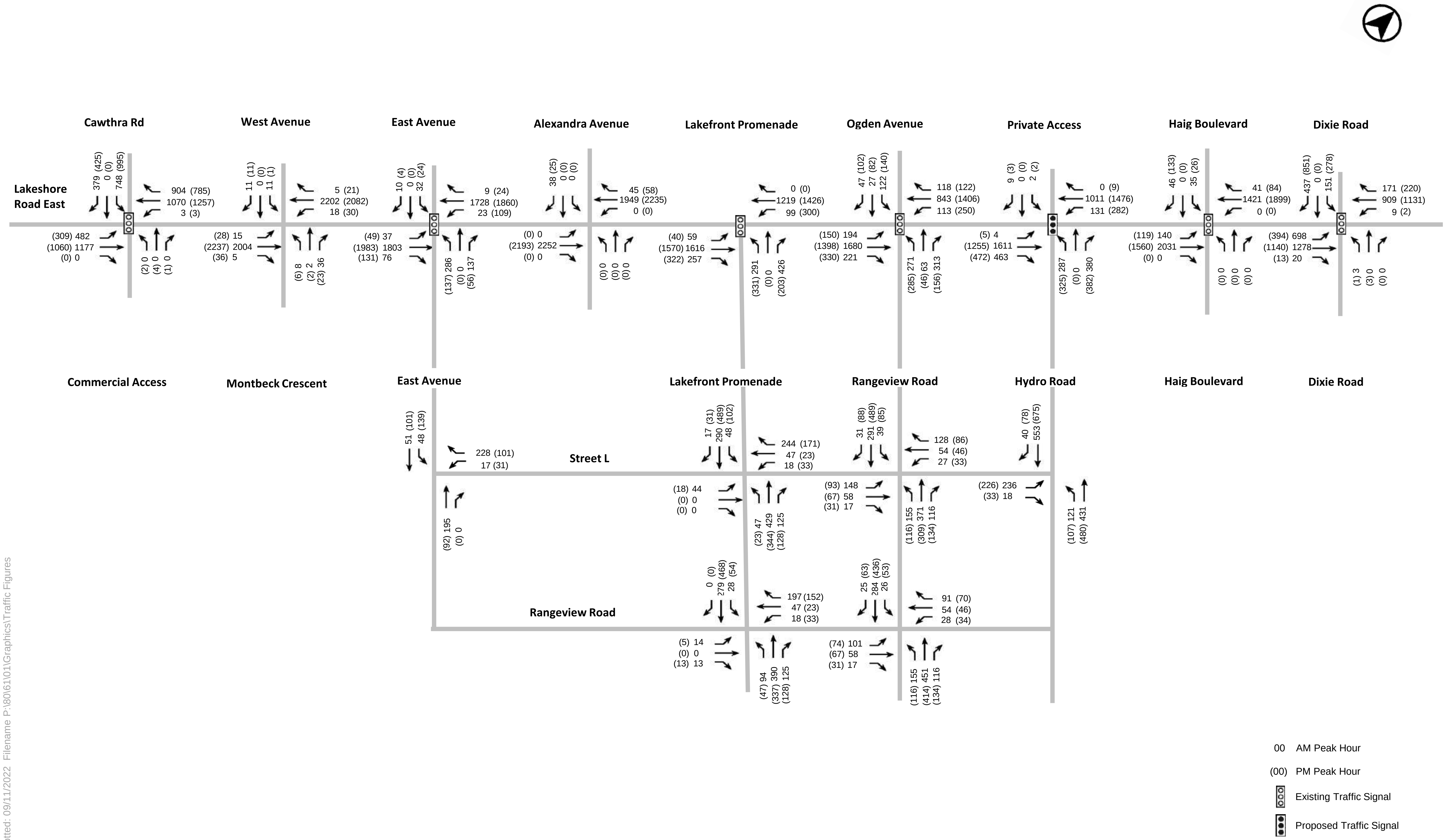

FIGURE 22 - SCENARIO 2 2041 FUTURE TOTAL TRAFFIC VOLUMES (11,750 UNITS)

7.3.3 Travel Demand: Scenario 3A – 5,300 Rangeview Residential Units (with Haig)

As summarized in **Table 16**, with the connection of Haig Boulevard, in consideration of Rangeview with 5,300 residential units + 100% development of the non-residential and Lakeview Village with 8,050 residential units + 100% development of the non-residential and 100% of the Serson lands developed, the combined sites are expected to generate a total of 4,337 and 4,739 two-way vehicle trips, during the morning and afternoon peak period, respectively.

TABLE 16 VEHICLE TRIPS: SCENARIO 3A – 5,300 RANGEVIEW UNITS (WITH HAIG)

Land Use	Number of Units / % Non-residential	AM Peak Hour			PM Peak Hour		
		In	Out	2-Way	In	Out	2-Way
Rangeview							
Residential	5,300 units	118	876	995	656	253	909
Office	100% (47,500 ft^2)	33	4	37	1	22	23
Retail	100% (47,500 ft^2)	61	40	101	91	84	174
	Total	**213**	**920**	**1,132**	**748**	**359**	**1,106**
Lakeview Village							
Residential	8,050 units	199	1,377	1576	1,007	407	1,414
Non-Residential	100% (2.1M ft^2)	1,003	427	1,430	744	1,253	1,997
	Total	**1,202**	**1,804**	**3,006**	**1,751**	**1,660**	**3,411**
Serson							
Office	100% (224,500 ft^2)	116	19	135	24	118	142
Research	100% (224,500 ft^2)	48	16	64	12	68	80
	Total	**164**	**35**	**199**	**36**	**186**	**222**
All Sites Combined							
	Total	**1,579**	**2,759**	**4,337**	**2,535**	**2,205**	**4,739**

Figures that illustrate the Scenario 3A traffic volumes are provided as follows:

- **Figure 23**: Scenario 3A: 2041 Rangeview Site Traffic Volumes (5,300 units + Haig)
- **Figure 24**: Scenario 3A: 2041 Lakeview Village Site Traffic Volumes (8,050 units + Haig)
- Figure 25: Scenario 3A: 2041 Serson Site Traffic Volumes (8,050 units + Haig)
-
- **Figure 26**: Scenario 3A: 2041 Rangeview + Lakeview Village Site Traffic Volumes (13,350 units + Haig)
- **Figure 27:** Scenario 3A: 2041 Future Total Traffic Volumes (13,350 units + Haig)

As summarized in **Table 17**, Scenario 3A (5,300 Rangeview units with Haig) is expected to generated 2,169 and 3,318 two-way transit trips, during the morning and afternoon peak period respectively. There are expected to be 1,561 and 853 two-way auto passenger trips, during the morning and afternoon peak period respectively and 434 and 379 two-way walking trips, during the morning and afternoon peak period respectively. With the adjusted travel mode shares for cycling trips, there are expected to be 173 and 190 two-way cycling trips, during the morning and afternoon peak period respectively.

TABLE 17 MULTI-MODAL TRAVEL DEMAND: SCENARIO 3A – 5,300 RANGEVIEW UNITS (WITH HAIG)

Mode of Travel	Morning			Afternoon		
	In	Out	2-Way	In	Out	2-Way
Transit	789	1,379	2,169	1,774	1,543	3,318
Auto Driver	1,579	2,759	4,337	2,535	2,205	4,739
Auto Passenger	568	993	1,561	456	397	853
Walk	158	276	434	203	176	379
Cycle	63	110	173	101	88	190
Total	**3,157**	**5,518**	**8,675**	**5,069**	**4,410**	**9,479**

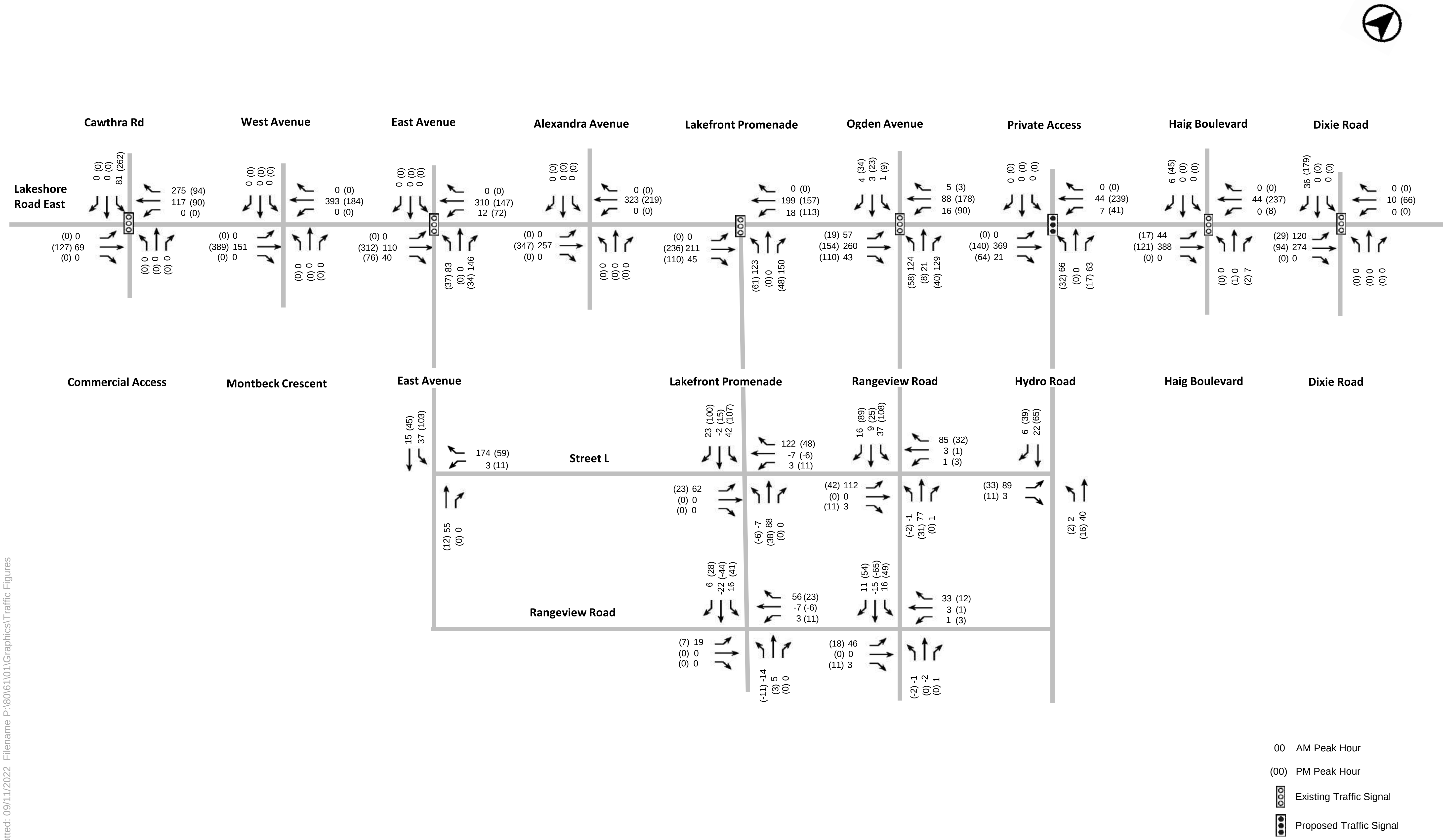

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FIGURE 23 - SCENARIO 3A 2041 RANGEVIEW SITE TRAFFIC VOLUMES (5,300 UNITS + HAIG)

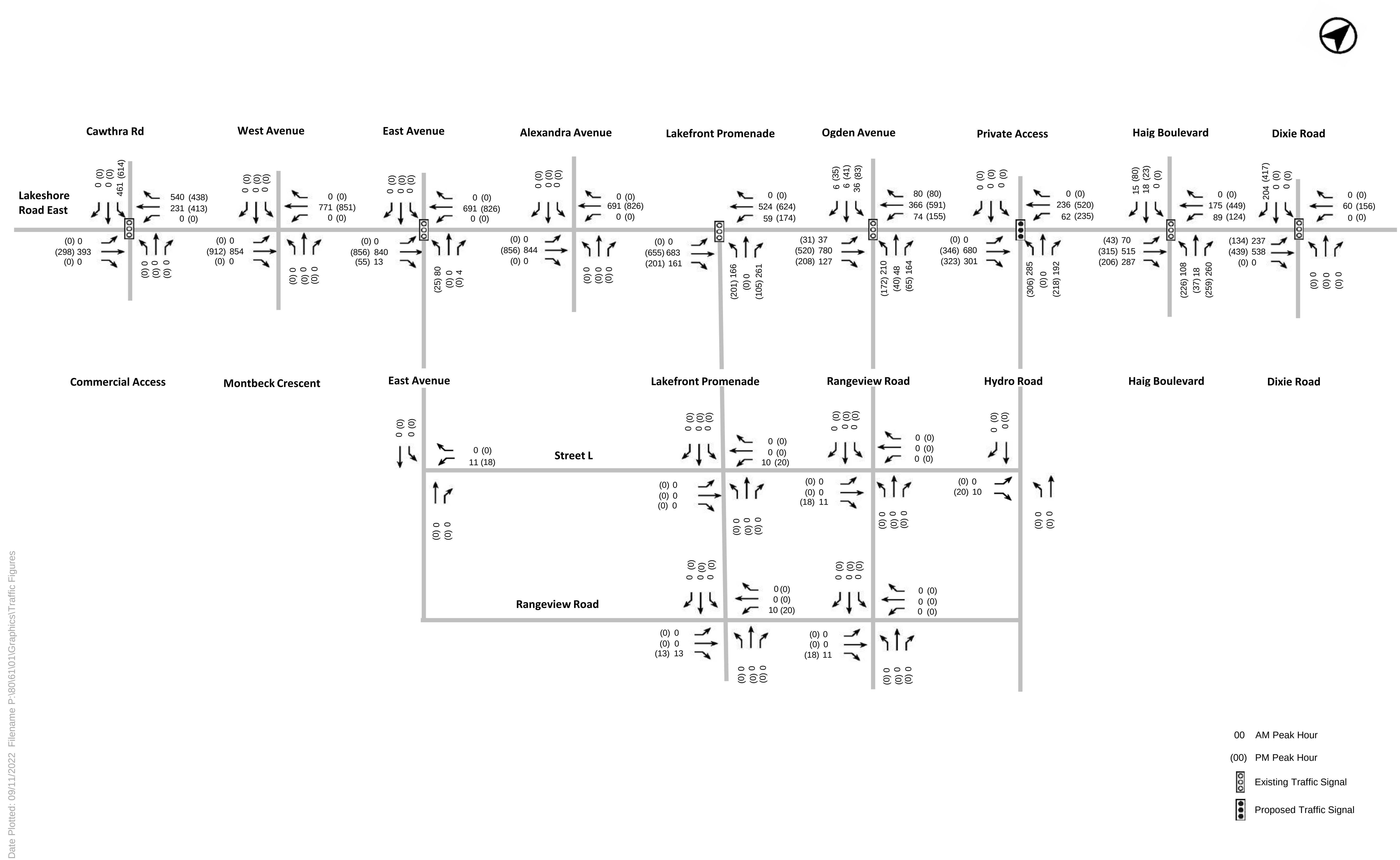


FIGURE 24 - SCENARIO 3A 2041 LAKEVIEW VILLAGE SITE TRAFFIC VOLUMES (8,050 UNITS + HAIG)

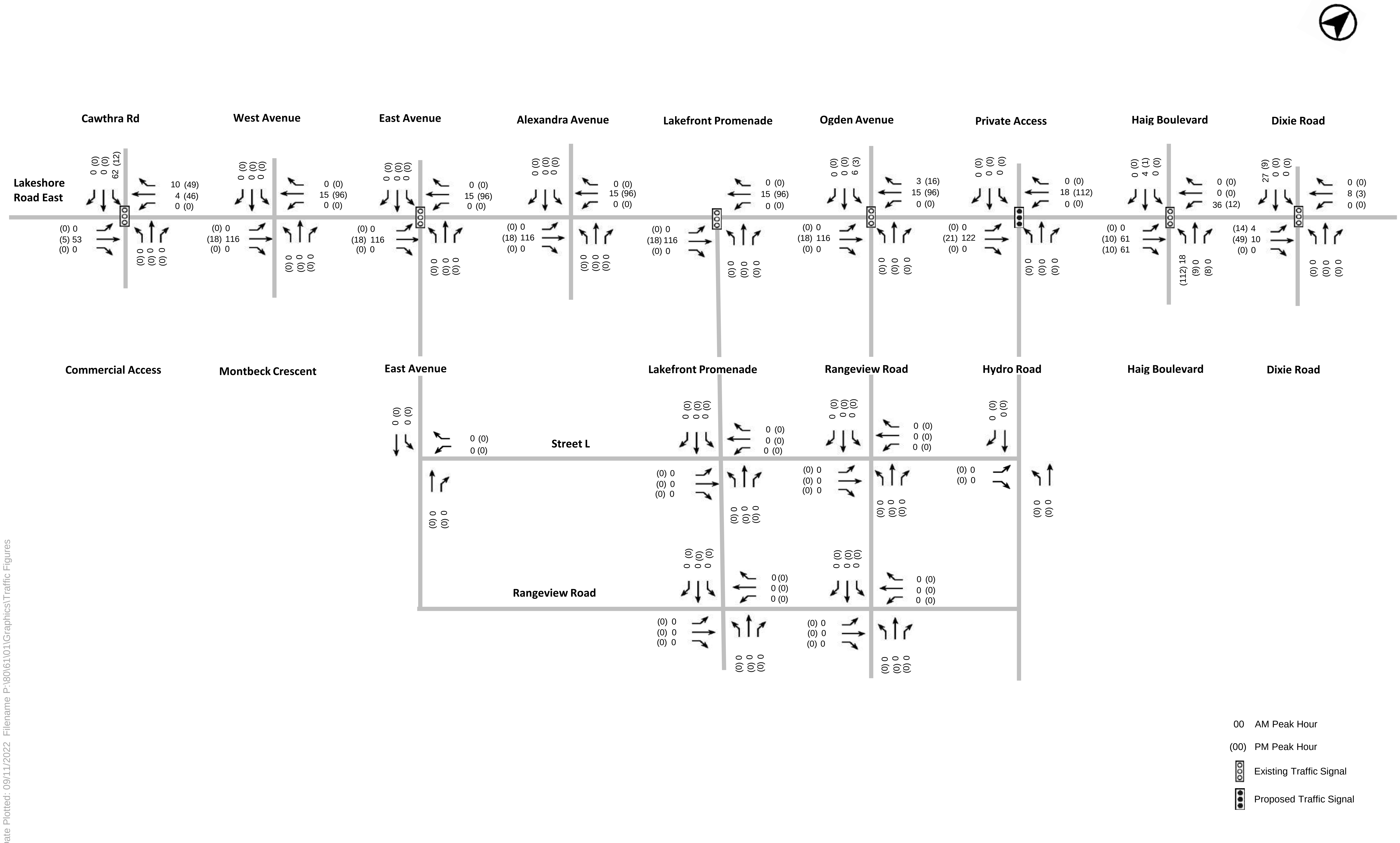


FIGURE 25 - SCENARIO 3A 2041 SERSON SITE TRAFFIC VOLUMES (+ HAIG)

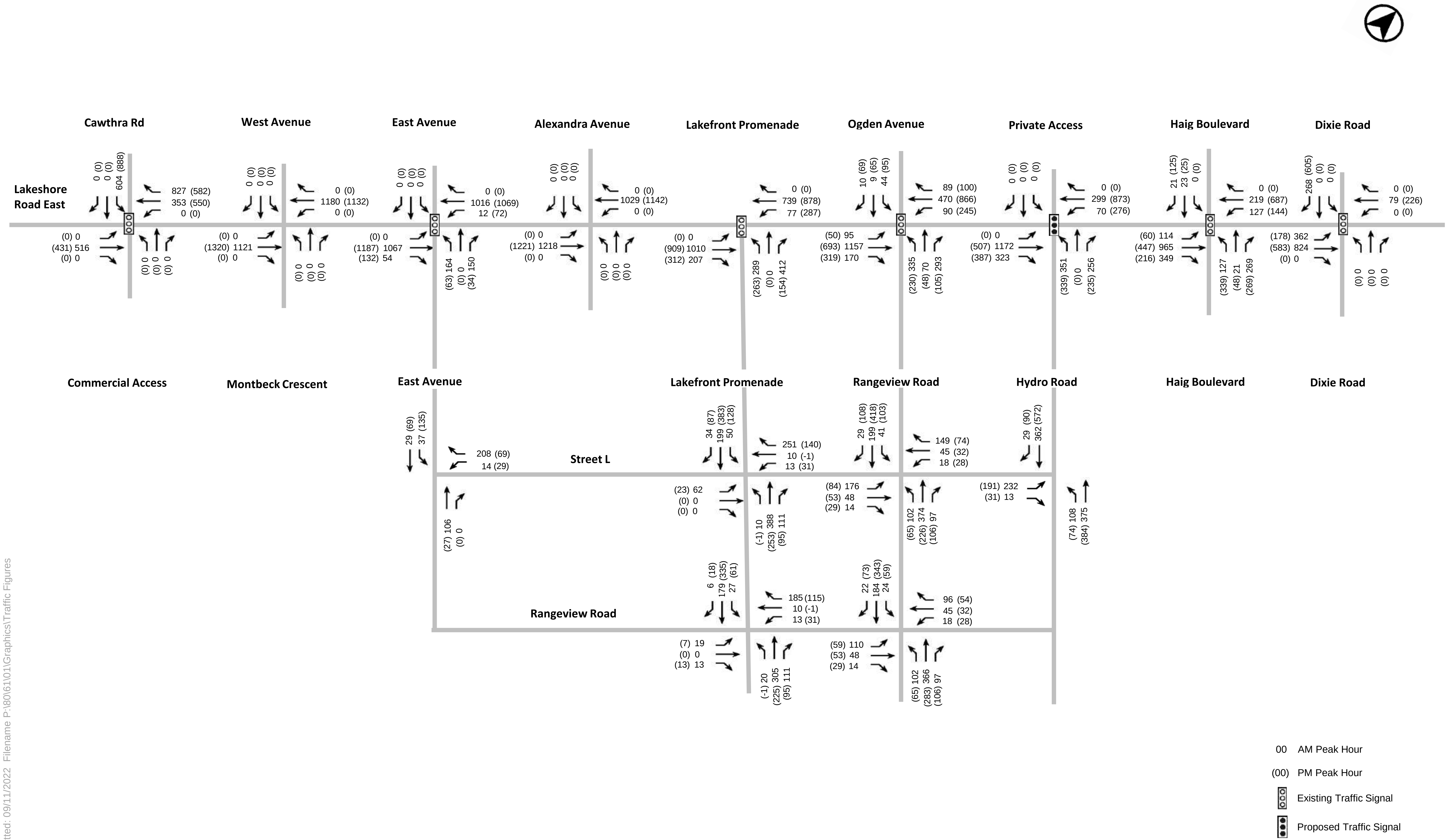


FIGURE 26 - SCENARIO 3A 2041 RANGEVIEW + LAKEVIEW VILLAGE + SERSON SITE TRAFFIC VOLUMES (13,350 UNITS + HAIG)

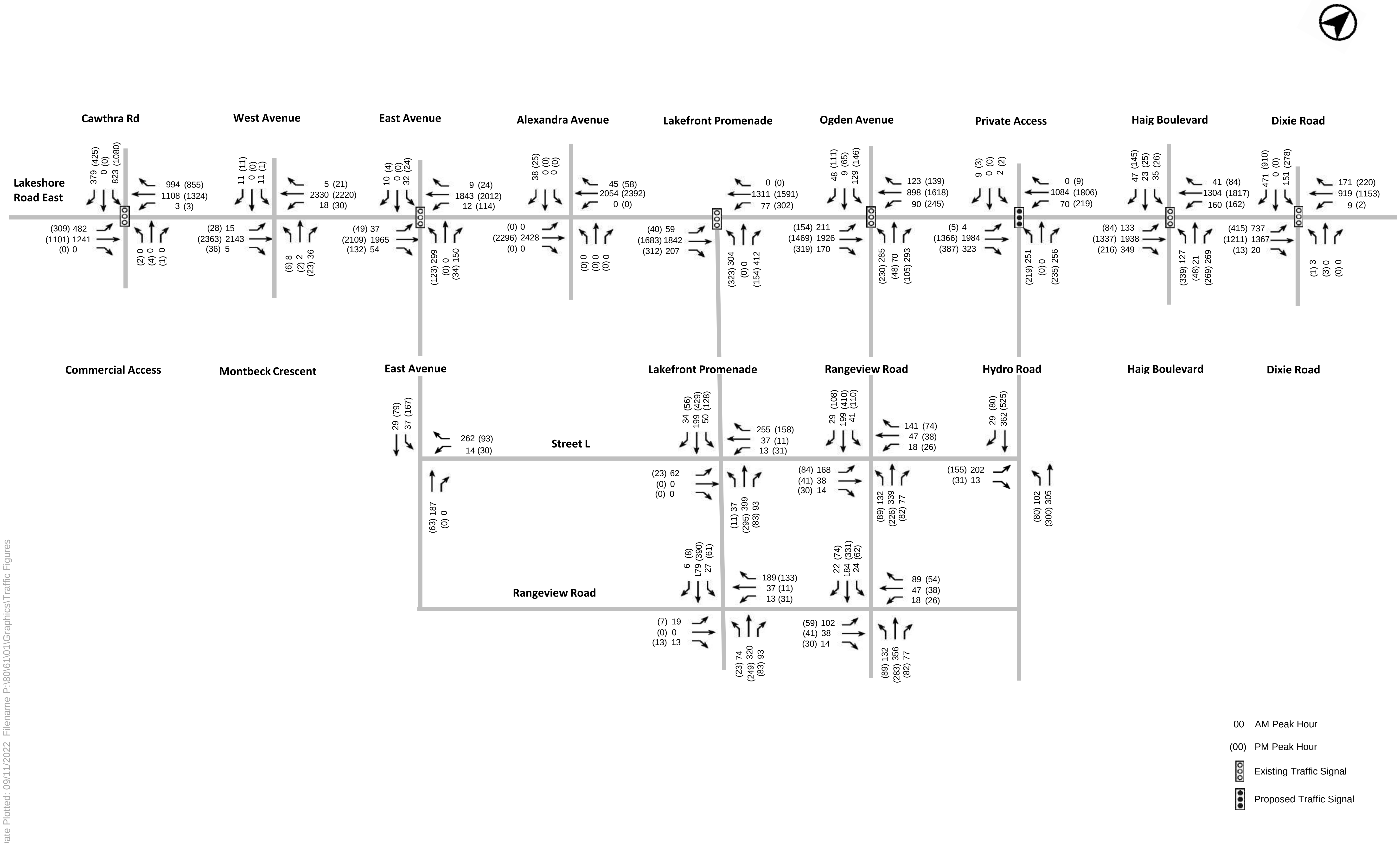


FIGURE 27 - SCENARIO 3A 2041 FUTURE TOTAL TRAFFIC VOLUMES (13,350 UNITS + HAIG)

7.3.4 Travel Demand: Scenario 3B – 5,300 Rangeview Residential Units (Dual left turns but no Haig)

Scenario 3B includes the implementation of a dual northbound left-turn on Lakefront Promenade at Lakeshore Road. As the traffic analysis determined that additional capacity would be required for northbound left-turning vehicles leaving both the Rangeview and Lakeview Village sites, to travel westbound along Lakeshore Road, the dual left-turn lane option, without the connection of Haig Boulevard, was deemed to be beneficial from a phasing and traffic operations perspective.

As summarized in **Table 18**, with the implementation of the northbound dual left-turn on Lakefront Promenade at Lakeshore Road, in consideration of Rangeview with 5,300 residential units + 100% development of the non-residential and Lakeview Village with 8,050 residential units + 100% development of the non-residential, the combined sites are expected to generate a total of 4,138 and 4,517 two-way vehicle trips, during the morning and afternoon peak period, respectively.

TABLE 18 VEHICLE TRIPS: SCENARIO 3B – 5,300 RANGEVIEW UNITS (DUAL LEFT)

Land Use	Number of Units / % Non-residential	AM Peak Hour			PM Peak Hour		
		In	Out	2-Way	In	Out	2-Way
Rangeview							
Residential	5,300	118	876	995	656	253	909
Office	100% (47,500 ft^2)	33	4	37	1	22	23
Retail	100% (47,500 ft^2)	61	40	101	91	84	174
	Total	**213**	**920**	**1,132**	**748**	**359**	**1,106**
Lakeview Village							
Residential	8,050	199	1,377	1,576	1,007	407	1,414
Non-Residential	100% (2.1M ft^2)	1,003	427	1,430	744	1,253	1,997
	Total	**1,202**	**1,804**	**3,006**	**1,751**	**1,660**	**3,411**
Serson							
Office	0%	0	0	0	0	0	0
Research	0%	0	0	0	0	0	0
	Total	0	0	0	0	0	0
All Sites Combined							
	Total	**1,415**	**2,724**	**4,138**	**2,499**	**2,019**	**4,517**

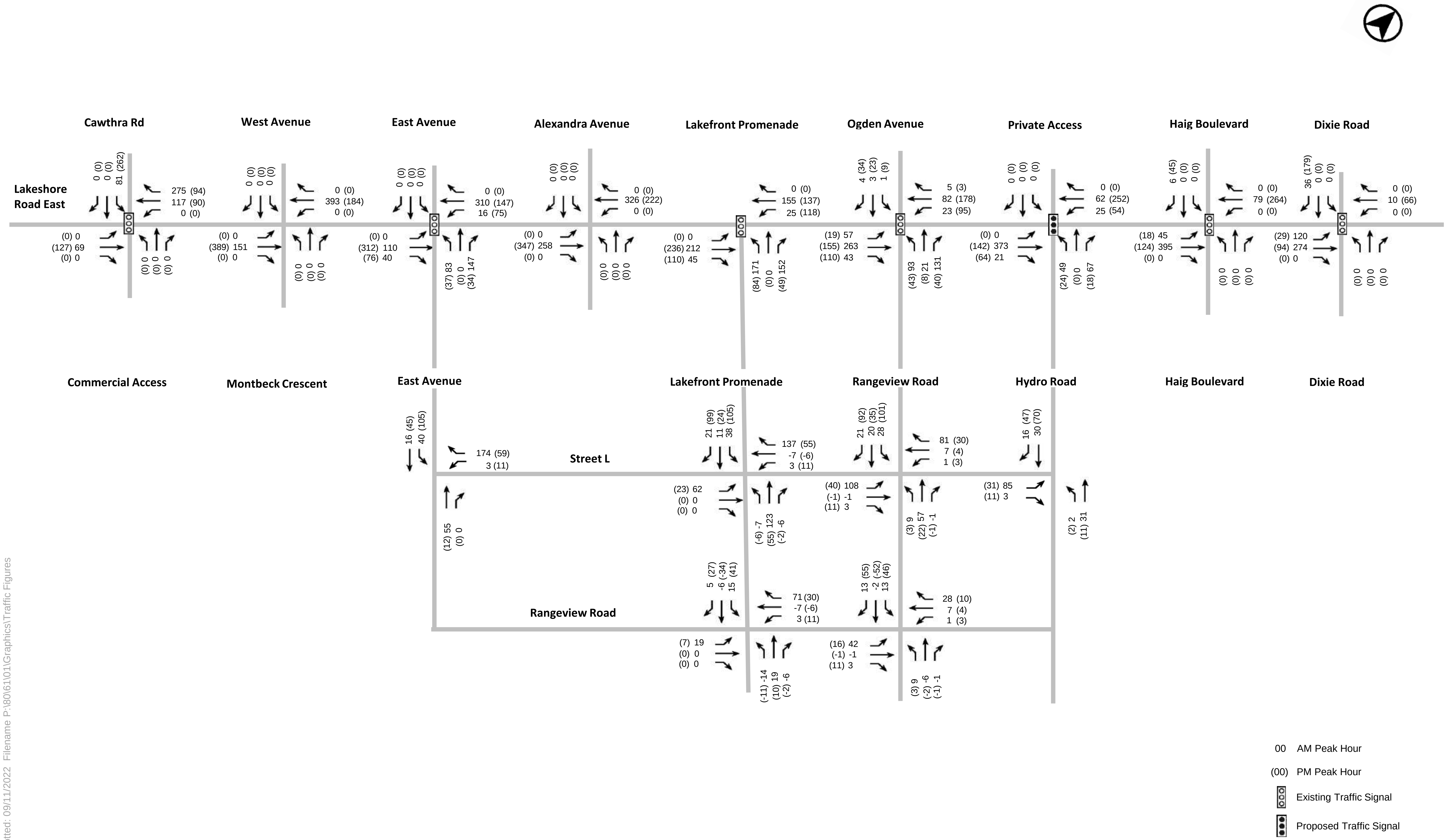
Figures that illustrate the Scenario 3B traffic volumes are provided as follows:

- **Figure 28**: Scenario 3B: 2041 Rangeview Site Traffic Volumes (5,300 units + Dual Left)
- **Figure 29**: Scenario 3B: 2041 Lakeview Village Site Traffic Volumes (8,050 units + Dual Left)
- **Figure 30**: Scenario 3B: 2041 Rangeview + Lakeview Village Site Traffic Volumes (13,350 units + Dual Left)
- **Figure 31**: Scenario 3B: 2041 Future Total Traffic Volumes (13,350 units + Dual Left)

As summarized in **Table 19**, Scenario 3B (5,300 Rangeview units with dual left) is expected to generated 2,069 and 3,162 two-way transit trips, during the morning and afternoon peak period respectively. There are expected to be 1,490 and 813 two-way auto passenger trips, during the morning and afternoon peak period respectively and 414 and 361 two-way walking trips, during the morning and afternoon peak period respectively. With the adjusted travel mode shares for cycling trips, there are expected to be 166 and 181 two-way cycling trips, during the morning and afternoon peak period respectively.

TABLE 19 MULTI-MODAL TRAVEL DEMAND: SCENARIO 3B – 5,300 RANGEVIEW UNITS (WITH DUAL LEFT)

Mode of Travel	Morning			Afternoon		
	In	Out	2-Way	In	Out	2-Way
Transit	707	1,362	2,069	1,749	1,413	3,162
Auto Driver	1,415	2,724	4,138	2,499	2,019	4,517
Auto Passenger	509	981	1,490	450	363	813
Walk	141	272	414	200	162	361
Cycle	57	109	166	100	81	181
Total	**2,829**	**5,448**	**8,277**	**4,997**	**4,038**	**9,035**



Date Plotted: 09/11/2022 Filename P:\80\61\01\Graphics\Traffic Figures

FIGURE 28 - SCENARIO 3B 2041 RANGEVIEW SITE TRAFFIC VOLUMES (5,300 UNITS + DUAL LEFT)

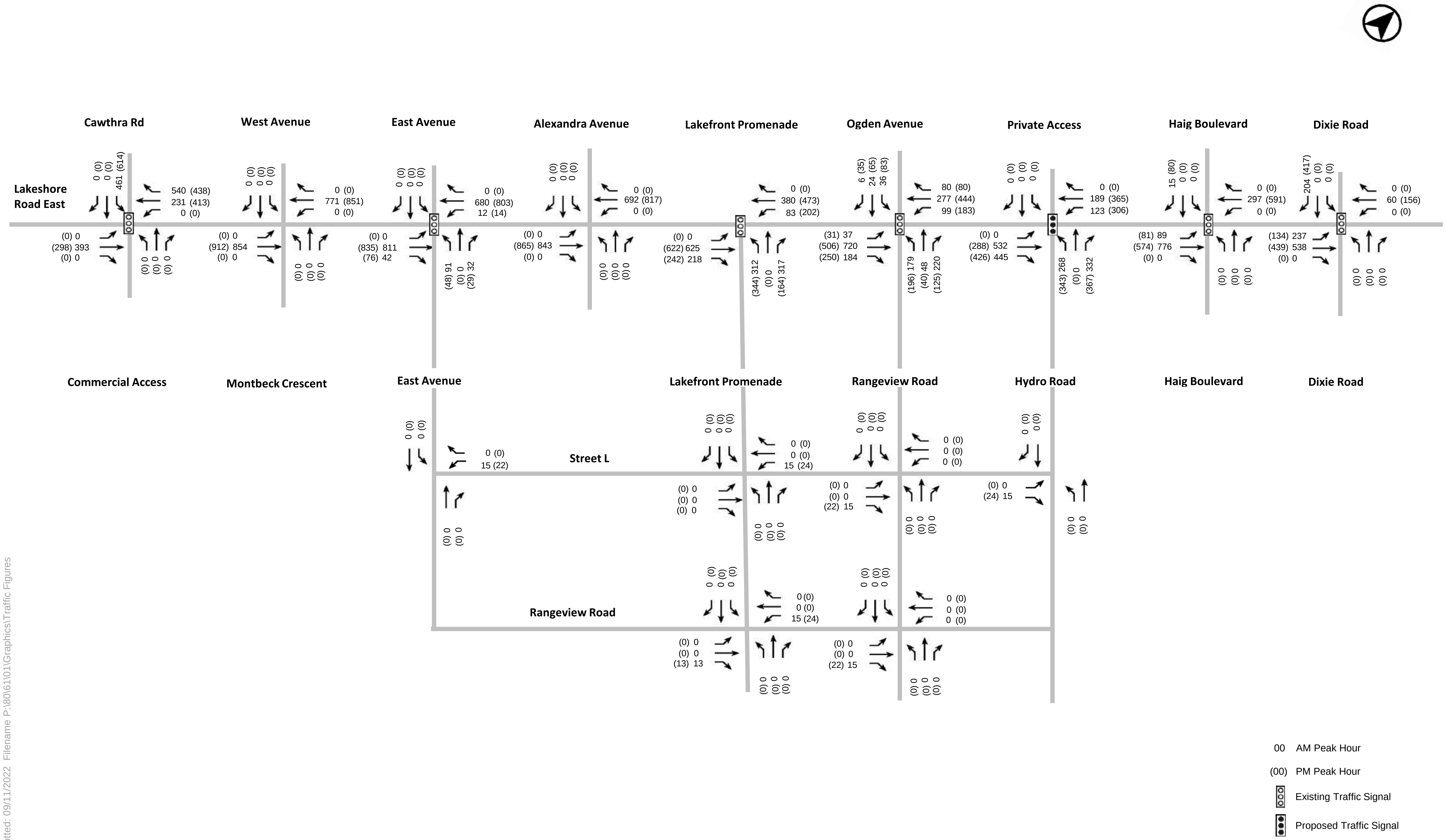


FIGURE 29 - SCENARIO 3B 2041 LAKEVIEW VILLAGE SITE TRAFFIC VOLUMES (8,050 UNITS + DUAL LEFT)

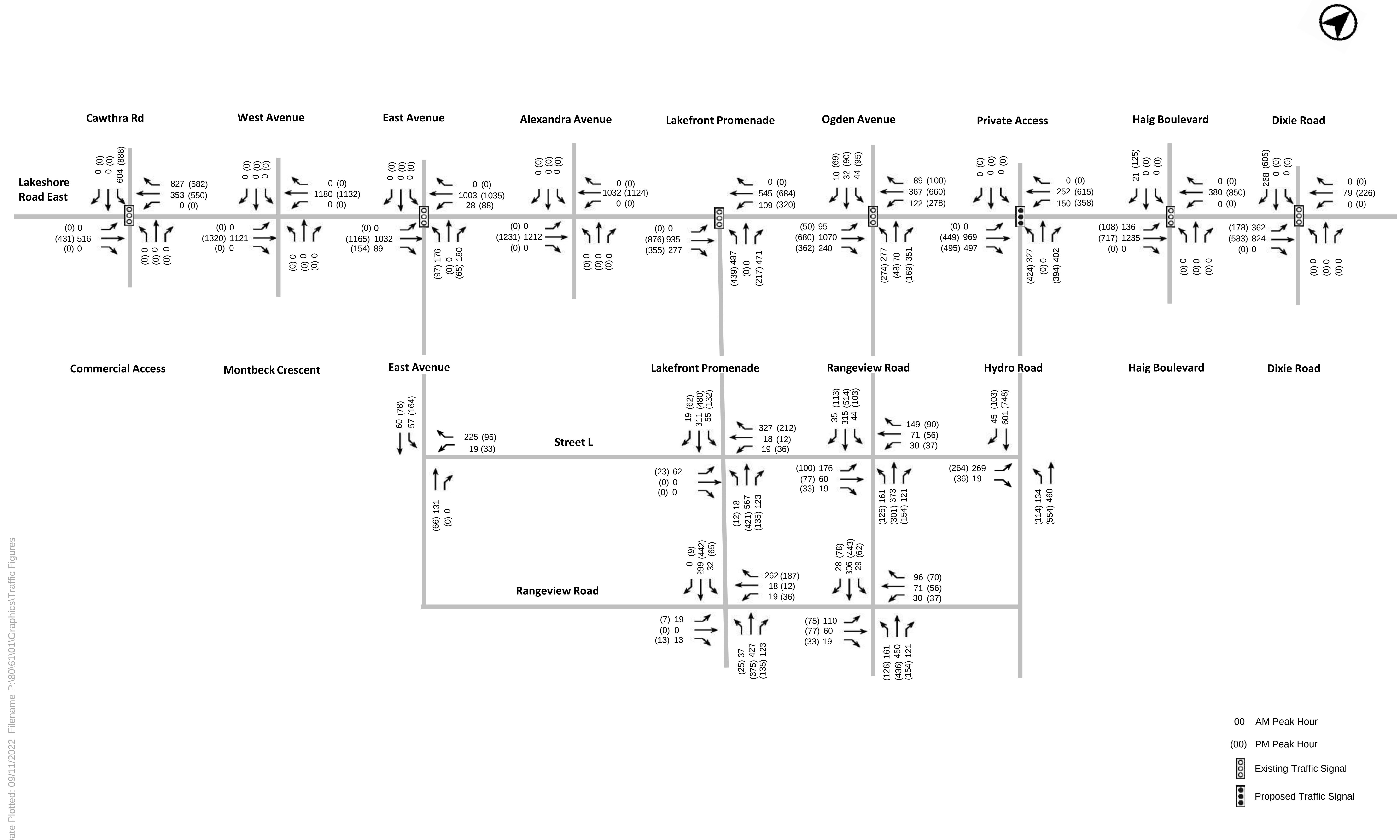


FIGURE 30 - SCENARIO 3B 2041 RANGEVIEW + LAKEVIEW VILLAGE SITE TRAFFIC VOLUMES (13,350 UNITS + DUAL LEFT)

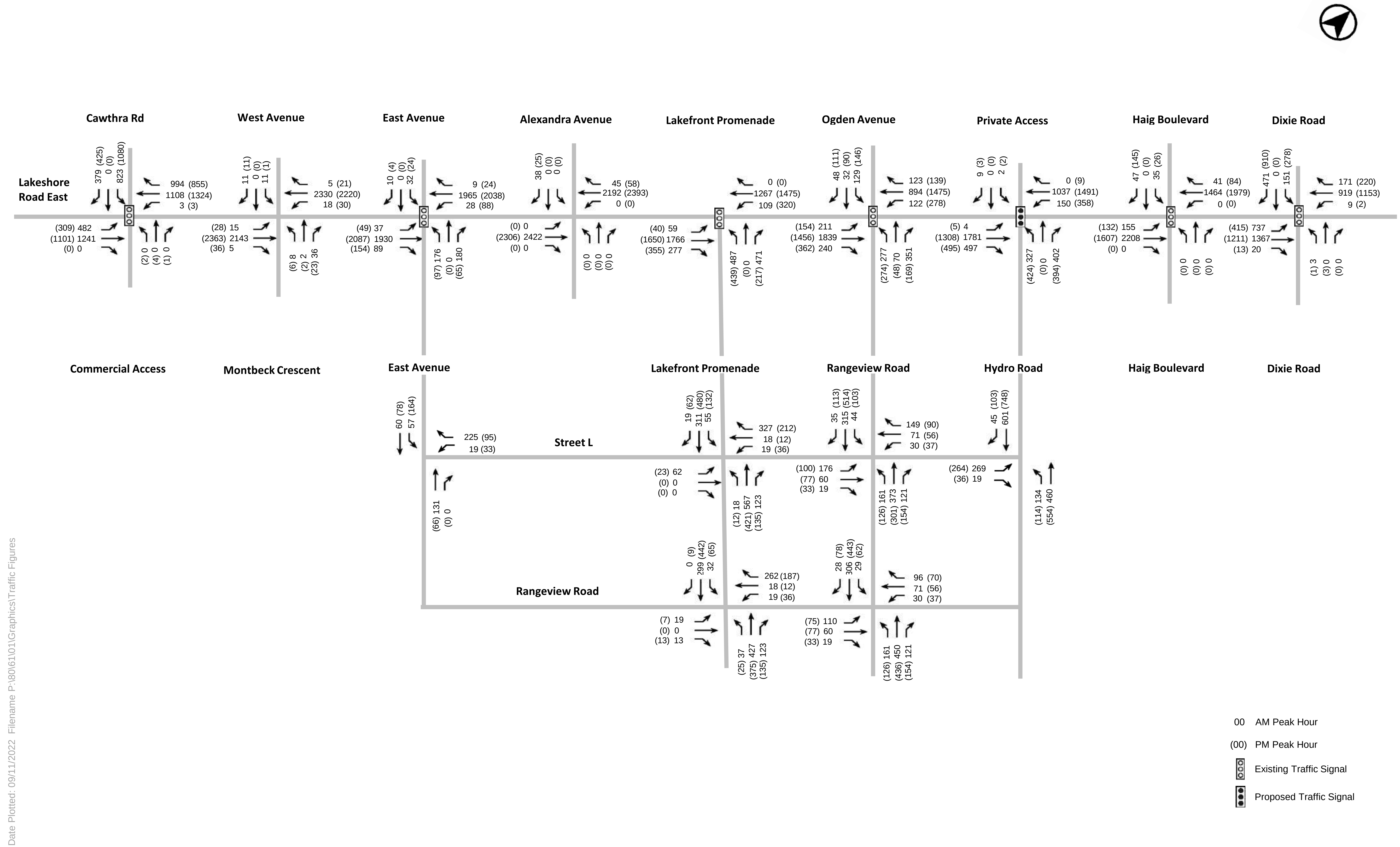


FIGURE 31 - SCENARIO 3B 2041 FUTURE TOTAL TRAFFIC VOLUMES (13,350 UNITS + DUAL LEFT)

8.0 TRAFFIC ANALYSIS

8.1 TRAFFIC ANALYSIS APPROACH AND ASSUMPTIONS

The approach and methodology utilized for the traffic analysis for this study generally aligned with the April 2021 TMIG report and are outlined as follows.

8.1.1 Study Area Intersections

Signalized Intersections

- Lakeshore Road East & East Avenue
- Lakeshore Road East & Lakefront Promenade
- Lakeshore Road East & Ogden Avenue
- Lakeshore Road East & Hydro Road
- Lakeshore Road East & Haig Boulevard
- Lakeshore Road East & Cawthra Road
- Lakeshore Road East & Dixie Road

Unsignalized Intersections

- Street L & East Avenue
- Street L & Lakefront Promenade
- Street L & Ogden Avenue
- Street L & Hydro Road
- Rangeview Road & East Avenue
- Rangeview Road & Lakefront Promenade
- Rangeview Road & Ogden Avenue
- Rangeview Road & Hydro Road

8.1.2 Time Periods Assessed

The traffic analysis evaluated both the morning peak and afternoon peak hours and aligned with the time periods assessed within the April 2021 TMIG report.

8.1.3 Signalized Intersections

The traffic operations analysis was undertaken at the area intersections using standard capacity analysis procedures. The analysis undertaken at intersections operating under traffic signal control was completed using the methodologies and procedures outlined in the Highway Capacity Manual (HCM) 2000 and using Synchro 11.0 software. The product of the signalized intersection evaluation is an intersection performance index (volume to capacity ratio or v/c), where a v/c index of 1.00 indicates 'at or near capacity' conditions.

HCM level of service (LOS) criteria for signalized intersections is as follow:

- LOS A: Control Delay ≤ 10s
- LOS B: 10s < Control Delay ≤ 20s
- LOS C: 20s < Control Delay ≤ 35s
- LOS D: 35s < Control Delay ≤ 55s
- LOS E: 55s < Control Delay ≤ 80s
- LOS F: Control Delay > 80s

8.1.4 Unsignalized Intersections

The unsignalized intersection analysis was completed using standard capacity procedures for intersections operating under “two-way” and “all-way” stop control and in accordance with the methodologies outlined in the Highway Capacity Manual 2000 (HCM2000).

The product of this analysis is a level of service (LOS) designation, ranging from LOS of A to F; which provides a relative indication of the level of delay experienced by motorists completing a turning manoeuvre at an intersection. LOS A represents conditions under which motorists would experience little delay and LOS F reflects conditions where more extended delays can be expected.

HCM level of service (LOS) criteria for unsignalized intersections is as follows:

- LOS A: Control Delay ≤ 10s
- LOS B: 10s < Control Delay ≤ 15s
- LOS C: 15s < Control Delay ≤ 25s
- LOS D: 25s < Control Delay ≤ 35s
- LOS E: 35s < Control Delay ≤ 50s
- LOS F: Control Delay > 50s

8.1.5 Network-Wide Parameters

Key analysis parameters were assumed based on default parameters summarized as follows:

Lane Widths

In order to align with the April 2021 TMIG report, the analysis for this study included 3.7 metre wide through lanes and 3.5 metre wide turning lanes.

Traffic Signal Timings

Traffic signal timings incorporated into the analysis were based upon information provided within the 2021 TMIG Synchro model. Although the traffic signal timings were optimized for each scenario analyzed for this study, cycle lengths were maintained at 130 seconds and 140 seconds, for the AM Peak and PM Peak period, respectively.

Base Saturation Flow Rates

The Synchro default saturation flow rate of 1,900 vehicles per hour was adopted for the analysis for this study.

Heavy Vehicle Assumptions

Heavy and medium truck percentages incorporated into the analysis were based upon information provided within the 2021 TMIG Synchro model.

Lost Time Adjustments

The lost time adjustment factor of -1.0 seconds (i.e. a total loss time per phase equal to the amber plus all-red time minus 1 second) was adopted for the traffic analysis in this study.

Peak Hour Factors

A peak hour factor (phf) of 1.0 was adopted for the traffic analysis in this study.

8.2 CAPACITY ANALYSIS AT SIGNALIZED INTERSECTIONS

A summary of the results of the detailed capacity analysis for the signalized intersections is provided in **TABLE 20**.

8.2.1 Traffic Analysis: Scenario 1 – 2,500 Rangeview Residential Units

All signalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0.

8.2.2 Traffic Analysis: Scenario 2 – 3,700 Rangeview Residential Units (with Ogden)

All signalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0.

8.2.3 Traffic Analysis: Scenario 3A – 5,300 Rangeview Residential Units (with Haig)

All signalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0 with the exception of the following movements:

- **Dixie Road & Lakeshore Road East:** the southbound right-turn movement operates with a v/c of 1.05 during the afternoon peak hour. In a busy urban environment, it is typical that particular movements will operate at, or slightly over capacity, during the peak periods of the day. It is also likely that traffic will divert and rebalance in the future as traffic patterns evolve. For these reasons, the intersection is expected to operate acceptably for all movements in relation to Scenario 3A.

- **Lakeshore Road & Haig Boulevard:** the northbound through/left movement operates with a v/c of 1.35 during the afternoon peak hour. It is likely that traffic will divert and rebalance in the future as traffic patterns evolve. This movement could also be improved with minor upgrades to the north approach, such as a southbound right-turn pocket. This intersection can also be monitored in the future when more accurate traffic data is available. For these reasons, the intersection is expected to operate acceptably for all movements in relation to Scenario 3A. It is however important to note that as no Rangeview-related volumes have been assigned to the intersection of Lakeshore Road & Haig Boulevard, the traffic concerns at this intersection are related only to the traffic generated by Lakeview Village and Serson.

8.2.4 Traffic Analysis: Scenario 3B – 5,300 Rangeview Residential Units (Dual left turns but no Haig)

All signalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0 with the exception of the following movements:

- **Dixie Road & Lakeshore Road East:** the southbound right-turn movement operates with a v/c of 1.04 during the afternoon peak hour. In a busy urban environment, it is typical that particular movements will operate at, or slightly over capacity, during the peak periods of the day. It is also likely that traffic will divert and rebalance in the future as traffic patterns evolve. For these reasons, the intersection is expected to operate acceptably for all movements in relation to Scenario 3B.

TABLE 20 CAPACITY ANALYSIS SUMMARY AT SIGNALIZED INTERSECTIONS

Movement	Scenario 1: Rangeview with 2,500 units Lakeview Village with 7,500 units No Ogden No Haig (with road improvements)			Scenario 2: Rangeview with 3,700 units Lakeview Village with 8,050 units Ogden connected			Scenario 3A: Rangeview with 5,300 units Lakeview Village with 8,050 units Haig connected			Scenario 3B: Rangeview with 5,300 units Lakeview Village with 8,050 units Dual left at Lakefront Promenade/No Haig		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
East Avenue & Lakeshore Road East												
EBL	0.69 (0.5)	94.6 (68.3)	F (E)	0.69 (0.45)	91.5 (66.5)	F (E)	0.54 (0.53)	71.2 (70)	E (E)	0.61 (0.45)	78.2 (66.3)	E (E)
EBT	0.85 (0.79)	36.3 (21.8)	D (C)	0.87 (0.96)	32.5 (36)	C (D)	0.95 (0.95)	42.5 (32.3)	D (C)	0.81 (0.91)	22.4 (24.8)	C (C)
NBL	0.91 (0.7)	67.9 (68.5)	E (E)	0.9 (0.69)	76 (66.4)	E (E)	0.89 (0.66)	71.6 (66.6)	E (E)	0.78 (0.57)	67.6 (64.8)	E (E)
NBT	0.42 (0.02)	36.9 (52.2)	D (D)	0.2 (0.04)	41.3 (51.8)	D (D)	0.24 (0.02)	40.4 (53)	D (D)	0.43 (0.04)	50.1 (56.3)	D (E)
SBL	0.13 (0.13)	33.2 (53.3)	C (D)	0.12 (0.13)	40.5 (52.7)	D (D)	0.12 (0.13)	39.1 (54.1)	D (D)	0.23 (0.17)	48.1 (57.6)	D (E)
SBT	0.01 (0)	31.8 (52.1)	C (D)	0.01 (0)	39.2 (51.5)	D (D)	0.01 (0)	37.8 (52.8)	D (D)	0.01 (0)	45.6 (56)	D (E)
WBL	0.78 (0.48)	96.5 (60.4)	F (E)	0.43 (0.5)	68.9 (61.8)	E (E)	0.29 (0.68)	68.3 (73.7)	E (E)	0.42 (0.52)	60.7 (58)	E (E)
WBT	0.7 (0.56)	23 (9.9)	C (A)	0.83 (0.75)	17.1 (14.9)	B (B)	0.91 (0.79)	26.8 (12.2)	C (B)	0.85 (0.75)	14.2 (9.8)	B (A)
WBR	0.01 (0.02)	13.5 (6.7)	B (A)	0.01 (0.02)	9.3 (7.1)	A (A)	0.01 (0.02)	10.4 (6.3)	B (A)	0.01 (0.02)	6.7 (5.6)	A (A)
OVERALL	**0.87 (0.74)**	**36.5 (21)**	**D (C)**	**0.87 (0.86)**	**30 (29.1)**	**C (C)**	**0.93 (0.88)**	**38 (26.1)**	**D (C)**	**0.83 (0.83)**	**22.6 (20.7)**	**C (C)**
Lakefront Promenade & Lakeshore Road East												
EBT	0.71 (0.78)	25.9 (32)	C (C)	0.8 (0.89)	18.8 (37.4)	B (D)	0.91 (0.93)	23.5 (39)	C (D)	0.93 (0.89)	36.3 (33.6)	D (C)
EBR	0.23 (0.46)	21.9 (27.8)	C (C)	0.25 (0.38)	14.8 (30.4)	B (C)	0.21 (0.36)	14.7 (29.2)	B (C)	0.3 (0.41)	22.5 (26.4)	C (C)
NBL	0.83 (0.79)	63.6 (57.5)	E (E)	0.84 (0.94)	67 (86.2)	E (F)	0.87 (0.94)	69.7 (88)	E (F)	0.75 (0.75)	54.3 (60.7)	D (E)
NBR	0.75 (0.15)	45 (40.3)	D (D)	0.8 (0.13)	51.8 (45.8)	D (D)	0.79 (0.1)	50.6 (46.1)	D (D)	0.61 (0.14)	52 (49.8)	D (D)
WBL	0.51 (0.9)	69.4 (87.8)	E (F)	0.65 (0.89)	70.2 (74.9)	E (E)	0.53 (0.94)	63.3 (87.3)	E (F)	0.36 (0.86)	50 (72.1)	D (E)
WBT	0.34 (0.4)	1.6 (5.3)	A (A)	0.49 (0.56)	6.6 (8.1)	A (A)	0.53 (0.61)	6.6 (7.6)	A (A)	0.7 (0.77)	15.9 (17.4)	B (B)
OVERALL	**0.77 (0.82)**	**26.7 (32.9)**	**C (C)**	**0.85 (0.91)**	**23.2 (33.8)**	**C (C)**	**0.92 (0.94)**	**24.5 (34.1)**	**C (C)**	**0.78 (0.86)**	**33.5 (34.1)**	**C (C)**
Ogden Avenue & Lakeshore Road East												
EBL	0.7 (0.63)	47.9 (49.8)	D (D)	0.75 (0.68)	57.8 (72.1)	E (E)	0.76 (0.68)	55.3 (62)	E (E)	0.79 (0.68)	68.5 (67.8)	E (E)
EBT	0.57 (0.44)	6.3 (3.8)	A (A)	0.95 (0.92)	36.9 (36.5)	D (D)	1 (0.85)	41.3 (31.4)	D (C)	0.96 (0.94)	31 (39.1)	C (D)
EBR	- (-)	- (-)	- (-)	0.21 (0.38)	23.3 (27.5)	C (C)	0.14 (0.32)	22.4 (27.2)	C (C)	0.22 (0.39)	21 (28.9)	C (C)
NBL	- (-)	- (-)	- (-)	0.85 (0.87)	64.3 (65)	E (E)	1 (1)	102.3 (112.2)	F (F)	0.79 (0.88)	55.1 (70.3)	E (E)
NBT	- (-)	- (-)	- (-)	0.2 (0.12)	46.8 (44.9)	D (D)	0.24 (0.17)	48.7 (52.5)	D (D)	0.2 (0.13)	45.1 (47.4)	D (D)
NBR	- (-)	- (-)	- (-)	0.7 (0.1)	58.7 (44.8)	E (D)	0.67 (0.07)	58.7 (51.5)	E (D)	0.77 (0.11)	62.7 (47.1)	E (D)
SBL	0.61 (0.93)	60.8 (114.4)	E (F)	0.47 (0.51)	48.6 (51.6)	D (D)	0.51 (0.57)	49.3 (54.7)	D (D)	0.42 (0.5)	44.8 (50.7)	D (D)
SBT	0.12 (0.24)	55.4 (63.1)	E (E)	0.15 (0.67)	51 (65.2)	D (E)	0.07 (0.64)	49.6 (65.3)	D (E)	0.13 (0.69)	47.5 (65.8)	D (E)
WBL	- (-)	- (-)	- (-)	0.55 (0.81)	64.2 (78.6)	E (E)	0.56 (0.76)	60.2 (70)	E (E)	0.75 (0.8)	75.9 (69.8)	E (E)
WBT	0.45 (0.56)	5.4 (6.3)	A (A)	0.6 (0.92)	16.5 (31.4)	B (C)	0.62 (0.94)	20.8 (30.5)	C (C)	0.65 (0.9)	22 (29.4)	C (C)
OVERALL	**0.65 (0.64)**	**11.9 (14.5)**	**B (B)**	**0.93 (0.93)**	**37.4 (41.5)**	**D (D)**	**1.01 (0.97)**	**42.6 (40.5)**	**D (D)**	**0.94 (0.92)**	**36.6 (41.4)**	**D (D)**

Movement	Scenario 1: Rangeview with 2,500 units Lakeview Village with 7,500 units No Ogden No Haig (with road improvements)			Scenario 2: Rangeview with 3,700 units Lakeview Village with 8,050 units Ogden connected			Scenario 3A: Rangeview with 5,300 units Lakeview Village with 8,050 units Haig connected			Scenario 3B: Rangeview with 5,300 units Lakeview Village with 8,050 units Dual left at Lakefront Promenade/No Haig		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Hydro Road & Lakeshore Road East												
EBL	0.15 (0.2)	57.9 (65.4)	E (E)	0.15 (0.17)	74.7 (67.7)	E (E)	0.15 (0.17)	82.8 (65.3)	F (E)	0.15 (0.2)	76.4 (65.9)	E (E)
EBT	0.78 (0.66)	31.2 (46.3)	C (D)	0.88 (0.79)	16.5 (29)	B (C)	0.97 (0.74)	18.7 (20.5)	B (C)	0.91 (0.94)	15.7 (42.5)	B (D)
EBR	0.3 (0.51)	26.2 (56)	C (E)	0.44 (0.51)	5.9 (25.2)	A (C)	0.29 (0.38)	2.2 (17.2)	A (B)	0.44 (0.61)	3.3 (32.7)	A (C)
NBL	0.83 (0.81)	59.1 (63.9)	E (E)	0.86 (0.91)	65.9 (77.4)	E (E)	0.83 (0.78)	66.2 (66.1)	E (E)	0.97 (0.92)	89.3 (74.8)	F (E)
NBT	0.6 (0.19)	44.1 (42.4)	D (D)	0.8 (0.41)	57.2 (43.8)	E (D)	0.56 (0.15)	47.2 (46.1)	D (D)	0.88 (0.32)	67.5 (39.4)	E (D)
SBT	0.01 (0)	35.1 (40.2)	D (D)	0.01 (0)	37.3 (38.7)	D (D)	0.01 (0)	39.8 (44.5)	D (D)	0.01 (0)	37.8 (35.5)	D (D)
WBL	0.61 (0.83)	53.4 (72.4)	D (E)	0.75 (0.88)	86.7 (85.2)	F (F)	0.62 (0.77)	76.5 (66.9)	E (E)	0.82 (0.94)	98.9 (92.8)	F (F)
WBT	0.4 (0.56)	12.8 (6.2)	B (A)	0.48 (0.68)	9.8 (11.5)	A (B)	0.5 (0.76)	9.3 (12.6)	A (B)	0.48 (0.72)	10.9 (21.7)	B (C)
OVERALL	**0.78 (0.74)**	**30.8 (37)**	**C (D)**	**0.86 (0.84)**	**23.6 (31.3)**	**C (C)**	**0.91 (0.78)**	**20.8 (23)**	**C (C)**	**0.92 (0.93)**	**26.7 (40.8)**	**C (D)**
Lakeshore Road East & Haig Boulevard												
EBL	0.58 (0.45)	43.4 (49.4)	D (D)	0.63 (0.44)	50.4 (47.6)	D (D)	0.64 (0.97)	57.7 (146.1)	E (F)	0.65 (0.53)	51.2 (62.8)	D (E)
EBT	0.6 (0.43)	7.7 (3.2)	A (A)	0.68 (0.52)	4.9 (3.9)	A (A)	0.95 (0.81)	24 (21.2)	C (C)	0.73 (0.53)	5.1 (2.2)	A (A)
EBR	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	0.31 (0.18)	13.8 (11.3)	B (B)	- (-)	- (-)	- (-)
NBT	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	0.75 (1.35)	66.1 (228.2)	E (F)	- (-)	- (-)	- (-)
NBR	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	0.53 (0.18)	51.8 (37.8)	D (D)	- (-)	- (-)	- (-)
SBT	0.05 (0.08)	57.7 (61.4)	E (E)	0.11 (0.19)	58 (61.4)	E (E)	0.38 (0.41)	49.6 (41.3)	D (D)	0.11 (0.3)	56.5 (62)	E (E)
WBL	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	0.72 (0.68)	52.7 (58.1)	D (E)	- (-)	- (-)	- (-)
WBT	0.49 (0.72)	23.2 (23)	C (C)	0.61 (0.85)	20.8 (27.4)	C (C)	0.65 (0.97)	19.8 (39.4)	B (D)	0.63 (0.86)	17.8 (17.3)	B (B)
OVERALL	**0.59 (0.66)**	**15.9 (17.4)**	**B (B)**	**0.67 (0.77)**	**14 (19.8)**	**B (B)**	**0.88 (1.12)**	**27.6 (51.4)**	**C (D)**	**0.71 (0.79)**	**12.9 (14.6)**	**B (B)**
Lakeshore Road East & Cawthra Road												
EBL	0.91 (0.9)	54.8 (65.1)	D (E)	0.96 (1)	69.2 (93.4)	E (F)	0.76 (0.68)	69.3 (93.6)	E (F)	0.96 (1)	69.3 (93.5)	E (F)
EBT	0.46 (0.5)	14.5 (21.5)	B (C)	0.54 (0.56)	15.9 (21.5)	B (C)	1.00 (0.85)	16.4 (22)	B (C)	0.55 (0.58)	16 (21.9)	B (C)
EBR	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	0.14 (0.32)	- (-)	- (-)	- (-)	- (-)	- (-)
NBL	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	0.95 (1)	- (-)	- (-)	- (-)	- (-)	- (-)
NBT	- (0.21)	- (67.1)	- (E)	- (0.21)	- (67.1)	- (E)	0.24 (0.17)	- (67.1)	- (E)	- (0.21)	- (67.1)	- (E)
NBR	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	0.66 (0.07)	- (-)	- (-)	- (-)	- (-)	- (-)
SBL	0.59 (0.69)	39.4 (39.7)	D (D)	0.76 (0.9)	46.5 (58)	D (E)	0.52 (0.57)	52.6 (74.1)	D (E)	0.77 (0.96)	47.2 (71.4)	D (E)
SBT	0.58 (0.61)	39 (32)	D (C)	0.74 (0.78)	45.3 (40.9)	D (D)	0.07 (0.64)	50.7 (46.1)	D (D)	0.75 (0.84)	46.2 (45.2)	D (D)
SBR	0.43 (0.47)	15.6 (16.7)	B (B)	0.43 (0.5)	15.9 (19.6)	B (B)	- (-)	15.9 (19.6)	B (B)	0.43 (0.5)	15.9 (19.6)	B (B)
WBL	0.02 (-)	40.1 (-)	D (-)	0.02 (0.02)	39.1 (26.1)	D (C)	0.56 (0.76)	39.4 (26.1)	D (C)	0.02 (0.02)	41.5 (26.1)	D (C)
WBT	0.78 (0.9)	46.7 (52.2)	D (D)	0.93 (0.94)	57.1 (53.2)	E (D)	0.62 (0.94)	64.8 (62.7)	E (E)	0.96 (0.95)	62.8 (55.6)	E (E)
WBR	0.67 (0.52)	10.2 (10.2)	B (B)	0.81 (0.66)	13.1 (11.9)	B (B)	- (-)	20.5 (13.9)	C (B)	0.89 (0.68)	22.5 (12.4)	C (B)
OVERALL	**0.83 (0.82)**	**29.1 (33.4)**	**C (C)**	**0.95 (0.94)**	**34.7 (38.4)**	**C (D)**	**1.00 (0.97)**	**38.7 (43.5)**	**D (D)**	**0.99 (0.98)**	**37.9 (41.1)**	**D (D)**

Movement	Scenario 1: Rangeview with 2,500 units Lakeview Village with 7,500 units No Ogden No Haig (with road improvements)			Scenario 2: Rangeview with 3,700 units Lakeview Village with 8,050 units Ogden connected			Scenario 3A: Rangeview with 5,300 units Lakeview Village with 8,050 units Haig connected			Scenario 3B: Rangeview with 5,300 units Lakeview Village with 8,050 units Dual left at Lakefront Promenade/No Haig		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Dixie Road & Lakeshore Road East												
EBL	0.91 (0.71)	44.4 (37.1)	D (D)	0.93 (0.65)	49.4 (35)	D (D)	0.98 (0.67)	38.3 (35)	D (D)	0.98 (0.65)	52.5 (26.8)	D (C)
EBT	0.46 (0.4)	5.7 (25.8)	A (C)	0.53 (0.48)	6.4 (19.8)	A (B)	0.56 (0.51)	18.9 (32.9)	B (C)	0.56 (0.49)	6.5 (23.7)	A (C)
NBT	0.02 (0.01)	46.2 (43.7)	D (D)	0.02 (0.01)	46.8 (44.6)	D (D)	0.02 (0.01)	46.8 (44.9)	D (D)	0.02 (0.01)	46.8 (44.9)	D (D)
SBT	0.7 (0.92)	61.5 (85.9)	E (F)	0.69 (0.96)	61.3 (95.6)	E (F)	0.69 (0.97)	61.3 (99.6)	E (F)	0.69 (0.97)	61.3 (99.6)	E (F)
SBR	0.42 (0.91)	15.2 (46.1)	B (D)	0.48 (0.99)	14.6 (58.5)	B (E)	0.52 (1.05)	15.2 (74.5)	B (E)	0.49 (1.04)	14.7 (71.3)	B (E)
WBT	0.72 (0.79)	45.7 (42.9)	D (D)	0.97 (0.95)	70.4 (61.2)	E (E)	0.98 (0.98)	72.8 (68.7)	E (E)	0.97 (0.98)	70.9 (68)	E (E)
WBR	0.18 (0.24)	35.4 (30.4)	D (C)	0.18 (0.27)	37.5 (35.3)	D (D)	0.18 (0.27)	37.5 (35.9)	D (D)	0.18 (0.27)	37.5 (35.9)	D (D)
OVERALL	**0.81 (0.86)**	**28.2 (41.1)**	**C (D)**	**0.9 (0.97)**	**35.3 (47.2)**	**D (D)**	**0.93 (1.02)**	**37.7 (56.5)**	**D (E)**	**0.93 (1.01)**	**35.5 (52.5)**	**D (D)**

8.3 QUEUING ASSESSMENT AT SIGNALIZED INTERSECTIONS

A summary of the queuing assessment for key movements at the signalized intersections along Lakeshore Road for Scenario 3A and 3B, is provided in **Table 21**. The details of this queuing assessment can be used to inform the future design of area intersections.

An updated queuing assessment is recommended to be undertaken in the future as development progresses and as more accurate traffic data becomes available.

TABLE 21 QUEUING SUMMARY AT SIGNALIZED INTERSECTIONS (KEY MOVEMENTS)

Movement	Scenario 3A: Rangeview with 5,300 units Lakeview Village with 8,050 units Haig connected		Scenario 3B: Rangeview with 5,300 units Lakeview Village with 8,050 units Dual left at Lakefront Promenade/No Haig	
	50th Percentile Queue (metres)	95th Percentile Queue (metres)	50th Percentile Queue (metres)	95th Percentile Queue (metres)
East Avenue & Lakeshore Road East				
NBL	77 (35)	153 (55)	45 (24)	70 (41)
NBT	16 (0)	38 (1)	23 (0)	47 (13)
WBL	3 (35)	7 (86)	7 (26)	12 (39)
WBT	258 (141)	180 (165)	100 (95)	109 (106)
Lakefront Promenade & Lakeshore Road East				
NBL	79 (94)	125 (152)	64 (62)	81 (78)
NBR	95 (0)	162 (19)	28 (0)	73 (22)
WBL	22 (94)	22 (101)	25 (98)	39 (111)
WBT	53 (60)	63 (74)	63 (66)	98 (106)
Ogden Avenue & Lakeshore Road East				
NBL	71 (59)	98 (99)	63 (58)	97 (84)
NBT	17 (12)	29 (24)	16 (12)	29 (22)
NBR	36 (0)	65 (6)	52 (0)	91 (19)
WBL	23 (62)	58 (110)	31 (70)	74 (145)
WBT	94 (158)	93 (283)	90 (123)	74 (82)
Hydro Road & Lakeshore Road East				
NBL	64 (61)	95 (85)	85 (101)	146 (159)
NBT	43 (0)	71 (13)	85 (11)	146 (40)
WBL	20 (65)	40 (68)	38 (106)	74 (144)
WBT	38 (96)	41 (137)	32 (97)	33 (123)
Lakeshore Road East & Haig Boulevard				
NBT	38 (147)	60 (213)	- (-)	- (-)
NBR	27 (0)	55 (22)	- (-)	- (-)
WBL	44 (48)	65(46)	- (-)	- (-)
WBT	97 (250)	112 (251)	102 (154)	124 (195)

8.4 CAPACITY ANALYSIS AT UNSIGNALIZED INTERSECTIONS

A summary of results of the detailed capacity analysis for the unsignalized intersections is provided in **Table 22**.

8.4.1 Traffic Analysis: Scenario 1 – 2,500 Rangeview Residential Units

All unsignalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0 with the exception of the following movements:

- **Lakefront Promenade & Rangeview Road:** with all-way stop control, the southbound left/through/right movement operates with a v/c of 1.01 during the afternoon peak hour. As this represents the interim road network condition, it is expected that when Ogden Avenue is connected and the road network is built-out as development progresses, the operations at this intersection would improve.

- **Hydro Road & Rangeview Road:** with all-way stop control, the southbound through/right movement operates with a v/c of 1.14 during the afternoon peak hour. As this represents the interim road network condition, it is expected that when Ogden Avenue is connected and the road network is built-out as development progresses, the operations at this intersection would improve.

8.4.2 Traffic Analysis: Scenario 2 – 3,700 Rangeview Residential Units (with Ogden)

All unsignalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0 with the exception of the following movements:

- **Ogden Avenue & Street L:** with all-way stop control, the northbound left/through/right movement operates with a v/c of 1.16 and 1.01, during the morning and afternoon peak hour, respectively.

- **Ogden Avenue & Rangeview Road:** with all-way stop control, the northbound left/through/right movement operates with a v/c of 1.18 and 1.17, during the morning and afternoon peak hour, respectively.

It is recommended that these intersections be assessed in the future when updated traffic volume data is available, in order to determine if traffic signals are warranted or if two-way stop control could be implemented, in combination with a controlled pedestrian crossing (i.e. intersection pedestrian signal or pedestrian crossover) on the major street.

8.4.3 Traffic Analysis: Scenario 3A – 5,300 Rangeview Residential Units (with Haig)

All unsignalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0.

8.4.4 Traffic Analysis: Scenario 3B – 5,300 Rangeview Residential Units (Dual left turns but no Haig)

All unsignalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0, with the exception of a number of intersections along Street L, as well as at Ogden Avenue & Rangeview Road and at Hydro Road & Rangeview Road.

It is recommended that these intersections be assessed in the future when updated traffic volume data is available, in order to determine if traffic signals are warranted or if two-way stop control could be implemented, with a controlled pedestrian crossing on the major street.

TABLE 22 UNSIGNALIZED INTERSECTION CAPACITY SUMMARY

Movement	Scenario 1: Rangeview with 2,500 units Lakeview Village with 7,500 units No Ogden No Haig (with road improvements)			Scenario 2: Rangeview with 3,700 units Lakeview Village with 8,050 units Ogden connected			Scenario 3A: Rangeview with 5,300 units Lakeview Village with 8,050 units Haig connected			Scenario 3B: Rangeview with 5,300 units Lakeview Village with 8,050 units Dual left at Lakefront Promenade/No Haig		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
East Avenue & Street L												
WBLR	0.13 (0.03)	8.8 (7.3)	A (A)	0.27 (0.16)	8.6 (8.1)	A (A)	0.3 (0.14)	8.7 (8)	A (A)	0.27 (0.14)	8.4 (8)	A (A)
NBTR	0.68 (0.17)	16.4 (8.1)	C (A)	0.24 (0.12)	9 (8.1)	A (A)	0.23 (0.08)	9 (7.9)	A (A)	0.17 (0.07)	8.5 (7.8)	A (A)
SBTL	0.28 (0.27)	9.7 (8.8)	A (A)	0.13 (0.3)	8.5 (9.3)	A (A)	0.09 (0.3)	8.3 (9.3)	A (A)	0.14 (0.29)	8.5 (9.2)	A (A)
Lakefront Promenade & Street L												
EBLTR	0.05 (0.01)	9.9 (9.9)	A (A)	0.1 (0.04)	11.7 (11.3)	B (B)	0.12 (0.05)	11.3 (10.7)	B (B)	0.14 (0.05)	12.5 (11.6)	B (B)
WBLTR	0 (0)	0 (0)	A (A)	0.54 (0.41)	16.3 (13.9)	C (B)	0.49 (0.34)	14.5 (12.2)	B (B)	0.64 (0.46)	20 (14.9)	C (B)
NBLTR	0.99 (0.75)	50.4 (20.2)	F (C)	0.95 (0.78)	48 (25.7)	E (D)	0.81 (0.59)	27.9 (15.9)	D (C)	1.19 (0.87)	124.5 (35.5)	F (E)
SBLTR	0.43 (0.88)	11.4 (31.5)	B (D)	0.61 (0.97)	18.5 (51.3)	C (F)	0.47 (0.89)	14.2 (36.2)	B (E)	0.66 (1.08)	21.5 (83.7)	C (F)
Ogden Avenue & Street L												
EBLTR	0.08 (0.02)	6.8 (6.7)	A (A)	0.48 (0.42)	17.4 (16.7)	C (C)	0.45 (0.31)	15.9 (13.6)	C (B)	0.56 (0.43)	20.5 (16.9)	C (C)
WBLTR	0.1 (0.03)	7.7 (7.5)	A (A)	0.43 (0.36)	15.7 (15.2)	C (C)	0.39 (0.27)	14.1 (12.7)	B (B)	0.52 (0.38)	18.5 (15.6)	C (C)
NBLTR	0.02 (0.12)	7.2 (7.4)	A (A)	1.16 (1.01)	113.8 (65.3)	F (F)	0.93 (0.67)	46.2 (20.6)	E (C)	1.25 (0.97)	149.7 (57.3)	F (F)
SBLTR	- (-)	- (-)	- (-)	0.68 (1.2)	23.4 (128.1)	C (F)	0.5 (1)	16 (58.5)	C (F)	0.74 (1.34)	28.5 (184)	D (F)
Hydro Road & Street L												
EBLR	- (-)	- (-)	- (-)	0.5 (0.51)	17.1 (17.3)	C (C)	0.36 (0.33)	12.5 (12.6)	B (B)	0.56 (0.56)	19 (18.6)	C (C)
NBLT	0.87 (0.77)	29.1 (21.5)	D (C)	0.92 (0.97)	43.5 (54.5)	E (F)	0.59 (0.57)	15.7 (15.5)	C (C)	0.99 (1.03)	58.7 (70.5)	F (F)
SBTR	0.53 (0.98)	12.8 (48.8)	B (E)	0.96 (1.23)	51.1 (139.1)	F (F)	0.56 (0.85)	14.6 (29.7)	B (D)	1.01 (1.38)	64.1 (201.2)	F (F)
East Avenue & Rangeview Road												
WBLR	0.6 (0.15)	12.4 (7.4)	B (A)	0.17 (0.09)	7.3 (7)	A (A)	0.16 (0.06)	7.1 (6.8)	A (A)	0.11 (0.05)	7 (6.8)	A (A)
NBTR	- (-)	- (-)	- (-)	0.01 (0)	7.4 (7.3)	A (A)	0.02 (0.01)	7.4 (7.2)	A (A)	0.02 (0.01)	7.3 (7.2)	A (A)
SBTL	0.28 (0.2)	10.1 (8.3)	B (A)	0.08 (0.15)	7.8 (8)	A (A)	0.05 (0.13)	7.6 (7.8)	A (A)	0.08 (0.13)	7.6 (7.8)	A (A)
Lakefront Promenade & Rangeview Road												
EBLTR	0.03 (0.01)	10.7 (10.8)	B (B)	0.05 (0.03)	10.1 (10.2)	B (B)	0.05 (0.03)	9.4 (9.3)	A (A)	0.06 (0.04)	10.6 (10.3)	B (B)
WBLTR	0.43 (0.21)	13.2 (11.1)	B (B)	0.42 (0.36)	13 (12.6)	B (B)	0.35 (0.27)	11 (10.6)	B (B)	0.49 (0.39)	14.5 (13.1)	B (B)
NBLTR	0.95 (0.24)	71.3 (32.4)	F (D)	0.16 (0.08)	24.9 (21.5)	C (C)	0.12 (0.04)	14.7 (12.3)	B (B)	0.07 (0.04)	36.8 (24.4)	E (C)
SBLTR	0.51 (1.01)	14.9 (58.5)	B (F)	0.5 (0.81)	14.4 (27.9)	B (D)	0.32 (0.65)	11.1 (17.3)	B (C)	0.53 (0.8)	15.7 (27.6)	C (D)
Ogden Avenue & Rangeview Road												
EBLTR	0.22 (0.3)	8.8 (9.1)	A (A)	0.36 (0.37)	14.2 (15.3)	B (C)	0.28 (0.24)	12.2 (11.8)	B (B)	0.38 (0.38)	14.8 (15.6)	B (C)
WBLTR	0.2 (0.14)	8.7 (8)	A (A)	0.34 (0.32)	13.4 (14.3)	B (B)	0.27 (0.21)	11.4 (11.3)	B (B)	0.38 (0.34)	14.3 (14.7)	B (B)
NBLTR	- (-)	- (-)	- (-)	1.18 (1.17)	116.6 (117)	F (F)	0.84 (0.69)	29.3 (19.7)	D (C)	1.21 (1.16)	131.8 (114.9)	F (F)
SBLTR	0.21 (0.06)	8.7 (8)	A (A)	0.59 (0.97)	17.9 (54.9)	C (F)	0.37 (0.71)	12.3 (20.5)	B (C)	0.61 (1.02)	19 (67.7)	C (F)

Movement	Scenario 1: Rangeview with 2,500 units Lakeview Village with 7,500 units No Ogden No Haig (with road improvements)			Scenario 2: Rangeview with 3,700 units Lakeview Village with 8,050 units Ogden connected			Scenario 3A: Rangeview with 5,300 units Lakeview Village with 8,050 units Haig connected			Scenario 3B: Rangeview with 5,300 units Lakeview Village with 8,050 units Dual left at Lakefront Promenade/No Haig		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Hydro Road & Rangeview Road												
EBLR	0.49 (0.29)	16 (12.8)	C (B)	0.4 (0.47)	14.2 (15.7)	B (C)	0.26 (0.28)	10.9 (11.5)	B (B)	0.44 (0.5)	15.1 (16.6)	C (C)
NBLT	0.93 (0.82)	43.2 (28.4)	E (D)	0.75 (0.79)	23.3 (27.1)	C (D)	0.5 (0.47)	12.9 (12.9)	B (B)	0.8 (0.82)	27.9 (30.2)	D (D)
SBTR	0.66 (1.14)	19.5 (98.8)	C (F)	0.86 (1.1)	32.5 (90)	D (F)	0.51 (0.75)	12.9 (21.2)	B (C)	0.89 (1.23)	36.6 (136.3)	E (F)

8.5 TRAFFIC ANALYSIS SUMMARY

A summary of the traffic analysis undertaken for the four scenarios is described below.

Scenario 1: Rangeview with 2,500 units

In consideration of Rangeview with 2,500 residential units and Lakeview Village with 7,500 residential units + 67% development of the non-residential, the combined sites are expected to generate a total of 2,890 and 3,054 two-way vehicle trips, during the morning and afternoon peak period, respectively.

The Scenario 1 road network includes only the list of minor road improvements to be undertaken along Lakeshore Road.

All signalized intersection movements within the study area are expected to operate at v/c equal to, or less than 1.0.

All unsignalized intersection movements within the study area are expected to operate at v/c equal to, or less than 1.0, with the exception of the southbound left/through/right movement at Lakefront Promenade & Rangeview Road and the southbound through/right movement, during the afternoon peak hour. As the concerns noted at the unsignalized intersections occur as part of the interim road network condition, it is expected that when Ogden Avenue is connected, and the road network is built-out as development progresses, operations at the unsignalized intersections noted above would improve.

Based on the foregoing, the traffic related to the Scenario 1 development proposal can be acceptably accommodated on the future transportation network.

Scenario 2: Rangeview with 3,700 units + Ogden connected

In consideration of Rangeview with 3,700 residential units + 100% development of the non-residential and Lakeview Village with 8,050 residential units + 100% development of the non-residential, the combined sites are expected to generate a total of 3,841 and 4,229 two-way vehicle trips during the morning and afternoon peak period, respectively.

The Scenario 2 road network includes the improvements along Lakeshore Road related to Scenario 1, in addition to the connection of Ogden Avenue to Lakeshore Road.

All signalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0.

All unsignalized intersection movements within the study area are expected to operate at v/c equal, to or less than 1.0, with the exception of the northbound left/through/right movement operates at Ogden Avenue & Street L and the northbound left/through/right movement, during the morning and afternoon peak hour. It is recommended that these unsignalized intersections be assessed in the future when updated traffic volume data is available, in order to determine if traffic signals are warranted or if two-way stop control could be implemented, in combination with a controlled pedestrian crossing (i.e. intersection pedestrian signal or pedestrian crossover) on the major street.

Based on the foregoing, the traffic related to the Scenario 2 development proposal can be acceptably accommodated on the future transportation network.

Scenario 3A: Rangeview with 5,300 units + Ogden + Haig

In consideration of Rangeview with 5,300 residential units + 100% development of the non-residential and Lakeview Village with 8,050 residential units + 100% development of the non-residential and 100% of the Serson lands developed, the combined sites are expected to generate a total of 4,337 and 4,739 two-way vehicle trips, during the morning and afternoon peak period, respectively.

The Scenario 3A road network includes the improvements along Lakeshore Road related to Scenario 1, in addition to the connection of Ogden Avenue to Lakeshore Road and the connection of Haig Boulevard to Lakeshore Road.

All signalized intersection movements within the study area are expected to operate at v/c equal to, or less than 1.0, with the exception of the southbound right-turn movement at Dixie Road & Lakeshore Road and the northbound through/left movement at Lakeshore Road & Haig Boulevard, during the afternoon peak hour. In a busy urban environment, it is typical that particular movements will operate at, or slightly over capacity, during the peak periods of the day. It is also likely that traffic will divert and rebalance in the future as traffic patterns evolve. Minor improvements on the north leg of Haig Boulevard at Lakeshore Road could also improve traffic operations, hence this location should be monitored in the future as development progresses. It is however important to note that as no Rangeview-related volumes have been assigned to the intersection of Lakeshore Road & Haig Boulevard, the traffic concerns at this intersection are related only to the traffic generated by Lakeview Village and Serson.

All unsignalized intersection movements within the study area are expected to operate at v/c equal to, or less than 1.0.

Based on the foregoing, the traffic related to the Scenario 3A development proposal can be acceptably accommodated on the future transportation network.

Scenario 3B: Rangeview with 5,300 units + Ogden + Northbound Dual Left-Turn (no Haig)

In consideration of Rangeview with 5,300 residential units + 100% development of the non-residential and Lakeview Village with 8,050 residential units + 100% development of the non-residential, the combined sites are expected to generate a total of 4,138 and 4,517 two-way vehicle trips, during the morning and afternoon peak period, respectively.

The Scenario 3B road network includes the improvements along Lakeshore Road related to Scenario 1, in addition to the connection of Ogden Avenue to Lakeshore Road, and the northbound dual left-turn implemented on Lakeshore Road at Lakefront Promenade. The connection of Haig Boulevard to Lakeshore Road is not included as part of Scenario 3B.

All signalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0, with the exception of the southbound right-turn movement at Dixie Road and Lakeshore Road, during the afternoon peak hour. In a busy urban environment, it is typical that particular movements will operate at, or slightly over capacity, during the peak periods of the day. It is also likely that traffic will divert and rebalance in the future as traffic patterns evolve.

All unsignalized intersection movements within the study area are expected to operate at v/c equal to or less than 1.0, with the exception of a number of intersections along Street L, as well as at Ogden Avenue & Rangeview Road and at Hydro Road & Rangeview Road. It is recommended that these intersections be assessed in the future when updated traffic volume data is available, in order to determine if traffic signals are warranted or if two-way stop control could be implemented with a controlled pedestrian crossing on the major street.

Based on the foregoing, the traffic related to the Scenario 3B development proposal can be acceptably accommodated on the future transportation network.

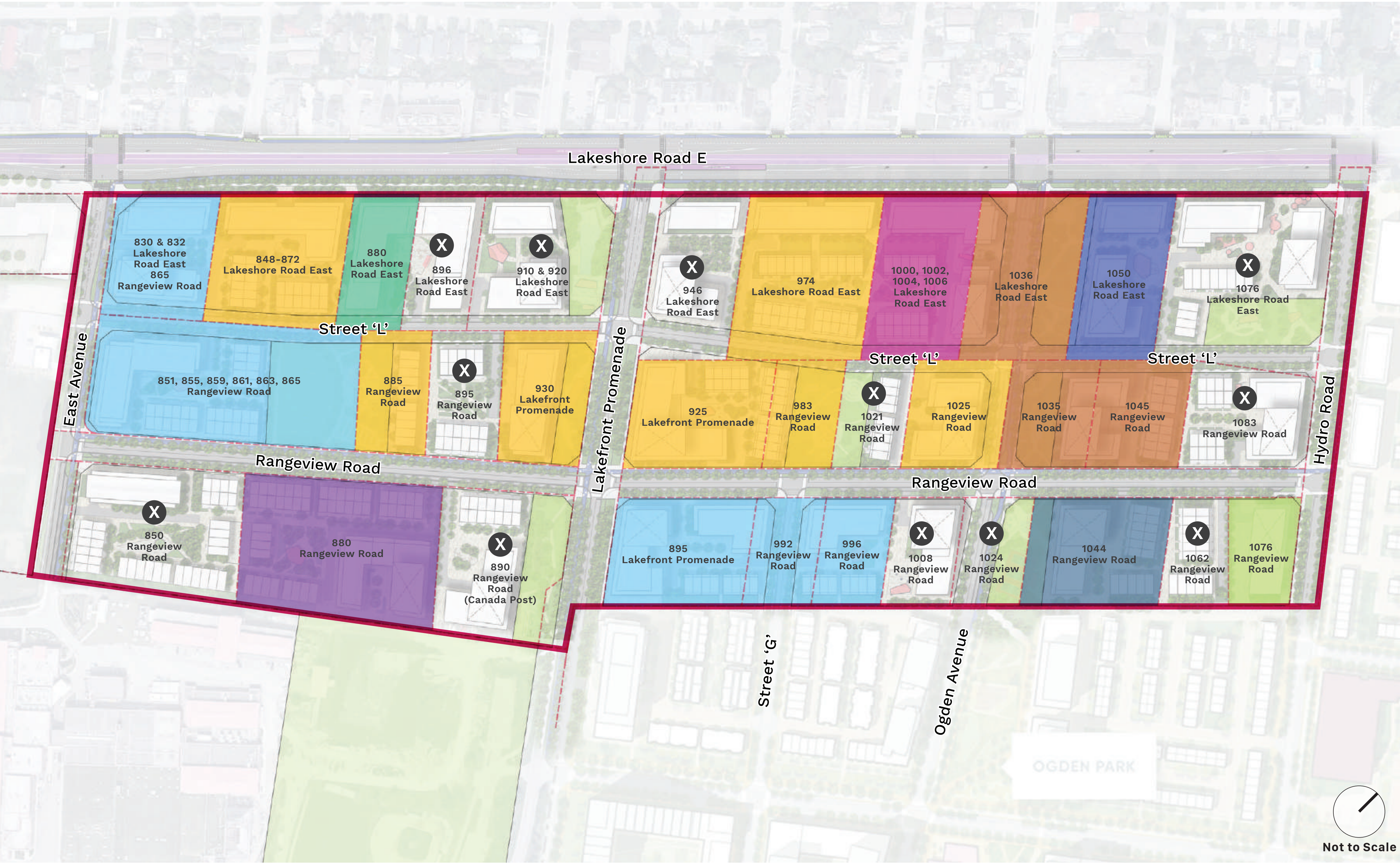
Conclusions

The traffic analysis indicated that the future transportation network, with BRT along Lakeshore Road East, can acceptably accommodate the travel demands of the Rangeview Site with 5,300 residential units and 95,000 ft^2 GFA of non-residential uses, if the road network includes the planned upgrades along Lakeshore Road, in addition to the extension of Ogden Avenue from Lakeshore Road East to Rangeview Road, and **either** the connection of Haig Boulevard to Lakeshore Road East **or** a dual northbound left-turn on Lakefront Promenade at Lakeshore Road East.

Appendix A:
Rangeview Estates Landowner Map

RANGEVIEW ESTATES

Ownership Map



- Dorsay (Lakeshore) Inc.
  Dorsay (Lakefront Promenade) Inc.
  Dorsay (Rangeview) Inc.
  (Dorsay Development Corp.)
- Elgroup Holdings Inc.
  Elias Bros. Construction Limited
  (Leonard Elia)
- Rangeview 1035 Holding Inc.
  Rangeview 1045 Holding Inc.
  297238 Ontario Inc. (Bert Rebelo - Oasis Convention)
- 2120412 Ontario Inc.
  (Jason Segato - Xtreme Tire)
- Whiterock 880 Rangeview Inc.
  (Dream Unlimited Corp.)
- 447111 Ontario Limited
  (Norstar Group)
- 1127792 Ontario Limited
  (Dino Collini)
- ILSCO of Canada Limited
  (Thomas Quinn)
- Kotyck Investments Ltd.
  (Michael Kotyck)

Legend Rangeview Estates Precinct Area (Gross Area = 25.67 ha) | X Non-Participating Landowners | Existing Parcel Lines | Development Parcels

Appendix B:
Rangeview Estates Master Plan

BOUSFIELDS INC.
PLANNING | DESIGN | ENGAGEMENT

Rangeview Master Plan

Concept Plan V5.1 (FINAL)

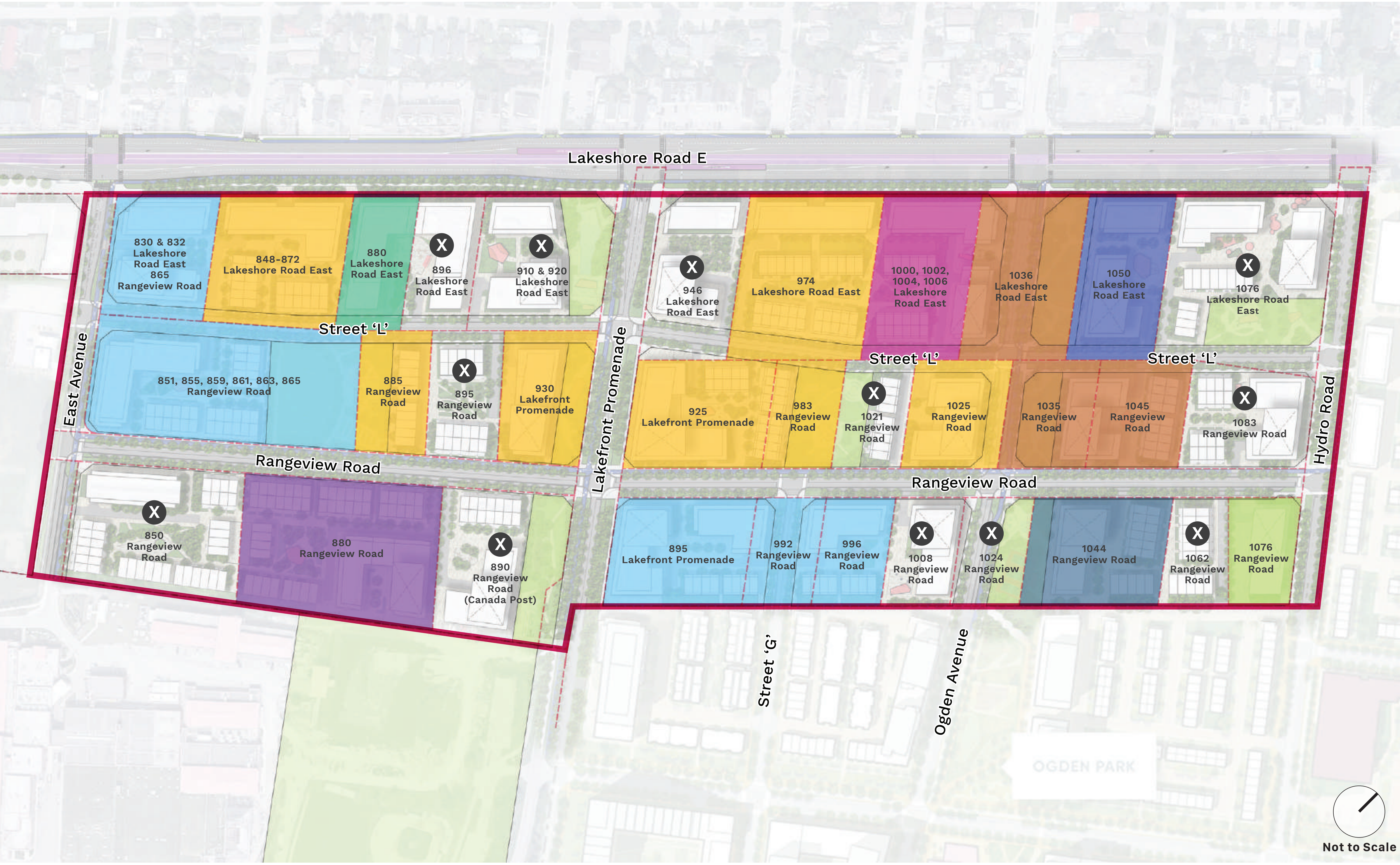
Rangeview Estates Precinct Area
Mississauga ON

October 2022

Project No. 20167

RANGEVIEW ESTATES

Ownership Map



- Dorsay (Lakeshore) Inc. Dorsay (Lakefront Promenade) Inc. Dorsay (Rangeview) Inc. (Dorsay Development Corp.)
- Elgroup Holdings Inc. Elias Bros. Construction Limited (Leonard Elia)
- Rangeview 1035 Holding Inc. Rangeview 1045 Holding Inc. 1207238 Ontario Limited Inc. (Bert Rebelo - Oasis Convention)
- 2120412 Ontario Inc. (Jason Segato - Xtreme Tire)
- Whiterock 880 Rangeview Inc. (Dream Unlimited Corp.)
- 447111 Ontario Limited (Norstar Group)
- 1127792 Ontario Limited (Dino Collini)
- ILSCO of Canada Limited (Thomas Quinn)
- Kotyck Investments Ltd. (Michael Kotyck)

Legend Rangeview Estates Precinct Area (Gross Area = 25.67 ha) | X Non-Participating Landowners | Existing Parcel Lines | Development Parcels

PARKLAND DEDICATION

Parkland Block Concept

Legend Rangeview Estates Precinct Area – – Existing Parcel Lines — Development Parcels Parkland Blocks

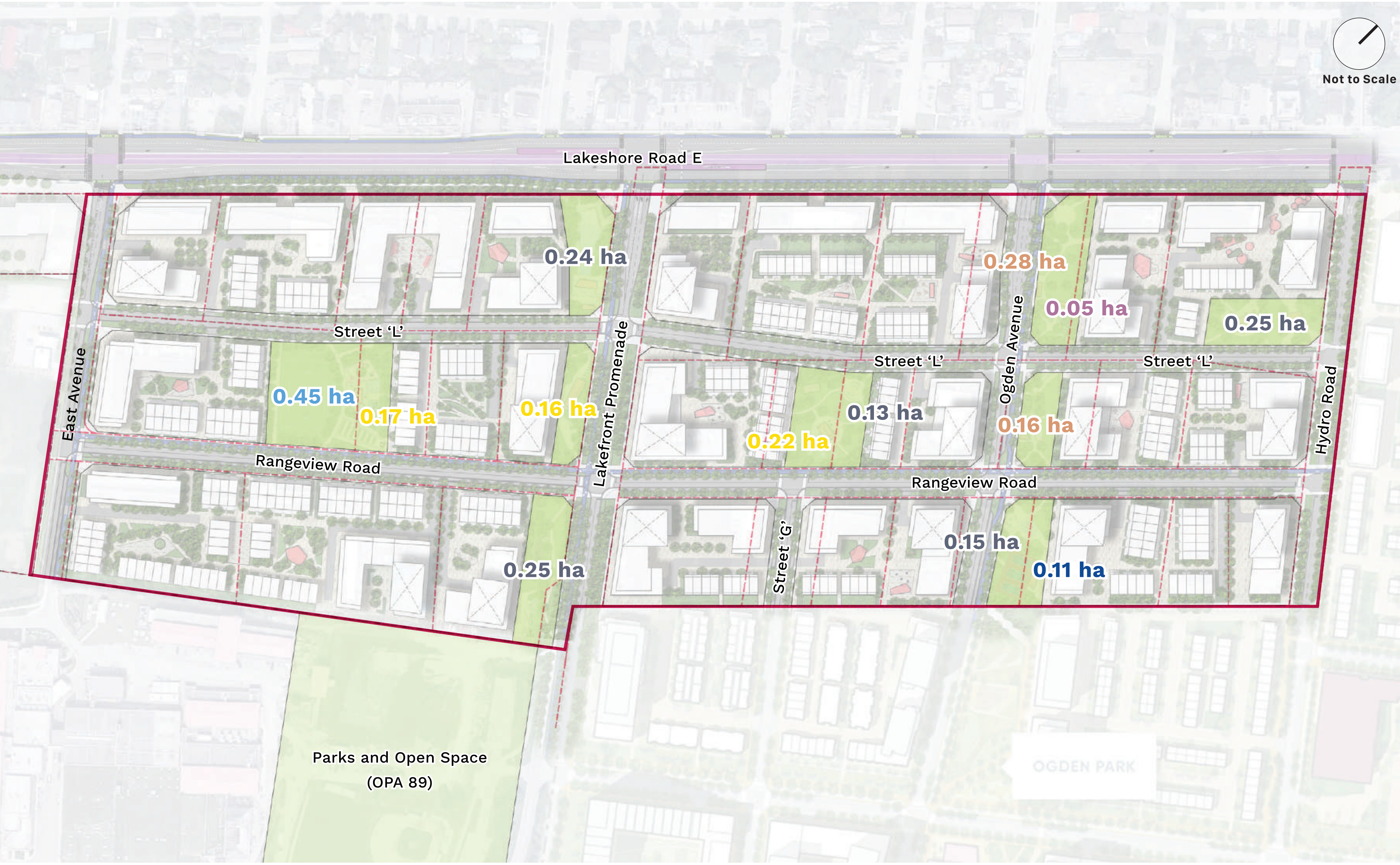
PARKLAND DEDICATION

Participating Landowners Dedication

Legend Rangeview Estates Precinct Area — Existing Parcel Lines — Development Parcels — Parkland Blocks — Non-Participating Landowners

PARKLAND DEDICATION

Statistics



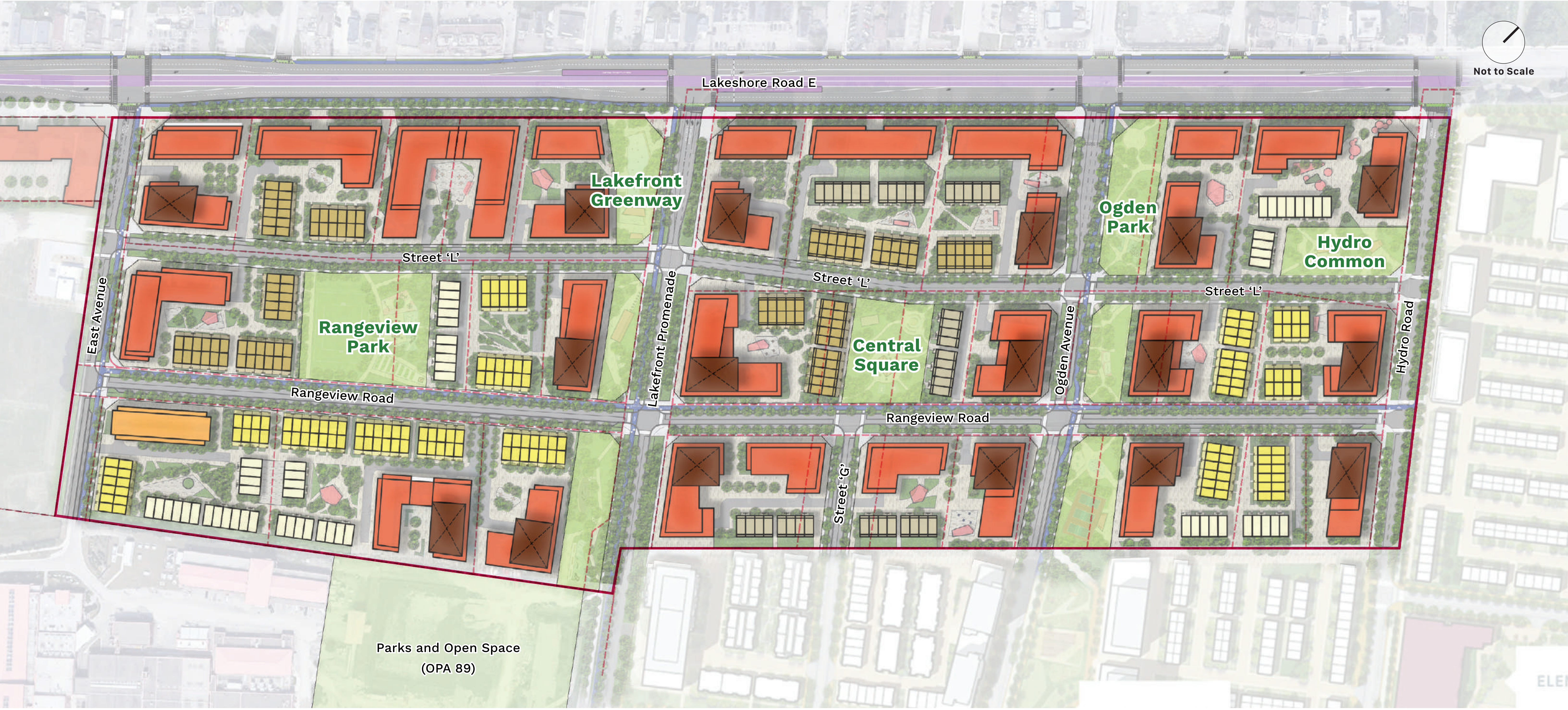
DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	0.55 ha
ELGROUP HOLDINGS INC./ ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	0.45 ha
RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	0.44 ha
2120412 ONTARIO INC. (Xtreme Tire)	0.11 ha
WHITEROCK 880 RANGEVIEW INC. (Dream)	0.0 ha
447111 ONTARIO LIMITED (Norstar)	0.0 ha
1127792 ONTARIO LIMITED (Dino Collini)	0.0 ha
ILSCO OF CANADA LIMITED (Thomas Quinn)	0.05 ha
KOTYCK INVESTMENTS LTD.	0.0 ha
NON PARTICIPATING LANDOWNERS	1.02 ha

±2.62 ha **TOTAL PARKLAND DEDICATION AREA**

Legend Rangeview Estates Precinct Area — Existing Parcel Lines — Development Parcels — Parkland Blocks

MASTER PLAN VERSION 5.1 (FINAL)

Concept Plan



Legend Rangeview Estates Precinct Area — Existing Parcel Lines — Development Parcels — Low-rise (Up to 4-Storeys) — Mid-rise (5 to 8-Storeys) — Tall Building (Up to 15-Storeys)

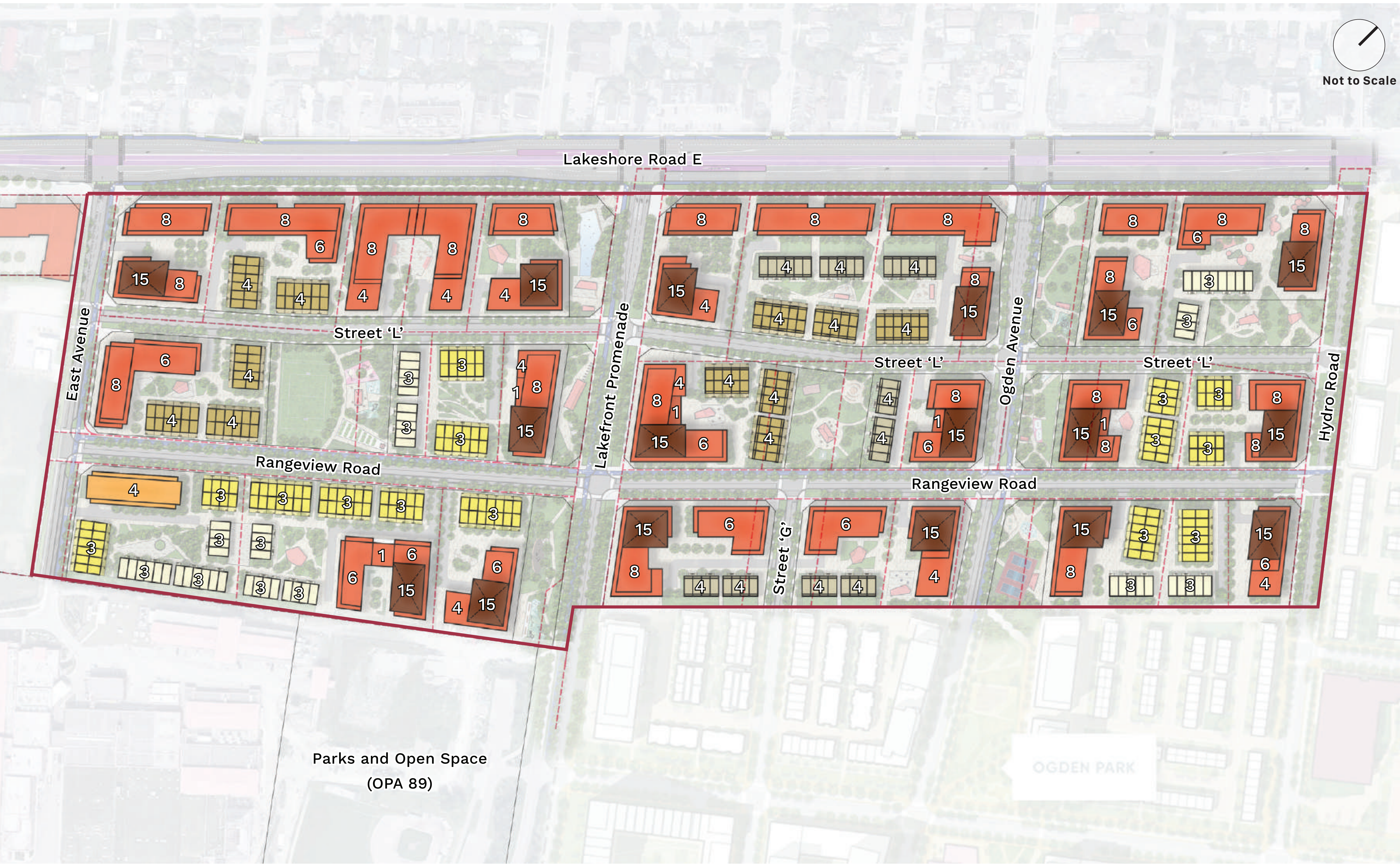
MASTER PLAN VERSION 5.1 (FINAL)

Development Parcels

Legend Rangeview Estates Precinct Area — Existing Parcel Lines — Development Parcels

BUILT FORM

Height (Storeys) + Individual Typology Statistics



Total Residential Units
± 5,300 units

Low-rise Buildings (Up to 4-St) **11.2%**
± 592 units

Traditional Townhouse Blocks (3-ST)
± 60 units

Stacked Townhouse Blocks (4-ST)
± 84 units

Back-to-Back Townhouse Blocks (3-ST)
± 150 units

Stacked Back-to-Back Townhouse Blocks (4-ST)
± 244 units

Apartment (4-ST)
± 54 units

Mid-rise Buildings (5- to 8-ST) **68.9%**
± 3,654 units

Tall Buildings (9- to 15-ST) **19.9%**
± 1,054 units

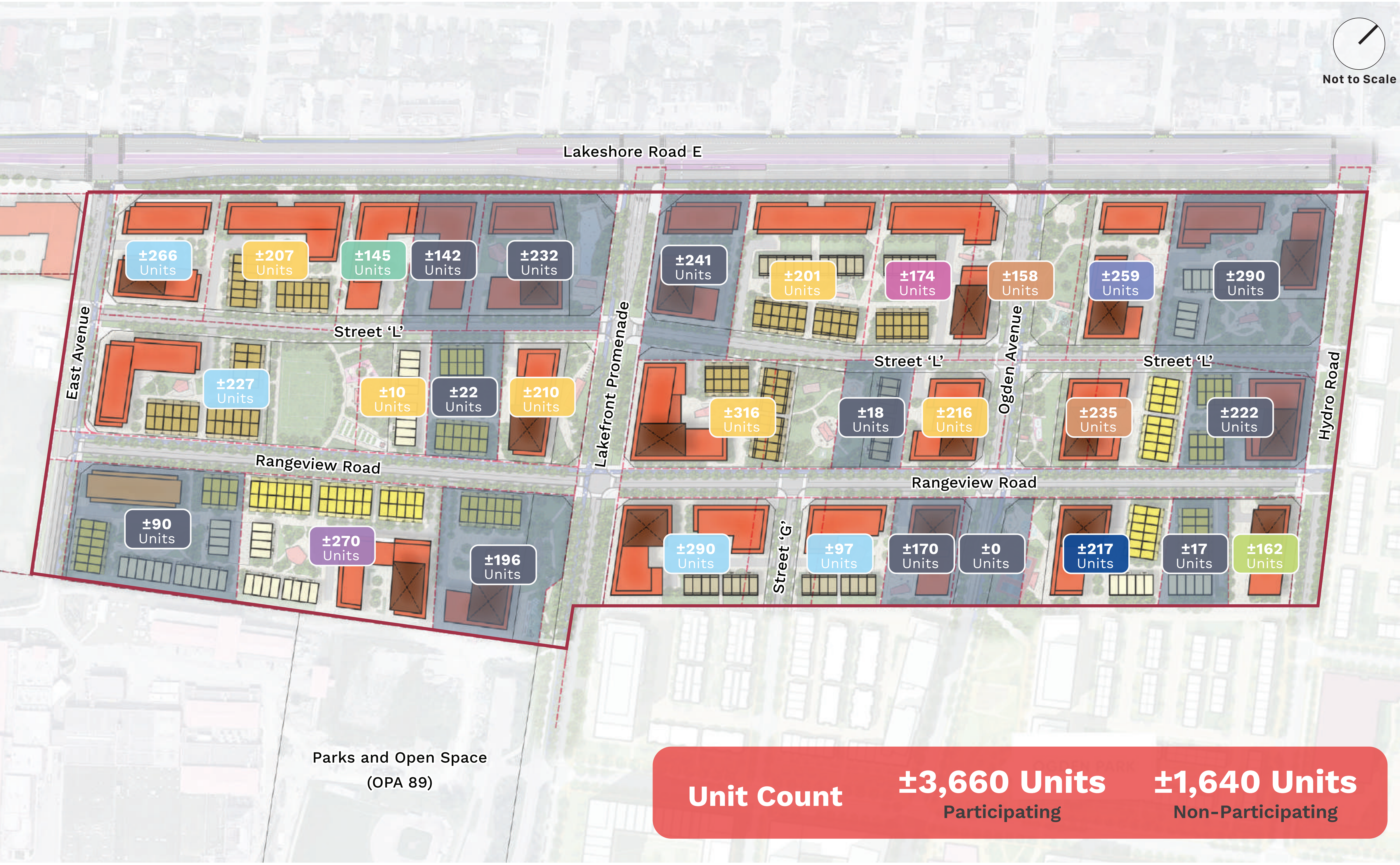
Assumptions

1. *Residential Gross Floor Area (GFA) for Apartments, Mid-rise and Tall Building based on 95% of the Gross Construction Area (GCA)*
2. *50% of the Ground Floor for Each Mid-rise / Tall Building is Allocated for Non-Residential Uses (i.e. lobby, servicing, etc.)*
3. *Approximate Unit Count for Mid-rise and Tall Building based on an 80 sq.m. unit size*
4. *Individual Stacked Townhouse module = 2 units*

Legend Rangeview Estates Precinct Area | Low-rise (Up to 4-Storeys) | Mid-rise (5 to 8-Storeys) | Tall Building (Up to 15-Storeys) | ## Building Height (Storeys)

MASTER PLAN VERSION 5.1 (FINAL)

Participating Landowners vs. Non-Participating Landowners Unit Counts



Landowner	Units
DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	± 1,160 Units
ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	± 880 Units
RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	± 393 Units
2120412 ONTARIO INC. (Xtreme Tire)	± 217 Units
WHITEROCK 880 RANGEVIEW INC. (Dream)	± 270 Units
447111 ONTARIO LIMITED (Norstar)	± 174 Units
1127792 ONTARIO LIMITED (Dino Collini)	± 145 Units
ILSCO OF CANADA LIMITED (Thomas Quinn)	± 259 Units
KOTYCK INVESTMENTS LTD.	± 162 Units
NON-PARTICIPATING LANDOWNERS	± 1,640 Units

Legend Rangeview Estates Precinct Area; Non-participating Landowners; Low-rise (Up to 4-Storeys); Mid-rise (5 to 8-Storeys); Tall Building (Up to 15-Storeys)

BUILT FORM + PARKLAND COMPARISON

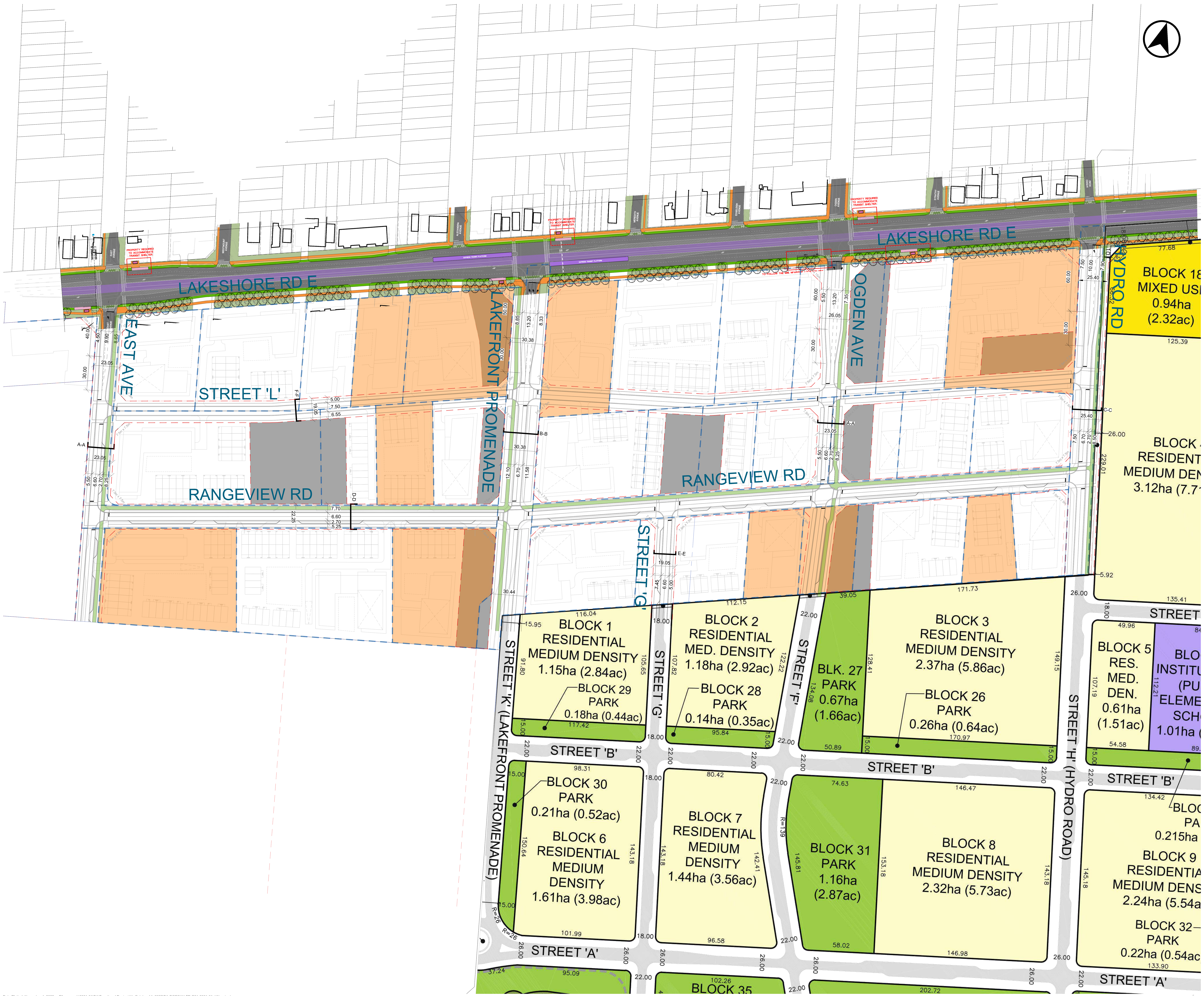
	Master Plan V4.1		Master Plan Draft V5.1		
Individual Statistics	Unit Count	Parkland Dedication	Unit Count	Parkland Dedication Provided [1]	Required Parkland Dedication [2]
DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	1,144	0.41 ha	1,160	0.55 ha	0.63 ha
ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	866	0.33 ha	880	0.45 ha	0.48 ha
RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	372	0.53 ha	393	0.44 ha	0.21 ha
2120412 ONTARIO INC. (Xtreme Tire)	206	0.11 ha	217	0.11 ha	0.12 ha
WHITEROCK 880 RANGEVIEW INC. (Dream)	258	0.12 ha	270	0.00 ha	0.15 ha
447111 ONTARIO LIMITED (Norstar)	167	0.00 ha	174	0.00 ha	0.09 ha
1127792 ONTARIO LIMITED (Dino Collini)	137	0.04 ha	145	0.00 ha	0.08 ha
ILSCO OF CANADA LIMITED (Thomas Quinn)	245	0.00 ha	259	0.05 ha	0.14 ha
KOTYCK INVESTMENTS LTD.	156	0.00 ha	162	0.00 ha	0.09 ha
NON-PARTICIPATING LANDOWNERS	1,546	0.53 ha	1,640	0.89 ha	0.89 ha
TOTALS	**5,330**	**2.07 ha**	**5,300**	**± 2.62 ha**	**± 2.88 ha**

Notes

1 Based on reduced OPA 89 parkland interpretation due to revised park blocks layout and road configuration.

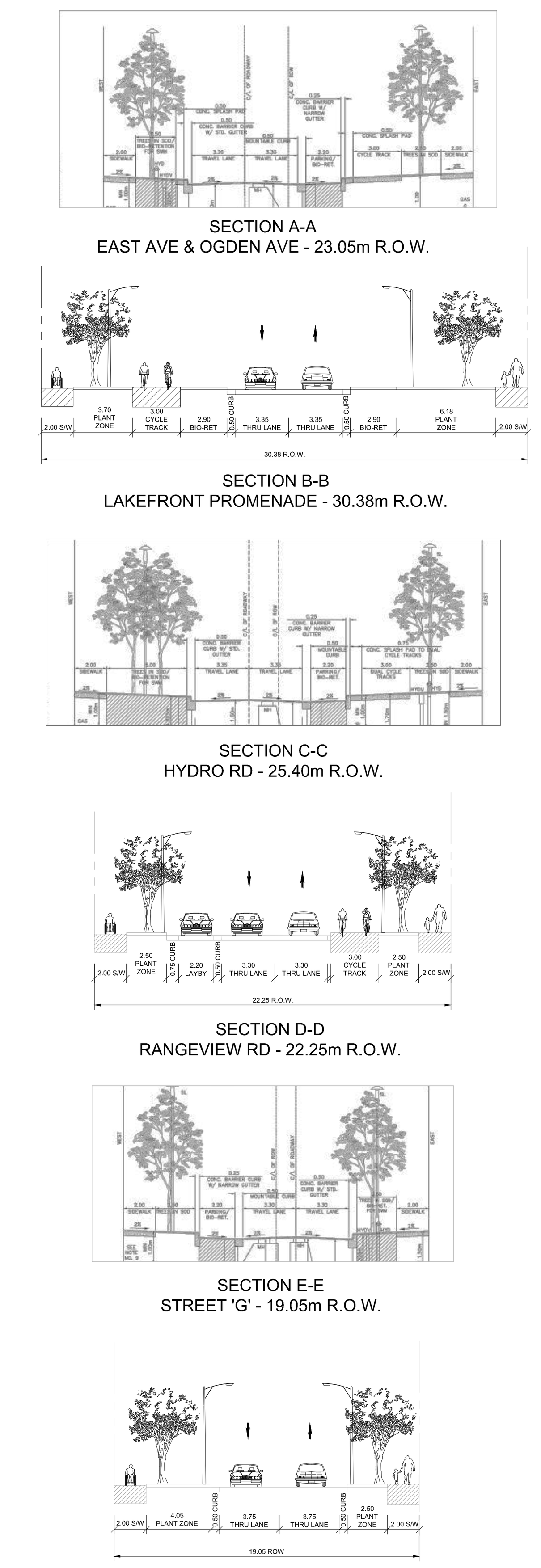
2 Based on Master Plan Draft V5.1 unit count and interpreted OPA 89 ratio (5.41 square metres per dwelling unit).

Appendix C:
Rangeview Estates Functional Road Plan



LEGEND

- EXISTING PROPERTY LINE
- PROPOSED RIGHT OF WAY
- NON-PARTICIPATING LANDOWNERS
- PARKS



SECTION A-A
EAST AVE & OGDEN AVE - 23.05m R.O.W.

SECTION B-B
LAKEFRONT PROMENADE - 30.38m R.O.W.

SECTION C-C
HYDRO RD - 25.40m R.O.W.

SECTION D-D
RANGEVIEW RD - 22.25m R.O.W.

SECTION E-E
STREET 'G' - 19.05m R.O.W.

SECTION F-F
STREET 'L' - 19.05m R.O.W.

BA Group

MOVEMENT IN URBAN ENVIRONMENTS

DORSAY PROPERTIES

ULTIMATE ROAD PLAN

Date: NOVEMBER 2022

Project No.: 8061-01

Scale: 1:1,500

RP-02

Appendix D:
Excerpts from April 2021 TMIG Report for Lakeview Village

LAKEVIEW VILLAGE

TRAFFIC CONSIDERATIONS REPORT ADDENDUM

FINAL▪ APRIL 2021

REPORT PREPARED FOR

LAKEVIEW COMMUNITY PARTNERS LIMITED
4595 PALLADIUM WAY
BURLINGTON, ON L7M 0W9

REPORT PREPARED BY

THE MUNICIPAL INFRASTRUCTURE GROUP LTD., A T.Y. LIN INTERNATIONAL COMPANY
8800 DUFFERIN STREET, SUITE 200, VAUGHAN, ON L4K 0C5
(905) 738-5700

TMIG PROJECT NUMBER 17201

Trip Generation Summary – Lakeview Village

Land Use	Parameters	Peak Hour of Trip Generator					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
Multifamily Housing (Low-Rise) (LUC 220) 355 units	Fitted Curve Equation	Ln(T) = 0.95 Ln(X) - 0.51			Ln(T) = 0.89 Ln(X) - 0.02		
	Distribution	23%	77%	-	63%	37%	-
	Gross Vehicle Site Trips	38	129	167	120	71	191
	Vehicle to Person Trip Conversion Rate	-	-	1.13	-	-	1.21
	Gross Person Trips	43	146	189	146	85	231
	Internal Reduction	1	2	3	13	9	22
	Total External Person Trips	42	144	186	133	76	209
	Mode Split Reduction	17	58	75	51	30	81
	Total Auto Driver Trips	25	86	111	82	46	128
Multifamily Housing (Mid-Rise) (LUC 221) 5287 units	Average Rate	0.2			0.18		
	Distribution	12%	88%	-	72%	28%	-
	Gross Vehicle Site Trips	127	930	1057	685	267	952
	Vehicle to Person Trip Conversion Rate	-	-	1.9	-	-	2
	Gross Person Trips	241	1768	2009	1370	533	1903
	Internal Reduction	5	31	36	119	59	178
	Total External Person Trips	236	1737	1973	1251	474	1725
	Mode Split Reduction	95	702	797	487	184	671
	Total Auto Driver Trips	141	1035	1176	764	290	1054
Multifamily Housing (High-Rise) (LUC 222) 2389 units	Average Rate or Fitted Curve Equation	Ln(T) = 0.84 Ln(X) - 0.65			2.17		
	Distribution	12%	88%		70%	30%	
	Gross Vehicle Site Trips	43	316	359	318	136	454
	Vehicle to Person Trip Conversion Rate	-	-	2.81	-	-	2.17
	Gross Person Trips	121	889	1010	690	295	985
	Internal Reduction	2	16	18	60	32	92
	Total External Person Trips	119	873	992	630	263	893
	Mode Split Reduction	48	353	401	245	102	347
	Total Auto Driver Trips	71	520	591	385	161	546
Hotel (LUC 310) 191 rooms	Fitted Curve Equation	T = 0.50(X) - 5.34			T = 0.75(X) - 26.02		
	Distribution	59%	41%		51%	49%	
	Gross Vehicle Site Trips	53	37	90	60	57	117
	Vehicle to Person Trip Conversion Rate	-	-	1.00	-	-	1.00

Land Use	Parameters	Peak Hour of Trip Generator					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
	Gross Person Trips	53	37	90	60	57	117
	Internal Reduction	-	-	-	-	-	-
	Total External Person Trips	53	37	90	60	57	117
	Mode Split Reduction	21	15	36	23	22	45
	Total Auto Driver Trips	32	22	54	37	35	72
Recreational Community Center (LUC 495)	Fitted Curve Equation	Ln(T) = 0.54 Ln(X) + 2.73			Ln(T) = 0.76 Ln(X) + 2.00		
	Distribution	66%	34%		47%	53%	
	Gross Vehicle Site Trips	269	139	408	352	397	749
	Vehicle to Person Trip Conversion Rate	-	-	1.86	-	-	1.82
	Gross Person Trips	501	258	759	641	722	1363
	Internal Reduction	-	-	-	-	-	-
	Total External Person Trips	501	258	759	641	722	1363
	Mode Split Reduction	202	104	306	249	281	530
	Total Auto Driver Trips	299	154	453	392	441	833
General Office Building (LUC 710)	Fitted Curve Equation	T = 0.72(X) + 21.64			T = 0.83(X) + 7.99		
	Distribution	86%	14%		17%	83%	
	Gross Vehicle Site Trips	480	78	558	107	520	627
	Vehicle to Person Trip Conversion Rate	-	-	1.47	-	-	1.46
	Gross Person Trips	706	115	821	156	759	915
	Internal Reduction	49	32	81	51	65	116
	Total External Person Trips	657	83	740	105	694	799
	Mode Split Reduction	266	34	300	41	270	311
	Total Auto Driver Trips	391	49	440	64	424	488
Research and Development Center (LUC 760)	Average Rate	0.42			0.49		
	Distribution	75%	25%		15%	85%	
	Gross Vehicle Site Trips	235	78	313	55	310	365
	Vehicle to Person Trip Conversion Rate	-	-	1.36	-	-	1.45
	Gross Person Trips	320	106	426	80	450	530
	Internal Reduction	-	-	-	-	-	-
	Total External Person Trips	320	106	426	80	450	530
	Mode Split Reduction	129	43	172	31	175	206
	Total Auto Driver Trips	191	63	254	49	275	324
Shopping Center	Fitted Curve Equation	T = 0.50(X) + 151.78			Ln(T) = 0.74Ln(X) + 2.89		
	Distribution	62%	38%		48%	52%	

Land Use	Parameters	Peak Hour of Trip Generator					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
(LUC 820)	Gross Vehicle Site Trips	157	96	253	440	477	917
	Vehicle to Person Trip Conversion Rate	-	-	1.31	-	-	1.43
	Gross Person Trips	206	126	332	629	682	1311
	Internal Reduction	60	36	96	113	191	304
	Total External Person Trips	146	90	236	516	491	1007
	Mode Split Reduction	59	36	95	201	191	392
	Total Auto Driver Trips	87	54	141	315	300	615
Elementary School (LUC 520) 850 student capacity	Average Rate	0.67			0.17		
	Distribution	54%	46%	-	48%	52%	-
	Gross Vehicle Site Trips	308	262	570	69	76	145
	Internal Reduction (50%)	154	131	285	34	38	72
	Total Auto Driver Trips	154	131	285	35	38	73
Day Care Center (LUC 565) 39 Student Capacity	Fitted Curve Equation	$T = 0.66(X) + 8.42$			$Ln(T) = 0.87 Ln(X) + 0.29$		
	Distribution	53%	47%	-	47%	53%	-
	Gross Vehicle Site Trips	18	16	34	15	17	32
	Internal Reduction	9	8	17	7	9	16
	Total Auto Driver Trips	9	8	17	8	8	16

Trip Generation Summary – Rangeview Estates

Land Use	Parameters	Peak Hour of Trip Generator					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
Multifamily Housing (Mid-Rise) (LUC 221) 2981 units	Average Rate	0.2			0.18		
	Distribution	12%	88%	-	72%	28%	-
	Gross Vehicle Site Trips	72	524	596	386	151	537
	Vehicle to Person Trip Conversion Rate	-	-	1.9	-	-	2
	Gross Person Trips	136	997	1133	773	300	1073
	Internal Reduction	3	12	15	61	28	89
	Total External Person Trips	133	985	1118	712	272	984
	Mode Split Reduction	54	398	452	277	106	383
	Total Auto Driver Trips	79	587	666	435	166	601
General Office Building (LUC 710)	Fitted Curve Equation	T = 0.72(X) + 21.64			T = 0.83(X) + 7.99		
	Distribution	86%	14%	-	17%	83%	-
	Gross Vehicle Site Trips	48	8	56	8	39	47
	Vehicle to Person Trip Conversion Rate	-	-	1.47	-	-	1.46
	Gross Person Trips	71	11	82	12	57	69
	Internal Reduction	5	3	8	11	12	23
	Total External Person Trips	66	8	74	1	45	46
	Mode Split Reduction	27	3	30	0	18	18
	Total Auto Driver Trips	39	5	44	1	27	28
Shopping Center (LUC 820)	Fitted Curve Equation	T = 0.50(X) + 151.78			Ln(T) = 0.74Ln(X) + 2.89		
	Distribution	62%	38%	-	48%	52%	-
	Gross Vehicle Site Trips	109	66	175	150	162	312
	Vehicle to Person Trip Conversion Rate	-	-	1.31	-	-	1.43
	Gross Person Trips	143	87	230	214	231	445
	Internal Reduction	13	6	19	32	64	96
	Total External Person Trips	130	81	211	182	167	349
	Mode Split Reduction	53	33	86	71	65	136
	Total Auto Driver Trips	77	48	125	111	102	213

Trip Generation Summary – Serson North

Land Use	Parameters	Peak Hour of Trip Generator					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
General Office Building (LUC 710)	Fitted Curve Equation	T = 0.72(X) + 21.64			T = 0.83(X) + 7.99		
	Distribution	86%	14%	-	17%	83%	-
	Gross Vehicle Site Trips	158	25	183	33	161	194
	Vehicle to Person Trip Conversion Rate	-	-	1.47	-	-	1.46
	Gross Person Trips	231	38	269	48	236	284
	Internal Reduction	-	-	-	-	-	-
	Total External Person Trips	231	38	269	48	236	284
	Mode Split Reduction	115	19	134	24	118	142
	Total Auto Driver Trips	116	19	135	24	118	142
Research and Development Center (LUC 760)	Average Rate	0.42			0.49		
	Distribution	75%	25%	-	15%	85%	-
	Gross Vehicle Site Trips	71	23	94	16	94	110
	Vehicle to Person Trip Conversion Rate	-	-	1.36	-	-	1.45
	Gross Person Trips	96	32	128	24	135	159
	Internal Reduction	-	-	-	-	-	-
	Total External Person Trips	96	32	128	24	135	159
	Mode Split Reduction	48	16	64	12	67	79
	Total Auto Driver Trips	48	16	64	12	68	80

Trip Generation Summary – 2041 50% Mode Split Sensitivity – Lakeview Village

Land Use	Parameters	Peak Hour of Trip Generator					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
Multifamily Housing (Low-Rise) (LUC 220) 355 units	Fitted Curve Equation	Ln(T) = 0.95 Ln(X) - 0.51			Ln(T) = 0.89 Ln(X) - 0.02		
	Distribution	23%	77%	-	63%	37%	-
	Gross Vehicle Site Trips	38	129	167	120	71	191
	Vehicle to Person Trip Conversion Rate	-	-	1.13	-	-	1.21
	Gross Person Trips	43	146	189	146	85	231
	Internal Reduction	1	2	3	13	9	22
	Total External Person Trips	42	144	186	133	76	209
	Mode Split Reduction	20	73	93	66	39	105
	Total Auto Driver Trips	22	71	93	67	37	104
Multifamily Housing (Mid-Rise) (LUC 221) 5287 units	Average Rate	0.2			0.18		
	Distribution	12%	88%	-	72%	28%	-
	Gross Vehicle Site Trips	127	930	1057	685	267	952
	Vehicle to Person Trip Conversion Rate	-	-	1.9	-	-	2
	Gross Person Trips	241	1768	2009	1370	533	1903
	Internal Reduction	5	31	36	119	59	178
	Total External Person Trips	236	1737	1973	1251	474	1725
	Mode Split Reduction	118	868	986	626	236	862
	Total Auto Driver Trips	118	869	987	625	238	863
Multifamily Housing (High-Rise) (LUC 222) 2389 units	Average Rate or Fitted Curve Equation	Ln(T) = 0.84 Ln(X) - 0.65			2.17		
	Distribution	12%	88%		70%	30%	
	Gross Vehicle Site Trips	43	316	359	318	136	454
	Vehicle to Person Trip Conversion Rate	-	-	2.81	-	-	2.17
	Gross Person Trips	121	889	1010	690	295	985
	Internal Reduction	2	16	18	60	32	92
	Total External Person Trips	119	873	992	630	263	893
	Mode Split Reduction	60	436	496	315	131	446
	Total Auto Driver Trips	59	437	496	315	132	447
Hotel (LUC 310) 191 rooms	Fitted Curve Equation	T = 0.50(X) - 5.34			T = 0.75(X) - 26.02		
	Distribution	59%	41%		51%	49%	
	Gross Vehicle Site Trips	53	37	90	60	57	117
	Vehicle to Person Trip Conversion Rate	-	-	1.00	-	-	1.00

Land Use	Parameters	Peak Hour of Trip Generator					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
	Gross Person Trips	53	37	90	60	57	117
	Internal Reduction	-	-	-	-	-	-
	Total External Person Trips	53	37	90	60	57	117
	Mode Split Reduction	26	18	44	30	28	58
	Total Auto Driver Trips	27	19	46	30	29	59
Recreational Community Center (LUC 495)	Fitted Curve Equation	Ln(T) = 0.54 Ln(X) + 2.73			Ln(T) = 0.76 Ln(X) + 2.00		
	Distribution	66%	34%		47%	53%	
	Gross Vehicle Site Trips	269	139	408	352	397	749
	Vehicle to Person Trip Conversion Rate	-	-	1.86	-	-	1.82
	Gross Person Trips	501	258	759	641	722	1363
	Internal Reduction	-	-	-	-	-	-
	Total External Person Trips	501	258	759	641	722	1363
	Mode Split Reduction	250	129	379	320	361	681
	Total Auto Driver Trips	251	129	380	321	361	682
General Office Building (LUC 710)	Fitted Curve Equation	T = 0.72(X) + 21.64			T = 0.83(X) + 7.99		
	Distribution	86%	14%		17%	83%	
	Gross Vehicle Site Trips	480	78	558	107	520	627
	Vehicle to Person Trip Conversion Rate	-	-	1.47	-	-	1.46
	Gross Person Trips	706	115	821	156	759	915
	Internal Reduction	49	32	81	51	65	116
	Total External Person Trips	657	83	740	105	694	799
	Mode Split Reduction	266	34	300	41	270	311
	Total Auto Driver Trips	391	49	440	64	424	488
Research and Development Center (LUC 760)	Average Rate	0.42			0.49		
	Distribution	75%	25%		15%	85%	
	Gross Vehicle Site Trips	235	78	313	55	310	365
	Vehicle to Person Trip Conversion Rate	-	-	1.36	-	-	1.45
	Gross Person Trips	320	106	426	80	450	530
	Internal Reduction	-	-	-	-	-	-
	Total External Person Trips	657	83	740	105	694	799
	Mode Split Reduction	328	41	369	52	347	399
	Total Auto Driver Trips	329	42	371	53	347	400
Shopping Center	Fitted Curve Equation	T = 0.50(X) + 151.78			Ln(T) = 0.74Ln(X) + 2.89		
	Distribution	62%	38%		48%	52%	

Land Use	Parameters	Peak Hour of Trip Generator					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
(LUC 820)	Gross Vehicle Site Trips	157	96	253	440	477	917
	Vehicle to Person Trip Conversion Rate	-	-	1.31	-	-	1.43
	Gross Person Trips	206	126	332	629	682	1311
	Internal Reduction	60	36	96	113	191	304
	Total External Person Trips	146	90	236	516	491	1007
	Mode Split Reduction	73	45	118	258	245	503
	Total Auto Driver Trips	73	45	118	258	246	504
Elementary School (LUC 520) 850 student capacity	Average Rate	0.67			0.17		
	Distribution	54%	46%	-	48%	52%	-
	Gross Vehicle Site Trips	308	262	570	69	76	145
	Internal Reduction (50%)	154	131	285	34	38	72
	Total Auto Driver Trips	154	131	285	35	38	73
Day Care Center (LUC 565) 39 Student Capacity	Fitted Curve Equation	T = 0.66(X) + 8.42			Ln(T) = 0.87 Ln(X) + 0.29		
	Distribution	53%	47%	-	47%	53%	-
	Gross Vehicle Site Trips	18	16	34	15	17	32
	Internal Reduction	9	8	17	7	9	16
	Total Auto Driver Trips	9	8	17	8	8	16

Trip Generation Summary – 2041 50% Mode Split Sensitivity – Rangeview Estates

Land Use	Parameters	Peak Hour of Trip Generator					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
Multifamily Housing (Mid-Rise) (LUC 221) 2981 units	Average Rate	0.2			0.18		
	Distribution	12%	88%	-	72%	28%	-
	Gross Vehicle Site Trips	72	524	596	386	151	537
	Vehicle to Person Trip Conversion Rate	-	-	1.9	-	-	2
	Gross Person Trips	136	997	1133	773	300	1073
	Internal Reduction	3	12	15	61	28	89
	Total External Person Trips	133	985	1118	712	272	984
	Mode Split Reduction	66	492	558	356	136	492
	Total Auto Driver Trips	67	493	560	356	136	492
General Office Building (LUC 710)	Fitted Curve Equation	T = 0.72(X) + 21.64			T = 0.83(X) + 7.99		
	Distribution	86%	14%	-	17%	83%	-
	Gross Vehicle Site Trips	48	8	56	8	39	47
	Vehicle to Person Trip Conversion Rate	-	-	1.47	-	-	1.46
	Gross Person Trips	71	11	82	12	57	69
	Internal Reduction	5	3	8	11	12	23
	Total External Person Trips	66	8	74	1	45	46
	Mode Split Reduction	33	4	37	0	22	22
	Total Auto Driver Trips	33	4	37	1	23	24
Shopping Center (LUC 820)	Fitted Curve Equation	T = 0.50(X) + 151.78			Ln(T) = 0.74Ln(X) + 2.89		
	Distribution	62%	38%	-	48%	52%	-
	Gross Vehicle Site Trips	109	66	175	150	162	312
	Vehicle to Person Trip Conversion Rate	-	-	1.31	-	-	1.43
	Gross Person Trips	143	87	230	214	231	445
	Internal Reduction	13	6	19	32	64	96
	Total External Person Trips	130	81	211	182	167	349
	Mode Split Reduction	65	40	105	91	83	174
	Total Auto Driver Trips	65	41	106	91	84	175

Trip Generation Summary – 2041 50% Mode Split Sensitivity – Serson North

Land Use	Parameters	Peak Hour of Trip Generator					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
General Office Building (LUC 710)	Fitted Curve Equation	T = 0.72(X) + 21.64			T = 0.83(X) + 7.99		
	Distribution	86%	14%	-	17%	83%	-
	Gross Vehicle Site Trips	158	25	183	33	161	194
	Vehicle to Person Trip Conversion Rate	-	-	1.47	-	-	1.46
	Gross Person Trips	231	38	269	48	236	284
	Internal Reduction	-	-	-	-	-	-
	Total External Person Trips	231	38	269	48	236	284
	Mode Split Reduction	115	19	134	24	118	142
	Total Auto Driver Trips	116	19	135	24	118	142
Research and Development Center (LUC 760)	Average Rate	0.42			0.49		
	Distribution	75%	25%	-	15%	85%	-
	Gross Vehicle Site Trips	71	23	94	16	94	110
	Vehicle to Person Trip Conversion Rate	-	-	1.36	-	-	1.45
	Gross Person Trips	96	32	128	24	135	159
	Internal Reduction	-	-	-	-	-	-
	Total External Person Trips	96	32	128	24	135	159
	Mode Split Reduction	48	16	64	12	67	79
	Total Auto Driver Trips	48	16	64	12	68	80

B

Appendix:
Master Functional Servicing Report

MASTER FUNCTIONAL SERVICING REPORT

RANGEVIEW DEVELOPMENT MASTER PLAN

CITY OF MISSISSAUGA
PROJECT 2020-4938 NOVEMBER 2022

Revision	Description	Prepared		Checked	
		By	Date	By	Date
0	First Submission	Ishraque Chandan	November 2022	Heather Milukow	November 2022

SCHAEFFERS
CONSULTING ENGINEERS
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Concord, Ontario L4K 4R3

Table of Contents

PAGE

List of Tables

List of Figures

Appendices

1 INTRODUCTION

1.1 Objective and Location

Schaeffer and Associates Ltd. (SCE) has been retained to prepare a Master Functional Servicing Report (MFSR) to facilitate the design of the proposed municipal roads and infrastructure to service the Rangeview Development on Lakeshore Rd. East and Lakefront Promenade, in the City of Mississauga, Region of Peel. The proposed development herein referred to as 'Rangeview Development' falls within the jurisdictional boundary of the Credit Valley Conservation Authority (CVC).

The subject site is approximately 21.94 ha and is bound by Lakeshore road to the northwest, Hydro Rd. to the northeast, East Avenue to the southwest, and Lakeview Park and Douglas Kennedy Park to the southeast. A location plan is provided in **Figure 1.1**. The majority of the site currently consists of employment land. The master plan proposes future right-of-way (ROW), residential site plans, and park areas. Currently, the proposed development consists of 33 parcels with 21 participating and 12 non-participating landowners' groups (LOG). The following sections of this report provide strategic information regarding the municipal servicing of the proposed re-developments.

1.2 Existing Site Conditions

Existing site conditions were reviewed using previous planning documents for the subject site. Under existing conditions, the site's land use is predominantly commercial and industrial employment lands. The site land area is also mostly paved impervious spaces (commercial and industrial) with some grassed landscaped areas within the municipal ROW. The site generally grades southwest, ultimately discharging to Lake Ontario.

A geotechnical investigation for the proposed development has been requested and will be provided when available. The Groundwater report by DS Consultants Ltd on June 9, 2020 for the neighbouring Lakeview development was reviewed for preliminary reference of the groundwater and soil conditions and excerpts are provided in **Appendix A**.

1.3 Background Studies and Documentation

The following material has been reviewed in order to identify environmental compliance, existing topography, target release rates, and stormwater management criteria, which govern the proposed development within the area of the subject land and form the basis of this report.

- *Development Requirements Manual,* Transportation and Works Department, City of Mississauga, dated November 2020
- *Stormwater Management Criteria*, Credit Valley Conservation, dated August 2012.
- *Lakeview Village Functional Servicing Report*, Lakeview Community Partners Ltd., dated June 2021.

1.4 Proposed Development

Based on the current development plans for the site, the following development features have been considered:

- Twenty-seven (27) site plan catchments with a mix of residential units;
- Eight (8) Park Blocks;
- Additional public right of ways (ROW);

The specific design of each of the proposed blocks is subject to change in the future; however, this report intends to establish the servicing requirements of the study area such that the aforementioned developments may be supported by existing infrastructure and to verify if there will be any requirements for necessary infrastructure improvements in the future. The details of the proposed servicing scheme are provided in the remainder of the report. Refer to **Figure 1.2** for the development plan (ultimate full buildout scenario with all site areas participating).

Access to the subject site is currently provided from Lakeshore Road east, Hydro Road, East Avenue, Lakefront Promenade, and Rangeview Road. It should be noted that the proposed development includes the existing public roads; Rangeview Road, Lakefront Promenade, and East Avenue. It is to note, road widening and road re-alignment may be required on Rangeview Road and East Avenue as per the Lakeview master plan. As shown in **Figure 1.2**, two (2) additional municipal ROW are proposed, one of the proposed municipal ROW is north of Rangeview Road, parallel to Lakeshore Rd. East, connecting to East Avenue and Hydro Road. While the second proposed municipal ROW runs parallel with Lakefront Promenade on the east side, connecting to Lakeshore Rd. East and the future Lakeview Village development.

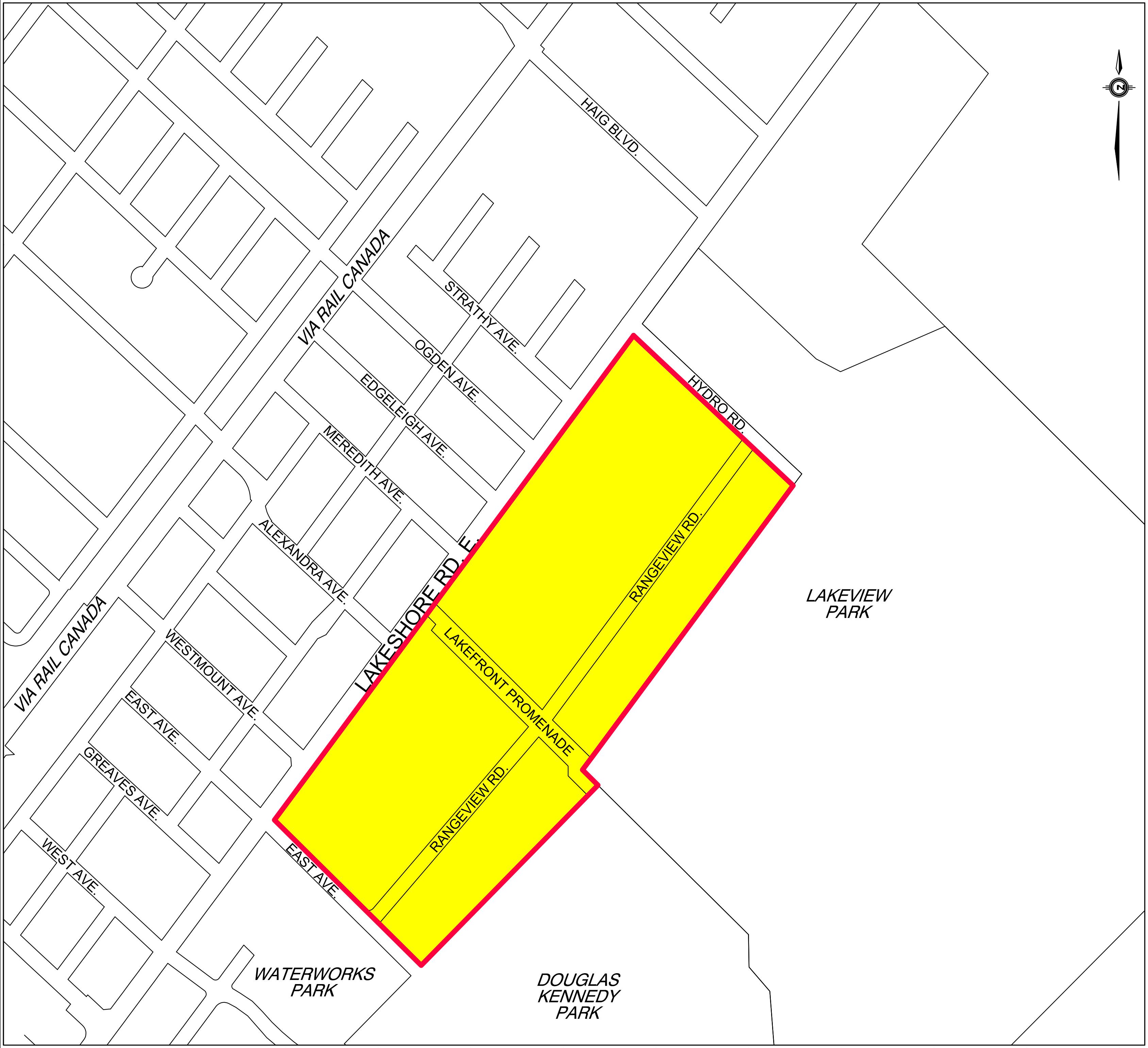
The approximate area of development and proposed unit count for each of the parcels are presented in **Table 1.1** below. Refer to **Appendix A** for detailed population statistics based on the current concept plan. At the behest of the Region of Peel, a population density of 2.7 people/unit for apartments and 3.5 people/unit for townhouses was considered. The servicing sections below will discuss interim conditions based on cost sharing and participating land agreements, and the ultimate condition in which all landowners are participating.

Table 1-1: Estimated Population

Parcel	**Parcel Area (Gross)**	*Townhouses* **(Up to 4-Storey)**	*Apartment* **(4-Storeys +)**	**Equivalent Population**		
				Townhouses	**Apartments**	**Total**
	ha	*Units*	*Units*	*persons*	*persons*	***persons***
1	0.62	0	266		719	**719**
2	0.85	48	159	168	430	**598**
3	0.43	0	145		392	**392**
4	0.43	0	142		384	**384**
5	0.87	0	232		627	**627**
6	0.70	0	241		651	**651**
7	1.07	66	135	231	365	**596**
8	0.78	36	138	126	373	**499**
9	0.86	0	158		427	**427**
10	0.70	0	259		700	**700**
11	1.36	12	278	42	751	**793**
12	1.54	68	159	238	430	**668**
13	0.42	10	0	35		**35**
14	0.45	22	0	77		**77**
15	0.57	0	210		567	**567**
16	0.73	20	256	70	692	**762**
17	0.36	40	0	140		**140**
18	0.36	18	0	63		**63**
19	0.51	0	216		584	**584**
20	0.46	0	217		586	**586**
21	0.48	18	0	63		**63**

Parcel	**Parcel Area (Gross)**	*Townhouses* (Up to 4-Storey)	*Apartment* (4-Storeys +)	**Equivalent Population**		
				Townhouses	**Apartments**	**Total**
	ha	*Units*	*Units*	*persons*	*persons*	***persons***
22	0.61	16	206	56	557	**613**
23	1.04	90	0	126	146	**272**
24	1.31	48	222	168	600	**768**
25	0.86	14	182	49	492	**541**
26	0.73	16	274	56	740	**796**
27	0.36	0	0			
28	0.36	16	81	56	219	**275**
29	0.36	0	170		459	**459**
30	0.36	0	0			
31	0.72	17	200	60	540	**600**
32	0.33	17	0	60		**60**
33	0.35	0	162		438	**438**
	21.94			**1,884**	**12,869**	**14,753**

** The population estimate was performed based on Peel Region criteria and correspondence with Peel Region. [2.7 persons per apartment unit and 3.5 persons per townhouse unit]*



RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA

LEGEND

SUBJECT AREA

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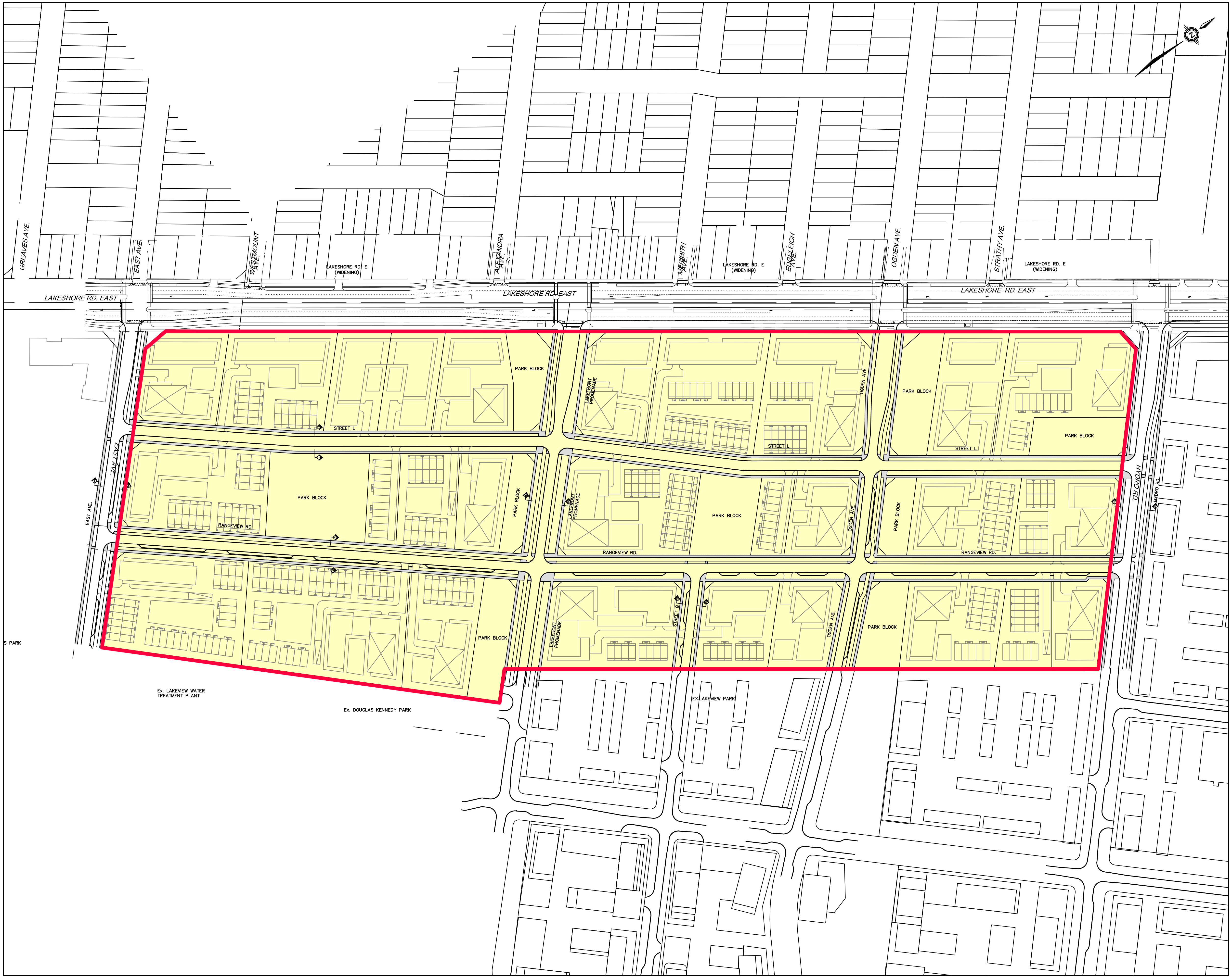
FIGURE 1.1
LOCATION PLAN

2020-4938	NOVEMBER 2022	SCALE: N.T.S.



RANGEVIEW ESTATES PRECINCT AREA
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FIGURE 1.2
PROPOSED DEVELOPMENT PLAN

2020-4938	NOVEMBER 2022	SCALE: N.T.S.

2 WATER SUPPLY SERVICING

2.1 Existing Water Supply Servicing

The subject site is located in the Region's Pressure District 1 (PD1). Existing water supply infrastructure proximate to the subject site includes:

- 600 mm diameter CPP along Lakeshore Road East;
- 2,400 mm diameter CPP watermain along Lakeshore Road East and Lakeshore Promenade;
- 300 mm diameter PVC watermains along East Avenue and Hydro Road;
- 300 mm diameter PVC watermain along Rangeview Road from East Avenue to Lakefront Promenade; and,
- 250 mm diameter PVC watermain along Rangeview Road from Lakefront Promenade to Hydro Road.

The Lakeview Community, located to the south of the Rangeview development, is currently under construction. At the time the Rangeview development is to be constructed, it is expected that the water servicing infrastructure, including 400 mm diameter watermains proposed along Lakefront Promenade and Hydro Road, to service the Lakeview community will be constructed. **Figure 2.1** shows the existing watermain layout.

RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA

LEGEND

SUBJECT AREA

EXISTING WATERMAIN

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FIGURE 2.1
EXISTING WATER SUPPLY SERVICES

2020-4938	NOVEMBER 2022	SCALE: N.T.S.

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2.2 Water Supply Servicing Design Criteria

The following criteria were utilized in the design of the subject site's water distribution system:

- Region of Peel's Design, Specifications & Procedures Manual – Watermain Design Criteria (June 2010)
- Ministry of Environment, Conservation and Parks' (MECP) Design Guidelines for Drinking Water Systems (2019)
- City of Mississauga Development Requirements Manual (September 2016)
- Technical memorandum for the Lakeview Community development: "Lakeview Community – Water Modelling Methodology and Analysis" (TMIG, 2021) (Lakeview Community Technical Memorandum)
- E-mail correspondence with the Region

For fire flow demands, the Region's design guidelines do not provide a minimum fire flow demand for townhouse and apartment complexes. Furthermore, building construction and floor area data was not available, so Fire Underwriter Survey (FUS) methods could not be utilized to determine fire flow demands. As such, the City of Vaughan's Engineering Design Criteria & Standard Drawings (December 2020) were referenced for fire flow demand requirements. Once architectural plans become available, calculations shall be performed per FUS standards and the fire flow analysis shall be updated accordingly. For the Lakeview Community south of the subject site, fire flow demands were based on the technical memorandum for the Lakeview Community development, "Lakeview Community – Water Modelling Methodology and Analysis" (TMIG, 2021), and can be referred to in **Appendix B**.

- Equivalent population density of 3.5 persons per unit for townhouses and 2.7 persons per unit for apartments, per e-mail correspondence with the Region (refer to **Appendix B**);
- Equivalent population density of 175 persons per hectare for townhouses and 475 persons per hectare for apartments
- Average Day Demand of 280 L/capita/day for residential developments and 300 L/capita/day for institutional, commercial, and industrial (ICI) developments;

- For residential land use, the Maximum Day Demand and Peak Hour Demand peaking factors shall be 2.0 and 3.0, respectively;
- For commercial land use, the Maximum Day Demand and Peak Hour Demand peaking factors shall be 1.4 and 3.0, respectively;
- Minimum Fire Flow Demand of 317 L/s for multi-unit apartment buildings per City of Vaughan Engineering Design Criteria & Standard Drawings (December 2020)
- Fire Flow Demand of 300 L/s for all buildings within the Lakeview Community development per Technical Memorandum: Lakeview Community – Water Modelling Methodology and Analysis (TMIG, 2021)
- The system shall be designed to provide sufficient flow and pressure to meet the greater of the Fire Flow plus Maximum Day Demand, or the Peak Hourly Demand;
- The minimum pressure under any non-fire demand scenario shall not be less than 275 kPa (40 psi). The minimum residual pressure during the Fire Flow plus Maximum Day Demand scenario shall not be less than 140 kPa (20 psi) at any location in the water distribution system;
- Hazen-Williams coefficients below table:

Pipe Diameter (mm dia.)	Hazen-Williams 'C' Coefficient
150	100
200-250	110
300-600	120
Over 600	130

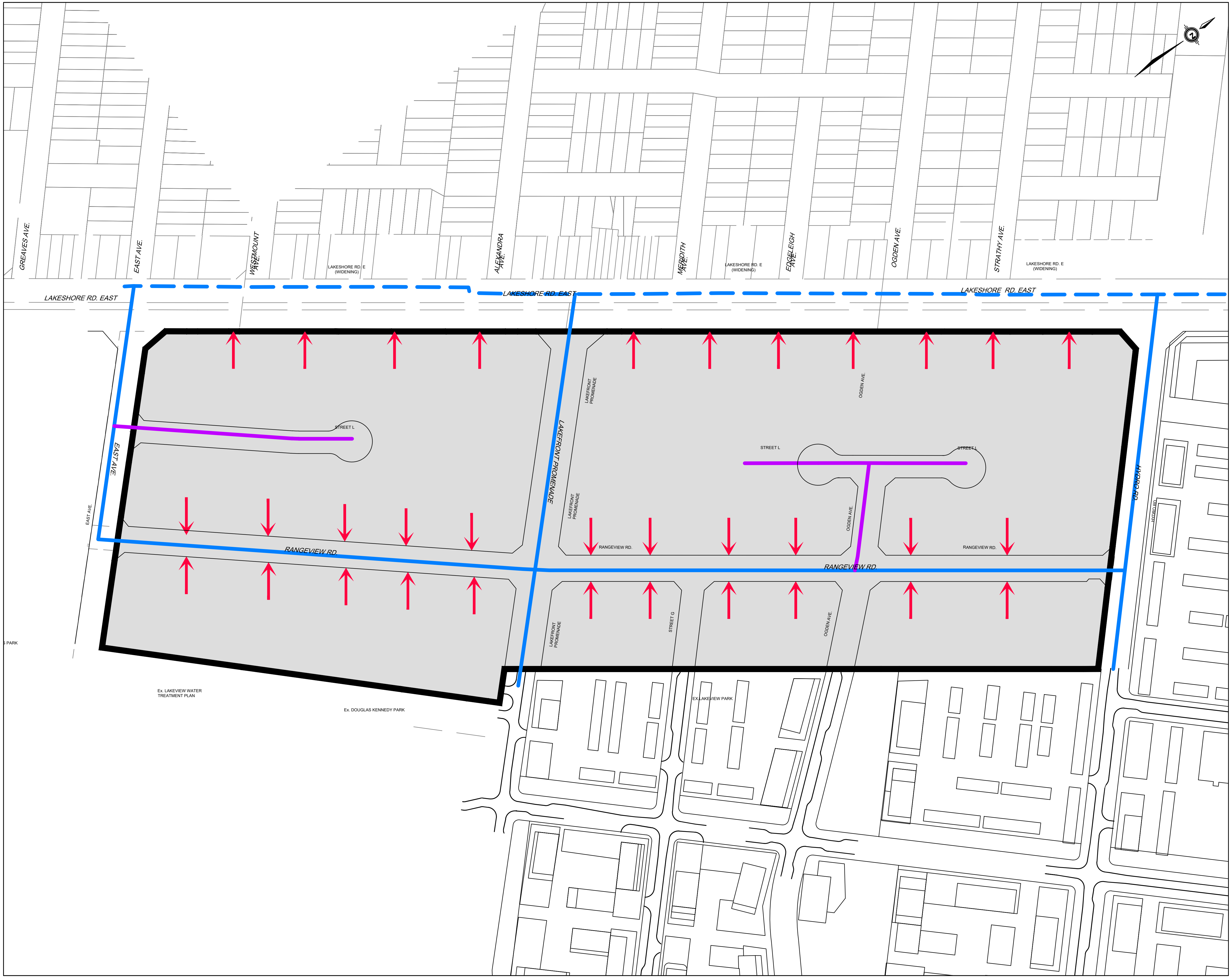
2.3 Proposed Water Supply Servicing Plan

2.3.1 Interim Scenario

Under the interim scenario, infrastructure cannot be built along the entirety of Street 'A' due to the presence of non-participating landowners within the Rangeview site. As a result, 2 alternatives shall be considered for water supply servicing under interim conditions. Option 1 involves servicing the parcels fronting Rangeview Road via existing 250 mm diameter and 300 mm diameter watermains along Rangeview Road. Parcels fronting Lakeshore Road East shall be serviced directly from the existing 600 mm diameter watermain along Lakeshore Road East. Option 2 involves servicing the parcels fronting Lakeshore Road East by connecting the existing Rangeview Road watermains to 300 mm diameter watermains along the reaches of Street ‘A’ where only participating landowners are present. Temporary easements would be required to loop these watermains back to Rangeview Road to limit dead-ends in the system. Parcels fronting Rangeview Road would be serviced via existing 250 mm diameter and 300 mm diameter watermains along Rangeview Road. Watermains connecting the Rangeview and Lakeview developments along Street ‘G” and Ogden Avenue are not required for the system to be compliant with design guidelines, and thus these connections have been excluded. Water supply analysis of the interim water servicing scenario will be completed once the participating and non-participating landowners are confirmed. Refer to **Figure 2.2** and **Figure 2.3** depicting the proposed watermain layouts for interim scenario options 1 and 2, respectively.

2.3.2 Ultimate Scenario

The subject site is proposed to be serviced by connecting to existing watermains along Lakeshore Road East, Rangeview Road and East Avenue, as well as the 400 mm diameter watermains along Lakefront Promenade and Hydro Road, proposed as part of the Lakeview Community development. A 300 mm diameter watermain is proposed along Street ‘A’, extending from East Avenue to Hydro Road. In addition, a 300 mm diameter watermain is proposed along Ogden Avenue, connecting to the existing 600 mm diameter watermain along Lakeshore Road East and the existing 250 mm diameter watermain along Rangeview Road. Watermains connecting the Rangeview and Lakeview developments along Street ‘G” and Ogden Avenue are not required for the system to be compliant with design guidelines, and thus these connections have been excluded. Refer to **Figure 2.4** depicting the proposed watermain layout for the ultimate scenario.



RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA

LEGEND

SUBJECT AREA

PROPOSED WATERMAIN

PROPOSED CLOSED WATERMAIN IN INTERIM CONDITION

EXISTING WATERMAIN

DIRECTION OF SERVICE CONNECTION

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FIGURE 2.2
INTERIM
WATER SUPPLY SERVICES - OPTION 1

2020-4938	NOVEMBER 2022	SCALE: N.T.S.

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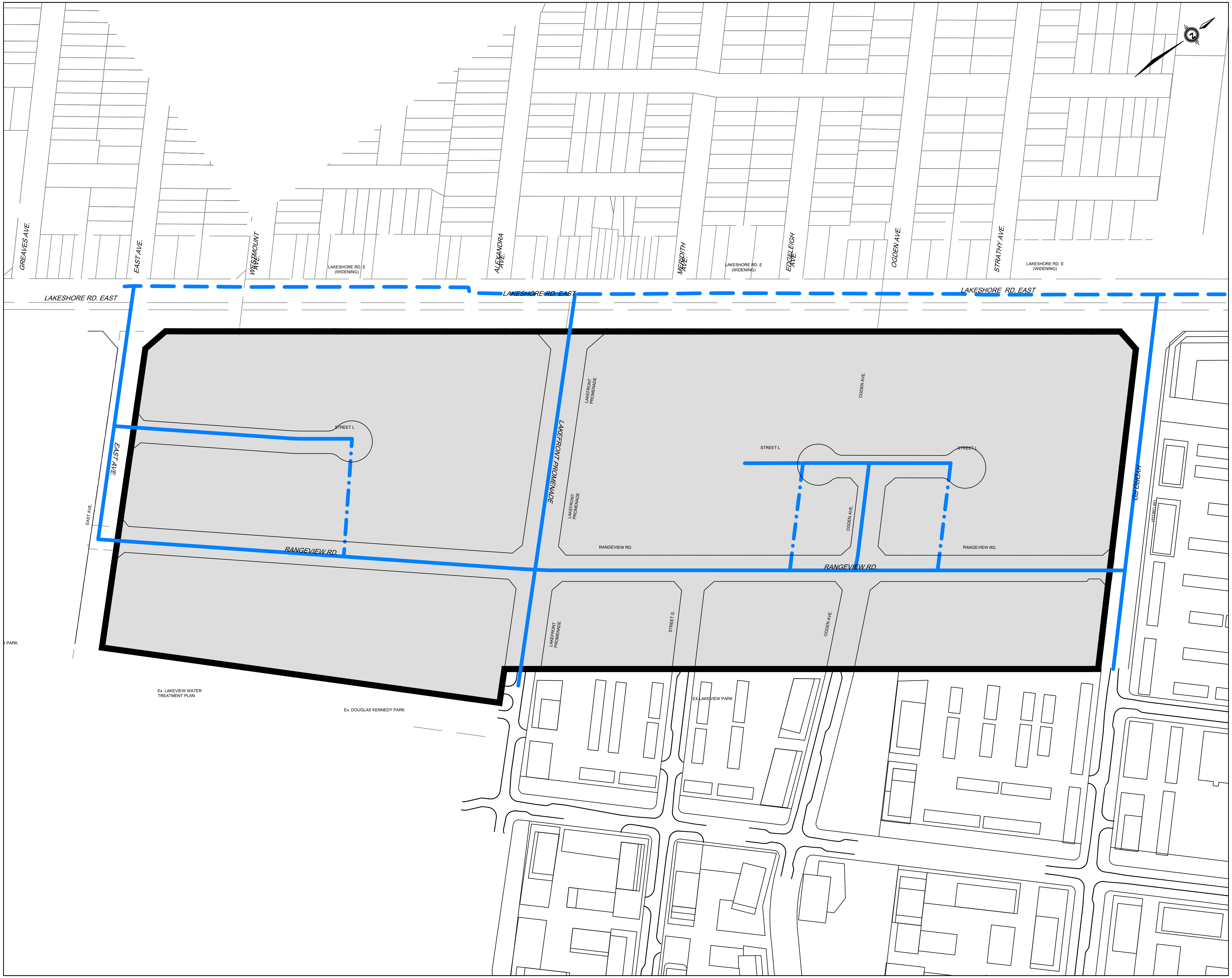

RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA

LEGEND

SUBJECT AREA

PROPOSED WATERMAIN

TEMPORARY EASEMENT

EXISTING WATERMAIN

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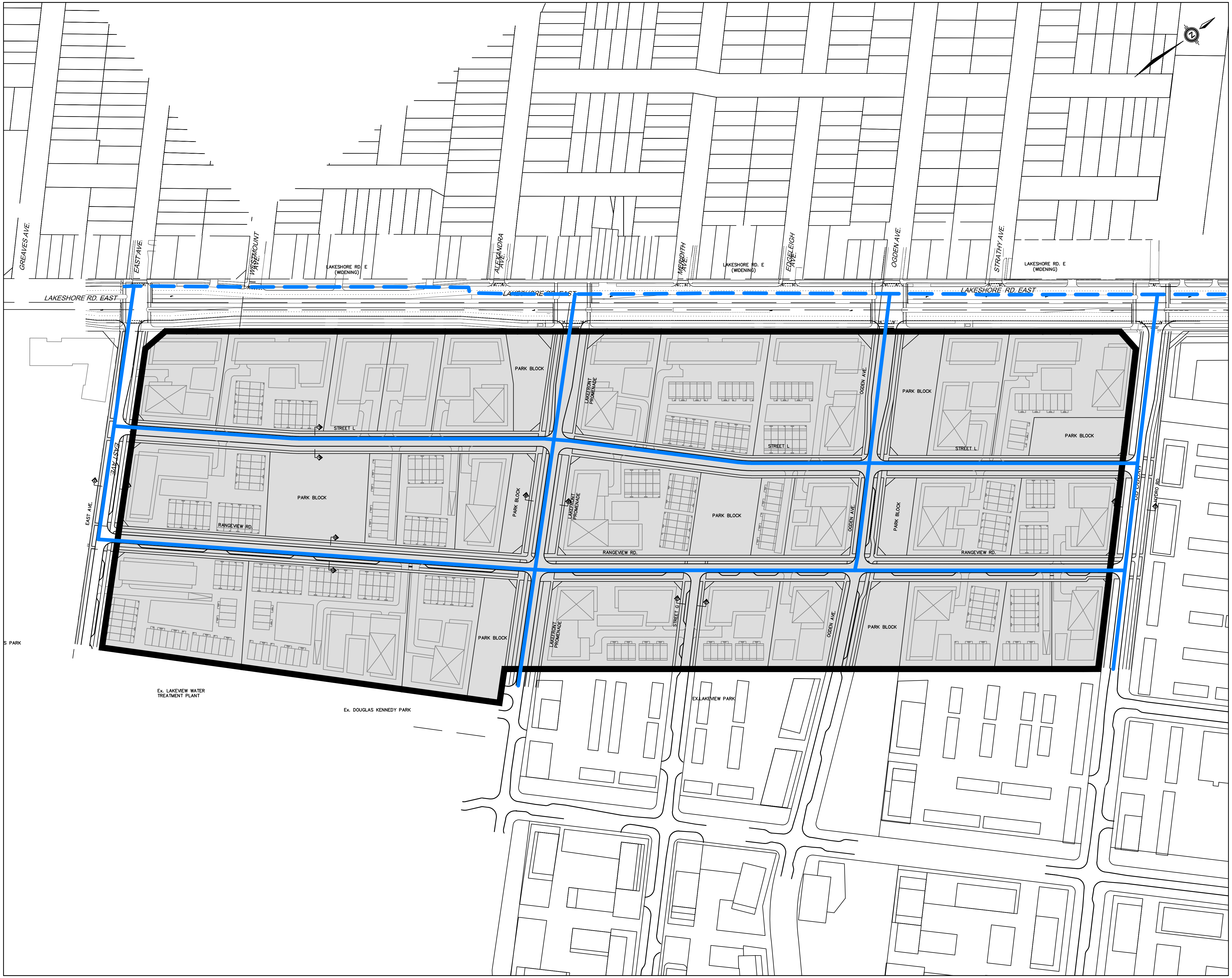
FIGURE 2.3
INTERIM
WATER SUPPLY SERVICES - OPTION 2

2020-4938	NOVEMBER 2022	SCALE: N.T.S.



RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA

LEGEND

SUBJECT AREA

PROPOSED WATERMAIN

EXISTING WATERMAIN

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FIGURE 2.4
ULTIMATE
WATER SUPPLY SERVICES

2020-4938 | NOVEMBER 2022 | SCALE: N.T.S.

2.4 Water Demands

Water demands for the proposed development were calculated based on Rangeview site statistics provided by Bousefields Inc., dated September 30, 2022. Equivalent populations were calculated using 2 population density methods: population per hectare, per the Region's Design, Specifications & Procedures Manual – Watermain Design Criteria (June 2010) and population per unit type, per correspondence with the Region on October 3, 2022. The equivalent population calculated using unit type yielded a higher value, thus, to be conservative this value was carried forward for water demand calculations.

Water demands for the Lakeview Community south of the subject site and external lands east of the subject site were calculated using population data from the Lakeview Community Technical Memorandum (TMIG, 2021). Per capita water demands and peaking factors were updated to reflect the latest Region design standards.

Table 2.1 below summarizes the water demands for the Rangeview development. Refer to the detailed water demand calculations for the Rangeview development, Lakeview Community and external lands in **Appendix B.**

Table 2-1: Summary of Water Demands – Rangeview Development

Land Use	Equivalent Population	Demand			Fire Flow
		Average Day	Max Day	Peak Hour	
		L/s	*L/s*	*L/s*	*L/s*
Residential	14,753	47.81	95.62	143.43	317

2.5 Hydraulic Modeling

An InfoWater model was prepared using elevation data from the Lakeview Community Technical Memorandum (TMIG, 2021) and the latest grading plan by SCE. Demands were assigned to the nearest junction within the proposed development.

The following boundary condition was assumed for the water supply analysis:

- The boundary condition utilized in the hydraulic model was sourced from a hydrant test completed by EBAL Engineering Ltd. on April 23, 2021. The hydrant test, performed at 1000 Lakeshore Road East, Mississauga, yielded a static pressure of 82 psi. The boundary condition was modeled as a fixed-head reservoir with a head of 144.11 m, calculated as the sum of the ground elevation at the residual hydrant of 86.44 m (per the latest grading plan) and the measured static pressure of 82 psi (57.67 m head). Refer to **Appendix B** for hydrant test results.

The InfoWater model was used to analyze the post-development system under the following demand scenarios: Average Day Demand, Maximum Day Demand, Peak Hour Demand, and Max Day plus Fire Flow Demand. The modeling results demonstrate the water supply system can provide sufficient pressure and flow to the proposed development under normal operational and fire flow scenarios in accordance with MECP and Region design guidelines.

Table 2.2 below summarizes the pressures for each demand scenario. Detailed model outputs are provided in **Appendix B**.

Table 2-2: Summary of Modelled System Pressures

Scenario	Minimum Pressure (psi)	Maximum Pressure (psi)
Average Day	81.98	96.59
Maximum Day	81.98	95.82
Peak Hour	81.98	94.27

Fire flow (Max Day plus Fire Flow Demand) scenario modelling showed that a minimum residual pressure of 20 psi could be maintained for all nodes in the system proximate to the subject site. **Table 2.3** below summarizes the pressure range under the Maximum Day plus Fire Flow scenario.

Table 2-3: Pressure Range (MDD plus Fire Flow Scenario)

Range	**Minimum Pressure** (psi)	**Maximum Pressure** (psi)
Node ID (Min/Max Location)	J124	J152
Residual Pressure	55.31	90.12

2.6 Water Age Analysis

A water age analysis was performed to ensure the proposed system is compliant with water age guidelines. Water turnover was calculated for the entirety of the modeled network as there are no proposed watermains that terminate at dead ends.

To be conservative, an occupancy rate of 20% and the minimum consumption rate (70% of the average day demand) were assumed for the purposes of calculating water age. Given these parameters, a water age of 0.47 days was determined for the entirety of the Rangeview and Lakeview Community water supply systems. Per "Effects of Water Age on Distribution System Water Quality" (AWWA, 2002), a maximum water turnover rate of 3 days was observed in distribution systems. With a water age of 0.47 days, the proposed system is less than the maximum observed turnover rate and therefore meets water age requirements. Refer to the water age analysis in **Appendix B**.

3 SANITARY SERVICING

3.1 Existing Sanitary Servicing

The majority of the site discharges sanitary flow westerly to the Beach Street Pumping Station (PS) via the existing 250mmØ sewers along Rangeview Road and the existing 250mmØ sewer on East Avenue. The remainder of the site, which includes the lots east of Lakeshore Road East and Lakefront Promenade, discharges easterly to the G.E. Booth Wastewater Treatment Facility (WWTF) via the existing 300mmØ sewers along Lakeshore Road East.

It is to be noted that there is another pumping station (Beechwood SPS), located north of Lakeshore Road East and east of Enola Avenue.

For further details, reference can be made to **Figure 3.1** for the existing sanitary services.

3.2 Background Information

SCE previously completed a high-level downstream sanitary sewer analysis for the proposed lands, with an estimated population per parcel. The results of this analysis were presented in a meeting with the Region of Peel in April 2021. The Region recommended that all future flows from the proposed development lands were to be discharged to the Beechwood PS and none of the flows were to be discharged to the Beach Street PS or Lakeview PS. The Region informed SCE that the Beach Street PS would be decommissioned. Therefore, reliance on the Beach Street PS for ultimate servicing is not feasible. The Region further informed SCE that they would be commencing the design of a Capital Project to decommission the Beach Street PS and install a new sewer along Lakeshore Road East to direct the flow from the Beach Street PS to Beechwood PS.

SCE previously contacted the Region to determine if a preliminary design was completed for the proposed sewer located west of Rangeview Road. The Region informed SCE that the preliminary design of this new system has not progressed and design information is unavailable at this time. SCE completed a preliminary high-level analysis to determine if servicing the new trunk sewer on Lakeshore Road East would be feasible to connect to the Beechwood PS. Based on the collected information from the Region's plan and profile drawings, it was noted that connection would be feasible with a flat slope. Reference can be made to **Appendix C** for the profile of this new sewer.

3.3 Sanitary Design Criteria

Reference has been made to the Region of Peel Public Works Design, Specifications & Procedures Manual (March 2017) and correspondence from the Region for the sanitary servicing portion of this report. Please note, the Region informed SCE that a density of 3.5 persons/unit and 2.7 persons/unit were to be considered for townhouses and apartments respectively. The relevant design criteria applicable to the development are summarized below:

- Average Domestic Flow q = 302.80 L/person/day
- Infiltration Allowance i = 0.20 L/s/ha
- Population (Townhouse) P = 3.5 Persons/Unit
- Population (Apartment) P = 2.7 Persons/Unit
- Population (Commercial) P = 50 Persons/ha
- Population (Industrial) P = 70 Persons/ha
- Harmon Peaking Factor $M = [1+(14/(4+P(total)^{1/2}))]$

3.4 Proposed Sanitary Servicing Plan

3.4.1 Interim Conditions

Under the interim conditions, infrastructure cannot be built along the entirety of Street ‘L’ due to some of the non-participating landowners along Rangeview Road. Please note that the configuration of the sanitary servicing for the ultimate (full build-out) conditions has been designed considering the interim conditions. The servicing for the interim conditions will be updated on the release of the phasing plan for the Rangeview Development. Reference can be made to **Figure 3.2** for the interim serving plan.

It is to be noted that there are upgrades recommended during the ultimate conditions and once a phasing plan has been issued, an interim servicing plan can be completed to determine the capacity of the sewers at that stage.

3.4.2 Ultimate Conditions

During ultimate conditions, the site is proposed to service 33 parcels of mid-high-rise buildings and townhouses. The full build-out of the site is expected to have a design population of approximately 14,753 people. As seen in the ultimate servicing plan in **Figure 3.3**, all future sanitary flows from the site will discharge only to the proposed internal sewers located within the subject site. Therefore, during the ultimate conditions, there will be no flows from the proposed development that would discharge into the existing sewers along Lakeshore Road East.

As discussed in the existing conditions section, a portion of the site discharges to the existing sewers along Lakeshore Road East. Since flows from the proposed development will only discharge into the new sewers, located within the boundary of the site, the existing flows to the sewers along Lakeshore Road East will be eliminated. This will result in the Lakeshore Road East sewers having greater capacity than the existing conditions. In the event, the Rangeview Development proposes to have a higher population, discharging some of the flow to the existing Lakeshore Road East sewers can be considered as a potential servicing option since there would be greater capacity.

3.4.3 Sanitary Demand

The proposed sanitary demand for the subject site is presented in the table below.

Table 3-1 Sanitary Demand

Site Discharge	Population****	Average Demand (L/S)	Harmon's Peaking Factor	Flow (L/s) **	Infiltration (L/s)***	Total PeakFlow (L/s)
Townhouse	1884	6.60	3.61	23.81	4.39	**23.81**
Apartment	12869	45.10	2.85	128.32		**128.32**
					Total Flow =	**156.52**

3.5 Downstream Capacity Analysis

A downstream sanitary sewer capacity analysis has been completed using theoretical design sheets to determine the pre-development and ultimate conditions. Reference has been made to the Region’s design criteria to complete the downstream analysis. The purpose of the analysis is to analyze the capacity within the existing downstream sewers and determine if the existing infrastructure can support the flows from the proposed development. The outcome of this analysis will ensure that the sewers can safely convey the flow from the subject site to the outlet location.

Based on the ultimate servicing plan provided in **Figure 3.3**, the existing sewers along Rangeview

Road will require upgrades to ensure that there is sufficient capacity to support the anticipated flows from future development. Approximately eight of the existing 250mmØ sewer legs, with a length of 642m, on Rangeview Road will require to be upgraded to 375mmØ and 450mmØ sewers. It is to be noted that a subtrunk sewer, approximately 108m is proposed to be constructed along East Avenue (from Rangeview Road to Lakeshore Avenue East). This subtrunk sewer is proposed to connect to the new trunk sewer on Lakeshore Road East, which, as previously discussed, will be designed and constructed by the Region. As per the design sheet analysis, the 108m subtrunk sewer on East Avenue is required to be 525mmØ. Reference can be made to **Appendix C** for the design sheet analysis.

Phil Gotfried

RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA

LEGEND

SUBJECT AREA

EXISTING SANITARY SEWER

SCHAEFFERS
CONSULTING ENGINEERS
6 Ronrose Drive, Concord, Ontario L4K 4R3
Tel: (905) 738-6100 Email: general@schaeffers.com
www.schaeffers.com

FIGURE 3.1
EXISTING SANITARY SERVICES

2020-4938 | NOVEMBER 2022 | SCALE: N.T.S.

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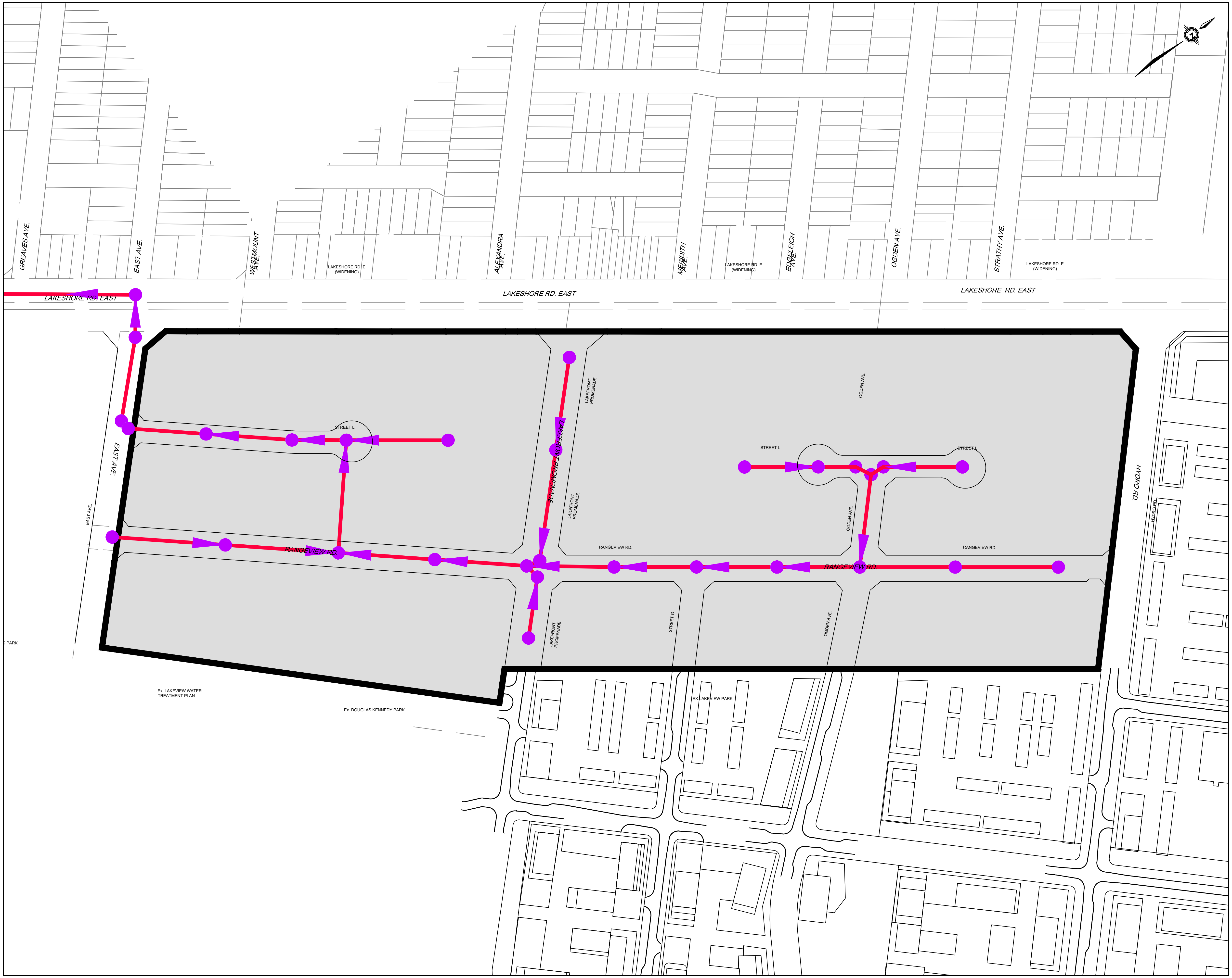

RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA

LEGEND

SUBJECT AREA

PROPOSED SANITARY SEWER

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6 Ronrose Drive, Concord, Ontario L4K 4R3
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FIGURE 3.2
INTERIM
SANITARY SERVICES

2020-4938	NOVEMBER 2022	SCALE: N.T.S.

Phil Gotfried

W:\4900's\4938 - Rangeview, Mississauga\Drawings\Servicing\2022-11-09-4938-Proposed Servicing Interim.dwg

RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA

LEGEND

SUBJECT AREA

PROPOSED SANITARY SEWER

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FIGURE 3.3
ULTIMATE
SNITARY SERVICES

2020-4938	NOVEMBER 2022	SCALE: N.T.S.

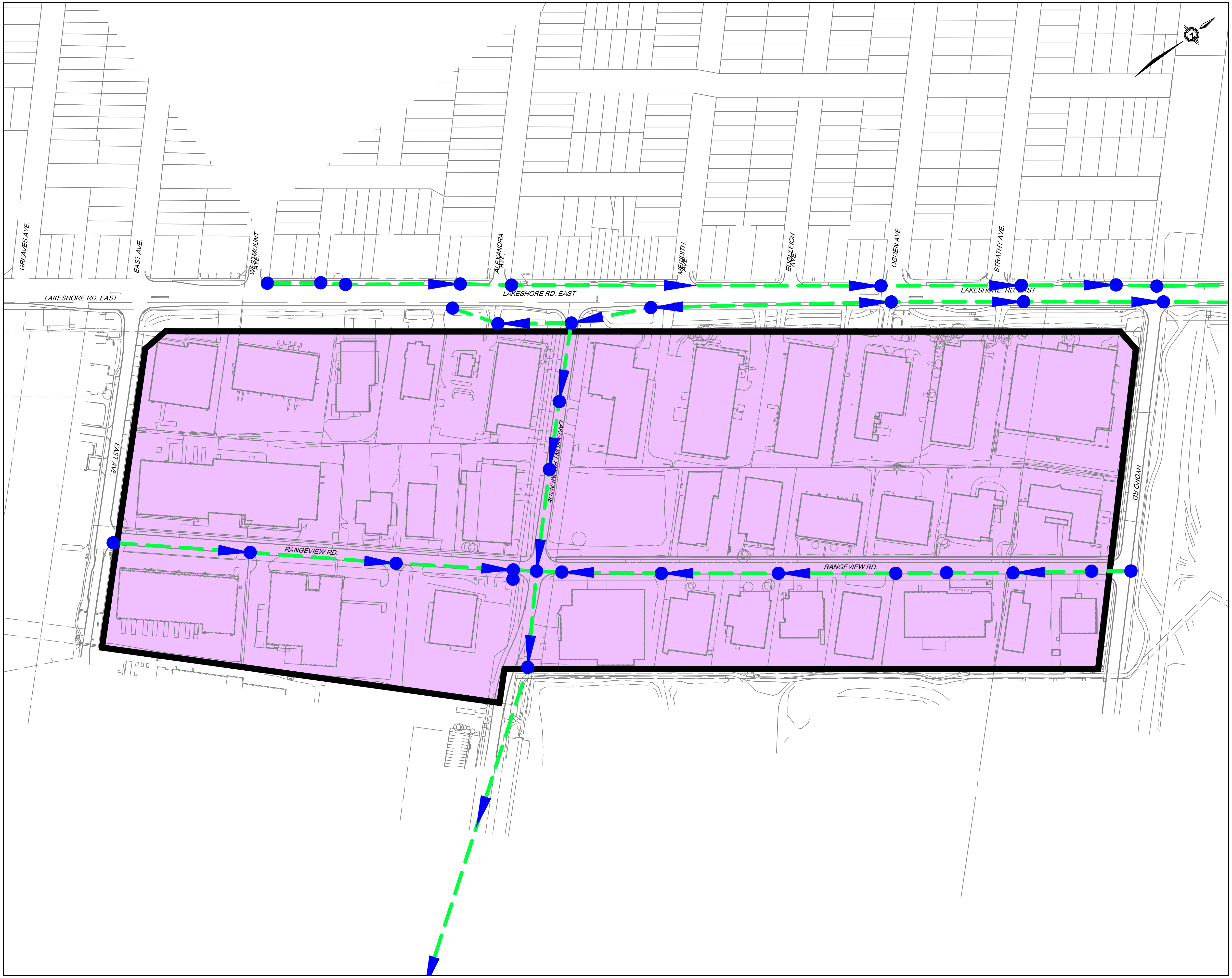
4 STORMWATER MANAGEMENT

4.1 Existing Condition & Stormwater Infrastructure

The subject site is approximately 21.94 ha of a predominantly commercial and industrial area which is serviced by an existing major and minor system. Based on available topographic surveys and existing drainage, the current minor system consists of a storm sewer network, with primary servicing located within Lakeshore Rd. East, Lakefront Promenade, Rangeview Rd., and Hydro Road. Refer to **Figure 4.1** for the existing drainage and storm servicing. The existing municipal storm sewers around the site are as follows:

1) 300mmØ - 675mmØ and a 450mmØ-750 mmØ storm sewers in parallel at opposite ends of the road along Lakeshore Road East
2) 450mmØ-950mmØ along Hydro Road
3) 975mmØ-1200mmØ along Rangeview Road
4) 450mmØ-1800mmØ along Lakefront Promenade

Based on the topography and previous planning documents, it was determined the subject site ultimately drains to Lake Ontario. Given the proposed developments' proximity to Lake Ontario, quantity control is not required as per City and CVC criteria. However, quantity control and the allowable release rates for the proposed site plans will be restricted based on the 10-year minor flows to storm sewers, as per the City of Mississauga Development Requirements Manual, dated 2020.



RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA

LEGEND

SUBJECT AREA

EXISTING STORM SEWER

EXISTING DRAINAGE AREA

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FIGURE 4.1
PRE-DEVELOPMENT DRAINAGE
& EXISTING STORM SERVICING

2020-4938 | NOVEMBER 2022 | SCALE: N.T.S.

Phil Gotfried

W:\4900's\4938 - Rangeview, Mississauga\Drawings\Servicing\2022-11-09-4938-Existing Servicing.dwg

4.2 Stormwater Management Criteria

Stormwater management criteria for the subject site are to be in accordance with the City of Mississauga, Peel Region, and the Credit Valley Conservation Authority (CVC) design criteria listed below.

Based on the City of Mississauga design criteria:

- Storm sewers shall be designed to convey at least the 10-year return frequency storm without surcharging during any storm return frequency event;
- The minimum pipe diameter for storm sewers is 300mmØ;
- For estimating flows using the Rational Method from storms larger than the 10-year return, the runoff coefficients were increased to account for the increase in runoff due to saturation of the soil as per equations provided in the City of Mississauga design criteria.
- Storm sewers shall be designed using the Rational Method: Q =A*I*R/360, where ‘Q’ is the flow rate in [m^3/s], ‘R’ is the runoff coefficient (dimensionless), ‘A’ is the area in [ha], ‘I’ is rainfall intensity in mm/hr;

Table 4-1 City of Mississauga IDF Curve

Design Storm Event	A	B	C	I (mm/hr)
2-Year	610.0	4.6	0.78	75.4
5-Year	820.0	4.6	0.78	101.3
10-Year	1010.0	4.6	0.78	124.8
25-Year	1160.0	4.6	0.78	143.3
50-Year	1300.0	4.7	0.78	159.7
100-Year	1450.0	4.9	0.78	176.3

I= A/(B+Tc)^C, where minimum time of concentration as per Mississauga Guidelines is Tc = 15mins

- **Water Quantity**–Site plans to be controlled to the post-development 10-year minor flows;
- **Water Quality**–Level 1 water quality (enhanced) protection (80% TSS removal) is required;
- **Water Balance-**The development is not located in the source protection plan's Q1, Q2 wellhead protection area. There is a lake within the vicinity of the proposed

development. Therefore, there is no requirement for a water balance analysis;

- **Volumetric Controls –** 5mm infiltration, filtration, or evapotranspiration is required.

The following sections describe how the subject site area will satisfy the above-mentioned stormwater management criteria.

4.3 Proposed Stormwater Management Plan

The following sections discuss in detail the proposed stormwater management solutions to be incorporated on-site to meet the applicable stormwater management criteria identified in **Section 4.2.**

The subject site is proposed to ultimately discharge in Lake Ontario as per existing conditions. The proposed SWM scheme considers the ultimate condition and complies with the Lakeview servicing proposed to the south of the subject site. Quantity control, quality control, and volumetric controls are proposed at the site plan level.

Quality control at the site plan level is proposed to be achieved via Jellyfish filters or equivalent measures. For the municipal right of way, quality control is proposed via a treatment train approach with tree pits in conjunction with OGS units to satisfy the required 80% TSS removal. Further details about quality control are presented in **Section 4.3.4**.

Considering the site's close proximity to the Lake, meeting the pre-development water balance is not a required criterion. However, 5mm retention via filtration or infiltration, or re-use is required for volumetric controls as per the City of Mississauga SWM criteria. Additional details about the 5mm retention on-site are presented in **Section 4.3.5**.

4.3.1 Allowable Release Rates

Allowable release rates were established based on the City of Mississauga's IDF parameters. The Rational method was used to calculate release rates as the total development discharges runoff to storm sewers. The allowable release rates for all site plans were established based on the 10-year storm events summarized in **Table 4.2**. A minimum time of concentration of 15 minutes was considered as per the City of Mississauga guidelines.

Table 4-2 Allowable Release Rate for Site Plans

Catchment #	Area (ha)	Runoff Coefficient	Allowable Release (10-year flows) Rate (L/s)
201	0.52	0.90	128.92
202	0.76	0.90	188.41
203	0.39	0.90	96.69
204	0.39	0.90	96.69
205	0.52	0.90	128.92
206	0.54	0.90	133.87
207	0.93	0.90	230.56
208	0.92	0.90	228.08
209	0.58	0.90	143.79
210	0.89	0.90	220.64
211	0.86	0.90	213.21
212	0.20	0.90	49.58
213	0.40	0.90	99.17
214	0.34	0.90	84.29
215	0.86	0.90	213.21
216	0.19	0.90	47.10
217	0.36	0.90	89.25
218	0.58	0.90	143.79
219	0.55	0.90	136.35
220	1.00	0.90	247.91
221	1.30	0.90	322.29
222	0.60	0.90	148.75
223	0.82	0.90	203.29
224	0.46	0.90	114.04
225	0.38	0.90	94.21
226	0.61	0.90	151.23
227	0.32	0.90	79.33
228	0.33	0.90	81.81

4.3.2 Quantity Control

In order to achieve the release rates, set up in **Section 4.3.1**, quantity control is proposed in the site plans. Due to the close proximity of Lake Ontario, no quantity control is proposed for the park and municipal right of way. The established release rate for each site plan and the required storage are presented in **Table 4.3** below. The quantity control requirement on the site plan can be met via underground storage combined with an orifice control device.

Table 4-3 Release Rates and Storage Summary

Catchment #	Area (ha)	Runoff Coefficient	Allowable Release (10-year flows) Rate (L/s)	Required On-site storage (m^3)
201	0.52	0.90	128.92	75.58
202	0.76	0.90	188.41	110.46
203	0.39	0.90	96.69	56.68
204	0.39	0.90	96.69	56.68
205	0.52	0.90	128.92	75.58
206	0.54	0.90	133.87	78.48
207	0.93	0.90	230.56	135.17
208	0.92	0.90	228.08	133.71
209	0.58	0.90	143.79	84.30
210	0.89	0.90	220.64	129.35
211	0.86	0.90	213.21	124.99
212	0.20	0.90	49.58	29.07
213	0.40	0.90	99.17	58.14
214	0.34	0.90	84.29	49.42
215	0.86	0.90	213.21	124.99
216	0.19	0.90	47.10	27.61
217	0.36	0.90	89.25	52.32
218	0.58	0.90	143.79	84.30
219	0.55	0.90	136.35	79.94
220	1.00	0.90	247.91	145.34
221	1.30	0.90	322.29	188.94
222	0.60	0.90	148.75	87.20
223	0.82	0.90	203.29	119.18
224	0.46	0.90	114.04	66.86
225	0.38	0.90	94.21	55.23
226	0.61	0.90	151.23	88.66
227	0.32	0.90	79.33	46.51
228	0.33	0.90	81.81	47.96

4.3.3 Full Capture Locations

Preliminary full capture locations can be seen in **Figure 4.4** and support calculations can be found in **Appendix D.** The full capture locations and ponding depths will be refined at the detail design stage.

4.3.4 Quality Control

As per the quality control requirements of the City of Mississauga and CVC, the proposed developments require the provision of an enhanced level of quality treatment (i.e., 80% TSS removal) on-site.

In order to achieve an enhanced level of treatment for the site, different strategies have been proposed based on each block's land use. The strategies for each land-use type are described in the following sections.

4.3.4.1 Private Site Plan Block Treatment

Within the private site plan blocks, treatment can be provided through various options based on the proposed land use. Given the variety of options for treatment within private developments, it is proposed that all site plan blocks provide 80% TSS removal (enhanced level) at the site level.

1. Treatment Train Approach (i.e. Bioswale/Retention/Infiltration Unit + OGS Unit)
2. Centralized Filtration Units (ie: jellyfish or equivalent)

Note that the use of the above-mentioned options should be considered on a per-site plan basis and should be further explored during each block's specific design. Considerations for each site plan block option are further discussed in this section.

<u>Option 1. Bioswale/Retention/Infiltration Unit + OGS Unit</u>

In option 1, site plans where spatial factors are favourable, flows can be directed to surface level bioretention facilities (such as bioswales or rain gardens) where an initial treatment layer can be provided. These facilities can be sized to provide a minimum of 60% TSS removal. Flows that have been treated by these facilities can then be directed to an on-site OGS for an additional layer of treatment (50% TSS removal). This approach would provide a treatment train to provide a minimum of 80% TSS prior to flows leaving the site.

<u>Option 2. Centralized Filtration Units</u>

In cases where infiltration-based treatment is not feasible, a centralized proprietary treatment unit can be provided within the private site and sized to provide an enhanced level of treatment (80%

TSS removal) to site flows before discharging to the municipal sewers. Any proposed treatment units should be sized as per each block's specific site plan design.

4.3.4.2 Public Park Block Treatment

In general, public park blocks are considered to be made up of predominantly clean vegetated pervious areas. The proposed parks will enhance the area as it is increasing the green space from existing conditions. As a result, it is expected that limited to no treatment will be required to achieve 80% TSS removal. Should some level of treatment be required, LID measures such as vegetated filter strips or swales can be incorporated into the park's design in order to ensure an enhanced level of quality treatment is obtained.

4.3.4.3 Public Right of Way Treatment

Within the public right-of-way areas, quality treatment is generally more constrained as a result of paved roadway areas which occupy the majority of the ROW.

Since an enhanced level of quality treatment is required, various options were developed based on the detailed review of the feasible LID measures and groundwater levels on site. These options include:

1. Centralized OGS units and tree pits/tree trenches;
2. Perforated catchbasin lead and OGS;

The final selection of these options will be made based on discussions with the City. These options are discussed in further detail in the following sections.

Option 1 – Tree Pits/Tree Trenches within Boulevards + OGS

The inclusion of infiltration within the City's public right of way allows for both quality treatment and stormwater retention, which assists in reducing the erosion potential and impact on water balance as a result of development.

Currently, there is no hydrogeological report for the subject site, only preliminary Borehole Logs from DS Consultants Ltd, provided in **Appendix A**. However, based on the review of the

Groundwater report by DS Consultants Ltd on June 9, 2020, for the neighbouring Lakeview development, the groundwater levels are at 1.0 m to 3.4m under the existing ground elevation; therefore, it is anticipated an infiltration-based tree pit wouldn't be feasible; therefore, a filter-based tree pit is proposed.

A typical tree pit filter design will be incorporated within areas with ample boulevard room for planting space and placed along the roadway, upstream of proposed catch basins. In this scheme, flows will first be directed to a tree pit via a curb cut along the road. Once the flows are diverted to the tree pits, they can filter through the proposed engineered soil media (sized to provide a minimum 60% TSS removal based on volumes prescribed by MOE Table 3-2), from where the flows can be collected and diverted to the storm sewer system or be infiltrated.

Based on the MOE Table 3.2, the filter beds need to be sized for $20m^3$/ha to achieve 60% TSS removal. A downstream OGS unit will be provided to ensure that a minimum of 50% TSS removal is achieved, providing a total of 80% TSS removal when used in conjunction with tree pits (50% + (1.0 – 0.5) x 60%) = 80%). Preliminary sizing of the OGS is provided **in Appendix D**. Sizing of the OGS units will be completed in the detailed design stage.

For ROW areas that are not treated by the OGS, the tree pits are to be sized to provide the entire 80% TSS removal as per MOE Table 3.2.

LIDs along Lakefront Promenade are proposed to satisfy the higher of the 5mm retention for volumetric controls or required TSS removal for quality. Refer to **Appendix D** for details. Refer to the table below Summary of Retention Targets for the Municipal ROW.

<u>Option 2 – Perforated CB lead + OGS</u>

Flows captured by a typical roadside catchbasin can be infiltrated via a perforated pipe system. to provide 60% TSS removal. The catchbasin lead can be perforated and appropriately sized to enable infiltration with the excess draining directly to the sewer system. Alternatively, an exfiltration pipe can be proposed at the catchbasin with excess flow overflowing to the storm sewer system via a CB lead placed strategically at a higher location.

Paired with the perforated CB lead and an OGS sized for 50% TSS removal to complete the treatment train in achieving 80% TSS removal (50% + (1.0 – 0.5) x 60%) = 80%).

4.3.5 Water Balance and Volumetric Controls

The Rangeview Development area was checked as per the Ontario Source Water Protection areas; the site was found to be outside of any source water well-head protection areas. Given the proximity of the site to Lake Ontario, there is no requirement for a water balance analysis. Furthermore, most of the subject site is developed under existing conditions and mainly consists of impervious commercial and industrial areas. Since it is proposed to provide eight park blocks and various landscaped areas within the subject site, it is expected that the development will provide a net reduction in impervious areas and an overall benefit to the water balance.

However, as stipulated in the City of Mississauga, on-site retention via infiltration, filtration, or water re-use of the first 5mm of rainfall should be retained on-site to mitigate water balance and volumetric impacts of development. The sections below discuss strategies to satisfy the volumetric requirements. The table below summarizes the required retention volumes for each portion of the proposed development.

Table 4-4 Summary of Retention Targets

Description	Catchment #	Area (ha)	Runoff Coefficient	Volumetric Requirement (m^3)*
Site Plan	201	0.52	0.90	26.00
Site Plan	202	0.76	0.90	38.00
Site Plan	203	0.39	0.90	19.50
Site Plan	204	0.39	0.90	19.50
Site Plan	205	0.52	0.90	26.00
Site Plan	206	0.54	0.90	27.00
Site Plan	207	0.93	0.90	46.50
Site Plan	208	0.92	0.90	46.00
Site Plan	209	0.58	0.90	29.00
Site Plan	210	0.89	0.90	44.50
Site Plan	211	0.86	0.90	43.00

Description	Catchment #	Area (ha)	Runoff Coefficient	Volumetric Requirement (m^3)*
Site Plan	212	0.20	0.90	10.00
Site Plan	213	0.40	0.90	20.00
Site Plan	214	0.34	0.90	17.00
Site Plan	215	0.86	0.90	43.00
Site Plan	216	0.19	0.90	9.50
Site Plan	217	0.36	0.90	18.00
Site Plan	218	0.58	0.90	29.00
Site Plan	219	0.55	0.90	27.50
Site Plan	220	1.00	0.90	50.00
Site Plan	221	1.30	0.90	65.00
Site Plan	222	0.60	0.90	30.00
Site Plan	223	0.82	0.90	41.00
Site Plan	224	0.46	0.90	23.00
Site Plan	225	0.38	0.90	19.00
Site Plan	226	0.61	0.90	30.50
Site Plan	227	0.32	0.90	16.00
Site Plan	228	0.33	0.90	16.50
Municipal ROW	401	0.20	0.90	10.00
Municipal ROW	402	0.19	0.90	9.50
Municipal ROW	403	0.27	0.90	13.50
Municipal ROW	404	0.72	0.90	36.00
Municipal ROW	405	0.83	0.90	41.50
Municipal ROW	406	0.24	0.90	12.00
Municipal ROW	407	0.27	0.90	13.50
Municipal ROW	408	0.36	0.90	18.00
Municipal ROW	409	0.52	0.90	26.00
Municipal ROW	410	0.59	0.90	29.50
Municipal ROW	411	0.18	0.90	9.00
Municipal ROW	412	0.16	0.90	8.00
Municipal ROW	413	0.36	0.90	18.00
Municipal ROW	414	0.43	0.90	21.50
Municipal ROW	415	0.50	0.90	25.00
Municipal ROW	416	0.21	0.90	10.50
Municipal ROW	417	0.20	0.90	10.00
Municipal ROW	418	0.37	0.90	18.50
Municipal ROW	419	0.17	0.90	8.50

*Volumetric Requirement= TIMP x 5mm x Area x 10

4.3.5.1 Private Site Plan Block Retention

Runoff can be infiltrated via infiltration-based LIDs or reused within private site plans via rainwater harvesting tanks. Site re-use can include a combination of irrigation, greywater, mechanical cooling, or infiltration where possible. The specific site uses and retention designs should be confirmed per each private site plan block's specific servicing design. Infiltration-based LIDs should be supported by site-specific groundwater conditions.

4.3.5.2 Public Park Block Retention

Due to the nature of the park design, with the increased landscape and reduced level of imperviousness from existing conditions, it is not proposed to provide any retention on the park blocks.

4.3.5.3 Public Right of Way Retention

In order to achieve the required retention volume presented in **Table 4.4** the use of infiltration or filtration-based techniques within the public boulevard is required.

LIDs to be used along the public right of way can include tree pits (as described in Section 5.3.2) which can be sized to retain the greater of 5mm retention volumes or quality control. However, considering the site consists of high groundwater levels, the use of infiltration LIDs may be challenging. In scenarios where groundwater constraints present infiltration concerns, the tree pits can be designed for filtration.

4.3.6 Interim Conditions

Under the interim scenario, infrastructure cannot be built along the entirety of Street 'A' due to the presence of non-participating landowners. The configuration of storm servicing for the ultimate (full buildout) scenario is based on the interim condition of current participating lands. Thus, as shown in **Figure 4.3**, there are three (3) proposed cul du sacs on Street L based on the current participating lands. The proposed SWM scheme considers the interim phase and ensures no impediment to the drainage flow from the existing developments. The interim condition is subject to meet the applicable stormwater management criteria identified in **Section 4.2**.

RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA
COMMUNITY COST SHARING

LEGEND

SUBJECT AREA

PROPOSED DRAINAGE BOUNDARY

201 / 0.54ha / C=0.90 — CATCHMENT ID, AREA IN HECTARES, RUNOFF COEFFECIENT

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FIGURE 4.2
PROPOSED STORM DRAINAGE PLAN

2020-4938	NOVEMBER 2022	SCALE: N.T.S.

RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA

LEGEND

SUBJECT AREA

PROPOSED STORM SEWER

PROPOSED OGS

STORM SEWER SHOWN ON OGDEN RD. AND STREET 'G', SOUTH OF RANGEVIEW ROAD, ARE ONLY REQUIRED TO SUPPORT POTENTIAL ROAD CONSTRUCTION.

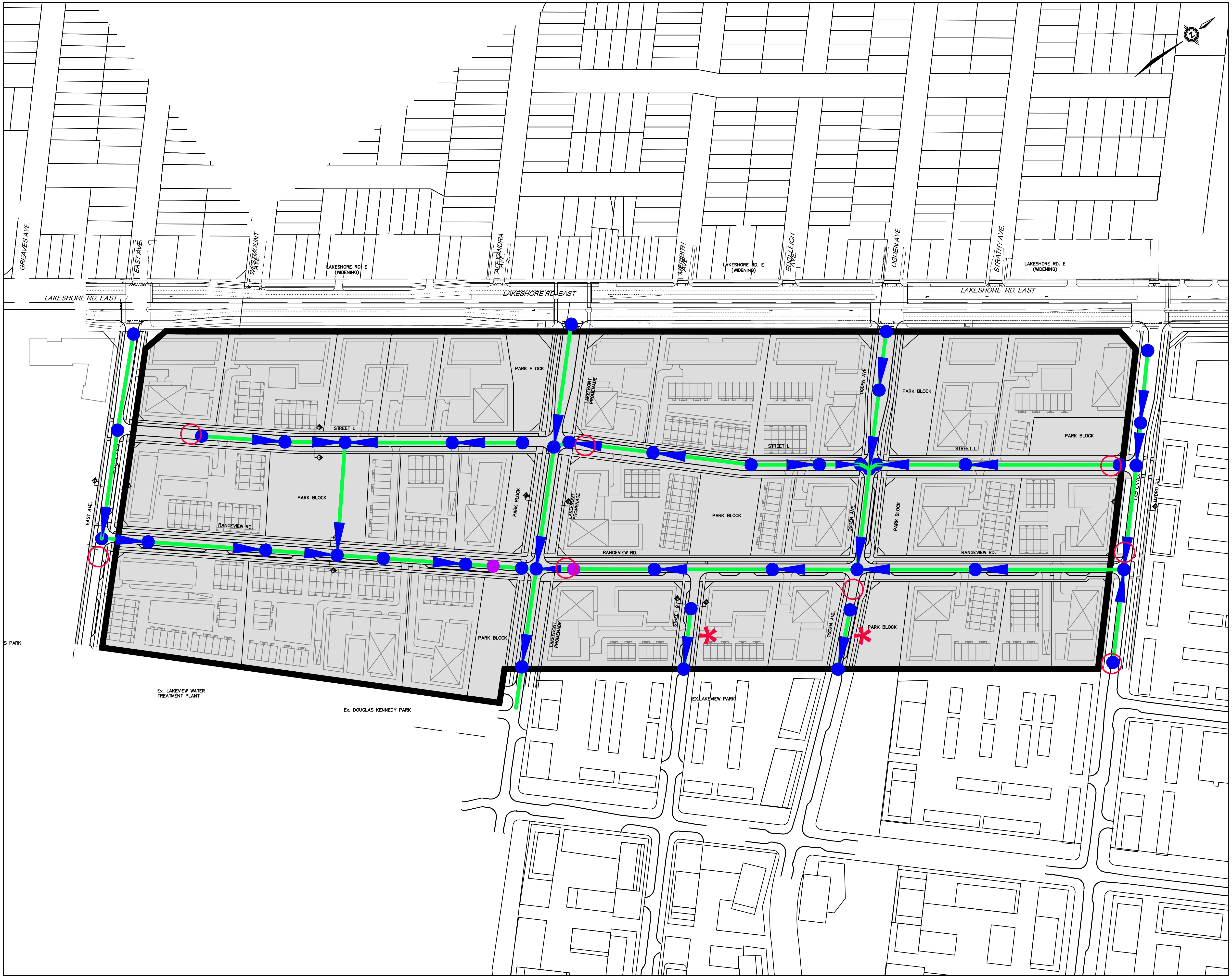
SCHAEFFERS
CONSULTING ENGINEERS
6 Ronrose Drive, Concord, Ontario L4K 4R3
Tel: (905) 738-6100 Email: general@schaeffers.com
www.schaeffers.com

FIGURE 4.3
INTERIM
STORM SERVICES

2020-4938 | OCTOBER 2022 | SCALE: N.T.S.

Phil Gotfried

W:\4900's\4938 - Rangeview, Mississauga\Drawings\Servicing\2022-10-27-4938-Proposed Servicing Interim.dwg



RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA

LEGEND

SUBJECT AREA

PROPOSED STORM SEWER

PROPOSED OGS

100 YEAR FULL CAPTURE LOCATION

* STORM SEWER SHOWN ON OGDEN RD. AND STREET 'G', SOUTH OF RANGEVIEW ROAD, ARE ONLY REQUIRED TO SUPPORT POTENTIAL ROAD CONSTRUCTION.

SCHAEFFERS CONSULTING ENGINEERS
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FIGURE 4.4
ULTIMATE
STORM SERVICES

2020-4938	NOVEMBER 2022	SCALE: N.T.S.

Phil Gotfried
W:\4900's\4938 - Rangeview, Mississauga\Drawings\Servicing\2022-11-09-4938-Proposed Servicing Ultimate.dwg

5 CLOSING REMARKS

This report illustrates the comprehensive servicing strategy for the Rangeview study area. The proposed municipal servicing strategy has been proposed to satisfy the City of Mississauga and CVC guidelines, and this strategy will be used by future developments for their respective detailed servicing designs. The key servicing components are summarized below.

Water Supply Servicing

- The subject site is proposed to be serviced by connecting to existing watermains along Lakeshore Road East, Rangeview Road and East Avenue, as well 400 mm diameter watermains along Lakefront Promenade and Hydro Road, proposed as part of the Lakefront Community development;
- A 300 mm diameter watermain is proposed along Street ‘A’, extending from East Avenue to Hydro Road;
- A 300 mm diameter watermain is proposed along Ogden Avenue, connecting to the existing 600 mm diameter watermain along Lakeshore Road East and the existing 250 mm diameter watermain along Rangeview Road;
- Two interim conditions have been proposed depending on the agreements with the non participating land owners.

Sanitary Servicing

- The subject site will be serviced as per the details outlined in the Interim and Ultimate Servicing Plan.
- A downstream sanitary capacity analysis has been completed to analyze the sewers during the Ultimate Servicing Plan. As discussed in **Section 3.5**, upgrades will be required for the existing sewers along Rangeview Road and a pipe size has been provided for the new subtrunk sewer along East Avenue.

Storm Servicing

- Quantity control is proposed at a site plan level. Quantity controls for proposed site plan developments will include the capture and control of peak flows from storm events up to and including the 100-year storm to the 10-year sewer capacity.

- Quality controls will be provided within each site plan block to meet the enhanced level of treatment. For the public right of way, various options were reviewed to provide an enhanced level of treatment. Currently, it is proposed to implement a tree pit filtration/infiltration strategy with an end-of-pipe OGS to achieve an enhanced level of treatment.
- The retention of 5mm on-site can be achieved in each block through the use of infiltration or re-use systems within site plans, while the ROW can make use of infiltration/filtration via roadside tree pits.

We trust that you will find this material satisfactory, and we are looking forward to receiving your comments soon. Should you have any questions or comments, please do not hesitate to contact us.

Respectfully Submitted,

SCHAEFFER & ASSOCIATES LTD.

Ishraque Chandan

LICENSED PROFESSIONAL ENGINEER
H. A. MILUKOW
100222438
Nov 9, 2022
PROVINCE OF ONTARIO

Ishraque Chandan, EIT.
Water Resource Analyst

Heather Milukow, M.Eng., P.Eng.
Water Resource Engineer

Appendix A
Background Information

BOUSFIELDS INC.
PLANNING | DESIGN | ENGAGEMENT

Rangeview Master Plan

Concept Plan V5.1 (FINAL)

Rangeview Estates Precinct Area
Mississauga ON

October 2022

Project No. 20167

PARKLAND DEDICATION

Parkland Block Concept

Legend Rangeview Estates Precinct Area – – Existing Parcel Lines — Development Parcels Parkland Blocks

PARKLAND DEDICATION

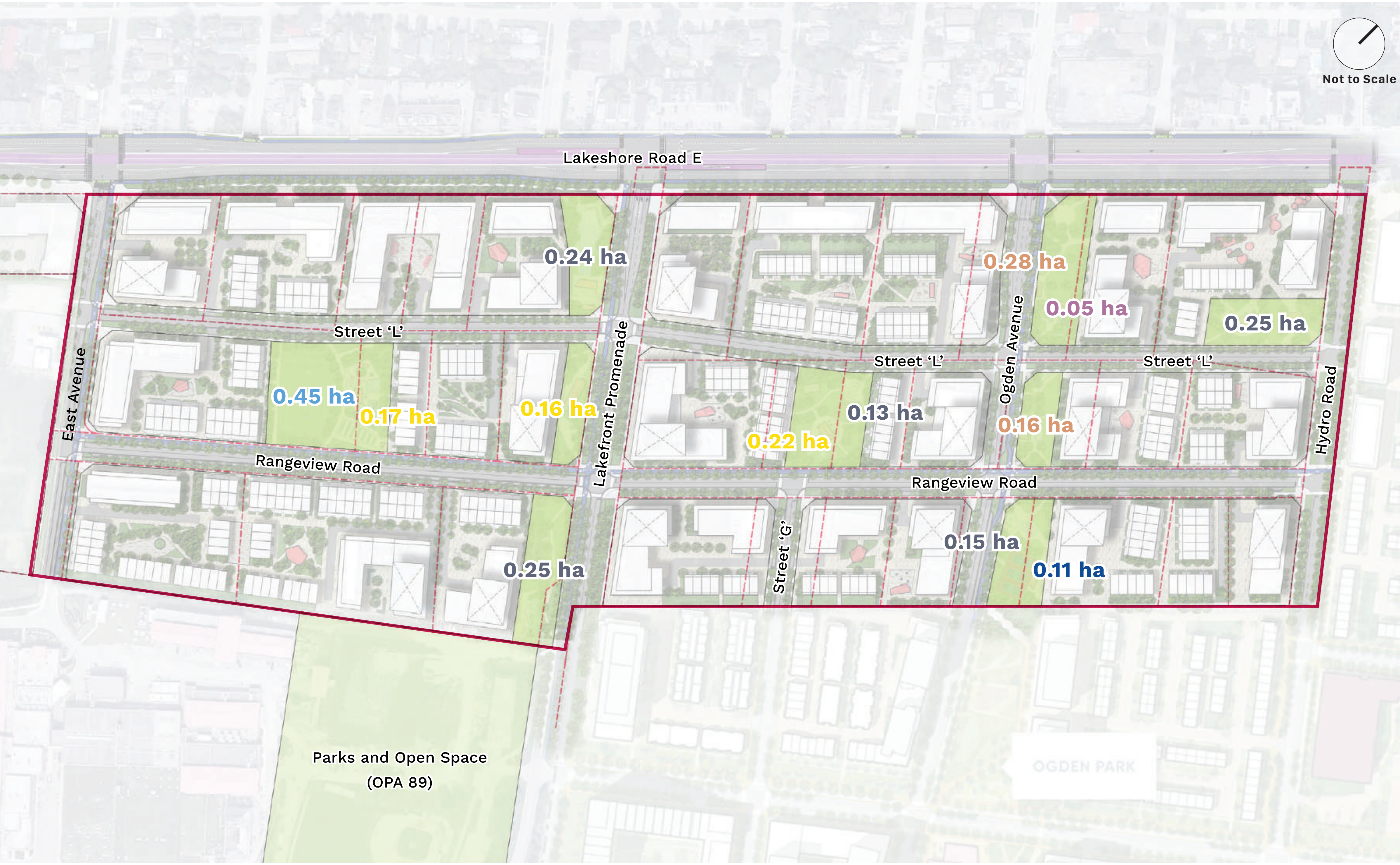
Participating Landowners Dedication

Statistics **± 1.60 hectares** Parkland Dedication

Legend Rangeview Estates Precinct Area; Existing Parcel Lines; Development Parcels; Parkland Blocks; Non-Participating Landowners

PARKLAND DEDICATION

Statistics



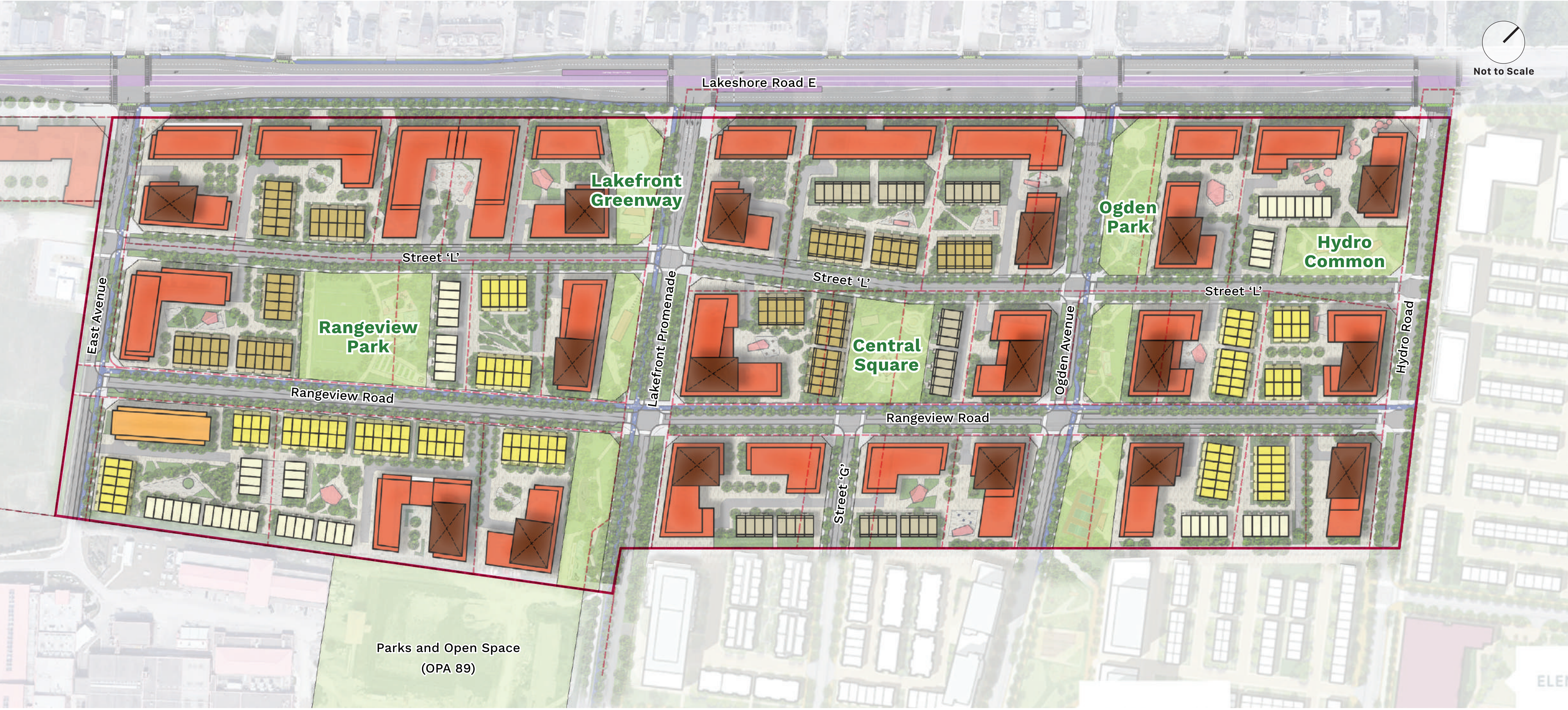
DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	0.55 ha
ELGROUP HOLDINGS INC./ ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	0.45 ha
RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	0.44 ha
2120412 ONTARIO INC. (Xtreme Tire)	0.11 ha
WHITEROCK 880 RANGEVIEW INC. (Dream)	0.0 ha
447111 ONTARIO LIMITED (Norstar)	0.0 ha
1127792 ONTARIO LIMITED (Dino Collini)	0.0 ha
ILSCO OF CANADA LIMITED (Thomas Quinn)	0.05 ha
KOTYCK INVESTMENTS LTD.	0.0 ha
NON PARTICIPATING LANDOWNERS	1.02 ha

±2.62 ha **TOTAL PARKLAND DEDICATION AREA**

Legend Rangeview Estates Precinct Area – – Existing Parcel Lines — Development Parcels Parkland Blocks

MASTER PLAN VERSION 5.1 (FINAL)

Concept Plan



Legend Rangeview Estates Precinct Area | Existing Parcel Lines | Development Parcels | Low-rise (Up to 4-Storeys) | Mid-rise (5 to 8-Storeys) | Tall Building (Up to 15-Storeys)

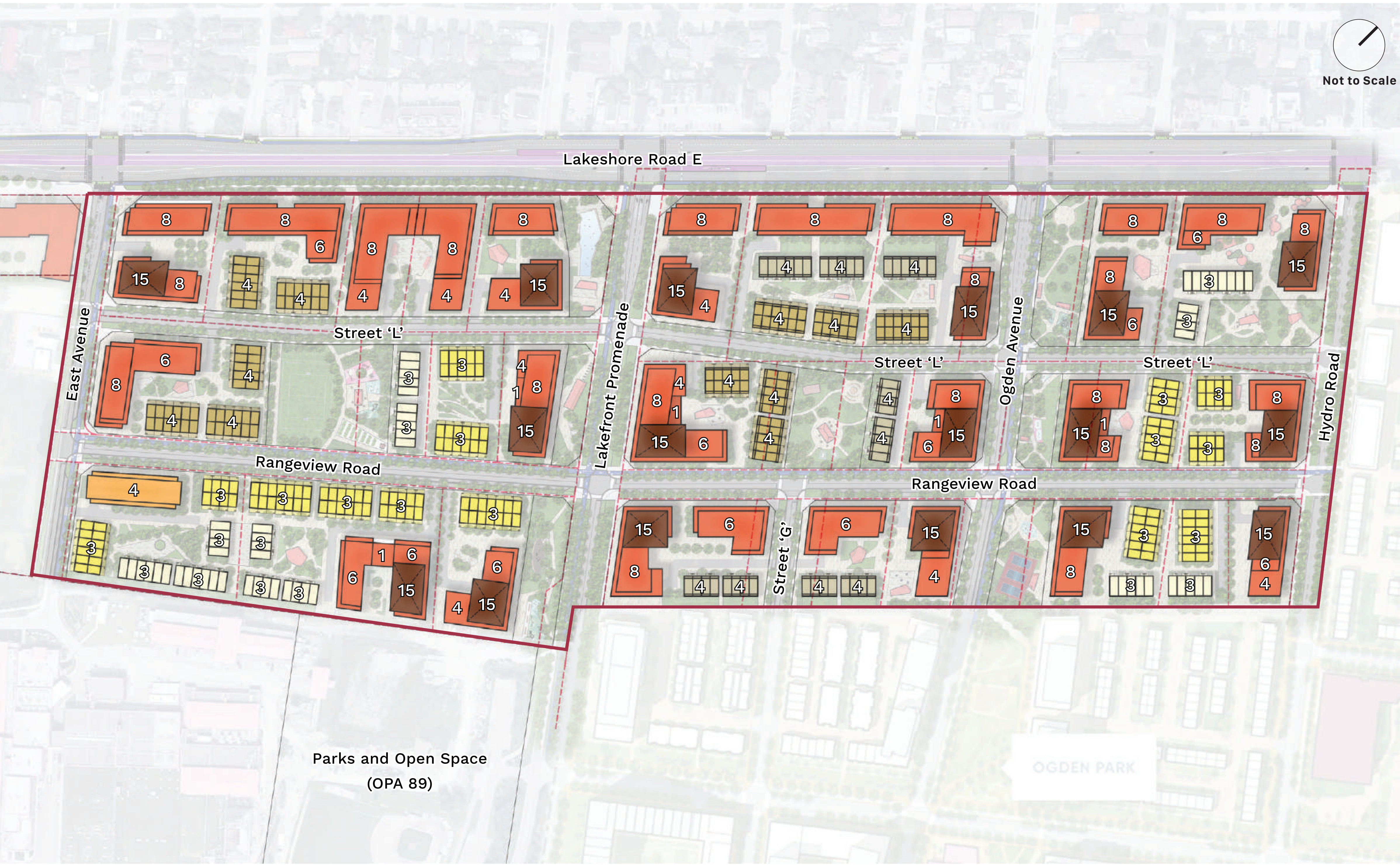
MASTER PLAN VERSION 5.1 (FINAL)

Development Parcels

Legend Rangeview Estates Precinct Area – – Existing Parcel Lines — Development Parcels

BUILT FORM

Height (Storeys) + Individual Typology Statistics



Total Residential Units
± 5,300 units

Low-rise Buildings (Up to 4-St) **11.2%**
± 592 units

Traditional Townhouse Blocks (3-ST)
± 60 units

Stacked Townhouse Blocks (4-ST)
± 84 units

Back-to-Back Townhouse Blocks (3-ST)
± 150 units

Stacked Back-to-Back Townhouse Blocks (4-ST)
± 244 units

Apartment (4-ST)
± 54 units

Mid-rise Buildings (5- to 8-ST) **68.9%**
± 3,654 units

Tall Buildings (9- to 15-ST) **19.9%**
± 1,054 units

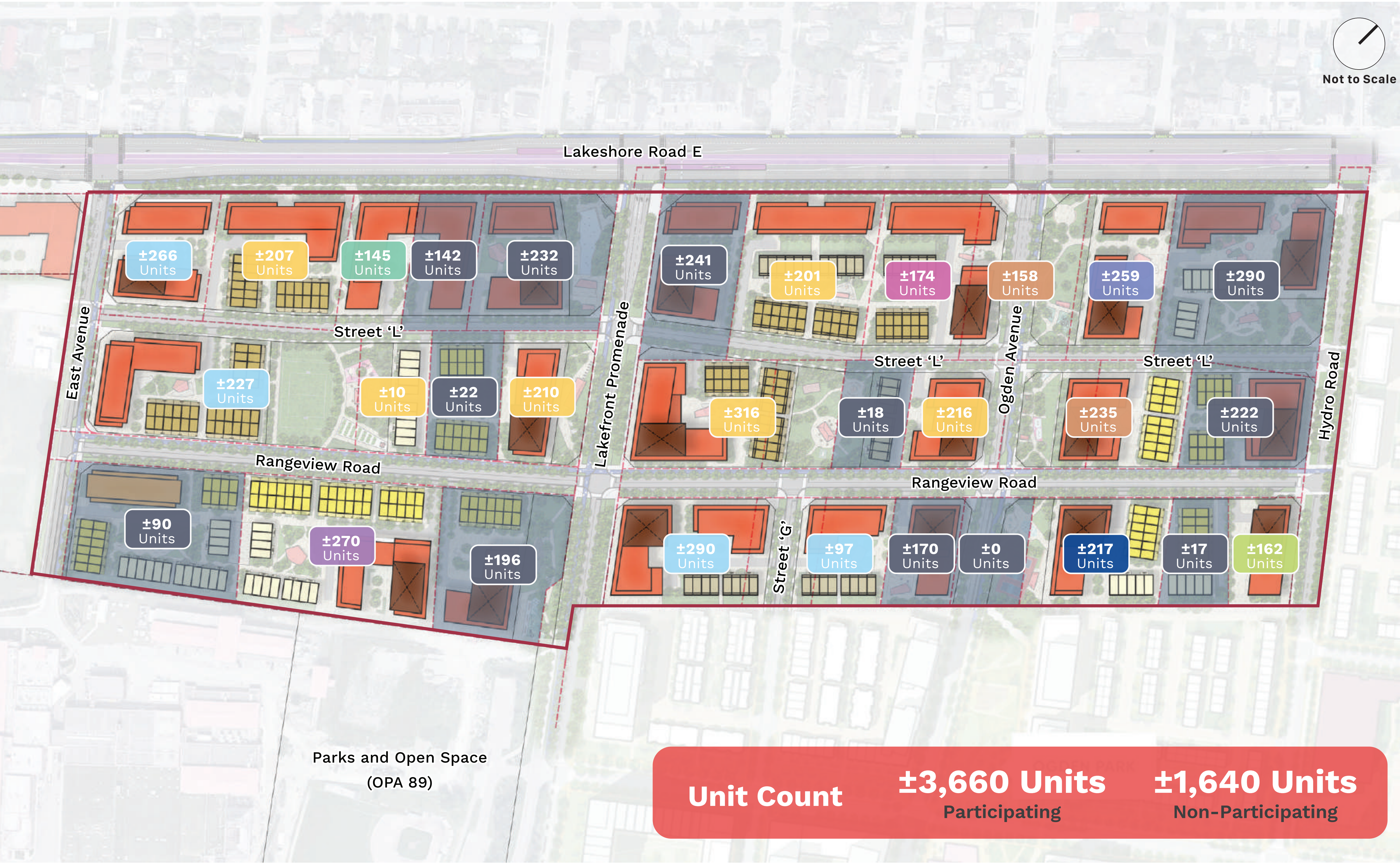
Assumptions

1. *Residential Gross Floor Area (GFA) for Apartments, Mid-rise and Tall Building based on 95% of the Gross Construction Area (GCA)*
2. *50% of the Ground Floor for Each Mid-rise / Tall Building is Allocated for Non-Residential Uses (i.e. lobby, servicing, etc.)*
3. *Approximate Unit Count for Mid-rise and Tall Building based on an 80 sq.m. unit size*
4. *Individual Stacked Townhouse module = 2 units*

Legend Rangeview Estates Precinct Area | Low-rise (Up to 4-Storeys) | Mid-rise (5 to 8-Storeys) | Tall Building (Up to 15-Storeys) | ## Building Height (Storeys)

MASTER PLAN DRAFT VERSION 5.1

Participating Landowners vs. Non-Participating Landowners Unit Counts



DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	± 1,160 Units
ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	± 880 Units
RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	± 393 Units
2120412 ONTARIO INC. (Xtreme Tire)	± 217 Units
WHITEROCK 880 RANGEVIEW INC. (Dream)	± 270 Units
447111 ONTARIO LIMITED (Norstar)	± 174 Units
1127792 ONTARIO LIMITED (Dino Collini)	± 145 Units
ILSCO OF CANADA LIMITED (Thomas Quinn)	± 259 Units
KOTYCK INVESTMENTS LTD.	± 162 Units
NON-PARTICIPATING LANDOWNERS	± 1,640 Units

Legend Rangeview Estates Precinct Area | Non-participating Landowners | Low-rise (Up to 4-Storeys) | Mid-rise (5 to 8-Storeys) | Tall Building (Up to 15-Storeys)

BUILT FORM + PARKLAND COMPARISON

	Master Plan V4.1		Master Plan Draft V5.1		
Individual Statistics	Unit Count	Parkland Dedication	Unit Count	Parkland Dedication Provided [1]	Required Parkland Dedication [2]
DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	1,144	0.41 ha	1,160	0.55 ha	0.63 ha
ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	866	0.33 ha	880	0.45 ha	0.48 ha
RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	372	0.53 ha	393	0.44 ha	0.21 ha
2120412 ONTARIO INC. (Xtreme Tire)	206	0.11 ha	217	0.11 ha	0.12 ha
WHITEROCK 880 RANGEVIEW INC. (Dream)	258	0.12 ha	270	0.00 ha	0.15 ha
447111 ONTARIO LIMITED (Norstar)	167	0.00 ha	174	0.00 ha	0.09 ha
1127792 ONTARIO LIMITED (Dino Collini)	137	0.04 ha	145	0.00 ha	0.08 ha
ILSCO OF CANADA LIMITED (Thomas Quinn)	245	0.00 ha	259	0.05 ha	0.14 ha
KOTYCK INVESTMENTS LTD.	156	0.00 ha	162	0.00 ha	0.09 ha
NON-PARTICIPATING LANDOWNERS	1,546	0.53 ha	1,640	0.89 ha	0.89 ha
TOTALS	**5,330**	**2.07 ha**	**5,300**	**± 2.62 ha**	**± 2.88 ha**

Notes

1 Based on reduced OPA 89 parkland interpretation due to revised park blocks layout and road configuration.

2 Based on Master Plan Draft V5.1 unit count and interpreted OPA 89 ratio (5.41 square metres per dwelling unit).

Block	Parcel	Landowners	Parcel Area		Public Road Conveyance		Parkland Dedication		Net Developable Area		Low-rise Units					Mid-rise Units	Tall Building Units	TOTALS
											Townhouses	*Stacked Townhouses*	*Back-to-Back Townhouses*	*Stacked Back-to-Back Townhouses*	*Apartments*	*Mid-rise Buildings*	*Tall Buildings*	
			sq.m.	*ha*	*sq.m.*	*ha*	*sq.m.*	*ha*	*sq.m.*	*ha*	*(Up to 4-Storeys)*					*(5- to 8-Storeys)*	*(9- to 15-Storeys)*	
	1	ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	6,198.99	0.62	987.60	0.10	0.00	0.00	5,211.39	0.52	0	0	0	0		204	62	266
	2	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	8,451.90	0.85	819.13	0.08	0.00	0.00	7,632.77	0.77	0	0	0	48		159	0	207
	3	1127792 ONTARIO LIMITED (Dino Collini)	4,339.04	0.43	470.67	0.05	0.00	0.00	3,868.37	0.38	0	0	0	0		145	0	145
	4	*896 Lakeshore Road East*	4,338.68	0.43	470.35	0.05	0.00	0.00	3,868.33	0.38	0	0	0	0		142	0	142
	5	*910 - 920 Lakeshore Road East*	8,686.81	0.87	1,081.29	0.11	2,360.87	0.24	5,244.66	0.52	0	0	0	0		170	62	232
	6	*946 Lakeshore Road East*	7,040.36	0.70	1,316.49	0.13	0.00	0.00	5,723.87	0.57	0	0	0	0		179	62	241
	7	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	10,735.57	1.07	1,400.78	0.14	0.00	0.00	9,334.79	0.93	0	22	0	44		135	0	201
	8	447111 ONTARIO LIMITED (Norstar)	7,833.20	0.78	700.05	0.07	0.00	0.00	7,133.15	0.71	0	12	0	24		138	0	174
	9	RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	8,590.92	0.86	3,709.01	0.37	2,792.76	0.28	2,089.15	0.21	0	0	0	0		96	62	158
	10	ILSCO OF CANADA LIMITED (Thomas Quinn)	6,980.11	0.70	628.18	0.06	531.28	0.05	5,820.65	0.59	0	0	0	0		197	62	259
	11	*1076 Lakeshore Road East*	13,573.97	1.36	2,101.19	0.21	2,548.07	0.25	8,924.70	0.90	12	0	0	0		216	62	290
	12	ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	15,357.62	1.54	2,271.26	0.23	4,500.04	0.45	8,586.32	0.86	0	0	0	68		159	0	227
	13	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	4,189.30	0.42	478.25	0.05	1,674.19	0.17	2,036.86	0.20	10	0	0	0		0	0	10
	14	*895 Rangeview Road*	4,465.52	0.45	490.35	0.05	0.00	0.00	3,975.17	0.40	0	0	22	0		0	0	22
	15	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	5,653.29	0.57	680.47	0.07	1,569.28	0.16	3,403.54	0.34	0	0	0	0		148	62	210
	16	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	7,259.45	0.73	149.47	0.01	0.00	0.00	7,109.98	0.72	0	0	0	20		194	62	276
	17	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	3,627.10	0.36	302.01	0.03	2,204.35	0.22	1,120.74	0.11	0	0	0	40		0	0	40
	18	2547046 ONTARIO INC./2545488 ONTARIO INC. (Vittorio Torchia)	3,627.76	0.36	471.03	0.05	1,299.94	0.13	1,856.79	0.18	0	18	0	0		0	0	18
	19	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	5,075.55	0.51	1,521.30	0.15	0.00	0.00	3,554.25	0.36	0	0	0	0		154	62	216
	20	RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	4,587.89	0.46	1,359.76	0.14	1,616.06	0.16	1,612.07	0.16	0	0	0	0		155	62	217
	21	RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	4,829.66	0.48	624.29	0.06	0.00	0.00	4,205.37	0.42	0	0	18	0		0	0	18
	22	2547046 ONTARIO INC./2545488 ONTARIO INC. (Vittorio Torchia)	6,054.50	0.61	560.73	0.06	0.00	0.00	5,493.77	0.55	0	0	16	0		144	62	222
	23	*850 Rangeview Road*	10,354.01	1.04	390.01	0.04	0.00	0.00	9,964.00	1.00	16	0	20	0	54			90
	24	WHITEROCK 880 RANGEVIEW INC. (Dream)	13,146.95	1.31	150.90	0.02	0.00	0.00	12,996.05	1.29	12	0	36	0		160	62	270
	25	*890 Rangeview Road (Canada Post)*	8,627.44	0.86	128.53	0.01	2,464.74	0.25	6,034.17	0.60	0	0	14	0		120	62	196
	26	ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	7,258.96	0.73	130.52	0.01	0.00	0.00	7,128.45	0.72	0	16	0	0		212	62	290
	27	ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	3,621.46	0.36	1,533.79	0.15	0.00	0.00	2,087.67	0.21	0	0	0	0		0	0	0
	28	ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	3,625.21	0.36	51.22	0.01	0.00	0.00	3,573.98	0.35	0	16	0	0		81	0	97
	29	*1008 Rangeview Road*	3,621.63	0.36	52.07	0.01	0.00	0.00	3,569.56	0.35	0	0	0	0		108	62	170
	30	*1024 Rangeview Road*	3,623.21	0.36	1,853.39	0.19	1,493.39	0.15	276.43	0.02	0	0	0	0		0	0	0
	31	2120412 ONTARIO INC. (Xtreme Tire)	7,248.77	0.72	102.47	0.01	1,077.26	0.11	6,069.05	0.60	5	0	12	0		138	62	217
	32	*1062 Rangeview Road*	3,273.04	0.33	40.63	0.00	0.00	0.00	3,232.41	0.33	5	0	12	0		0	0	17
	33	KOTYCK INVESTMENTS LTD. (Laurie McPherson)	3,491.56	0.35	247.02	0.02	0.00	0.00	3,244.53	0.33	0	0	0	0		100	62	162
		TOTALS	**219,389.45**	**21.94**	**27,274.23**	**2.74**	**26,132.23**	**2.62**	**165,982.98**	**16.58**	60	84	150	244	54	**3,654**	**1,054**	**5,300**
													592					

LEGEND

Non-participating Landowners

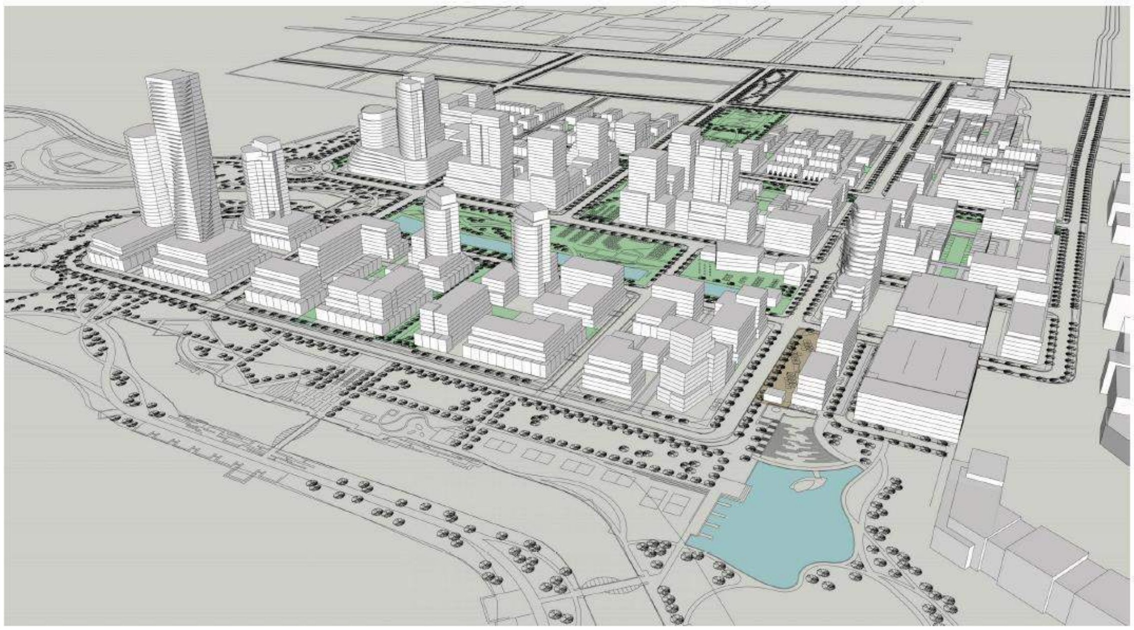
XX.XX Manual Rounding

Check *219,389.45* *27,274.23* *26,132.23*

Net Developable + Parkland ***19.20***

Participating Landowners	Units	Public Road Conveyance	Parkland Dedication
DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	1,160	0.53	0.55
ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	880	0.50	0.45
RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	393	0.57	0.44
2120412 ONTARIO INC. (Xtreme Tire)	217	0.01	0.11
WHITEROCK 880 RANGEVIEW INC. (Dream)	270	0.02	0.00
447111 ONTARIO LIMITED (Norstar)	174	0.07	0.00
1127792 ONTARIO LIMITED (Dino Collini)	145	0.05	0.00
ILSCO OF CANADA LIMITED (Thomas Quinn)	259	0.06	0.05
KOTYCK INVESTMENTS LTD. (Laurie McPherson)	162	0.02	0.00
TOTAL	3,660	1.83	1.60
Non-participating Landowners	1,640	0.91	1.02
MASTER PLAN TOTAL	5,300	2.74	2.62

REPORT ON
Preliminary Geotechnical Investigation
Proposed Residential & Commercial Development
800 Hydro Road
Mississauga, Ontario



PREPARED FOR:
Lakeview Community Partners Limited

PREPARED BY:
DS Consultants Ltd.

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Telephone: (905) 264-9393
www.dsconsultants.ca

Project No: 18-519-10 R2
Date: June 9, 2020

Table of Contents

APPENDIX B: LOGS AND LOCATION PLAN OF EXP BOREHOLES

APPENDIX C: GEOPHYSICAL SURVEY REPORT BY GEOPHYSICS GPR INTERNATIONAL INC.

1. INTRODUCTION

DS Consultants Ltd. (DS) was retained by the ARGO Development Corporation on behalf of Lakeview Community Partners Limited to carry out preliminary geotechnical and hydrogeological investigations for the proposed Lakeview Village on the lands of the former Lakeview Power Generation Station located at 800 Hydro Road in Mississauga, Ontario.

It is understood that the proposed 71.6-hectare Lakeview Village will include 5,000 to 7,000 new homes in a variety of housing options, including townhouses, mid-rise and high-rise buildings. There will be more than 600,000 square feet of employment and institutional use and another 200,000 square feet of cultural space. Lakeview Village will include a Serson Square, a year-round central gathering space with retail offices and homes that can be used as an arts and cultural hub.

The proposed high-rise structures will entail up to 3-levels of basement. The finished basement floor elevations are not available to us at the time of writing this report.

exp Services Inc (exp.) conducted a preliminary geotechnical investigation at the subject site in December 2017 and drilled nine (9) boreholes as a part of their field work. The logs and location plan of exp. boreholes (BH1 to BH9) are attached in **Appendix B** of this report.

The purpose of this geotechnical investigation was to determine the subsurface conditions at the borehole locations and make preliminary engineering recommendations for the following:

1. Foundations
2. Floor slabs and permanent drainage
3. Earth pressures
4. Excavations and backfill
5. Earthquake considerations
6. Pavements
7. Underground utilities

This report deals with geotechnical issues only. Preliminary hydrogeological findings by DS will be presented in a separate report. Environmental testing was not part of our scope of work.

This report is provided on the basis of the assumption that the design will be in accordance with the applicable codes and standards. If there are any changes in the design features relevant to the geotechnical analyses, or if any questions arise concerning the geotechnical aspects of the codes and standards, this office should be contacted to review the design. It may then be necessary to carry out additional borings and reporting before the recommendations of this office can be relied upon.

The site investigation and recommendations follow generally accepted practice for geotechnical consultants in Ontario, Canada. The format and contents are guided by client specific needs and economics and conform to generalized standards for services. Laboratory testing for most part follows ASTM or CSA Standards or modifications of these standards that have become standard practice.

The foundation recommendations made in this report are based on the subsoil conditions found during the field investigation. The comments made in this report on potential construction problems and possible construction options intended only for guidance of the designer.

This report has been prepared for Lakeview Community Partners Limited and its architects and designers. Third party use of this report without DS Consultants Ltd. consent is prohibited.

2. FIELD WORK & LAB TESTING

Forty-five (45) boreholes (BH18-1 to BH18-49, except BH18-22 to BH18-24 and BH18-26, see Drawing 1 and 1A for location plan) were drilled at the site to depths varying from 1.7 m to 48.3m below the existing grade.

Four boreholes (BH18-22 to BH18-24 and BH18-26) were not be drilled due to the on-going construction work related to removal of buried concrete slabs associated with the former powerhouse.

Boreholes were drilled with solid stem and hollow stem continuous flight auger equipment by a drilling sub-contractor under the direction and supervision of DS Consultants Ltd personnel. Mud rotary was used in the drilling of some deep boreholes. Samples were retrieved at regular intervals with a 50 mm O.D. split-barrel sampler driven with a hammer weighing 624 N and dropping 760 mm in accordance with the Standard Penetration Test (SPT) method. The samples were logged in the field and returned to the DS Consultants Ltd laboratory for detailed examination by the project engineer and for laboratory testing.

Shale bedrock was cored at five (5) borehole locations (BH18-19, BH18-29, BH18-32, BH18-37 and BH18-45), with HQ double tube wireline equipment providing 63.5mm diameter rock core samples. The coring was carried out under the full-time supervision of a representative from DS who identified and described the rock samples, noting and recording the percentages of total and solid rock core recovery, RQD values, fracture index and the percentage and thicknesses of hard layers.

As well as visual examination in the laboratory, majority of the soil samples were tested for moisture contents. Selected fourteen (14) soil samples were subjected to grain size analyses and gradation curves are presented on Drawings 58 & 59. Atterberg's Limits tests were conducted on selected five (5) soil samples and results are presented on the respective borehole logs.

Water level observations were made during drilling and in the open boreholes at the completion of the drilling operations. Monitoring wells were installed in overburden and bedrock at seven (7) borehole locations for the longer-term groundwater level monitoring.

Methane gas measurements were taken in boreholes during drilling and upon completion of drilling, using a portable multi-gas detector RKI Eagle 2 instrument.

The ground surface elevations at the borehole locations was undertaken by DS personnel, using the differential GPS unit, leased from Sokkia Inc.

Geophysical survey was carried out at the subject site by the sub-contractor, Geophysics GPR International Inc. and their report is attached in **Appendix C** of this report.

3. SITE AND SUBSURFACE CONDITIONS

The subject site is located at 800 Hydro Road in Mississauga, approximately three kilometers east of Port Credit, on Mississauga's waterfront. The subject property primarily consists of former OPG Lakeview Coal plant that was decommissioned between 2006 & 2008 and the City own lands that is currently being used as playing fields and parking lot. The topography of the site has gentle slope towards south towards Lake Ontario, with elevations decreasing from 84m to 77m. At the time of our field work, the existing concrete slabs associated with the former OPG powerhouse were being removed by the contractor.

The borehole location plan is shown on Drawings 1 and 1A. Notes on samples description are provided on Drawing 1B. The subsurface conditions in the boreholes are presented in the individual borehole log on Drawings 2 to 46. Generalized sub-surface profiles are provided on Drawing 47 to 57.

Based on the borehole information, there is a significant variation in the bedrock depths at site along the north-south and east-west directions. There is a bedrock valley within the site, with the bedrock surface depths varying from 1.5m to at or below 48.3m. To delineate the bedrock valley and for the ease of describing the geotechnical conditions, the site is sub-divided into three areas (Area A, Area B & Area C, see Drawing 1 for areas & respective borehole locations). The subsurface conditions in the boreholes, area wise, are summarized in the following paragraphs.

3.1 Soil Conditions in Area ‘A’

Seventeen boreholes (BH18-14, BH18-19, BH18-21, BH18-25, BH27 to BH18-38 and BH18-49) were drilled within Area ‘A’. All boreholes were drilled to shale bedrock.

Topsoil, Pavement Structure & Fill Materials: A surficial topsoil layer, ranging in thickness from 125 to 350mm, was encountered at BH18-21, BH18-33 to BH18-38 & BH18-49. Two boreholes (BH18-28 & BH18-30) drilled on the paved areas encountered 70mm of asphalt at the surface, overlying granular base/subbase. Fill materials were found in all boreholes, extending to depths varying from 0.8 to 4.2m below the existing grade. Fill material was heterogeneous and consisted of sand & gravel, crusher run limestone, silty sand, sandy silt and clayey silt to silty clay, with inclusions of organics/topsoil, wood, concrete, asphalt and shale fragments. The SPT 'N' values recorded in fill materials ranged from 5 to over 50 blows per 300mm of spoon penetration, indicating loose to very dense state of relative density.

Clayey Silt to Silty Clay Till: Below the fill materials, clayey silt to silty clay till deposits were encountered in BH18-14, BH18-19, BH18-29, and BH18-34 to BH18-38 (except BH18-35), overlying shale bedrock or silty clay. Clayey silt till was present in a stiff to hard consistency, with measured SPT 'N' values ranging from 8 to over 50 blows per 300mm of spoon penetration. Occasional cobble/boulders and sand seams were encountered within this deposit.

Grain size analysis of one soil sample (BH18-33/SS3) was conducted. The results are shown on Drawing 59, with the following fractions:

Clay: 29%
Silt: 46%
Sand: 23%
Gravel: 2%

Atterberg limits testing of one soil sample (BH18-33/SS3) was conducted. The results are shown on the borehole log and are summarized as follows:

Liquid limit (W_L): 34%
Plastic limit (W_P): 21%
Plasticity index (PI): 13

Silty Clay: A silty clay deposit was encountered in BH18-25, BH18-27, BH18-30 and BH18-36, below the fill material, or cohesionless soils or clayey silt till, and overlying shale bedrock. Silty clay was present in a firm to hard, generally hard consistency, with measured SPT 'N' values ranging from 6 to more than 50 blows for 300 mm penetration.

Grain size analysis of one soil sample (BH18-36/SS4) was conducted. The results are shown on Drawing 59 with the following fractions:

Clay: 32%
Silt: 57%
Sand: 11%

Atterberg limits testing of same soil sample (BH18-36/SS7) was conducted. The results are shown on the borehole log and are summarized as follows:

Liquid limit (W_L): 37%
Plastic limit (W_P): 23%
Plasticity index (PI): 14

Cohesionless Soils (Sand & Gravel, Sand): Cohesionless soils consisting of sand and gravel and sand were encountered in boreholes BH18-25, to BH18-28, BH18-32 below the fill material. These cohesionless soils were water bearing and present in a very loose to very dense state, as indicated by the measured SPT 'N' values of nil to over 50 blows per 300mm of spoon penetration.

Sandy Silt Till: A sandy silt till deposit was encountered in BH18-49 below the fill material, extending to a depth of 4.5m, overlying shale bedrock. Sandy silt till was present in a compact to dense state, as indicated by the measured SPT 'N' values of 29 to 31 blows per 300mm of spoon penetration. Occasional cobble/boulders and sand seams were encountered within this deposit.

Shale Bedrock:

In Area 'A', shale bedrock of Georgian Bay Formation was found at all borehole locations, at depths ranging from 1.5 to 6.3m below the existing grade, corresponding to elevations ranging from 71.2 to 80.1m. The approximate depth and elevation of the shale bedrock surface at the borehole locations are listed on Table 3.1 below.

Table 3.1: Approximate Depth and Elevation of Shale Bedrock Surface in Area 'A'

Borehole No.	Depth of Shale Bedrock Surface below Existing Ground (m)	Approximate Elevation of Shale Bedrock Surface (m)	Notes
BH18-14	2.3	78.1	Augered
BH18-19	4.5	76.2	CORED
BH18-21	1.5	78.2	Augered
BH18-25	4.2	73.3	Augered
BH18-27 (30a)	3.8	73.5	Augered
BH18-28	3.3	79.5	Auger refusal
BH18-29A	6.3	71.2	cored
BH18-30	1.5	75.7	Augered
BH18-31	3.8	73.5	Augered
BH18-32	4.3	72.9	CORED
BH18-33	3.8	75.7	Augered
BH18-34	3.1	77.0	Augered
BH18-35	4.2	73.7	Augered
BH18-36	4.6	75.7	Augered
BH18-37	3.1	78.2	CORED
BH18-38	4.6	75.7	Augered
BH18-49	4.5	76.3	Augered
BH3*	**3.2**	**74.1**	**CORED**
BH5*	**3.5**	**76.8**	**Augered**
BH6*	**1.3**	**75.8**	**Augered**
BH9*	**4.4**	**74.6**	**CORED**

*exp. boreholes

Detailed description of shale bedrock is provided in Section 3.4.

3.2 Soil Conditions in Area 'B'

Twenty-two (22) boreholes (BH18-1 to BH18-13, BH18-15 to BH18-18, BH18-20, BH18-39, BH18-40, BH18-46 & BH18-48) were drilled within Area 'B', to depths ranging from 11.1 to 48.3m.

<u>Topsoil, Pavement Structure & Fill Materials</u>: A surficial topsoil layer, ranging in thickness from 100 to 350mm, was encountered at BH18-1, BH18-3 to BH18-6, BH18-10 to BH18-12, BH18-16, BH18-39, BH18-40 and BH18-48). Three boreholes (BH18-2, BH18-17 and BH18-20) drilled on the paved areas encountered 70 to 100mm of asphalt at the surface, overlying granular base/subbase. Fill materials were found in all boreholes, extending to depths varying from 0.8 to 3.1m below the existing grade. Fill material was heterogeneous and consisted of clayey silt, silty clay, silty sand, sandy silt, silt and sand and gravel, with inclusions of organics/topsoil in varying proportions and trace asphalt & shale fragments. The SPT 'N' values recorded in fill materials ranged from 4 to 50 blows per 300mm of spoon penetration, indicating loose to very dense state of relative density.

<u>Clayey Silt to Silty Clay Till:</u> Clayey silt to silty clay till deposits of varying thicknesses were encountered in boreholes at varying depths. Clayey silt to silty clay till was present in a stiff to hard consistency, with measured SPT 'N' values ranging from 14 to over 50 blows per 300mm of spoon penetration. Occasional cobble/boulders and sand seams were encountered within this deposit.

Grain size analysis of four soil samples from clayey silt to silty clay till (BH18-1/SS5, BH18-2/SS6, BH18-7/SS12 & BH18-15/SS3) were conducted. The results are shown on Drawings 58 & 59, with the following fractions:

Clay: 16 to 37%
Silt: 33 to 48%
Sand: 15 to 49%
Gravel: 1 to 9%

Atterberg limits testing of two soil samples (BH18-2/SS6 & BH18-3/SS15) were conducted. The results are shown on the borehole logs and are summarized as follows:

Liquid limit (W_L): 19 to 20%
Plastic limit (W_P): 11 to 12%
Plasticity index (PI): 8

<u>Clayey Silt to Silty Clay:</u> Clayey silt to silty clay deposit of varying thicknesses were encountered in boreholes at varying depths of the boreholes. Clayey silt o silty clay was present in a firm to hard, generally in very stiff consistency, with measured SPT 'N' values ranging from 6 to more than 50 blows for 300 mm penetration.

Grain size analysis of one soil sample (BH18-6/SS12) was conducted. The results are shown on Drawings 58 with the following fractions:

Clay: 68%
Silt: 26%
Sand: 6%

Atterberg limits testing of same soil sample (BH18-6/SS12) was conducted. The results are shown on the borehole log and are summarized as follows:

Liquid limit (W_L): 48%
Plastic limit (W_P): 23%
Plasticity index (PI): 25

<u>Sandy Silt to Silty Sand Till:</u> Sandy silt to silty sand till deposits of varying thicknesses were encountered in boreholes at varying depths. Sandy silt to silty sand till was generally water bearing and present in a very dense state, with measured SPT 'N' values of over 50 blows per 300mm of spoon penetration. Occasional to frequent cobble/boulders should be expected within this deposit.

<u>Cohesionless Soils (Sand & Gravel, Sand, Silty Sand, Sandy Silt, Silt):</u> Cohesionless soils consisting of sand & gravel, sand, silty sand, sandy silt, silt were encountered in majority of boreholes, embedded within the glacial till, at varying depths. These cohesionless soils were water bearing and present in a compact to very dense state, as indicated by the measured SPT 'N' values of 22 to over 50 blows per 300mm of spoon penetration.

Grain size analyses of seven (7) soil sample (BH18-2/SS3, BH18-3/SS10, BH18-8/SS7, BH18-8/SS8, BH18-8/SS12, BH18-9/SS5 and BH18-40/SS7) were conducted. The results are shown on Drawings 58 and 59, with the following fractions: 2

Clay: 2 to 10%
Silt: 3 to 62%
Sand: 23 to 95%
Gravel: up to 4%

<u>Shale Bedrock:</u>

In Area 'B', shale bedrock Georgian Bay Formation was found at five (5) borehole locations (BH18-6, BH18-9, BH18-15, BH18-18 & BH18-20), at depths ranging from 9.1 to 48.1 below the existing grade, corresponding to elevations ranging from 34.7 to 71.3m. There is a bedrock valley in this area which was further confirmed by the geophysics testing. The approximate depth and elevation of the shale bedrock surface at the borehole locations are listed on Table 3.2 below.

Table 3.2: Approximate Depth and Elevation of Shale Bedrock Surface in Area 'B'

Borehole No.	Depth of Shale Bedrock Surface below Existing Ground (m)	Approximate Elevation of Shale Bedrock Surface (m)	Notes
BH18-6	48.1	34.7	Augered
BH18-7	>30.7		Not encountered at 30.7m
BH18-9	15.2	65.0	Augered
BH18-15	9.1	71.3	Augered
BH18-18	13.7	67.4	Augered
BH18-20	10.7	69.6	Augered
BH2*	**12.0**	**68.3**	**Augered**

*exp. boreholes

Detailed description of shale bedrock is provided in Section 3.4.

3.3 Soil Conditions in Area 'C'

Six boreholes (BH18-41 to BH18-45 and BH18-47) were drilled within Area 'C'. All boreholes were drilled to shale bedrock.

Topsoil & Fill Materials: A surficial topsoil layer, ranging in thickness from 150 to 400mm, was encountered at borehole locations. Fill materials were found in all boreholes, extending to depths varying from 0.8 to 3.4m below the existing grade. Fill material was heterogeneous and consisted of clayey silt, silty clay, sandy silt, and sand & gravel with trace inclusions of organics/topsoil, brick, concrete, asphalt and shale fragments. The SPT 'N' values recorded in fill materials ranged from 4 to 17 blows per 300mm of spoon penetration, indicating loose to compact/firm to stiff state of compactness.

Clayey Silt to Silty Clay Till: Below the fill materials or silt/sandy silt, clayey silt to silty clay till deposits were encountered in boreholes, overlying shale bedrock or silt/sandy silt. Clayey silt till was present in a stiff to hard consistency, with measured SPT 'N' values ranging from 13 to over 50 blows per 300mm of spoon penetration.

Cohesionless Soils (Silt, Sandy Silt to Silty Sand): Cohesionless soils consisting of silt and sandy silt to silty sand were encountered in all boreholes, except in BH18-43 and BH18-44 below the fill material or clayey silt till. These cohesionless soils were generally water bearing and present in a very loose to dense state, as indicated by the measured SPT 'N' values of 5 to 32 blows per 300mm of spoon penetration.

Shale Bedrock: In Area 'C', shale bedrock of Georgian Bay Formation was found at all borehole locations, at depths ranging from 3.1 to 7.6m below the existing grade, corresponding to elevations ranging from 75.7 to 80.4m. The approximate depth and elevation of the shale bedrock surface at the borehole locations are listed on Table 3.3 below.

Table 3.3: Approximate Depth and Elevation of Shale Bedrock Surface in Area 'C'

Borehole No.	Depth of Shale Bedrock Surface below Existing Ground (m)	Approximate Elevation of Shale Bedrock Surface (m)	Notes
BH18-41	7.6	75.7	Augered
BH18-42	6.1	79.6	Augered
BH18-43	3.1	80.4	Augered
BH18-44	3.8	80.1	Augered
BH18-45	3.8	79.2	CORED
BH18-47	6.1	76.3	Augered
BH7*	3.6	79.8	CORED

*exp. boreholes

Detailed description of shale bedrock is provided in Section 3.4.

3.4 Shale Bedrock (Georgian Bay Formation)

Shale bedrock belonging to Georgian Bay Formation was encountered at this site. Because of the method of drilling and sampling, the surface elevations of the bedrock can be different than indicated on the borehole logs (Drawings 2 to 46). Commonly the till overlying the shale contains slabs of limestone which would give a false indication of the bedrock level. Similarly, the depth of weathering cannot be determined accurately due to the presence of limestone layers.

Shale bedrock was cored at five (5) borehole locations (BH18-19, BH18-29, BH18-32, BH18-37 and BH18-45) to confirm the depth and quality of bedrock.

Photographs of the bedrock cores are also presented in **Appendix A** of the report. The descriptive terms used on the record of rock cores and throughout this report are explained on the "Explanation of Terms Used in the Bedrock Core Log" sheet in Appendix A. **Appendix A** also presents more details and general comments about the shale bedrock in Toronto area.

Total Core Recovery (TCR):

The total core recovery indicates the total length of rock core recovered, expressed as a percentage of the actual length of the core run. The total core recovery for the cored runs ranged from 67 to 100%. Generally, less core recovery was experienced only near the surface of the rock, where the formation is highly to moderately weathered and was almost full as depth increased.

Solid Core Recovery (SCR):

The solid core recovery is the total length of solid, full diameter rock core that was recovered, expressed as a percentage of the length of the core run. Solid core recovery ranged from 28 to 98%, and also appears to generally improve with depth. The SCR index was generally influenced by the orientations of the fractures. SCR was low when fractures oblique to the borehole axis were intercepted.

Rock Quality Designation (RQD):

The rock quality designation index is obtained by measuring the total length of recovered rock core pieces which are longer than 100mm and expressing their sum total length as a percentage of the length of the core run. RQD is a function of the frequency of joints, bedding plane partings and fractures in the rock cores. While the use of double tube core barrels provided reasonably good protection of the core during drilling and core retrieval, the fissile nature of the shale greatly influences the RQD values of the rock cores. Consequently, it is believed that the RQD values recorded underestimate the rock quality classification of the laminated fissile shale. On the basis of the recorded RQD values which range from nil to 97%, the rock quality is estimated to be “very poor” to “excellent”, and the average value of more than 50% suggests a rock of generally “fair” quality.

Hard Layers:

Based on the visual examination of the rock cores, an attempt was made to identify and record the thickness and percentages of the relatively harder siltstone and limestone layers. The percentage of the “hard layers” per core run ranges between nil and 32%. The thickness of these layers varied but was generally varied from 50 to 380mm, but thicker layers have been observed to be as much as 750 to 900 mm at other sites. The layers are actually lenses and they can vary significantly in thickness over short distance. Encountering such thick layers should be anticipated. It is also common to encounter closely spaced groupings of thin strong limestone/siltstone layers which individually may only be 25 to 50mm thick but collectively can be 1m in thickness.

Fracture Index:

When logging the rock cores, the fracture Index (i.e. the number of fractures for each 0.3m length of core) was also recorded. The recorded values range between nil and greater than 25. Occasional fragmented and broken zones were encountered within the solid core. Bedrock was fragmented up to a depth of about 4.9m m in BH18-37, as indicated by nil solid core recovery in this zone. It was observed that the planes of weaknesses along which the cores tended to break, included planes of fissility and bedding, the contact surfaces between shale and siltstone or limestone bands and some oblique and subvertical joints.

Weathering:

In general, moderately weathered zone in the bedrock was limited to about 1.5 m from the bedrock surface. Below this, the degree of weathering ranged from slightly weathered to fresh. The siltstone and limestone layers were generally fresh with only slight surficial weathering on joint surfaces in the zone close to bedrock surface.

Methane Gas:

Methane gas under pressure was encountered in BH18-13 below a depth of about 11m, which is possibly just above the bedrock surface. The borehole was terminated at this depth and properly sealed. Although, during the rock coring there were no physical indications of the presence of gas in the coreholes, the Georgian Bay Formation is known to contain pockets of combustible gas. Therefore, appropriate care and monitoring are essential in all confined excavation work, particularly caissons and tunnels.

3.5 Groundwater Conditions

During drilling, short-term (un-stabilized) groundwater levels were found at depths ranging from 1.5 to 18.3m below the existing grade. Long-term (stabilized) groundwater levels in the monitoring wells were found at depths ranging from 2.0 to 8.0m below the existing grade, corresponding to Elevations of 74.9 to 80.2m. The results of the water level readings taken on Sept. 26, 2018 in the monitoring wells are summarized on Table 3.5.

Table 3.5: Groundwater Levels Observed in DS Monitoring Wells

Borehole	Surface Elevation (m)	Date of Observation	Water Level Depth (mbgs)	Water Level Elev. (m)	Notes
BH18-8	81.6	Sept. 26, 2018	2.8	78.8	Screened in overburden
BH18-12	83.2	Sept. 26, 2018	8.0	75.2	Screened in overburden
BH18-16	82.9	Sept. 26, 2018	2.7	80.2	Screened in overburden
BH18-19	80.7	Sept. 26, 2018	4.7	76.0	Screened in bedrock
BH18-29A*	77.5	Sept. 26, 2018	-	-	Screened in bedrock (Well not accessible)
BH18-32	77.2	Sept. 26, 2018	2.3	74.9	Screened in bedrock
BH18-37	81.3	Sept. 26, 2018	2.0	79.3	Screened in bedrock

It should be noted that the groundwater levels can vary and are subject to seasonal fluctuations in response to major weather events.

4. FOUNDATIONS

It is understood that the 71.6-hectare Lakeview Village will include 5,000 to 7,000 new homes in a variety of housing options, including townhouses, mid-rise and high-rise buildings. The proposed structures will entail up to 3-levels of basement. The finished basement floor elevations are not available to us at the time of writing this report. It is assumed that P1, P2 and P3 basement levels will approximately be at 3m, 6m and 9m depths respectively below the existing grade. Footings will be 1m to 2m below the lowest basement slab.

Based on the encountered bedrock depths, the subject site is sub-divided into three areas (Area A, Area B and Area C), as summarized in Sections 3.1 to 3.3. The foundation recommendations for these three areas are provided below:

4.1 Proposed Buildings in Area ‘A’

Boreholes drilled within Area ‘A’ (BH18-14, BH18-19, BH18-21, BH18-25, BH27 to BH18-38 and BH18-49) reported shale bedrock at depths ranging from 1.5 to 6.3m below the existing grade, corresponding to elevations ranging from 71.2 to 80.1m. Due to the shallow bedrock depths, this area is considered more suitable for high-rise development with one or more basement levels.

Depending upon the finished lowest basement floor elevation, the proposed buildings can be supported by conventional spread and strip footings / mat foundations or short drilled piers founded on shale bedrock, at minimum 0.3 m below the shale bedrock surface, for a bearing pressure values of 2.5 MPa at the Serviceability Limit States (SLS), and for a factored geotechnical resistance of 3.75 MPa at the Ultimate Limit States (ULS).

The footings/piers founded on sound shale, at minimum 1.5 m below the shale surface can be designed for a bearing pressure of 5.0 MPa at SLS, and a factored geotechnical resistance of 7.5 MPa at ULS.

The depths and elevations of shale bedrock at the borehole locations in Area ‘A’ are provided in Table 3.1 of this report.

4.2 Proposed Buildings in Area ‘B’

Twenty-two (22) boreholes (BH18-1 to BH18-13, BH18-15 to BH18-18, BH18-20, BH18-39, BH18-40, BH18-46 & BH18-48) were drilled within Area ‘B’, to depths ranging from 11.1 to 48.3m.

There is a bedrock valley within Area ‘B’, with bedrock depths ranging from 9.1 to 48.1m below the existing grade, corresponding to elevations ranging from 34.7 to 71.3m. Therefore, this area is more suitable for low-rise to mid-rise development to be supported by shallow foundations (footings/raft) founded on undisturbed native soil.

Depending upon the location of the building and number of basement levels, it may be possible to support the proposed development in this area on footings or deep foundations such as caissons founded on bedrock.

Additional boreholes will be required to further delineate and confirm the bedrock depths if foundations are to be supported on bedrock.

Footings and/or raft founded on undisturbed native soils can be designed for a bearing capacity values of 300 to 500 kPa at SLS (serviceability limit states) and for a factored geotechnical resistance of 450 to

750 kPa at ULS (ultimate limit states). The bearing values and the corresponding founding elevations at the borehole locations are summarized on Table 4.2.

Table 4.2: Bearing Values and Founding Levels of Spread Footings

BH No.	Material	Bearing Capacity at SLS (kPa)	Factored Geotechnical Resistance at ULS (kPa)	Minimum Depth below Existing Ground (m)	Founding Level At or Below Elevation (m)	Notes/WL Elevation (m)
BH18-1	Silty clay Till/ Sandy Silt Till	500	750	3.4	79.4	during drilling WL at 76.7m
BH18-2	Clayey Silt Till	500	750	2.6	81.2	
BH18-3	Clayey Silt Till/ sandy silt to silty sand	500	750	1.0	80.4	during drilling WL at 76.8m
BH18-4	Sandy silt to silty sand	400	600	2.1	79.0	during drilling WL at 75.1m
BH18-5	Clayey Silt Till	500	750	2.6	81.4	
BH18-6	Clayey Silt Till	500	750	1.8	81.0	
BH18-7	Clayey Silt Till	500	750	1.5	80.6	
BH18-8	Clayey Silt/sandy silt	400	600	1.1	80.5	WL at 78.8m on Sept. 26/18
BH18-9	Clayey Silt/sandy silt	300 500	450 750	2.3 6.1	77.9 74.1	during drilling WL at 77.1m
BH18-10	Clayey Silt Till/clayey silt/sandy silt till	500	750	1.8	80.5	during drilling WL at 76.5m
BH18-11	Clayey Silt Till Silty Clay	500 300	750 450	3.4 13.0	81.7 72.1	
BH18-12	Clayey Silt Till Clayey Silt	500 300	750 450	3.0 8.0	80.2 75.2	WL at 75.2m on Sept. 26/18
BH18-13	Clayey Silt Till/Clayey Silt/Sandy silt to silty sand till	300 500	450 750	1.8 4.6	78.4 75.6	during drilling WL at 75.6m; methane gas encountered at 11m
BH18-15	Silt/silty sand/silty clay	500	750	3.1	77.3	
BH18-16	Clayey silt till	500	750	2.6	80.3	WL at 80.2m on Sept. 26/18
BH18-17	Clayey Silt Till/Clayey Silt	500	750	1.8	78.5	
BH18-18	Clayey silt till Silty clay/silt	300	450	2.1	79.0	
BH18-20	Clayey silt till/silty clay/silt to clayey silt	500	750	1.0	79.3	during drilling WL at 77.2m
BH18-39	Sandy silt till/silty clay till	500	750	3.4	78.4	
BH18-40	Sandy Silt to silty sand/silty clay till	500	750	2.5	79.3	during drilling WL at 79.5m
BH18-46	Silty clay till	500	750	1.1	80.3	

BH18-48	Clayey silt till/sandy silt till	500	750	1.8	79.3	during drilling WL at 78.0m

4.3 Proposed Buildings in Area 'C'

Boreholes drilled in Area 'C' (BH18-41 to BH18-45 and BH18-47) reported shale bedrock depths ranging from 3.1 to 7.6m below the existing grade, corresponding to elevations ranging from 75.7 to 80.4m. Due to the shallow bedrock depths, this area is also suitable for high-rise development with one or more basement levels.

Depending upon the finished lowest basement floor elevation, the proposed buildings can be supported by conventional spread and strip footings / mat foundations or short drilled piers founded on shale bedrock, at minimum 0.3 m below the shale bedrock surface, for a bearing pressure values of 2.5 MPa at the Serviceability Limit States (SLS), and for a factored geotechnical resistance of 3.75 MPa at the Ultimate Limit States (ULS).

The footings/piers founded on sound shale, at minimum 1.5 m below the shale surface can be designed for a bearing pressure of 5.0 MPa at SLS, and a factored geotechnical resistance of 7.5 MPa at ULS.

The depths and elevations of shale bedrock at the borehole locations are provided in Table 3.3 of this report.

Footings and/or raft founded on undisturbed native soils can be designed for a bearing capacity values of 300 to 500 kPa at SLS (serviceability limit states) and for a factored geotechnical resistance of 450 to 750 kPa at ULS (ultimate limit states). The bearing values and the corresponding founding elevations at the borehole locations are summarized on Table 4.3.

Table 4.3: Bearing Values and Founding Levels of Spread Footings

BH No.	Material	Bearing Capacity at SLS (kPa)	Factored Geotechnical Resistance at ULS (kPa)	Minimum Depth below Existing Ground (m)	Founding Level At or Below Elevation (m)	Notes/WL Elevation (m)
BH18-41	Silty clay Till/ silt	500	750	2.6	80.7	during drilling WL at 78.7m
BH18-42	Clayey Silt Till	500	750	4.6	81.1	
BH18-43	Clayey Silt Till	500	750	1.1	82.4	
BH18-44	Clayey Silt Till	300	450	1.5	82.4	
BH18-45	Silty Clay Till	400	600	2.6	80.7	
BH18-47	Clayey Silt Till / Silt/sandy silt to silty sand	300	450	1.0	81.4	during drilling WL at 77.8m

4.4 Other Comments on Foundations

Foundations designed to the specified bearing capacity at the serviceability limit states (SLS) are expected to settle less than 25 mm total and 19 mm differential.

Where it is necessary to place footings at different levels in soil, the upper footing must be founded below an imaginary 10 horizontal to 7 vertical line drawn up from the base of the lower footing. Where it is necessary to place footings at different levels on bedrock, the upper footing must be founded below an imaginary 1 horizontal to 1 vertical line (1H:1V in bedrock) drawn up from the base of the lower footing. The lower footing must be installed first to help minimize the risk of undermining the upper footing.

All foundation bases must be inspected by this office prior to pouring concrete.

The shale bedrock weathers rapidly between wetting and drying cycles. In view of this, it is suggested that a lean concrete mat slab be placed immediately after the excavation is complete to keep the shale intact, unless the footings are cast immediately after excavating.

The inspected and approved footing base should be covered with 50 mm thick mud slab immediately in order to avoid disturbance of the founding soil due to construction activity and weathering /drying.

It should be noted that the recommended bearing capacities have been calculated by DS Consultants Limited from the borehole information for the preliminary design stage only. Additional boreholes may be required when the final building plans are available. The investigation and comments are necessarily on-going as new information of the underground conditions becomes available. For example, more specific information is available with respect to conditions between boreholes when foundation construction is underway. The interpretation between boreholes and the recommendations of this report must therefore be checked through field inspections provided by DS Consultants Limited to validate the information for use during the construction stage.

5. FROST PROTECTION

All foundations exposed to seasonal freezing conditions must have at least 1.2m of soil cover for frost protection.

There is no official rule governing the required founding depth for footings below unheated basement floors. Certainly, it will not be greater than the 1.2 m required in Southern Ontario for exterior footings. Un-monitored experience indicates that a shallower depth ranging from 0.82 to 0.9 m for interior column footings and 0.4 m for wall footings has been successful where 2 or more basement levels apply. The 0.82 m depth is believed to be close to the minimum structural requirement for interior column footings. Adjacent to air shafts and entrance and exit doors, a footing depth of 1.2 m below floor level is required or, alternatively, insulation protection must be provided.

It is also emphasized that underfloor drainage and/or an adequate free draining gravel base is required to minimize the risk of floor dampness. Floor dampness could lead to temporary icing and the risk of accidents.

6. FLOOR SLAB AND PERMANENT DRAINAGE

The floor slab can be supported on grade provided all existing fill material and disturbed soils are removed and the base thoroughly proof rolled. The fill required to raise the grade can consist of inorganic soil, placed in shallow lifts and compacted to 98 percent of Standard Proctor Maximum Dry Density (SPMDD). A moisture barrier consisting of at least 200 mm of 19 mm clear crushed stone should be installed under the floor slab.

In the area where shale bedrock is encountered at floor slab level, the floor slab can be cast as slab-on-grade, provided a 200 mm layer of clear crushed stone (19 mm maximum size) is placed between the underside of the floor slab and the exposed bedrock surface.

A perimeter and underfloor drainage system will be required for buildings with basements. Typical drainage and backfill recommendations are illustrated on Drawings 60 to 62 for the open cut and shored excavation system.

7. ELEVATOR AND SUMP PITS

If elevator/sump pits are to be installed in cohesionless soils (sandy silt, sand, silt) below the water table, drainage systems at the base level of the pits are not recommended, due to the concern of loss of fines. In this case, the pits can be designed as water-tight structures, and water pressure on the pit walls and the pit base slab should be considered.

8. EARTH, ROCK AND WATER PRESSURES

The design of basement walls can incorporate the conventional design in the overburden using the earth pressure coefficient K_1=0.40. In the rock, the earth pressure coefficient K can be reduced to K_2=0.20.

The lateral earth/rock pressure acting at any depth on basement walls can be calculated as follows:

In soil: $p = K_1 (\gamma_1 h_1 + q) + p_w$

In rock: $p = K_2 (\gamma_1 H_1 + q + \gamma_2 h_2) + p_w$

where p = lateral earth and water pressure in kPa acting at depth h_1 or h_2

K_1, K_2 = earth pressure coefficients, K_1=0.40 for overburden soil; K_2=0.20 for rock

γ_1 = unit weight of overburden soil, assuming 20.5 kN/m^3 above the water table and 11 kN/m^3 below the water table

γ_2 = unit weight of rock below water, assuming 15 kN/m^3

h_1 = Depth in overburden soil, below ground surface

H_1 = thickness of soil above rock

h_2 = Depth in rock, below rock surface

q = value of surcharge in kPa

p_w = hydrostatic water pressure

When the foundation wall is poured against the caisson wall, the foundation wall as well as the caisson wall should be designed for hydrostatic pressure, even though a drainage board is provided between the basement wall and the caisson wall.

9. EXCAVATIONS AND GROUNDWATER CONTROL

Excavations can be carried out with heavy hydraulic backhoe. Long-term (stabilized) groundwater levels in the monitoring wells were found at depths ranging from 2.0 to 8.0m below the existing grade, corresponding to Elevations of 74.9 to 80.2m. Positive dewatering will be required prior to any excavation in water bearing cohesionless soils below the groundwater table, otherwise it will result in an unstable base and flowing sides. A contractor specializing in dewatering should be retained to design the dewatering systems for excavations below the groundwater table.

Further comments on groundwater control during construction and permanent drainage are provided in our preliminary hydrogeology report.

It should be noted that the glacial till soils may contain boulders. Large obstructions in the fill material are anticipated. Provisions must be made in the excavation contract for the removal of boulders in the till and large obstructions in the fill material.

Excavation of the shale can be carried out using heaviest available single tooth ripper equipment. The limestone beds are present and may overly the shale bedrock surface at some locations. It may be necessary at some locations to utilize jackhammer type equipment to “open” the limestone layers for the ripper.

All excavations must be carried out in accordance with the most recent Occupational Health and Safety Act (OHSA). In accordance with OHSA, the fill material can be classified as Type 3 soil above the groundwater table. The very stiff to hard clayey soils can be classified as Type 2 Soil above the groundwater table and as Type 3 below the groundwater table. The cohesionless soils of sand and silty sand can be classified as Type 3 Soil above the groundwater table and Type 4 soil below the groundwater table.

The native soils free from topsoil and organics can be used as general construction backfill, provided its moisture content is within 2 percent of the optimum moisture content. Loose lifts of soil, which are to be compacted, should not exceed 200 mm. Depending on the time of construction and weather, some excavated material may be too wet to compact and will require aeration prior to its use.

Imported granular fill, which can be compacted with hand held equipment, should be used in confined areas. The excavated soils are not considered to be free draining. Where free draining backfill is required, imported granular fill such as OPSS Granular B should be used.

It should be noted that the excavated soils are subject to moisture content increase during wet weather which would make these materials too wet for adequate compaction. Stockpiles should be compacted at the surface or be covered with tarpaulins to minimize moisture uptake.

10. EARTHQUAKE CONSIDERATIONS

Based on the existing borehole information and according to Table 4.1.8.4.A of OBC 2012, the subject site for the proposed development can be classified as “Class C” for seismic site response.

In Area ‘A’ and Area ‘B’, for the proposed buildings with one or more levels of basement, founded on sound shale bedrock, it may be possible to classify the site as “Class B” for seismic site response. This should be further confirmed during the detail design stage.

11. ROADS

The proposed development will be serviced by a network of roads.

11.1 Pavement Thickness

The investigation has shown that the predominant subgrade soil, after stripping the topsoil and any other organic and otherwise unsuitable subsoil, will generally consist of clayey silt till, clayey silt, clayey silt till shale complex and shale bedrock.

Based on the above and assuming that traffic usage will be residential/commercial for local and collector road, the following minimum pavement thicknesses are recommended for roads to be constructed within the development.

Collector Road

40 mm HL3 Asphaltic Concrete
85 mm HL8 Asphaltic Concrete
200 mm Granular ‘A’
325 mm Granular ‘B’

<u>Local/Minor Local Road</u>

40 mm HL3 Asphaltic Concrete
85 mm HL8 Asphaltic Concrete
200 mm Granular 'A'
175 mm Granular 'B'

These values may need to be adjusted according to the City of Mississauga Standards. The site subgrade and weather conditions (i.e. if wet) at the time of construction may necessitate the placement of thicker granular sub-base layer in order to facilitate the construction. Furthermore, heavy construction equipment may have to be kept off the newly constructed roads before the placement of asphalt and/or immediately thereafter, to avoid damaging the weak subgrade by heavy truck traffic.

11.2 Stripping, Sub-excavation and Grading

The site should be stripped of all topsoil and any organic, weathered or otherwise unsuitable soils to the full depth of the roads, both in cut and fill areas. Following stripping, the site should be graded to the subgrade level and approved. The subgrade should then be proof-rolled, in the presence of the Geotechnical Engineer, by at least several passes of a heavy compactor having a rated capacity of at least 8 tonnes. Any soft spots thus exposed should be removed and replaced by select fill material, similar to the existing subgrade soil and approved by the Geotechnical Engineer. The subgrade should then be re-compacted from the surface to at least 98% of its Standard Proctor Maximum Dry Density (SPMDD). The final subgrade should be cambered or otherwise shaped properly to facilitate rapid drainage and to prevent the formation of local depressions in which water could accumulate.

Owing to the clayey (i.e. impervious) nature of some subsoils at the site, proper cambering and allowing the water to escape towards the sides (where it can be removed by means of subdrains) is considered to be beneficial for this project. Otherwise, any water collected in the granular sub-base materials could be trapped thus causing problems due to softened subgrade, differential frost heave, etc. For the same reason damaging the subgrade during and after placement of the granular materials by heavy construction traffic should be avoided. If the moisture content of the local material cannot be maintained at ±2% of the optimum moisture content, imported granular material may need to be used.

Any fill required for re-grading the site or backfill should be select, clean material, free of topsoil, organic or other foreign and unsuitable matter. The fill should be placed in thin layers and compacted to at least 95% of its SPMDD. The degree of compaction should be increased to 98% within the top 1.0 m of the subgrade, or as per City Standards. The compaction of the new fill should be checked by frequent field density tests.

11.3 Construction

Once the subgrade has been inspected and approved, the granular base and sub-base course materials should be placed in layers not exceeding 200 mm (uncompacted thickness) and should be compacted to at least 100% of their respective SPMDD. The grading of the material should conform to current OPS Specifications.

The placing, spreading and rolling of the asphalt should be in accordance with OPS Specifications or, as required by the local authorities.

Frequent field density tests should be carried out on both the asphalt and granular base and sub-base materials to ensure that the required degree of compaction is achieved.

11.4 Drainage

The City of Mississauga may require the installation of full-length subdrains on all roads. The subdrains should be properly filtered to prevent the loss of (and clogging by) soil fines.

All paved surfaces should be sloped to provide satisfactory drainage towards catch-basins. As discussed in Section 11.2, by means of good planning any water trapped in the granular sub-base materials should be drained rapidly towards subdrains or other interceptors.

12. UNDERGROUND UTILITIES

It is understood that underground services (watermains, storm and sanitary sewer) will be installed at the site to service the proposed development. Based on the preliminary servicing plans prepared by Urbantech, invert levels of the proposed utilities will be about 2 to 6m below the existing grade, with sanitary sewer at the deepest point at about 6m below the existing grade.

Trenches will be dug through fill materials followed by native soils of cohesive and cohesionless nature. Long-term (stabilized) groundwater levels in the monitoring wells were found at depths ranging from 2.0 to 8.0m below the existing grade, corresponding to Elevations of 74.9 to 80.2m. Positive dewatering will be required prior to any excavation in water bearing cohesionless soils below the groundwater table, otherwise it will result in an unstable base and flowing sides. Water table must be lowered to at least 1m below the lowest excavation level.

Detailed comments on excavation and groundwater control are provided in Section 9.

The undisturbed native soils encountered in the boreholes will provide adequate support for the service pipes and allow the use of Class B type bedding. The recommended minimum thickness of granular bedding below the invert of the pipes is 150 mm. The thickness of the bedding may, however, have to be increased depending on the pipe diameter or in accordance with local standards or if wet or weak subgrade conditions are encountered, especially when the soil at the trench base level consists of wet, dilatant silt.

The bedding material should conform to City of Mississauga bedding stone gradation requirements. Where the bedding falls below the anticipated water table, the bedding stone must be surrounded with a geotextile filter cloth.

For deep trenches, i.e. more than 2.0 m below the shale surface, a minimum 50 mm thick polystyrene etc. layer will be required at both sides of the pipe to avoid rock squeezing. The polystyrene layer should extend vertically to at least 0.3 m above the pipe. The rock trench should be wide enough so that at each side, the horizontal distance between the pipe side and the cut rock surface is at least 0.3 m.

The select inorganic fill materials or native soils free from topsoil / organics can be used as general construction backfill, provided their moisture contents at the time of construction are within 2% of their optimum moisture content.

In any case the degree of compaction of the trench backfill should be at least 95% of the material's Standard Proctor Maximum Dry Density (SPMDD). This value should be increased to at least 98% within 2 m of the road surface. The granular pavement sub-base and base materials should be compacted to at least 100% of their respective SPMDD.

13. GENERAL COMMENTS AND LIMITATIONS OF REPORT

This geotechnical report is preliminary, prepared based on the conceptual design plans. Additional boreholes will be required, once the detailed development plans are available to confirm the findings and recommendations provided in this report.

This report is intended solely for the client named. The material in it reflects our best judgment in light of the information available to DS Consultants Ltd at the time of preparation. Unless otherwise agreed in writing by DS Consultants Ltd, it shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. No portion of this report may be used as a separate entity, it is written to be read in its entirety.

The conclusions and recommendations given in this report are based on information determined at the borehole locations. The information contained herein in no way reflects on the environment aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the boreholes may differ from those encountered at the borehole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. The benchmark and elevations used in this report are primarily to establish relative elevation differences between the borehole locations and should not be used for other purposes, such as grading, excavating, planning, development, etc.

DS Consultants Ltd should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, DS Consultants Ltd will assume no responsibility for interpretation of the recommendations in the report.

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

We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.

We trust that the information contained in this report is satisfactory. Should you have any questions, please do not hesitate to contact this office.

DS CONSULTANTS LTD

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Drawings

J:\-GIS\18-519-10 800 Hydro Road, Mississuaga\1-QGIS\Geotechnical\Figure 1- BH Location Plan.qgs

Image Source: Imagery @2018 Google

Legend:

Boreholes

- Monitoring Well
- Borehole
- Area 'A' Bedrock depth 1.5 to 4.6m
- Area 'B' Bedrock depth 9.1 to 48.1m
- Area 'C' Bedrock depth 3.1 to 76m

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Project: GEOTECHNICAL INVESTIGATION		
Title: **BOREHOLE LOCATION PLAN**		
Approved By: N.W	Drawn By: S.Y	Date: October 2018
Scale: As Shown	Project No.: 18-519-10	Figure No.: **1**

Client: LAKEVIEW COMMUNITY PARTNERS LIMITED

C:\0Sharon\18-519-10 800 Hydro Road, Mississuaga\1-QGIS\Geotechnical\Figure 1- BH Location Plan-Only 2018.qgs Jun-08 17:08

Legend

- Approx_Site_bnd
- Monitoring Well (2018)
- Borehole (2018)

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Project:	PROPOSED GEOTECHNICAL INVESTIGATION - PHASE 1 AREA Lakeview Development, 800 Hydro Road, Toronto, ON						
Title:	**BOREHOLE LOCATION PLAN**						
Client: ARGO DEVELOPMENT CORPORATION	Size: 11 x 17	Approved By:	N.W	Drawn By:	S.Y	Date:	June 2020
	Rev. 0	Scale:	As Shown	Project No.:	18-519-10	Drawing No.:	**1A**
		Image/Map Source:	CAD Drawing				

Drawing 1B: Notes On Sample Descriptions

1. All sample descriptions included in this report generally follow the Unified Soil Classification. Laboratory grain size analyses provided by DSCL also follow the same system. Different classification systems may be used by others, such as the system by the International Society for Soil Mechanics and Foundation Engineering (ISSMFE). Please note that, with the exception of those samples where a grain size analysis and/or Atterberg Limits testing have been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		

0.002 0.006 0.02 0.06 0.2 0.6 2.0 6.0 20 60 200

EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC)	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional preliminary geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

DS CONSULTANTS LTD.
Geotechnical ◆ Environmental ◆ Materials ◆ Hydrogeology

LOG OF BOREHOLE BH18-01

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-18-2018

REF. NO.: 18-519-10
ENCL NO.: 2

SOIL PROFILE | SAMPLES | GROUND WATER CONDITIONS | ELEVATION | DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) | SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE (20 40 60 80 100) | PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10 20 30) | POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m^3) | METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	POCKET PEN. (Cu) (kPa)	GR	SA	SI	CL
82.8 / 0.0	**TOPSOIL:** 350mm	1	SS	14						
82.4 / 0.4	**FILL:** clayey silt, some organics, trace gravel, grey, moist, stiff	2	SS	8						
		3	SS	10						
80.5 / 2.3	**FILL:** sandy silt, some organics, grey, moist, loose	4	SS	8						
79.7 / 3.1	**SILTY CLAY TILL:** some sand, trace gravel, brown, moist, very stiff	5	SS	17		225	1	15	47	37
78.2 / 4.6	**SANDY SILT TILL:** trace to some clay, trace gravel, grey, moist, very dense	6	SS	50						
76.7 / 6.1	**SAND:** trace silt, brown, wet, dense	7	SS	45	W. L. 76.7 m during drilling					
75.2 / 7.6	**SAND AND GRAVEL:** trace silt, brown, wet, very dense	8	SS	50						
73.7 / 9.1	**SILTY SAND TILL:** some gravel to gravelly, occassional cobble/boulders, trace clay, grey, moist to wet, very dense	9	SS	78						

Elevation scale: 82, 81, 80, 79, 78, 77, 76, 75, 74, 73
Depth scale: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DS SOIL LOG 18-519-10 800 HYDRO ROAD.GPJ DS.GDT 18-10-12

LOG OF BOREHOLE BH18-01

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-18-2018

REF. NO.: 18-519-10
ENCL NO.: 2

(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT W_P / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY SAND TILL: some gravel to gravelly, occassional cobble/boulders, trace clay, grey, moist to wet, very dense(Continued)						72					
11			10	SS	50				○			
12							71					
	wet below 12.2 m		11	SS	76				○			
70.0 12.8	**END OF BOREHOLE** Notes: 1) Water level at 6.1 mbgl during drilling						70					

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
$+^3, \times^3$: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-19-2018

REF. NO.: 18-519-10
ENCL NO.: 3

(m) ELEV DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa)	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
83.8											
83.7 / 0.1	**ASPHALT:** 100 mm										
83.4 / 0.4	**SAND AND GARVEL:** 250 mm	1	AS								
83.0 / 0.8	**FILL:** silty sand, trace gravel, grey, wet					83					
82.3 / 1.5	**CLAYEY SILT TILL:** some sand, trace gravel, brown, moist, very stiff	2	SS	22							
81.5 / 2.3	**SILTY SAND:** trace clay, brown, wet, dense	3	SS	40		82					0 72 22 6
	CLAYEY SILT TILL: sandy, trace gravel, occasional cobble/boulder, grey, moist, very stiff to hard	4	SS	46		81			225		
		5	SS	40		80			225		
		6	SS	28		79			225		1 49 33 17
		7	SS	41		78, 77			225		
		8	SS	70		76, 75			225		
		9	SS	44		74	wet spoon		225		July 19, 2018 / -------------- / July 20, 2018

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: + 3, × 3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-02

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-19-2018

REF. NO.: 18-519-10
ENCL NO.: 3

(m) ELEV / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%) (approx.)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	CLAYEY SILT TILL: sandy, trace gravel, occasional cobble/boulder, grey, moist, very stiff to hard(Continued)					73				
		10	SS	21			○	225		
						72				
		11	SS	40			○			
						71				
70.1 / 13.7	**CLAYEY SILT:** trace sand, grey, moist, very stiff					70				
		12	SS	21			○	225		
						69				
		13	SS	19			○	225		
						68				
						67				
		14	SS	18			○	225		
						66				
	stiff at 18.3 m	15	SS	19			○	225		
						65				
						64				

Depth scale (m): 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-02

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-19-2018

REF. NO.: 18-519-10
ENCL NO.: 3

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT W_P / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	CLAYEY SILT: trace sand, grey, moist, very stiff(Continued)		16	SS	18				○	225		
63.4 / 20.4	**END OF BOREHOLE** Notes: 1) Borehole dry upon completion											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES $+^3, \times^3$: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-03

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-25-2018

REF. NO.: 18-519-10
ENCL NO.: 4

ELEV (m) / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	POCKET PEN. (Cu) (kPa)
81.4 / 0.0	**TOPSOIL:** 350mm	1	SS	13		
81.0 / 0.4	**POSSIBLE FILL:** clayey silt, brown, moist, stiff					
80.6 / 0.8	**CLAYEY SILT:** some sand, occassional sand seams, brown, moist, very stiff to hard	2	SS	22		>225
79.7 / 1.7	**CLAYEY SILT TILL :** some sand, trace gravel, occassional sand seams, brown, moist, very stiff	3	SS	33		>225
		4	SS	24		
78.3 / 3.1	**SANDY SILT TO SILTY SAND** trace clay, trace gravel, brown, moist to wet , very dense	5	SS	50/ 100mm		
	grey, wet below 4.6 m	6	SS	50/ 100mm	▽ W. L. 76.8 m during drilling	
		7	SS	80		
73.8 / 7.6	**SILTY SAND TO SAND:** trace clay, grey, wet, dense	8	SS	46		
72.3 / 9.1	**SILTY SAND TILL:** trace to some clay, trace gravel, occasional cobble/boulder, grey, wet, very dense	9	SS	50/ 150mm		

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30
NATURAL UNIT WT (kN/m^3)
METHANE AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL
ELEVATION: 81, 80, 79, 78, 77, 76, 75, 74, 73, 72

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-25-2018

REF. NO.: 18-519-10
ENCL NO.: 4

SOIL PROFILE (m) ELEV / DEPTH	DESCRIPTION	SAMPLES NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY SAND TILL: trace to some clay, trace gravel, occasional cobble/boulder, grey, wet, very dense(Continued)					71	
70.7 / 10.7	**SAND:** trace silt, grey, wet, dense to very dense	10	SS	42			0 95 (5)
						70	
		11	SS	64		69	
						68	
67.7 / 13.7	**SANDY SILT TO SILTY SAND:** trace to some clay, some gravel, grey, wet, very dense	12	SS	80			
						67	
		13	SS	50/ 150mm		66	
						65	
		14	SS	50/ 75mm		64	
63.1 / 18.3	**CLAYEY SILT TILL:** sandy, trace gravel, occasssional cobble/boulders, grey, moist, hard	15	SS	50/ 150mm		63	
						62	

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH (kPa): ○ UNCONFINED; + FIELD VANE & Sensitivity; ● QUICK TRIAXIAL; × LAB VANE: 20 40 60 80 100

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L
WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m^3)

Depth scale: 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Continued Next Page

LOG OF BOREHOLE BH18-03

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-25-2018

REF. NO.: 18-519-10
ENCL NO.: 4

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); SHEAR STRENGTH (kPa): O UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L; WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
			16	SS	92					>225		
61.2 / 20.2	**END OF BOREHOLE** Notes: 1) Water level at 4.6 mbgl during drilling											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; O ε=3% Strain at Failure

LOG OF BOREHOLE BH18-04

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-22-2018

REF. NO.: 18-519-10
ENCL NO.: 5

ELEV (m) / DEPTH	SOIL PROFILE – DESCRIPTION
81.1	
81.0 / 0.1	**TOPSOIL:** 150mm
	FILL: silty sand and gravel, brown, moist, compact
80.3 / 0.8	**FILL:** silt to clayey silt, trace organics, trace gravel, grey, moist, compact
79.3 / 1.8	**CLAYEY SILT TILL:** sandy, trace gravel, trace cobble, brown, moist, very stiff
78.8 / 2.3	**SANDY SILT TO SILTY SAND:** trace clay, trace to some gravel, brown, moist to wet, very dense to compact
	grey and wet below 6.1 m
73.5 / 7.6	**SILTY SAND TILL:** trace clay, some gravel, occassional cobble/boulders, grey, wet, very dense

SAMPLE NUMBER	TYPE	"N" BLOWS / 0.3 m
1	SS	10
2	SS	12
3	SS	14
4	SS	29
5	SS	50/ 150mm
6	SS	50/ 50mm
7	SS	25
8	SS	78
9	SS	64

GROUND WATER CONDITIONS: W. L. 75.1 m during drilling

Column headings: STRATA PLOT; ELEVATION (81, 80, 79, 78, 77, 76, 74, 73, 72); DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100); SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE (20, 40, 60, 80, 100); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10, 20, 30); POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Depth scale: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-04

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-22-2018

REF. NO.: 18-519-10
ENCL NO.: 5

(m) ELEV DEPTH	SOIL PROFILE DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY SAND TILL: trace clay, some gravel, occassional cobble/boulders, grey, wet, very dense(Continued)					71				
		10	SS	hammer bounced		70				
		11	SS	50/ 125mm		69	~12			
67.4 / 13.7	**SAND:** trace silt, grey, wet, very dense	12	SS	62		67	~17			
	interbed of silt at 15.5 m	13	SS	53		65	~23			
		14	SS	80		64	~16			
62.9 / 18.2	**SILTY CLAY TILL:** some sand, trace gravel, grey, moist, hard	15	SS	56		62	~19	>225		

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-04

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-22-2018

REF. NO.: 18-519-10
ENCL NO.: 5

ELEV (m) / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLE NUMBER	SAMPLE TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) (○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT W_P / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY CLAY TILL: some sand, trace gravel, grey, moist, hard(Continued)		16	SS	42		61			>225		
60.7 20.4	**END OF BOREHOLE** Notes: 1) Water level at 6.0 mbgl during drilling											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-05

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-26-2018

REF. NO.: 18-519-10
ENCL NO.: 6

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	NATURAL MOISTURE CONTENT W (%) (approx.)
84.0					
83.9 / 0.1	**TOPSOIL:** 127mm				
	FILL: clayey silt, trace rootlet, trace organic, brown, moist, stiff to hard	1	SS	22	~6
		2	SS	11	~20
		3	SS	50	~11
81.7 / 2.3	**CLAYEY SILT TILL:** some sand, trace gravel, occassional cobble/boulder, brown to grey, moist, hard	4	SS	45	~8
		5	SS	69	~8
	grey below 4.9 m	6	SS	93	~7
		7	SS	58	~9
		8	SS	60	~8
		9	SS	39	~8

Column headings: SOIL PROFILE; STRATA PLOT; SAMPLES (NUMBER, TYPE, "N" BLOWS/0.3 m); GROUND WATER CONDITIONS; ELEVATION; DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE (20 40 60 80 100); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10 20 30); POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m³); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Elevation scale: 83, 82, 81, 80, 79, 78, 77, 76, 75. Depth scale: 1–10.

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-26-2018

REF. NO.: 18-519-10
ENCL NO.: 6

(m) ELEV / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS / 0.3 m	ELEVATION
	CLAYEY SILT TILL: some sand, trace gravel, occassional cobble/boulder, brown to grey, moist, hard(Continued)	10	SS	51	73
					72
71.8 / 12.2	**SILTY CLAY:** trace sand, grey, moist, hard to very stiff	11	SS	32	71
		12	SS	19	70
					69
68.8 / 15.2	**CLAYEY SILT:** trace sand, grey, moist, very stiff	13	SS	21	68
		14	SS	19	67
					66
65.7 / 18.3	**SILT:** trace clay, trace sand, grey, wet, compact	15	SS	26	65
64.5 / 19.5	**SANDY SILT TO SILTY SAND TILL :** interbed of wet sand, grey, wet, very dense				

Depth scale (m): 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Column headings: SOIL PROFILE; SAMPLES; STRATA PLOT; GROUND WATER CONDITIONS; ELEVATION; DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE (20 40 60 80 100); PLASTIC LIMIT w_P, NATURAL MOISTURE CONTENT w, LIQUID LIMIT w_L; WATER CONTENT (%) (10 20 30); POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-05

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-26-2018

REF. NO.: 18-519-10
ENCL NO.: 6

SOIL PROFILE (m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
			16	SS	66				○			
63.6 20.4	**END OF BOREHOLE** Notes: 1) Water level at 18.3 mbgl upon completion.											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3 , × 3 : Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-06

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-18-2018

REF. NO.: 18-519-10
ENCL NO.: 7

ELEV (m) / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)
82.8 / 0.0	**TOPSOIL:** 230 mm					
82.6 / 0.2	**FILL:** sand and gravel, brown, moist, compact	1	SS	13		
82.0 / 0.8	**FILL:** silty clay, trace gravel, brown, moist, compact	2	SS	13		
81.3 / 1.5	**CLAYEY SILT TILL:** some sand to sandy trace gravel, brown, moist, hard	3	SS	28		>225
		4	SS	44		>225
	grey below 3.1 m	5	SS	34		>225
		6	SS	40		>225
		7	SS	51		
		8	SS	54		>225
		9	SS	54		>225

Column headings: SOIL PROFILE; SAMPLES; GROUND WATER CONDITIONS; ELEVATION; DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE (20 40 60 80 100); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L, WATER CONTENT (%) (10 20 30); POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL; STRATA PLOT.

Elevation scale: 82, 81, 80, 79, 78, 77, 76, 75, 74, 73. Depth scale: 1–10.

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-18-2018

REF. NO.: 18-519-10
ENCL NO.: 7

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	CLAYEY SILT TILL: some sand to sandy trace gravel, brown, moist, hard(Continued)	10	SS	54	~11	>225	
		11	SS	64	~11	>225	
69.1 / 13.7	**SILTY CLAY:** trace sand, occasional sand seams, grey, moist, very stiff	12	SS	16	~30 (LL 48)	125	0 6 26 68
		13	SS	26	~18	200	
66.0 / 16.8	**CLAYEY SILT TO SILT :** some clay, trace sand, grey, moist, compact	14	SS	23	~24	200	
		15	SS	26	~31	>225	

Elevation scale: 72, 71, 70, 69, 68, 67, 66, 65, 64, 63. Depth scale: 11–20.

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L
NATURAL UNIT WT (kN/m^3)
METHANE AND GRAIN SIZE DISTRIBUTION (%)

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-18-2018

REF. NO.: 18-519-10
ENCL NO.: 7

ELEV (m) / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	Water Content (%)	Pocket Pen. (Cu) (kPa)
	CLAYEY SILT TO SILT : some clay, trace sand, grey, moist, compact(Continued)	16	SS	23	~31	200
		17	SS	28	~22	200
59.9 / 22.9	**SILT:**some clay, grey, very moist to wet, dense	18	SS	32	~20	
58.4 / 24.4	**SAND:**trace silt, some gravel to gravelly, grey, wet, very dense	19	SS	81	~22	
		20	SS	87	~11	
55.4 / 27.4	**SANDY SILT TO SILTY SAND:**trace clay, grey, wet, very dense	21	SS	58	~18	
54.8 / 28.0	**SILTY CLAY:**trace sand, trace gravel, grey, moist, hard	22	SS	81	~22	>225
52.8						

Elevation scale: 62, 61, 60, 59, 58, 57, 56, 55, 54, 53. Depth scale: 21–30.

Column headings: SOIL PROFILE; SAMPLES; STRATA PLOT; GROUND WATER CONDITIONS; ELEVATION; DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100; PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30; POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-18-2018

REF. NO.: 18-519-10
ENCL NO.: 7

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLE NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	Natural moisture content w (%)
30.0	**SILT:** some clay, trace sand, grey, wet, dense							
			23	SS	45		52	~15
51.8 / 31.0	**SAND:** trace silt, grey, wet, dense						51	
50.8 / 32.0	**SAND AND GRAVEL:** trace silt, occassional cobble/boulders, grey, wet, very dense		24	SS	80			~10
							50	
			25	SS	87		49	~6
							48	
			26	SS	50/ 125mm			~6
							47	
			27	SS	76		46	~16
							45	
			28	SS	50/ 150mm			~9
							44	
			29	SS	80		43	~9

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED; + FIELD VANE & Sensitivity; ● QUICK TRIAXIAL; × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L
WATER CONTENT (%): 10 20 30
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m^3)
METHANE AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

Depth scale: 31, 32, 33, 34, 35, 36, 37, 38, 39, 40

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-18-2018

REF. NO.: 18-519-10
ENCL NO.: 7

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	WATER CONTENT (%) (approx.)
	SAND AND GRAVEL: trace silt, occassional cobble/boulders, grey, wet, very dense(Continued)				
		30	SS	50/ 100mm	~10
		31	SS	50/ 125mm	~11
		32	SS	50/ 100mm	~11
		33	SS	50/ 100mm	~18
		34	SS	100/ 75mm	
34.7 / 48.1	**SHALE:** Georgian Bay Formation, weathered, grey	35	SS	100/ 50mm	~18
34.5 / 48.3	**END OF BOREHOLE:** Notes: 1) Water level at 16.8m during drilling.				

Column headings: SOIL PROFILE; SAMPLES; GROUND WATER CONDITIONS; ELEVATION; DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100; PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30; POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Elevation scale: 42, 41, 40, 39, 38, 37, 36, 35. Depth scale: 41, 42, 43, 44, 45, 46, 47, 48.

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-07

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-20-2018

REF. NO.: 18-519-10
ENCL NO.: 8

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	NATURAL MOISTURE CONTENT	POCKET PEN. (Cu) (kPa)
82.1							
0.0	**GRANULAR BASE:** 300mm						
81.8 / 0.3	**FILL:** sand, some gravel, grey, moist, compact	1	AS				
		2	SS	16		o	
81.0 / 1.1	**CLAYEY SILT TILL:** sandy, trace gravel, occasional cobble/boulder, brown to grey, moist, very stiff to hard	3	SS	33		o	>225
		4	SS	79		o	>225
	grey below 3.1 m	5	SS	59		o	>225
		6	SS	58		o	>225
		7	SS	51		o	>225
74.5 / 7.6	**SANDY SILT TILL:** some clay, some gravel, occasional cobble/boulder, grey, very moist to wet, very dense	8	SS	87	W. L. 74.5 m during drilling	o	
73.0 / 9.1	**SILT:** trace sand, grey, moist to very moist, compact	9	SS	29		o	

Column headings also printed: STRATA PLOT; ELEVATION (82, 81, 80, 79, 78, 77, 76, 75, 74, 73); DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; SHEAR STRENGTH (kPa) O UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100; PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L, WATER CONTENT (%) 10 20 30; NATURAL UNIT WT (kN/m³); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL.

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; O ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-20-2018

REF. NO.: 18-519-10
ENCL NO.: 8

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	POCKET PEN. (Cu) (kPa)	NATURAL MOISTURE CONTENT	GR	SA	SI	CL
	SILT: trace sand, grey, moist to very moist, compact(Continued)									
71.4 / 10.7	**SANDY SILT TO SILTY SAND:** trace gravel, grey, wet, very dense	10	SS	77		○				
70.0 / 12.1	**SILTY CLAY TILL:** sandy, trace gravel, occasional cobble/boulder, grey, moist, hard	11	SS	59	>225	○				
		12	SS	59	>225	○	2	27	48	23
66.9 / 15.2	**SANDY SILT TO SILTY SAND:** trace clay, grey, wet, very dense	13	SS	79		○				
65.3 / 16.8	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, occasional cobble/boulder, grey, moist, hard	14	SS	72	>225	○				
		15	SS	40	>225	○				
62.3 / 19.8										

Column headings: SOIL PROFILE; STRATA PLOT; SAMPLES; GROUND WATER CONDITIONS; ELEVATION (72, 71, 70, 69, 68, 67, 66, 65, 64, 63); DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100); SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE (20, 40, 60, 80, 100); PLASTIC LIMIT w_P, NATURAL MOISTURE CONTENT w, LIQUID LIMIT w_L; WATER CONTENT (%) (10, 20, 30); POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Depth scale (m): 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-20-2018

REF. NO.: 18-519-10
ENCL NO.: 8

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY CLAY: trace sand, grey, moist, hard(Continued)	16	SS	39		62	~22	200		
		17	SS	34			~27	175		
		18	SS	56			~20	>225		
		19	SS	52			~21	>225		
		20	SS	57			~19	>225		
		21	SS	50/ 25mm			~21	>225		
53.1 / 29.0	**SANDY SILT TILL:** trace to some clay, trace gravel, occasional cobble/boulder, grey, wet, very dense					53				

Depth scale (m): 21, 22, 23, 24, 25, 26, 27, 28, 29, 30
Elevation scale: 62, 61, 60, 59, 58, 57, 56, 55, 54, 53

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-20-2018

REF. NO.: 18-519-10
ENCL NO.: 8

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W_P / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SANDY SILT TILL: trace to some clay, trace gravel, occasional cobble/boulder, grey, wet, very dense(Continued)						52					
51.4			22	SS	50/ 100mm				○			
30.7	**END OF BOREHOLE** Notes: 1) Water level at 7.6m during drilling.											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: + 3, × 3: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-28-2018

REF. NO.: 18-519-10
ENCL NO.: 9

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS / ELEVATION	WATER CONTENT (%)	GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
81.6 / 0.0	**FILL:** sand and gravel, brown, wet, compact	1	SS	17			
80.8 / 0.8	**CLAYEY SILT :** trace sand, brown to grey, moist, very stiff to hard	2	SS	16			
		3	SS	20			
	grey below 2.3 m	4	SS	28	W. L. 78.8 m Sep 26, 2018		
		5	SS	32			
76.7 / 4.9	**SAND & SILT:** trace to some clay, grey, wet, compact to dense	6	SS	24			
		7	SS	46	Bentonite		0 43 47 10
74.0 / 7.6	**SANDY SILT:** trace clay, grey, wet, very dense	8	SS	66			0 31 62 7
72.5 / 9.1	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, occasional cobble/boulder, grey, moist, hard	9	SS	71			

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE — 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30
POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m^3) | METHANE AND GRAIN SIZE DISTRIBUTION (%)

Elevations: 81, 80, 79, 78, 77, 76, 75, 74, 73, 72

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-28-2018

REF. NO.: 18-519-10
ENCL NO.: 9

ELEV (m) / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	CLAYEY SILT TILL: some sand to sandy, trace gravel, occasional cobble/boulder, grey, moist, hard(Continued)					71			
70.9 / 10.7	**SILT TO CLAYEY SILT:** trace sand, grey, moist to very moist, dense	10	SS	34		70	○	175	
69.4 / 12.2	**SILTY SAND TILL:** trace clay, some gravel, grey, wet, very dense	11	SS	50/ 150mm	Filter pack	69	○		
68.1 / 13.5	**SAND:** trace silt, trace gravel, grey, wet, very dense	12	SS	74	Slotted Pipe	68, 67	○		8 88 (4)
66.4 / 15.2	**SANDY SILT TO SILTY SAND:** trace clay, grey, wet, very dense	13	SS	82		66, 65	○		
64.5 / 17.1	**SILTY CLAY:** trace sand, grey, moist, hard	14	SS	71	Bentonite	64	○		
		15	SS	50		63, 62	○	>225	

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE — 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30
NATURAL UNIT WT (kN/m^3)

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-28-2018

REF. NO.: 18-519-10
ENCL NO.: 9

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT W_P / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
61.2	**SILTY CLAY:** trace sand, grey, moist, hard(Continued)		16	SS	35				○	>225		
20.4	**END OF BOREHOLE** Notes: 1) Water level at 4.9 mbgl during drilling 2) Water level in the monitoring well recorded at 2.8m on Sept. 26, 2018.											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
$+^3, \times^3$: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-09

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jul-04-2018

REF. NO.: 18-519-10
ENCL NO.: 19

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	NATURAL MOISTURE CONTENT (approx. %)	POCKET PEN. (Cu) (kPa)	GR SA SI CL (%)
80.2 / 0.0	**FILL:** sandy silt, trace gravel, grey, moist	1	AS					
79.4 / 0.8	**FILL:** silty clay, trace organics, grey, moist, loose	2	SS	4				
78.7 / 1.5	**CLAYEY SILT:** trace sand, grey, moist, firm to very stiff	3	SS	6				
		4	SS	20			>225	
77.1 / 3.1	**SANDY SILT:** trace to some clay, grey, wet, compact	5	SS	22	W. L. 77.1 m during drilling			4 33 53 10
		6	SS	30				
74.1 / 6.1	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, hard	7	SS	75			>225	
72.6 / 7.6	**SILT TO SANDY SILT:** trace clay, grey, wet, very dense	8	SS	81				
		9	SS	50/ 125mm				

Plot legend: DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100); SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE (20, 40, 60, 80, 100); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10, 20, 30); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%).

Elevation scale: 80, 79, 78, 77, 76, 75, 74, 73, 72, 71

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-09

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jul-04-2018

REF. NO.: 18-519-10
ENCL NO.: 19

(m) ELEV DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	ELEVATION	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)
	SILT TO SANDY SILT: trace clay, grey, wet, very dense(Continued)				70		
69.5 / 10.7	**SILTY CLAY:** trace sand, trace gravel, grey, moist, hard	10	SS	32	69	~21	>225
		11	SS	53	68	~26	>225
66.5 / 13.7	**SILT:** trace to some clay, trace sand, grey, wet, dense	12	SS	34	66	~24	
65.0 / 65.9 / 15.3	**SHALE:** Georgian Bay Formation, weathered, grey	13	SS	50/ 100mm	65	~15	

END OF BOREHOLE
Notes:
1) Water level at 3.1 mbgl during drilling.

Column headings: SOIL PROFILE; SAMPLES; STRATA PLOT; GROUND WATER CONDITIONS; DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100; PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30; NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES + 3, × 3: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-25-2018

REF. NO.: 18-519-10
ENCL NO.: 11

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)
82.3							
0.0	**TOPSOIL:** 300 mm						
82.0 / 0.3	**FILL:** silty clay, trace topsoil, trace gravel, brown, wet, stiff	1	SS	14			
81.5 / 0.8	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, very stiff to hard	2	SS	19			200
		3	SS	50			>225
		4	SS	45			>225
		5	SS	30			>225
77.7 / 4.6	**CLAYEY SILT:** trace sand, grey, moist, very stiff	6	SS	20	W. L. 76.5 m during drilling		225
76.2 / 6.1	**SILT:** trace clay, trace to some sand, grey, wet, compact	7	SS	23			
74.7 / 7.6	**SANDY SILT TILL:** some clay, frequent seams of wet sand, trace gravel, occassional cobbe/boulders, grey, moist, very dense	8	SS	54			
		9	SS	73			

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED; + FIELD VANE & Sensitivity; ● QUICK TRIAXIAL; × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L
WATER CONTENT (%): 10 20 30
NATURAL UNIT WT (kN/m^3)
METHANE AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

ELEVATION: 82, 81, 80, 79, 78, 77, 76, 75, 74, 73

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-25-2018

REF. NO.: 18-519-10
ENCL NO.: 11

(m) ELEV / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%)
	SANDY SILT TILL: some clay, frequent seams of wet sand, trace gravel, occassional cobbe/boulders, grey, moist, very dense(Continued)					72	
		10	SS	50			o (~9)
						71	
70.1 / 12.2	**SILTY CLAY:** trace sand, grey, moist, very stiff					70	
		11	SS	27			
						69	
		12	SS	28		68	
						67	
		13	SS	30			
						66	
		14	SS	24		65	
64.0 / 18.3	**SAND AND GRAVEL:** trace silt, grey, saturated, very dense					64	
		15	SS	76			
						63	
62.3		16	SS	50/			

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE — 20 40 60 80 100
PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L; WATER CONTENT (%) 10 20 30
POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m^3) | METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Depth scale: 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-10

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-25-2018

REF. NO.: 18-519-10
ENCL NO.: 11

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L / WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS / 0.3 m							
20.0	**END OF BOREHOLE** Notes: 1) Water level at 5.8 mbgl during drilling				150mm							

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES + 3 , × 3 : Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-11

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-20-2018

REF. NO.: 18-519-10
ENCL NO.: 12

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	ELEVATION	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)
85.1							
84.9 / 0.0	**TOPSOIL:** 250 mm				85		
0.2	**FILL:** clayey silt, mixed with topsoil, trace gravel, grey, moist, compact	1	SS	18		○	
84.3 / 0.8	**FILL:**silty clay, trace to some organics, trace gravel, grey, moist, loose to compact	2	SS	20	84	○	
		3	SS	9	83	○	
		4	SS	7		○	
82.0 / 3.1	**CLAYEY SILT TILL:** sandy, trace gravel, greyish brown, moist, very stiff to hard	5	SS	22	82	○	>225
					81		
		6	SS	58	80	○	>225
		7	SS	34	79	○	>225
					78		
		8	SS	35	77	○	>225
		9	SS	39	76	○	

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-20-2018

REF. NO.: 18-519-10
ENCL NO.: 12

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	CLAYEY SILT TILL: sandy, trace gravel, greyish brown, moist, very stiff to hard(Continued)					75				
	wet sand seams below 10.7 m	10	SS	50		74	wet spoon			
		11	SS	41		73		>225		
71.4 / 13.7	**SILT CLAY:** trace sand/silt seams, grey, moist, stiff to very stiff	12	SS	14		71		125		
		13	SS	21		70		150		
		14	SS	19		68		150		
		15	SS	23		66		175		

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-11

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-20-2018

REF. NO.: 18-519-10
ENCL NO.: 12

(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT W_P / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILT CLAY: trace sand/silt seams, grey, moist, stiff to very stiff(Continued)		16	SS	16		65			150		
64.7 20.4	**END OF BOREHOLE** Notes: 1) Borehole dry upon completion											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES + 3, × 3: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-12

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-24-2018

REF. NO.: 18-519-10
ENCL NO.: 13

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	WATER CONTENT (%) (approx.)	POCKET PEN. (Cu) (kPa)
83.2							
83.0 / 0.0	**TOPSOIL:** 150 mm						
0.2	**FILL:** silty clay, mixed with topsoil/organics, trace gravel, brown to grey, moist, loose to compact	1	SS	23		10	
		2	SS	28		7	
		3	SS	6		24	
80.5 / 2.7	**CLAYEY SILT TILL:** sandy, trace gravel, occassional cobble/boulders, brown, moist, very stiff to hard	4	SS	7		14	
		5	SS	24		14	>225
		6	SS	50		7	>225
		7	SS	56	Bentonite	8	>225
		8	SS	60	W. L. 75.2 m Sep 26, 2018	7	>225
74.1 / 9.1	**CLAYEY SILT:** trace seams/partings of silt, grey, moist, very stiff	9	SS	23		17	

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE: 20 40 60 80 100
PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L
NATURAL UNIT WT (kN/m³)
METHANE AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-24-2018

REF. NO.: 18-519-10
ENCL NO.: 13

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	NATURAL MOISTURE CONTENT (%)	POCKET PEN. (Cu) (kPa)
	CLAYEY SILT: trace seams/partings of silt, grey, moist, very stiff(Continued)					73		
		10	SS	26		72	~19	
71.0 / 12.2	**SILT :** trace to some clay, trace sand, grey, very moist to wet, compact to dense	11	SS	18	Filter Pack	71, 70	~20	175
		12	SS	30	Slotted pipe	69	~21	
68.0 / 15.2	**CLAYEY SILT TO SILTY CLAY** :trace sand, grey, moist, very stiff to hard	13	SS	21		68, 67	~20	>225
		14	SS	42	Bentonite	66	~20	>225
64.9 / 18.3	**SILT TO CLAYEY SILT:** some clay, grey, moist, compact to dense	15	SS	29		65, 64	~20	

Depth scale (m): 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Column headings also printed: STRATA PLOT; DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE (20 40 60 80 100); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10 20 30); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-12

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-24-2018

REF. NO.: 18-519-10
ENCL NO.: 13

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
62.8	**SILT TO CLAYEY SILT:** some clay, grey, moist, compact to dense(Continued)		16	SS	34		63		o (~20)			
20.4	**END OF BOREHOLE:** Notes: 1) 50 mm dia monitoring well installed upon completion. 2) Water level in moniotring well at 8m on Sept. 26, 2018.											

Legend: SHEAR STRENGTH (kPa): ○ UNCONFINED; + FIELD VANE & Sensitivity; ● QUICK TRIAXIAL; × LAB VANE. PLASTIC LIMIT w_P, NATURAL MOISTURE CONTENT w, LIQUID LIMIT w_L.

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-16-2018

REF. NO.: 18-519-10
ENCL NO.: 14

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	NATURAL MOISTURE CONTENT	POCKET PEN. (Cu) (kPa)
80.2 / 0.0	**FILL:** sand & gravel, trace silt, grey, moist	1	AS			○	
79.4 / 0.8	**FILL:** silty clay, trace gravel, grey, moist, stiff	2	SS	8		○	
78.7 / 1.5	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, very stiff	3	SS	21		○	
77.9 / 2.3	**CLAYEY SILT TO SILT:** trace sand, grey, moist, very stiff	4	SS	18		○	200
		5	SS	17		○	200
75.6 / 4.6	**SANDY SILT TO SILTY SAND TILL :** trace clay, trace gravel, grey, wet, very dense	6	SS	64	W. L. 75.6 m during drilling	○	
74.1 / 6.1	**CLAYEY SILT TILL :**sandy, frequent sand seams, trace gravel, grey, moist, hard	7	SS	38		○	>225
72.6 / 7.6	**SANDY SILT:** trace to some clay, brownish grey, wet, dense	8	SS	49		○	
71.1 / 9.1	**SILTY CLAY:**frequent seams of silt, grey, moist, hard	9	SS	37		○	>225

Column headers also printed: SOIL PROFILE; SAMPLES; STRATA PLOT; ELEVATION; DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100; PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30; NATURAL UNIT WT (kN/m³); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Elevation scale: 80, 79, 78, 77, 76, 75, 74, 73, 72, 71

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-16-2018

REF. NO.: 18-519-10
ENCL NO.: 14

ELEV (m) / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLE NUMBER	SAMPLE TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT — WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY CLAY: frequent seams of silt, grey, moist, hard(Continued)						70					
69.5 / 10.7	**SILT TO CLAYEY SILT:** seams of sand, trace gravel, grey, moist, very dense		10	SS	70/ 279mm				o			
69.1 / 11.1	**END OF BOREHOLE:** Notes: 1) Borehole terminated due to eruption of gas with mud and water from hole. 2) Water level at 4.6 mbgl during drilling											

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED; + FIELD VANE & Sensitivity; ● QUICK TRIAXIAL; × LAB VANE — 20 40 60 80 100
w_P — w — w_L; WATER CONTENT (%) 10 20 30

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-14

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-11-2018

REF. NO.: 18-519-10
ENCL NO.: 15

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	Natural moisture content (circle plotted on the WATER CONTENT (%) scale)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
80.4 / 0.0	**FILL:** sand and gravel, trace rootlets, grey, moist	1	AS			○			
79.6 / 0.8	**FILL:** silty clay, trace gravel, pieces of wood, grey, moist, loose	2	SS	8		○			
78.9 / 1.5	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, very stiff	3	SS	29		○	>225		
78.1 / 2.3	**SHALE:** Georgian Bay Formation, weathered, grey	4	SS	50/ 50 mm		○			
77.2 / 3.2	**END OF BOREHOLE:** Notes: 1) Borehole dry and open upon completion.	5	SS	50/ 50 mm		○			

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE: 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L
WATER CONTENT (%): 10 20 30

ELEVATION: 80, 79, 78

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-15

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-11-2018

REF. NO.: 18-519-10
ENCL NO.: 16

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	POCKET PEN. (Cu) (kPa)	GR	SA	SI	CL
80.4 / 0.0	**FILL:** sand and gravel, trace rootlets, grey, moist	1	AS						
79.6 / 0.8	**FILL:** clayey silt, trace organics, grey, moist, compact	2	SS	18					
78.9 / 1.5	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, stiff	3	SS	9	125	9	33	42	16
78.1 / 2.3	**SILT:** trace to some clay, trace sand, brown, moist, compact	4	SS	22	>225				
77.3 / 3.1	**SILTY SAND:** some gravel, brown, moist, very dense	5	SS	50/ 100 mm					
76.6 / 3.8	**SILTY CLAY:** trace sand, grey, moist, hard to very stiff	6	SS	33	>225				
		7	SS	21	>225				
74.3 / 6.1	**SILT TO CLAYEY SILT:** trace sand, grey, moist, compact to very dense	8	SS	22	>225				
		9	SS	50/ 50 mm					
71.3 / 9.1	**SHALE:** Georgian Bay Formation, weathered, grey	10	SS	50/ 50 mm					
71.1 / 9.3	**END OF BOREHOLE**								

Notes:
1) Borehole dry and open upon completion.

Column headings: SOIL PROFILE; SAMPLES; GROUND WATER CONDITIONS; ELEVATION (80, 79, 78, 77, 76, 75, 74, 73, 72); DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100); SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE (20, 40, 60, 80, 100); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10, 20, 30); POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m³); METHANE AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-16

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-23-2018

REF. NO.: 18-519-10
ENCL NO.: 17

(m) ELEV / DEPTH	DESCRIPTION
82.9	
82.8 / 0.1	**TOPSOIL:** 100 mm
	FILL: clayey silt, mixed with topsoil, brown, moist, compact
80.6 / 2.3	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, very stiff to hard
	frequent wet sand seams
79.4 / 3.5	**SAND:** trace silt, brown, wet, compact
78.3 / 4.6	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, hard
75.3 / 7.6	**SANDY SILT TILL:** some clay, trace gravel, sand seams, grey, very moist to wet, dense
73.8 / 9.1	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, very stiff to hard

SAMPLE NUMBER	TYPE	"N" BLOWS / 0.3 m	POCKET PEN. (Cu) (kPa)
1	SS	19	
2	SS	10	
3	SS	15	
4	SS	21	>225
5	SS	28	
6	SS	30	
7	SS	36	>225
8	SS	38	
9	SS	30	>225

GROUND WATER CONDITIONS: Bentonite; W. L. 80.2 m Sep 26, 2018; Slotted Pipe

ELEVATION: 82, 81, 80, 79, 78, 77, 76, 75, 74, 73

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity; ● QUICK TRIAXIAL × LAB VANE: 20 40 60 80 100

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT W_L
WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m³) | METHANE AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-16

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-23-2018

REF. NO.: 18-519-10
ENCL NO.: 17

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	CLAYEY SILT TILL: sandy, trace gravel, grey, moist, very stiff to hard(Continued)								
		10	SS	33		72			
						71			
70.7 / 12.2	**CLAYEY SILT:** trace sand, occassional seams of silt, grey, moist, very stiff to hard	11	SS	21			>225		
						70			
		12	SS	29		69			
						68			
		13	SS	30		67			
	frequent seams of silt below 16.8 m	14	SS	28		66			
						65			
		15	SS	24		64			
						63			

Depth scale (m): 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): O UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE: 20 40 60 80 100
PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%): 10 20 30

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: + 3, × 3: Numbers refer to Sensitivity; O ε=3% Strain at Failure

LOG OF BOREHOLE BH18-16

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-23-2018

REF. NO.: 18-519-10
ENCL NO.: 17

SOIL PROFILE (m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
			16	SS	25							
62.5 20.4	**END OF BOREHOLE:** Notes: 1) Monitoring well was installed beside BH18-16. 2) Water level in the monitoring well at 2.7m on Sept. 26, 2018.											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-17

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-16-2018

REF. NO.: 18-519-10
ENCL NO.: 18

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	NATURAL MOISTURE CONTENT w (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
80.3										
80.2 / 0.1	**ASPHALT:** 100 mm									
80.0 / 0.3	**GRANULAR BASE:** 250 mm	1	AS			80	~18			
79.5 / 0.8	**FILL:** sandy silt, trace topsoil/organics, greyish brown, moist									
	FILL: silty clay, trace organics, trace gravel, grey, moist, loose	2	SS	7		79	~21			
78.8 / 1.5	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, very stiff to hard	3	SS	18			~21			
		4	SS	50/ 25mm		78	~21	>225		
		5	SS	82/ 280mm		77	~14			
		6	SS	26		76 / 75	~6			
74.2 / 6.1	**CLAYEY SILT:** sandy, grey, moist, hard	7	SS	34		74	~19			
		8	SS	36		73 / 72	~12	>225		
71.2 / 9.1	**SILT:** some clay, trace sand, grey, moist to wet, compact	9	SS	26		71	~9			

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE: 20 40 60 80 100
PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%): 10 20 30

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-17

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-16-2018

REF. NO.: 18-519-10
ENCL NO.: 18

(m) ELEV DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	Natural Moisture Content (%)
	SILT: some clay, trace sand, grey, moist to wet, compact(Continued)	10	SS	27	~11
68.1 / 12.2	**SILTY CLAY & SILT:** interbedded, trace sand, grey, moist, hard	11	SS	37	~7
		12	SS	45	~20
65.1 / 15.2	**SILT TO SANDY SILT:** trace clay, grey, wet, very dense	13	SS	53	~19
63.5 / 16.8	**SILTY CLAY:** trace sand, grey, moist, hard	14	SS	73	~19
62.0 / 18.3	**SILT:** trace to some clay, grey, wet, very dense	15	SS	70/ 280mm	~20
60.8 / 19.5	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, hard				

Column headings: SOIL PROFILE; SAMPLES; STRATA PLOT; GROUND WATER CONDITIONS; ELEVATION (70, 69, 68, 67, 66, 65, 64, 63, 62, 61); DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100; PLASTIC LIMIT w_P, NATURAL MOISTURE CONTENT w, LIQUID LIMIT w_L, WATER CONTENT (%) 10 20 30; POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Depth scale: 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-17

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-16-2018

REF. NO.: 18-519-10
ENCL NO.: 18

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) (○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
59.9	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, hard (Continued)		16	SS	50/ 50mm		60		○ (~10)			
20.4	**END OF BOREHOLE** Notes: 1) Water level at 9.1m during drilling.											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

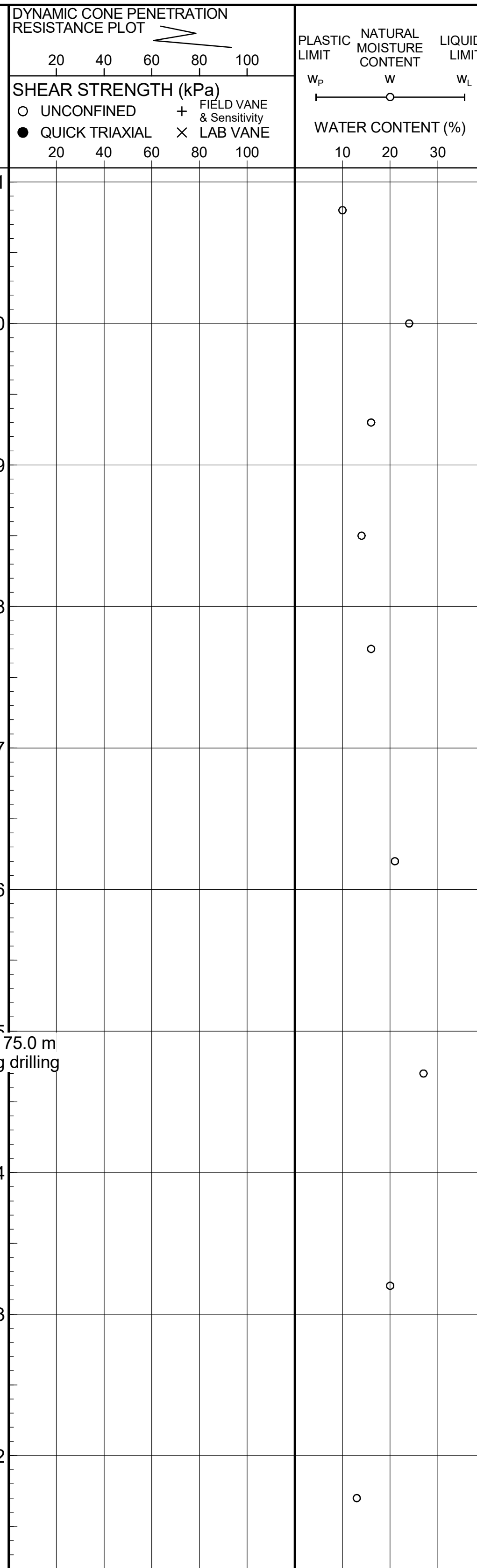
LOG OF BOREHOLE BH18-18

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-11-2018

REF. NO.: 18-519-10
ENCL NO.: 19

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	POCKET PEN. (Cu) (kPa)
81.1 / 0.0	**FILL:** sand and gravel, moist	1	AS			
80.3 / 0.8	**FILL:** clayey silt, trace to some organics, greyish brown, moist, loose	2	SS	9		
79.4 / 1.7	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, stiff to hard	3	SS	11		125
		4	SS	29		>225
		5	SS	33		>225
76.5 / 4.6	**SILTY CLAY:** seams of silt, trace sand, grey, moist, very stiff	6	SS	15		175
75.0 / 6.1	**SILT:** trace to some clay, grey, wet, compact	7	SS	19	W. L. 75.0 m during drilling	
		8	SS	25		
72.0 / 9.1	**SAND AND GRAVEL:** some silt, grey, wet, very dense	9	SS	86		



NATURAL UNIT WT (kN/m^3)
METHANE AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; O ε=3% Strain at Failure

LOG OF BOREHOLE BH18-18

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-11-2018

REF. NO.: 18-519-10
ENCL NO.: 19

(m) ELEV DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SAND AND GRAVEL: some silt, grey, wet, very dense(Continued)					71				
70.4 / 10.7	**SILT:** trace to some clay, trace sand, grey, wet, very dense	10	SS	76		70	~16			
68.9 / 12.2	**SILTY CLAY:** trace sand, grey, moist, hard	11	SS	51		69	~21	>225		
67.4 / 13.7	**SHALE:** Georgian Bay Formation, weathered, grey	12	SS	50/ 50 mm		68	~11			
67.1 / 14.0	**END OF BOREHOLE:** Notes: 1) Water level at 6.1m during drilling.									

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100
PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) 10 20 30

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-19

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-11-2018

REF. NO.: 18-519-10
ENCL NO.: 20

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)
80.7 / 0.0	**FILL:** sand and gravel, grey, moist	1	AS		~7	
79.9 / 0.8	**FILL:** silty clay, trace organics, trace gravel, greyish brown, moist, firm	2	SS	8	~18	
79.0 / 1.7	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, stiff to hard	3	SS	10	~22	125
		4	SS	26	~13	>225
		5	SS	32	~12	>225
76.2 / 4.5	**GEORGIAN BAY FORMATION:**	6	SS	50/100mm		
76.1 / 4.6	shale interbedded with limestone/siltstone layers, grey Total Core Recovery = 83% Solid Core Recovery = 29% RQD = 17% Hard Layer (Limestone/Siltstone)= less than 10% Maximum Thickness of Hard Layer = 50mm	1	RC			
75.5 / 5.2	Total Core Recovery = 85% Solid Core Recovery = 23% RQD = 18% Hard Layer (Limestone/Siltstone)= less than 10% Maximum Thickness of Hard Layer = 50mm	2	RC			
74.0 / 6.7	Total Core Recovery = 100% Solid Core Recovery = 28% RQD = 19% Hard Layer (Limestone/Siltstone)= less than 10% Maximum Thickness of Hard Layer = 50mm	3	RC			
72.5 / 8.2	Total Core Recovery = 100% Solid Core Recovery = 28% RQD = 28% Hard Layer (Limestone/Siltstone)= 32% Maximum Thickness of Hard Layer = 380mm	4	RC			
71.0 / 9.7						

Groundwater conditions: Bentonite; W. L. 76.0 m Sep 26, 2018; Filter Pack; Slotted Pipe

Column headings: SOIL PROFILE; STRATA PLOT; SAMPLES; GROUND WATER CONDITIONS; ELEVATION (80, 79, 78, 77, 76, 75, 74, 73, 72); DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100; PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30; NATURAL UNIT WT (kN/m³); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-19

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-11-2018

REF. NO.: 18-519-10
ENCL NO.: 20

(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L / WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
11 69.5	Total Core Recovery = 100% Solid Core Recovery = 40% RQD = 30% Hard Layer (Limestone/Siltstone)= 15% Maximum Thickness of Hard Layer = 125mm(Continued)		5	RC			70					
11.2	**END OF BOREHOLE:** Notes: 1) Monitoring well was installed in the borehole upon completion. 2) Water level in the monitoring well at 4.7m on Sept. 26, 2018.											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-20

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jun-26-2018

REF. NO.: 18-519-10
ENCL NO.: 21

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	POCKET PEN. (Cu) (kPa)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
80.3						
80.2 / 0.1	**ASPHALT:** 70mm					
	GRANULAR BASE: 300mm	1	AS			
79.9 / 0.4	**FILL:** clayey silt, some sand, trace gravel, greyish brown, moist					
79.5 / 0.8	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, hard	2	SS	33		
		3	SS	45		
		4	SS	83	>225	
77.2 / 3.1	**SAND:** trace silt, grey, wet, compact					
76.9 / 3.4	**SILTY CLAY :** trace sand, grey, moist, very stiff	5	SS	28		
75.7 / 4.6	**SILT TO CLAYEY SILT:** trace sand, occassional wet sand seams, grey, moist, hard	6	SS	52	>225	Wet Spoon
74.2 / 6.1	**SILT:** trace to some clay, some sand, grey, wet, dense to very dense	7	SS	57		
		8	SS	48		
71.2 / 9.1	**SILT TO CLAYEY SILT:** trace sand, grey, moist to very moist, hard	9	SS	39	>225	

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L
WATER CONTENT (%): 10 20 30
NATURAL UNIT WT (kN/m^3)

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-20

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jun-26-2018

REF. NO.: 18-519-10
ENCL NO.: 21

(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILT TO CLAYEY SILT: trace sand, grey, moist to very moist, hard(Continued)						70					
69.6 10.7	**SHALE:** Georgian Bay Formation, weathered, grey		10	SS	50/ 100mm				○			
69.4 10.9	**END OF BOREHOLE** Notes: 1) Water level at 3.1m during drilling.											

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES + 3, × 3: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-21

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jun-26-2018

REF. NO.: 18-519-10
ENCL NO.: 22

(m) ELEV / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%)
79.7							
0.0	**TOPSOIL:** 350mm						
79.4 / 0.3	**FILL:** silty clay mixed with topsoil, trace gravel, brown, moist, loose	1	SS	8			
79.0 / 0.7	**FILL:** sand and gravel mixed with weathered shale, brown, moist, compact	2	SS	23		79	
78.2 / 1.5	**SHALE:** Georgian Bay Formation, weathered, grey	3	SS	50/ 100mm		78	
77.3 / 2.4	**END OF BOREHOLE** Notes: 1) Borehole dry and open upon completion.	4	SS	50/ 100mm			

Column headings: SOIL PROFILE; SAMPLES; STRATA PLOT; DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100); SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE (20, 40, 60, 80, 100); PLASTIC LIMIT w_P, NATURAL MOISTURE CONTENT w, LIQUID LIMIT w_L; WATER CONTENT (%) (10, 20, 30); POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-25

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-10-2018

REF. NO.: 18-519-10
ENCL NO.: 23

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
77.5						
0.0	**FILL:** sand and gravel, cobbles	1	AS			
76.7 / 0.8	**FILL:** 19mm crusher run limestone, grey, wet, loose to compact	2	SS	6	W. L. 76.7 m during drilling	Wet spoon
		3	SS	10		
75.2 / 2.3	**SAND AND GRAVEL:** trace silt, grey, wet, very dense	4	SS	50/ 100mm		
		5	SS	50/ 100mm		
73.7 / 3.8	**SILTY CLAY :** trace to some sand, grey, moist, hard	6	SS	39		
73.3 / 4.2	**SHALE:** Georgian Bay Formation, weathered, grey					
73.1 / 4.4	**END OF BOREHOLE:** Notes: 1) Water level at 0.8m during drilling.					

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE: 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L
WATER CONTENT (%): 10 20 30
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m^3)
ELEVATION: 77, 76, 75, 74

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-27

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-10-2018

REF. NO.: 18-519-10
ENCL NO.: 27

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS
77.3					
0.0	**FILL:** sand and gravel, grey, moist, loose	1	AS		
		2	SS	7	
75.8 / 1.5	**FILL:** silty sand, trace gravel, brown, moist, compact	3	SS	11	
75.0 / 2.3	**SAND:** trace silt, brown, wet, very loose	4	SS	WH	W. L. 75.0 m during drilling
74.2 / 3.1	**SILTY CLAY:** trace sand, grey, moist, firm	5	SS	6	
73.5 / 3.8	**SHALE:** Georgian Bay Formation, weathered, grey	6	SS	50/ 100mm	
73.3 / 4.0	**END OF BOREHOLE:** Note: 1) Water level at 2.3 m during drilling				

ELEVATION: 77, 76, 75, 74

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE: 20 40 60 80 100

PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L

WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m^3)

METHANE AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

DS SOIL LOG 18-519-10 800 HYDRO ROAD.GPJ DS.GDT 18-10-12

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-28

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jun-26-2018

REF. NO.: 18-519-10
ENCL NO.: 25

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	Natural moisture content (%)
82.8						
82.7 / 0.1	**ASPHALTIC CONCRETE:** 70mm					
	GRANULAR BASE: 600mm	1	AS			~3
82.1 / 0.7	**FILL:** clayey silt mixed with sand and gravel, brown, moist, very stiff to firm	2	SS	17		~13
	grey and wet below 1.5 m	3	SS	15	W. L. 81.3 m during drilling	~14
	fragments of Concrete	4	SS	6		~13
79.7 / 3.1	**SAND AND GRAVEL:** cobbles, brown, wet, very dense	5	SS	57		~11
79.5 / 3.3	**END OF BOREHOLE**					

Notes:
1) Auger refusal at 3.3m on possible shale bedrock.

Column headings: SOIL PROFILE; SAMPLES; GROUND WATER CONDITIONS; ELEVATION; DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE (20 40 60 80 100); PLASTIC LIMIT w_P, NATURAL MOISTURE CONTENT w, LIQUID LIMIT w_L; WATER CONTENT (%) (10 20 30); POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Elevation scale: 82, 81, 80

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-29

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger/Rock Coring
Diameter: 200 mm
Date: Jul-09-2018

REF. NO.: 18-519-10
ENCL NO.: 24

(m) ELEV DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	NATURAL MOISTURE CONTENT (%)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
77.5								
0.0	**FILL:** sand and gravel, brown, moist	1	AS			77	~7	
76.8 / 0.7	**FILL:** clayey silt, some sand and gravel, greyish brown, moist, compact	2	SS	17			~10	
76.0 / 1.5	**CLAYEY SILT TILL:** sandy, trace gravel, greyish brown to grey, moist, stiff to very stiff	3	SS	12		76	~13	
	grey below 2.3 m	4	SS	8		75	~11	
		5	SS	8		74	~16	
		6	AS			73	~12	
		7	SS	21	Bentonite		~3	
						72		July 09, 2018
71.2 / 6.3	**GEORGIAN BAY FORMATION:**	8	SS	69			~8	
71.0 / 6.5	shale interbedded with limestone/siltstone layers, grey					71		July 10, 2018
	SHALE BEDROCK: Total Core Recovery = 96% Solid Core Recovery = 70% RQD = 37% Hard Layer (Limestone/Siltstone)= 27% Maximum Thickness of Hard Layer = 270mm	RUN 1	RC			70		
69.5 / 8.0	**SHALE BEDROCK:** Total Core Recovery = 100% Solid Core Recovery = 77% RQD = 77% Hard Layer (Limestone/Siltstone)= 27% Maximum Thickness of Hard Layer = 230mm	RUN 2	RC			69		
68.0 / 9.5						68		

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: + 3, × 3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100
SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100
PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L
WATER CONTENT (%) 10 20 30
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m^3)

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger/Rock Coring
Diameter: 200 mm
Date: Jul-09-2018

REF. NO.: 18-519-10
ENCL NO.: 24

(m) ELEV DEPTH	DESCRIPTION	SAMPLES NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION
	SHALE BEDROCK: Total Core Recovery = 100%, Solid Core Recovery = 93%, RQD = 93%, Hard Layer (Limestone/Siltstone)= less than 10%, Maximum Thickness of Hard Layer = 50mm(Continued)	RUN 3	RC		Filter Pack	
66.6 / 10.9	**SHALE BEDROCK:** Total Core Recovery = 100%, Solid Core Recovery = 98%, RQD = 98%, Hard Layer (Limestone/Siltstone)= less than 10%, Maximum Thickness of Hard Layer = 100mm	RUN 4	RC			66
65.2 / 12.3	**SHALE BEDROCK:** Total Core Recovery = 100%, Solid Core Recovery = 97%, RQD = 97%, Hard Layer (Limestone/Siltstone)= less than 10%, Maximum Thickness of Hard Layer = 100mm	RUN 5	RC		Slotted Pipe	65, 64
63.6 / 13.9	**END OF BOREHOLE**					

Notes:
1) Monitoring well was installed in the borehole upon completion.
2) Monitoring well was not accessible on Sept. 26, 2018. Area is covered with a stock-pile.

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE: 20 40 60 80 100
PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%): 10 20 30
POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m^3) | METHANE AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-30

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jun-26-2018

REF. NO.: 18-519-10
ENCL NO.: 26

(m) ELEV / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%)
77.2 / 77.0 / 0.1	**ASPHALTIC CONCRETE:** 70mm						
	GRANULAR BASE: 300mm	1	AS			77	
76.8 / 0.4	**SILTY CLAY:** trace sand, shale fragments, grey, moist, hard	2	SS	21		76	○
75.7 / 1.5 / 75.5 / 1.7	**SHALE:** Georgian Bay Formation, weathered, grey	3	SS	50/ 75mm			○
	END OF BOREHOLE Notes: 1) Borehole dry and open upon completion.						

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30
POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m^3) | METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

DS SOIL LOG 18-519-10 800 HYDRO ROAD.GPJ DS.GDT 18-10-12

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-31

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200 mm
Date: Jul-17-2018

REF. NO.: 18-519-10
ENCL NO.: 28

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION
77.3						
0.0	**FILL:** silty sand and gravel, grey, moist	1	AS			77
76.5 / 0.8	**FILL:** silty clay, trace gravel, trace organics, grey, moist to wet, stiff to firm	2	SS	15		76
		3	SS	7		
		4	SS	5	▽ W. L. 75.0 m during drilling	75
		5	SS	5		74
73.5 / 3.8	**SHALE:** Georgian Bay Formation, weathered, grey	6	SS	50/ 125mm		
73.2 / 4.1	**END OF BOREHOLE:** Notes: 1) Water level at 2.3 m during drilling					

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED; + FIELD VANE & Sensitivity; ● QUICK TRIAXIAL; × LAB VANE — 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m^3)
METHANE AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-32

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger/Rock Coring
Diameter: 200 mm
Date: Jul-06-2018

REF. NO.: 18-519-10
ENCL NO.: 29

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	Natural moisture content (approx. %)	METHANE AND GRAIN SIZE DISTRIBUTION (%)
77.2 / 0.0	**FILL:** sand and gravel, brown	1	AS			~8	
76.4 / 0.8	**FILL:** 19mm crusher run limestone, brick/concrete fragments, grey, wet, compact	2	SS	22		~7	
75.7 / 1.5	**FILL:**sandy silt mixed with gravel, trace clay, grey, wet, very dense	3	AS	50/ 25mm		~17	
74.9 / 2.3	**SAND AND GRAVEL:** grey, wet, very loose	4	SS	2	W. L. 74.9 m Sep 26, 2018	~17	
		5	SS	2	Bentonite		July 06, 2018
	cobbles below 4 m	6	SS	50/ 50mm		~12	------------------
72.9 / 4.3	**GEORGIAN BAY FORMATION:** shale interbedded with limestone/siltstone layers, grey Total Core Recovery = 67% Solid Core Recovery = 33% RQD = 33%	RUN 1	RC				July 09, 2018
72.2 / 5.0	Hard Layer (Limestone/Siltstone)=15% Maximum Thickness of Hard Layer = 140mm Total Core Recovery = 100% Solid Core Recovery = 84% RQD = 73% Hard Layer (Limestone/Siltstone)= 15%	RUN 2	RC				
70.8 / 6.4	Maximum Thickness of Hard Layer = 140mm Total Core Recovery = 100% Solid Core Recovery = 94% RQD = 94% Hard Layer (Limestone/Siltstone)= less than 10% Maximum Thickness of Hard Layer = 50mm	RUN 3	RC		Filter Pack		
69.2 / 8.0	Total Core Recovery = 100% Solid Core Recovery = 93% RQD = 93% Hard Layer (Limestone/Siltstone)= less than 10% Maximum Thickness of Hard Layer = 50mm	RUN 4	RC		Slotted Pipe		
67.8 / 9.4							

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-32

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger/Rock Coring
Diameter: 200 mm
Date: Jul-06-2018

REF. NO.: 18-519-10
ENCL NO.: 29

(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	Total Core Recovery = 100% Solid Core Recovery = 93% RQD = 93% Hard Layer (Limestone/Siltstone)= 15% Maximum Thickness of Hard Layer = 100mm(Continued)		RUN 5	RC			67					
66.3 10.9	**END OF BOREHOLE:** Notes: 1) Monitoring well was installed in the borehole upon completion. 2) Water level in the monitoring well at 2.3m on Sept. 26, 2018.											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
$+^3, \times^3$: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-33

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jul-04-2018

REF. NO.: 18-519-10
ENCL NO.: 30

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	NATURAL MOISTURE CONTENT (W, %)	PLASTIC/LIQUID LIMIT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
79.5											
0.0	**TOPSOIL:** 300mm	1	SS	52			○				
79.2 / 0.3	**FILL:** silty clay, trace sand, grey, moist, compact					79					
78.4 / 1.1	**SILTY CLAY TILL:** sandy, trace gravel, occasional cobble/boulder, brown, moist, stiff to hard	2	SS	14			○		125		
						78					
		3	SS	33			○	├──┤	>225		2 23 46 29
		4	SS	55		77	○		>225		
		5	SS	62		76	○				
75.7 / 3.8	**SHALE:** Georgian Bay Formation, weathered, grey	6	SS	50/ 100mm							
75.5 / 4.0	**END OF BOREHOLE**										

Notes:
1) Borehole dry and open upon completion.

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE; 20 40 60 80 100
WATER CONTENT (%): 10 20 30
METHANE AND GRAIN SIZE DISTRIBUTION (%)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-34

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PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jul-04-2018

REF. NO.: 18-519-10
ENCL NO.: 31

(m) ELEV / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	NATURAL MOISTURE CONTENT	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
80.1										
79.9 / 0.0	**TOPSOIL:** 200mm					80				
0.2	**FILL:** silty clay, trace gravel, dark grey, moist, loose	1	SS	8			o			
79.3 / 0.8	**CLAYEY SILT TILL:** trace gravel, brown, moist, very stiff to hard	2	SS	27		79	o	>225		
		3	SS	31			o	>225		
						78				
		4	SS	72			o			
77.0 / 3.1	**SHALE:** Georgian Bay Formation, weathered, grey	5	SS	50/100mm		77				
76.8 / 3.3	**END OF BOREHOLE** Notes: 1) Borehole dry and open upon completion.									

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-35

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-27-2018

REF. NO.: 18-519-10
ENCL NO.: 32

(m) ELEV / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS / 0.3 m	WATER CONTENT (%)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
77.9						
77.8 / 0.1	**TOPSOIL :**125 mm					
	FILL : clayey silt, trace gravel, trace cobbles, brown to grey, moist, loose to compact	1	SS	11		
		2	SS	20		
		3	SS	13		
		4	SS	10		
		5	SS	5		
73.7 / 4.2						
73.6 / 4.3	**SHALE:** Georgian Bay Formation, weathered, grey					Wet spoon
	END OF BOREHOLE: Notes: 1) Water level at 4.1 m upon completion of borehole.					

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L
WATER CONTENT (%): 10 20 30
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m^3)
GROUND WATER CONDITIONS
ELEVATION: 77, 76, 75, 74

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-36

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-27-2018

REF. NO.: 18-519-10
ENCL NO.: 33

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	WATER CONTENT (%)	GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
80.3						
80.2 / 0.0	**TOPSOIL :**150 mm					
0.2	**FILL:** clayey silt, trace asphalt/concrete fragments, trace organics, grey to dark grey, moist, compact	1	SS	18		
		2	SS	12		
78.8 / 1.5	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, very stiff	3	SS	25		
78.0 / 2.3	**SILTY CLAY:**some sand, brown, moist, hard	4	SS	44		0 11 57 32
		5	SS	50/ 100mm		
75.7 / 4.6	**SHALE:** Georgian Bay Formation, weathered, grey	6	SS	50/ 75mm		
75.5 / 4.8	**END OF BOREHOLE:** Notes: 1) Borehole dry and open upon completion.					

Column headings: SOIL PROFILE; SAMPLES; GROUND WATER CONDITIONS; ELEVATION (80, 79, 78, 77, 76); DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100; PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30; POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-37

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger/Rock Coring
Diameter: 150mm
Date: Jun-27-2018

REF. NO.: 18-519-10
ENCL NO.: 34

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
81.3								
81.1 / 0.0	**TOPSOIL:** 230mm							
0.2	**FILL:** clayey silt, trace gravel, trace organics, brown, very moist, compact	1	SS	15		81		
80.6 / 0.7	**FILL:** sandy gravel/cobbles, grey, moist, compact	2	SS	19		80		
79.8 / 1.5	**CLAYEY SILT:** trace sand, trace gravel, brown, moist, hard	3	SS	44	W. L. 79.3 m Sep 26, 2018	79		
		4	SS	50/ 125mm				June 27, 2018
78.2 / 3.1	**GEORGIAN BAY FORMATION:** shale interbedded with limestone/siltstone layers, grey Bedrock coring started at 3.8 m	5	SS	50/ 75mm	Bentonite	78		July 30, 2018
77.5 / 3.8	Total Core Recovery = 62% Solid Core Recovery = 0% RQD = 0% Hard Layer (Limestone/Siltstone)= less than 5% Maximum Thickness of Hard Layer = 50mm	RUN 1	RC			77		
76.4 / 4.9	Total Core Recovery = 90% Solid Core Recovery = 68% RQD = 68% Hard Layer (Limestone/Siltstone)= less than 10% Maximum Thickness of Hard Layer = 50mm	RUN 2	RC			76		
74.9 / 6.4	Total Core Recovery = 100% Solid Core Recovery = 61% RQD = 56% Hard Layer (Limestone/Siltstone)= less than 10% Maximum Thickness of Hard Layer = 50mm	RUN 3	RC		Filter Pack	75, 74		
73.3 / 8.0	Total Core Recovery = 100% Solid Core Recovery = 94% RQD = 94% Hard Layer (Limestone/Siltstone)= less than 10% Maximum Thickness of Hard Layer = 100mm	RUN 4	RC		Slotted Pipe	73, 72		
71.7 / 9.6								

Column headings also include: DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE (20 40 60 80 100); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30; POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m³); STRATA PLOT.

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-37

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger/Rock Coring
Diameter: 150mm
Date: Jun-27-2018

REF. NO.: 18-519-10
ENCL NO.: 34

SOIL PROFILE (m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L / WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
70.4	Total Core Recovery = 100% Solid Core Recovery = 88% RQD = 88% Hard Layer (Limestone/Siltstone)= less than 10% Maximum Thickness of Hard Layer = 100mm(Continued)		RUN 5	RC			71					
10.9	**END OF BOREHOLE** Notes: 1) Monitoring well was installed in the borehole upon completion. 2) Water level in the monitoring well at 2.0m on Sept. 26, 2018.											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-38

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-27-2018

REF. NO.: 18-519-10
ENCL NO.: 35

(m) ELEV DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	ELEVATION	NATURAL MOISTURE CONTENT (approx. %)
80.3 / 0.0	**TOPSOIL:** 230mm					
80.1 / 0.2	**FILL:** clayey silt, trace gravel, trace cobbles, asphalt fragments, dark brown to dark grey, very moist, compact	1	SS	11	80	~19
		2	SS	16	79	~17
78.5 / 1.8	**CLAYEY SILT TILL:** sandy, trace gravel, occasional cobble/boulder, brown, moist, stiff to hard	3	SS	14	78	~21
		4	SS	58	77	~16
		5	SS	50/100mm	76	~9
75.7 / 4.6	**SHALE:** Georgian Bay Formation, weathered, grey	6	SS	50/50mm		
75.5 / 4.8	**END OF BOREHOLE**					

Notes:
1) Borehole dry and open upon completion.

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED; + FIELD VANE & Sensitivity; ● QUICK TRIAXIAL; × LAB VANE — 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30
POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m^3) | METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-39

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-21-2018

REF. NO.: 18-519-10
ENCL NO.: 36

ELEV (m) / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
81.8							
0.0	**TOPSOIL:** 250mm						
81.6 / 0.3	**FILL:** sandy silt mixed with topsoil, brown, moist, compact	1	SS	14			
81.0 / 0.8	**FILL:** silt to clayey silt, trace gravel, trace topsoil/organics, grey, moist, compact	2	SS	12			
		3	SS	19			
		4	SS	13			
78.7 / 3.1	**SANDY SILT TILL :** trace to some clay, trace gravel, grey, moist, very dense	5	SS	50/ 125mm			
77.2 / 4.6	**SILTY CLAY TILL:** sandy, trace gravel, grey, moist, hard	6	SS	65		>225	Mud Rotary Drilling
		7	SS	64		>225	
		8	SS	38		>225	
72.7 / 9.1	**SILT :** some clay, trace gravel, grey, wet, dense	9	SS	36			

Column headings: SOIL PROFILE; STRATA PLOT; SAMPLES; GROUND WATER CONDITIONS; ELEVATION (81, 80, 79, 78, 77, 76, 75, 74, 73, 72); DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100; PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30; NATURAL UNIT WT (kN/m^3)

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-39

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-21-2018

REF. NO.: 18-519-10
ENCL NO.: 36

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	NATURAL MOISTURE CONTENT (W)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILT : some clay, trace gravel, grey, wet, dense(Continued)									
71.1 / 10.7	**SILTY SAND TILL:** trace clay, trace gravel, grey, wet, very dense	10	SS	75		71	~8			
						70				
69.6 / 12.2	**SILTY CLAY TILL:** sandy, trace gravel, grey, moist, hard	11	SS	40			~24	>225		
						69				
	seams of sand at 13.7 m	12	SS	50/ 150mm		68	~21	>225		
						67				
66.6 / 15.2	**SILT:**trace clay, trace sand, grey, wet, dense	13	SS	44			~18			
						66				
65.0 / 16.8	**SILTY CLAY TILL:** sandy, seams of sand, trace gravel, grey, moist, hard	14	SS	84		65	~12	>225		
						64				
63.5 / 18.3	**SILTY CLAY:**trace sand, grey, moist, hard	15	SS	64		63	~21	>225		
						62				

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-39

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-21-2018

REF. NO.: 18-519-10
ENCL NO.: 36

(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L / WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
61.4	**SILTY CLAY:** trace sand, grey, moist, hard(Continued)		16	SS	52				○ (~20)	>225		
20.4	**END OF BOREHOLE:** Notes: 1) Water level at 9 mbgl during drilling											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-40

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-25-2018

REF. NO.: 18-519-10
ENCL NO.: 37

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
81.8 / 0.0	**TOPSOIL:** 200mm								
81.6 / 0.2	**FILL:** clayey silt, trace topsoil/organics, shale fragments, dark brown, moist, compact	1	SS	16					
		2	SS	12		81			
80.3 / 1.5	**CLAYEY SILT TILL :** sandy, trace gravel, brown, moist, stiff	3	SS	10		80		125	
79.5 / 2.3	**SANDY SILT TO SILTY SAND:** trace clay, brown, wet, very dense	4	SS	50/ 100mm	W. L. 79.5 m during drilling	79			
78.7 / 3.1	**SAND AND GRAVEL:** trace silt, grey, wet, very dense	5	SS	52		78			Wet Spoon
77.2 / 4.6	**SILTY CLAY TILL :** sandy, trace gravel, grey, moist, hard	6	SS	34		77, 76			
75.7 / 6.1	**SANDY SILT :** trace clay, grey, wet, very dense	7	SS	58		75			0 23 70 7
74.2 / 7.6	**SILTY CLAY TILL :** sandy, trace gravel, grey, moist, hard	8	SS	44		74, 73		>225	
	interbed of sand at 9.1 m	9	SS	66		72		>225	

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100
SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100
PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L WATER CONTENT (%) 10 20 30
NATURAL UNIT WT (kN/m^3)

LOG OF BOREHOLE BH18-40

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-25-2018

REF. NO.: 18-519-10
ENCL NO.: 37

(m) ELEV DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%) (w)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY CLAY TILL : sandy, trace gravel, grey, moist, hard(Continued)									
		10	SS	90		71	~10	>225		
		11	SS	73		70–69	~10	>225		
		12	SS	23		68	~33	175		
		13	SS	31		66	~23	>225		
		14	SS	30		65	~23	175		
		15	SS	30		63	~19	>225		
62.0 19.8						62				

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-40

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-25-2018

REF. NO.: 18-519-10
ENCL NO.: 37

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W_P / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY CLAY: trace sand, grey, moist, very stiff(Continued)		16	SS	26				○ (≈30)	200		
61.4 20.4	**END OF BOREHOLE** Notes: 1) Water level at 2.3 mbgl during drilling											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-41

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Jul-26-2018

REF. NO.: 18-519-10
ENCL NO.: 38

ELEV (m) / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	WATER CONTENT (%)
83.3					
83.1 / 0.0	**TOPSOIL:** 152mm				
0.2	**FILL:** clayey silt, trace rootlet, trace asphalt, brown, moist, stiff	1	SS	12	~12
		2	SS	12	~14
81.8 / 1.5	**SILT :** some sand, trace clay, brown, wet, loose	3	SS	5	~23
81.0 / 2.3	**CLAYEY SILT TILL :** some sand, trace gravel, trace cobble, brown to grey, moist, very stiff to hard	4	SS	18	~14
		5	SS	50/127mm	~10
78.7 / 4.6	**SILT :** some sand, trace clay, grey, very moist to wet, dense	6	SS	32	~14
77.2 / 6.1	**CLAYEY SILT TILL :** some sand, trace gravel, trace cobble, grey, moist, hard	7	SS	50/127mm	~5
75.7 / 7.6	**SHALE:** Georgian Bay Formation, weathered, grey	8	SS	50/100mm	
75.5 / 7.8	**END OF BOREHOLE** Notes: 1) Borehole open and dry upon completion				

Column headings: SOIL PROFILE; SAMPLES; STRATA PLOT; GROUND WATER CONDITIONS; ELEVATION (83, 82, 81, 80, 79, 78, 77, 76); DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100); SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE (20, 40, 60, 80, 100); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10, 20, 30); POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-42

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-29-2018

REF. NO.: 18-519-10
ENCL NO.: 39

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)
85.7						
0.0	**TOPSOIL:** 350 mm					
85.4 / 0.3	**FILL:** silty sand, trace topsoil/rootlets, some gravel, brown, moist, compact	1	SS	10		
84.9 / 0.8	**FILL:**sandy silt, trace clay, brown, wet, loose	2	SS	4		
84.2 / 1.5	**FILL:** clayey silt, trace organics, grey, moist, stiff	3	SS	9		
		4	SS	11		
82.3 / 3.4	**SANDY SILT:** trace clay, brown, moist, compact	5	SS	10		
81.1 / 4.6	**CLAYEY SILT TILL:** trace gravel, brown, moist, hard	6	SS	50/ 150mm		>225
79.6 / 6.1	**SHALE:** Georgian Bay Formation, weathered, grey	7	SS	50/ 100mm		
79.4 / 6.3	**END OF BOREHOLE**					

Notes:
1) Borehole dry and open upon completion.

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L
WATER CONTENT (%): 10 20 30
NATURAL UNIT WT (kN/m^3)
METHANE AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL
ELEVATION: 85, 84, 83, 82, 81, 80

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-43

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-29-2018

REF. NO.: 18-519-10
ENCL NO.: 40

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
83.5										
0.0	**TOPSOIL:** 350mm									
83.2 / 0.3	**FILL:** clayey silt, brown, moist, stiff	1	SS	10		83	○			
82.7 / 0.8	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, very stiff to hard	2	SS	24		82	○			
		3	SS	28			○	>225		
	grey below 2.3 m	4	SS	33		81	○			
80.4 / 3.1	**SHALE:** Georgian Bay Formation, weathered, grey	5	SS	50/ 125mm			○			
80.1 / 3.4	**END OF BOREHOLE** Notes: 1) Borehole open and dry upon completion									

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L; WATER CONTENT (%) 10 20 30

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-44

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-29-2018

REF. NO.: 18-519-10
ENCL NO.: 41

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	ELEVATION	WATER CONTENT (%)
83.9						
0.0	**TOPSOIL:** 350mm					
83.6 / 0.3	**FILL:** clayey silt, trace organics, brown, moist, firm	1	SS	7		○
83.1 / 0.8	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, stiff to hard	2	SS	14	83	○
		3	SS	23	82	○
	trace shale fragments below 2.6 m	4	SS	35	81	○
		5	SS	43		○
80.1 / 3.8	**SHALE:** Georgian Bay Formation, weathered, grey	6	SS	50/100mm	80	○
79.9 / 4.0	**END OF BOREHOLE** Notes: 1) Borehole open and dry upon completion					

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30
GROUND WATER CONDITIONS | POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m^3) | METHANE AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-45

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-29-2018

REF. NO.: 18-519-10
ENCL NO.: 42

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	ELEVATION	POCKET PEN. (Cu) (kPa)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
83.0 / 0.0	**TOPSOIL:** 400mm	1	SS	14			
82.6 / 0.4	**FILL:** sand and gravel, trace concrete/ brick pieces, brown, moist, compact	2	SS	17	82		
81.5 / 1.5	**SILT TO CLAYEY SILT:** brown, moist, stiff	3	SS	13	81	>225	
80.7 / 2.3	**SILTY CLAY TILL:** trace gravel, grey, moist, very stiff to hard	4	SS	25	80		
		5	SS	50/ 100mm			June 29, 2018
79.2 / 3.8	**GEORGIAN BAY FORMATION:** shale interbedded with limestone/siltstone layers, grey	6	SS	50/ 50mm	79		------------------ July 27, 2018
78.7 / 4.3	Bedrock Coring started at 4.3 m **SHALE BEDROCK:** Total Core Recovery = 83% Solid Core Recovery = 75% RQD = 50%	RUN 1	RC				
78.1 / 4.9	Hard Layer (Limestone/Siltstone)= less than 10% Maximum Thickness of Hard Layer = 50mm Total Core Recovery = 100% Solid Core Recovery = 93% RQD = 65% Hard Layer (Limestone/Siltstone)= less than 10% Maximum Thickness of Hard Layer = 75mm	RUN 2	RC		78, 77		
76.6 / 6.4	**SHALE BEDROCK:** Total Core Recovery = 100% Solid Core Recovery = 57% RQD = 72% Hard Layer (Limestone/Siltstone)= less than 10% Maximum Thickness of Hard Layer = 75mm	RUN 3	RC		76		
75.1 / 7.9	**END OF BOREHOLE**						

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%): 10 20 30
NATURAL UNIT WT (kN/m^3)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-46

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-17-2018

REF. NO.: 18-519-10
ENCL NO.: 43

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	POCKET PEN. (Cu) (kPa)
81.4						
0.0	**FILl:** sand and gravel, grey, moist	1	AS			
80.6 / 0.8	**SILTY CLAY TILL :** sandy, trace gravel, brown, moist, hard to very stiff	2	SS	16		
		3	SS	48		>225
	grey below 2.3 m	4	SS	33		>225
		5	SS	36		>225
		6	SS	24		200
		7	SS	22		200
73.8 / 7.6	**SANDY SILT :** trace to some clay, grey, wet, compact to very dense	8	SS	24	W. L. 73.8 m during drilling	
		9	SS	94		

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-17-2018

REF. NO.: 18-519-10
ENCL NO.: 43

(m) ELEV / DEPTH	SOIL PROFILE DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%) (W)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SANDY SILT : trace to some clay, grey, wet, compact to very dense(Continued)						71				
70.7 / 10.7	**SILT TO SANDY SILT:** trace to some clay, grey, moist to very moist, very dense		10	SS	50			~11			
							70				
			11	SS	50/ 127mm		69	~16			
							68				
67.7 / 13.7	**CLAYEY SILT:** trace sand, grey, moist, hard		12	SS	77			~16	>225		
							67				
			13	SS	36		66	~20			
							65				
			14	SS	31			~24	>225		
							64				
			15	SS	51		63	~21			
							62				
61.6 / 19.8											

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE: 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30

Depth scale (m): 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-46

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-17-2018

REF. NO.: 18-519-10
ENCL NO.: 43

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W_P / NATURAL MOISTURE CONTENT W / LIQUID LIMIT W_L — WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILT : some clay, grey, wet, very dense(Continued)		16	SS	62				○ (~20)			
61.0 20.4	**END OF BOREHOLE:** Notes: 1) Water level at 7.6 mbgl during drilling						61					

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES + 3 , × 3 : Numbers refer to Sensitivity ○ ε=3% Strain at Failure

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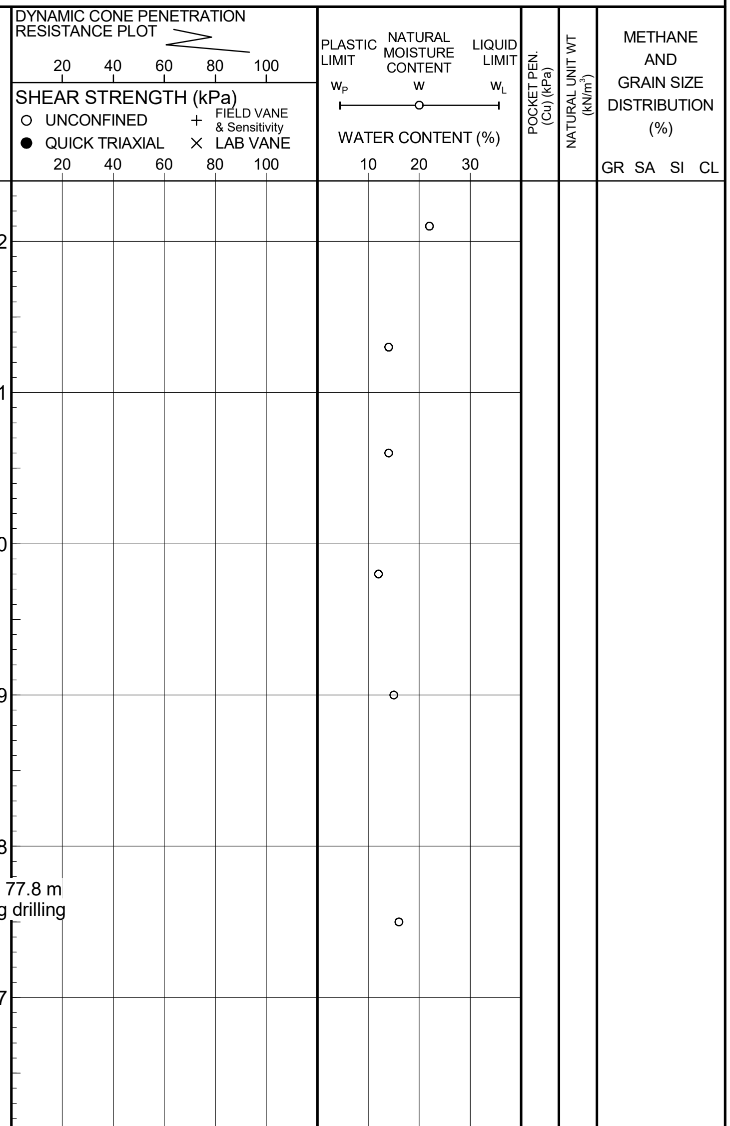
LOG OF BOREHOLE BH18-47

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jun-28-2018

REF. NO.: 18-519-10
ENCL NO.: 44

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	WATER CONTENT (%)
82.4						
82.2 / 0.0	**TOPSOIL:** 200mm					
0.2	**FILL:** silty clay, trace gravel, brown, moist, loose	1	SS	5		
81.6 / 0.8	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, very stiff to stiff	2	SS	18		
		3	SS	22		
	grey below 2.3 m	4	SS	13		
79.3 / 3.1	**SILT:** some clay, trace sand, grey, moist, compact	5	SS	21		
77.8 / 4.6	**SILTY SAND TO SANDY SILT:** trace clay, trace gravel, grey, wet, dense	6	SS	32	▽ W. L. 77.8 m during drilling	
76.3 / 6.1	**SHALE:** Georgian Bay Formation	7	SS	50/100mm		
76.1 / 6.3	**END OF BOREHOLE** Notes: 1) Water level at 4.6 mbgl during drilling					



GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-48

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jul-05-2018

REF. NO.: 18-519-10
ENCL NO.: 45

ELEV (m) / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	WATER CONTENT (%) approx.
81.1						
80.9 / 0.0	**TOPSOIL:** 200mm					
0.2	**FILL :** clayey silt mixed with asphalt, trace organics, some sand, dark grey, moist, compact	1	SS	17		10
		2	SS	11		21
79.6 / 1.5	**CLAYEY SILT TILL:** sandy, trace gravel, greyish brown, moist, very stiff	3	SS	17		15
78.8 / 2.3	**SANDY SILT TILL :** trace to some clay, trace gravel, brown, moist, dense	4	SS	34		16
78.0 / 3.1	**SILTY SAND :** trace clay, brown, wet, very dense	5	SS	50/ 150mm	W. L. 78.0 m during drilling	9
76.5 / 4.6	**SAND:** trace silt, trace gravel, grey, wet, very dense	6	SS	66		13
75.0 / 6.1	**SILTY SAND:** trace clay, grey, wet, very dense	7	SS	87		14
		8	SS	50/ 50mm		12
72.0 / 9.1	**SAND AND GRAVEL:** trace silt, grey, wet, very dense	9	SS	50/ 150mm		8

Column headings also printed: STRATA PLOT; ELEVATION; DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100; PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30; POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jul-05-2018

REF. NO.: 18-519-10
ENCL NO.: 45

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)
	SAND AND GRAVEL: trace silt, grey, wet, very dense(Continued)	10	SS	50/ 100mm	○	
68.9 / 12.2	**SILTY SAND:** trace clay, grey, wet, very dense	11	SS	57	○	
67.4 / 13.7	**SILT :** trace clay, grey, wet, very dense	12	SS	50/ 150mm	○	
65.8 / 15.3	**SILTY CLAY TILL :** some sand to sandy, trace gravel, grey, moist hard	13	SS	79	○	>225
64.3 / 16.8	**SILTY CLAY:** trace sand, grey, moist, hard	14	SS	47	○	>225
62.8 / 18.3	**SILT TO CLAYEY SILT:** trace sand, grey, very moist, very dense	15	SS	50	○	>225

Elevation scale: 71, 70, 69, 68, 67, 66, 65, 64, 63, 62. Depth scale: 11, 12, 13, 14, 15, 16, 17, 18, 19, 20.

Column headings: SOIL PROFILE; SAMPLES; GROUND WATER CONDITIONS; ELEVATION; DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100; SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100; PLASTIC LIMIT w_P, NATURAL MOISTURE CONTENT w, LIQUID LIMIT w_L, WATER CONTENT (%) 10 20 30; POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH18-48

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jul-05-2018

REF. NO.: 18-519-10
ENCL NO.: 45

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
60.7	**SILT TO CLAYEY SILT:** trace sand, grey, very moist, very dense(Continued)		16	SS	64		61		~20	>225		
20.4	**END OF BOREHOLE:** Notes: 1) Water level at 3.1 mbgl during drilling											

DS SOIL LOG 18-519-10 800 HYDRO ROAD.GPJ DS.GDT 18-10-12

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES + 3, × 3: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-49

PROJECT: Preliminary Geotechnical Investigation- Proposed Development
CLIENT: Lakeview Community Partners Ltd.
PROJECT LOCATION: 800 Hydro Road, Mississauga, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 150mm
Date: Jul-04-2018

REF. NO.: 18-519-10
ENCL NO.: 46

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
80.8 / 0.0	**TOPSOIL:** 200 mm							
80.6 / 0.2	**FILL:** silty clay, trace asphalt, some gravel, dark grey, moist, firm	1	SS	5			~26	
80.0 / 0.8	**FILL :** sandy silt, dark grey, moist, very dense	2	SS	50/ 50mm		80	~13	
		3	SS	50/ 75mm		79	~2	
78.5 / 2.3	**SANDY SILT TILL :** some clay, trace gravel, grey, moist, compact to dense	4	SS	29		78	~20	
		5	SS	31		77	~21	
76.3 / 4.5	**SHALE:** Georgian Bay Formation, weathered, grey	6	SS	50/ 125mm			~3	
76.1 / 4.7	**END OF BOREHOLE:** Notes: 1) Borehole dry and open upon completion.							

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P — NATURAL MOISTURE CONTENT W — LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30
POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m^3)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH22-13

PROJECT: Geotechnical Investigation
CLIENT: Rangeview Estate Precinct Development
PROJECT LOCATION: 855 Rangeview Road, Mississauga, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-19-2022

REF. NO.: 22-200-100
ENCL NO.:

(m) ELEV DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	NATURAL MOISTURE CONTENT (%)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.0	**ASPHALT:** 180mm					
0.2	**GRANULAR BASE:** sand and gravel, 380mm	1	SS	23	~11	
0.6	**FILL:** crusher run limestone, brown, wet, compact					
0.8	**FILL:** silty clay, some organics, some sand, trace gravel, grey, moist, stiff to very stiff	2	SS	10	~20	
		3	SS	22	~24	
2.3	**SILTY CLAY TILL:** some sand, some gravel, brown, moist, hard	4	SS	50	~20 (Wp ~17, WL ~30)	13 18 47 22
	trace shale fragments below 3.0m	5	SS	75	~20	
3.7	**END OF BOREHOLE:**					

Notes:
1) Augar refusal @3.7m due to possible shale bedrock.
2) 50mm dia. monitoring well installed upon completion.
3) Water Level Readings:

Date: Water Level(mbgl):

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GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES $+^3, \times^3$: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH22-15

PROJECT: Geotechnical Investigation
CLIENT: Rangeview Estate Precinct Development
PROJECT LOCATION: 855 Rangeview Road, Mississauga, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-15-2022

REF. NO.: 22-200-100
ENCL NO.:

ELEV (m) / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS / 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION / SHEAR STRENGTH (kPa)	WATER CONTENT (%) (w)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.0	**GRANULAR FILL:** sand and gravel, 280mm										
0.3	**FILL:** sand & gravel, trace brick pieces, grey, moist, compact	1	SS	21				~5			
0.8	**FILL:** silty clay, trace organics, grey, moist, firm	2	SS	5				~33			
1.5	**CLAYEY SILT:** trace sand, trace gravel, brown, moist, stiff	3	SS	11				~16			
2.3	**CLAYEY SILT TILL:** sandy, trace gravel, occasional cobble, brown, moist, hard	4	SS	44				~9			
		5	SS	86				~9			
		6	SS	47				~9			
	grey below 6.1m	7	SS	50				~9			
		8	SS	46				~8			
8.2	**END OF BOREHOLE:**										

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GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ $^{\varepsilon}$=3% Strain at Failure

LOG OF BOREHOLE BH22-16

PROJECT: Geotechnical Investigation
CLIENT: Rangeview Estate Precinct Development
PROJECT LOCATION: 855 Rangeview Road, Mississauga, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-18-2022

REF. NO.: 22-200-100
ENCL NO.:

(m) ELEV DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	NATURAL MOISTURE CONTENT W (%)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.0	**ASPHALT:** 150mm							
0.2	**GRANULAR BASE:** sand and gravel, 250mm	1	SS	9			○	
0.4	**FILL:** silty clay, some organics, some sand, trace gravel, grey, moist, stiff	2	SS	11			○	
1.2	**SILT TO CLAYEY SILT:** trace sand, brown, moist, stiff to hard	3	SS	30			○ ├─┤	0 7 76 17
2.3	**CLAYEY SILT:**, trace sand, trace gravel, brown, moist, hard	4	SS	77			○	
3.1	**SHALE BEDROCK:** grey, weathered	5	SS	50/ 130mm				
3.2	**END OF BOREHOLE:**							

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE: 20 40 60 80 100
PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L
WATER CONTENT (%): 10 20 30
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m^3)

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GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH22-17

PROJECT: Geotechnical Investigation
CLIENT: Rangeview Estate Precinct Development
PROJECT LOCATION: 855 Rangeview Road, Mississauga, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-18-2022

REF. NO.: 22-200-100
ENCL NO.:

(m) ELEV DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	WATER CONTENT (%)	GR	SA	SI	CL
0.0	**ASPHALT:** 150mm								
0.2	**GRANULAR BASE:** sand and gravel, 380mm	1	SS	12					
0.5	**FILL:** crusher run limestone								
0.8	**FILL:** clayey silt, trace organics, grey, moist, firm to very stiff	2	SS	7					
1.7	**SILTY CLAY TILL:** some sand, trace to some gravel, trace shale fragements, brown, moist, very stiff to hard	3	SS	29					
		4	SS	54		10	10	56	24
3.1	augar refusal at 3.1m on possible shale bedrock								

END OF BOREHOLE:
Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date: Water Level(mbgl):

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DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT w_P, NATURAL MOISTURE CONTENT w, LIQUID LIMIT w_L; WATER CONTENT (%) 10 20 30
POCKET PEN. (Cu) (kPa) | NATURAL UNIT WT (kN/m^3) | REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH22-18

PROJECT: Geotechnical Investigation
CLIENT: Rangeview Estate Precinct Development
PROJECT LOCATION: 855 Rangeview Road, Mississauga, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-18-2022

REF. NO.: 22-200-100
ENCL NO.:

ELEV DEPTH (m)	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m^3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.0	**ASPHALT:** 130mm											
0.1	**GRANULAR BASE:** sand and gravel, 380mm		1	SS	16							
0.5	**FILL:** silty clay, some organics, trace asphalt, grey, moist, firm to very stiff		2	SS	6							
1.5	**SILT TO CLAYEY SILT:** trace sand, trace gravel, brown to grey, moist, very stiff to hard		3	SS	15							
			4	SS	31							
			5	SS	29							
	~~no recovery@4.3m~~		6	SS	50/25mm							
4.4	augar refusal on possible shale bedrock **END OF BOREHOLE:**											

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GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES + 3, × 3: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH22-21

PROJECT: Geotechnical Investigation
CLIENT: Rangeview Estate Precinct Development
PROJECT LOCATION: 855 Rangeview Road, Mississauga, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-19-2022

REF. NO.: 22-200-100
ENCL NO.:

ELEV DEPTH (m)	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	WATER CONTENT (%)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.0	**ASPHALT:** 150mm							
0.2	**GRANULAR BASE:** sand and gravel, 380mm	1	SS	13				
0.5	**FILL:** sand, some asphalt pieces, trace gravel, dark brown, moist, loose to compact							
1.0	**SILTY CLAY:** trace sand, trace gravel, brown, moist, stiff to very stiff	2	SS	8				
		3	SS	20				0 4 68 28
		4	SS	25				
3.1	**CLAYEY SILT TILL/SHALE COMPLEX:** trace sand, trace gravel, grey, moist, hard	5	SS	69				
4.5	**SHALE BEDROCK:** grey, weathered	6	SS	50/ 50mm				
4.7	**END OF BOREHOLE:**							

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT W_P NATURAL MOISTURE CONTENT W LIQUID LIMIT W_L; WATER CONTENT (%) 10 20 30
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m^3)

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GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH22-4

PROJECT: Geotechnical Investigation
CLIENT: Rangeview Estate Precinct Development
PROJECT LOCATION: 855 Rangeview Road, Mississauga, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-15-2022

REF. NO.: 22-200-100
ENCL NO.:

ELEV DEPTH (m)	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	WATER CONTENT (%) w	GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.0	**ASPHALT:** 180mm					
0.2	**GRANULAR BASE:** sand and gravel, 460mm	1	SS	4		
0.6	**FILL:** crusher run limestone					
0.8	**SILT TO CLAYEY SILT:** trace sand, trace gravel, brown, moist, very stiff to hard	2	SS	17		2 8 62 28
		3	SS	30		
2.3	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, hard	4	SS	50/25mm		
2.4	**SHALE BEDROCK:** Georgian Bay Formation, grey, weathered TCR=75%, SCR=14%, RQD=0	R1	RC	50/75mm		
3.4	TCR=96%, SCR=98%, RQD=28% Hard layer=18%, Maximum hard layer thickness=50mm	R2	RC			
4.9	TCR=93%, SCR=90%, RQD=63% Hard layer=1%, Maximum hard layer thickness=25mm	R3	RC			
6.4	TCR=100%, SCR=98%, RQD=70% Hard layer=9%, Maximum hard layer thickness=25mm	R4	RC			
7.8	**END OF BOREHOLE:**					

Column headings also include: STRATA PLOT; GROUND WATER CONDITIONS; ELEVATION; DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE (20 40 60 80 100); PLASTIC LIMIT w_P, NATURAL MOISTURE CONTENT w, LIQUID LIMIT w_L, WATER CONTENT (%) 10 20 30; POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m³); REMARKS AND GRAIN SIZE DISTRIBUTION (%)

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GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES +3, ×3: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH22-6

PROJECT: Geotechnical Investigation
CLIENT: Rangeview Estate Precinct Development
PROJECT LOCATION: 855 Rangeview Road, Mississauga, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-15-2022

REF. NO.: 22-200-100
ENCL NO.:

ELEV (m) DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	WATER CONTENT (%)
0.0	**ASPHALT:** 200mm				
0.2	**GRANULAR BASE:** sand and gravel, 380mm	1	SS	8	~24
0.6	**FILL:** silty clay, some organics, brown, moist, stiff				
0.8	**CLAYEY SILT TILL:** some sand, trace gravel, brown, moist, stiff to hard	2	SS	11	~17
	trace shale fragments below 1.5m	3	SS	50	~16
2.3	**SHALE BEDROCK:** grey, weathered	4	SS	50/ 50mm	
3.1	**END OF BOREHOLE:**				

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date: Water Level(mbgl):

Column headings: SOIL PROFILE; SAMPLES; GROUND WATER CONDITIONS; ELEVATION; DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); SHEAR STRENGTH (kPa) ○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE (20 40 60 80 100); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10 20 30); POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

DRAFT

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
$+^3, \times^3$: Numbers refer to Sensitivity
○ $^{\varepsilon}$=3% Strain at Failure

DS CONSULTANTS LTD.
Geotechnical ◆ Environmental ◆ Materials ◆ Hydrogeology

LOG OF BOREHOLE BH22-8

PROJECT: Geotechnical Investigation
CLIENT: Rangeview Estate Precinct Development
PROJECT LOCATION: 855 Rangeview Road, Mississauga, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: Jul-15-2022

REF. NO.: 22-200-100
ENCL NO.:

(m) ELEV DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	GROUND WATER CONDITIONS	ELEVATION	NATURAL MOISTURE CONTENT (%)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0.0	**ASPHALT:** 130mm									
0.1	**GRANULAR FILL:** sand and gravel, 330mm	1	SS	12						
0.5	**FILL:** clayey silt, trace organics, trace gravel, brown, moist, stiff									
0.8	**CLAYEY SILT TILL/SHALE COMPLEX:** trace sand, trace gravel, brown to grey, moist, stiff to hard	2	SS	14			o (~19)			no recovery
		3	SS	53			o (~10)			
2.3	**SHALE BEDROCK:** weathered, grey	4	SS	50/ 150mm						
2.6	**END OF BOREHOLE:**									

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED, + FIELD VANE & Sensitivity, ● QUICK TRIAXIAL, × LAB VANE: 20 40 60 80 100
PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%): 10 20 30

DRAFT

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

Appendix B
Water Supply Support Information

Appendix B-1

Lakeview Community – Water Modelling Methodology and Analysis

(TMIG, 2021)

THE MUNICIPAL INFRASTRUCTURE GROUP LTD.
8800 Dufferin Street, Suite 200
Vaughan, Ontario L4K 0C5
T 905.738.5700
F 905.738.0065
www.tmig.ca

MEMORANDUM

DATE	May 6, 2021
TO	**Jeff Ormonde (Urbantech)**
CC	
SUBJECT	Lakeview Community Water Modelling Methodology and Analysis – 8050 Units
FROM	Cassandra Leal, P.Eng
PROJECT NUMBER	17201

1 Introduction

The Municipal Infrastructure Group Ltd. (TMIG) has been retained to conduct an analysis to review the water servicing capacity of the proposed watermain network (Urbantech, January 2020) relative to the contemplated development densities.

This memorandum will outline the modelling methodology adopted for the Lakeview Community. The water model was used to confirm that the proposed pipe network can supply the design water demands at appropriate pressures expected under various scenarios.

This memorandum has been updated with the updated population, provided from Urbantech May 2021. The watermain network is assumed to be unchanged.

2 Design Criteria

The Region of Peel produced the Inspiration Lakeview Water and Wastewater Servicing Analysis (May 2018). Within this document, the Region outlined the design criteria that apply to the proposed development:

- 265 Lpcd for average day water consumption
- A maximum day peaking factor of 1.8 for residential and 1.4 for employment growth
- A peak hour factor of 3.0

Also, there are limits to the velocity and pressures:

- Under Maximum Day demand, pipe velocity should remain below 1.5 m/s
- Under Maximum Day demand, pressure in the system should not drop below 280 kPa (40 psi)
- Pressure in the system should not drop below 140 kPa (20 psi) under a maximum day plus fire condition

Standards outlined in the Region's *Inspiration Lakeview Water and Wastewater Servicing Analysis (May 2018)* report and Inspiration Lakeview Conceptual Municipal Servicing Strategy (TMIG, July 2014) were used in substitution.

3 Population Breakdown

Using the information provided by Urbantech (May 2021), the populations in the water model were modified to match the populations used in the sanitary sewer design sheet and drainage map (dated August 2020). The information provided by Urbantech does not include the External Lands between the subject lands and Lakeshore Road. The sanitary drainage map used to obtain the population is found in **Appendix A.**

Detailed population and demand calculations can be found in **Appendix B**. The future demands for the external lands between Lakeshore Road and the Lakeview Community Lands (called "External") were calculated using the population breakdown from the Inspiration Lakeview Village Masterplan Concept. This information is also included in **Appendix B** and is unchanged from previous submissions.

A summary of the water demands is provided in **Table 1**:

TABLE 1 WATER DEMANDS – SUMMARY

	Lakeview Community	External
Total Residential Population	22,042	10,048
Residential Avg Day Demand	67.6 L/s	30.8 L/s
Employment Avg Day Demand	24.7 L/s	0 L/s
Residential Max Day Demand	121.7 L/s	55.47 L/s
Employment Max Day Demand	34.5 L/s	0 L/s
Residential Peak Hour Demand	202.8 L/s	92.46 L/s
Employment Peak Hour Demand	74.0 L/s	0 L/s

4 Water Model Development

InfoWater has been selected for modelling the water distribution system for the study area. The key input factors for the model are described below:

4.1 Pipe Network

The preliminary watermain layout was provided by Urbantech and is included in **Appendix C**.

4.2 Water Demands

The average daily demands were calculated for each development block (internal), as shown in **Appendix B**. These demands were assigned to nodes adjacent to the respective parcels. The average day demand set is populated with the residential demands assigned to Demand 1 and employment demands assigned to Demand 2.

Based on the standards outlined in Inspiration Lakeview Water and Wastewater Servicing Analysis (May 2018) the peaking factor for the Maximum day is 1.8 for residential and 1.4 for employment. The peaking factor for Peak hour is 3 for both residential and employment.

The average day demand set was multiplied with the respective peaking factors to create separate maximum day and Peak hour demand sets.

Design fire demands have been proposed to be minimum of 300 L/s. This is common for commercial properties, and high-rise residential development.

Using the Inspiration Lakeview Master Plan population breakdown, the external lands were included in the model. For simplicity, the external demands were added as two demands in the model, an east and a west demand (Junction J-34 and J-198, respectively). The population breakdown included residential and employment. For this review, the appropriate rates and factors were used.

A table listing the nodes at which the development blocks were allocated is provided in **Appendix B**.

4.3 Boundary Conditions

The proposed development is located within Peel Region pressure zone PZ1. Since we are modelling a local area from within a larger distribution network, suitable boundary conditions were established at the study area limits (where the proposed internal network will connect to existing sub-transmission mains). The proposed connection locations are:

- To the 600 mm watermain along Lakeshore Road East, at Lakefront Promenade;
- To the 600 mm watermain along Lakeshore Road East, at Hydro Road;

Fixed head reservoirs were established at these two locations. The HGL elevations at these reservoirs were established through pressure logging data provided by Region of Peel. The details of the boundary conditions are in **Table 2**.

TABLE 2 HGL ELEVATIONS AT BOUNDARY CONDITIONS

Boundary Location	HGL Elevation	Source
Lakeshore Road East, at Lakefront Promenade	142 m	Region of Peel email dated September 11th
Lakeshore Road East, at Hydro Road	142 m	Region of Peel email dated September 11th

5 Modelling Results

The proposed watermain network and demands were simulated to determine the resulting pressures under various demand conditions. We also considered a condition where the Lakeshore Road watermain is unavailable and the lands area serviced only through the feed from the plant.

Pressure maps indicating modelled pressure at every node for the Scenarios are provided in Figure 1 through Figure 4. The InfoWater Junction output for all scenarios and Pipe output for Maximum day scenario is provided in **Appendix D**.

5.1 Normal Conditions Scenarios

Average day demand, maximum day demand, maximum day demand plus fire flow and peak hour demand scenarios were run with the two proposed connections to the existing 600mm Lakeshore Road watermain, at Lakefront Promenade and Hydro Road. These scenarios did not consider a feed from the west at Lakefront Promenade and Rangeview Road.

The summary of modelling results is provided in **Table 3**.

TABLE 3 MODELLING RESULTS SUMMARY

Water Demand Modeling Scenario	Minimum Water System Requirements	Modeling Results
Average Day Demand	Recommended Normal Pressures within System 275 kPa to 690 kPa (40 psi to 100 psi)	System Pressure = 510 kPa to 647 kPa (74 psi to 93 psi)
Maximum Day Demand	Recommended Normal Pressures within System 275 kPa to 690 kPa (40 psi to 100 psi)	System Pressure = 507 kPa to 643 kPa (74 psi to 93 psi)
	Flow velocity remains below 1.5 m/s within the distribution network	Flow velocity within the distribution network is between 0.01 m/s to 0.89 m/s.
Peak Hour Demand	Recommended Normal Pressures within System 275 kPa to 690 kPa (40 psi to 100 psi)	System Pressure = 498 kPa to 637 kPa (72 psi to 92 psi)
Maximum Day Demand plus Fire Flow	Required Fire Flow to be provided at a residual pressure of no less than 140 kPa	
	Fire flow requirements for the proposed development Q_f > 300 L/s	Available Fire Flow = 532 L/s to 2,710 L/s

5.2 Emergency Conditions Scenario

To simulate an emergency or maintenance condition where one or both water supply points to Lakeshore Road are not available, the two boundary conditions and watermain along Lakeshore Road East were turned off and the boundary condition to the west (supply from Lakefront Promenade and south of Rangeview Road) was turned on.

The HGL at this boundary condition was established through pressure logging data provided by the Region of Peel. The details of the boundary condition are in **Table 4**.

TABLE 4 HGL ELEVATION AT WEST BOUNDARY CONDITION

Boundary Location	HGL Elevation	Source
Water Treatment Plant, south of Rangeview Road	148 m	Region of Peel email dated September 11th

Under this condition, the pressures were between 488 – 643 kPa (71 to 93 psi). This is still within the acceptable pressure range. Figure 5 is the pressure map for this scenario. This scenario illustrates that the watermain network and sizing is acceptable for the population and demands for Lakeview Community. Under normal conditions, all three of these supply points would be available.

6 Conclusions and Recommendations

The modelled results all lie within acceptable range, but the pressures could exceed 600 kPa (90 psi) along Street A. The available fire flows at the nodes within the Study Area will be between 532 L/s and 2,710 L/s. The actual block-by-block fire flow requirements should be verified relative to these values.

The watermain network and sizing appears to be adequate for the population and demands used in this model.

FIGURE 1 AVERAGE DAY DEMAND SCENARIO PRESSURE

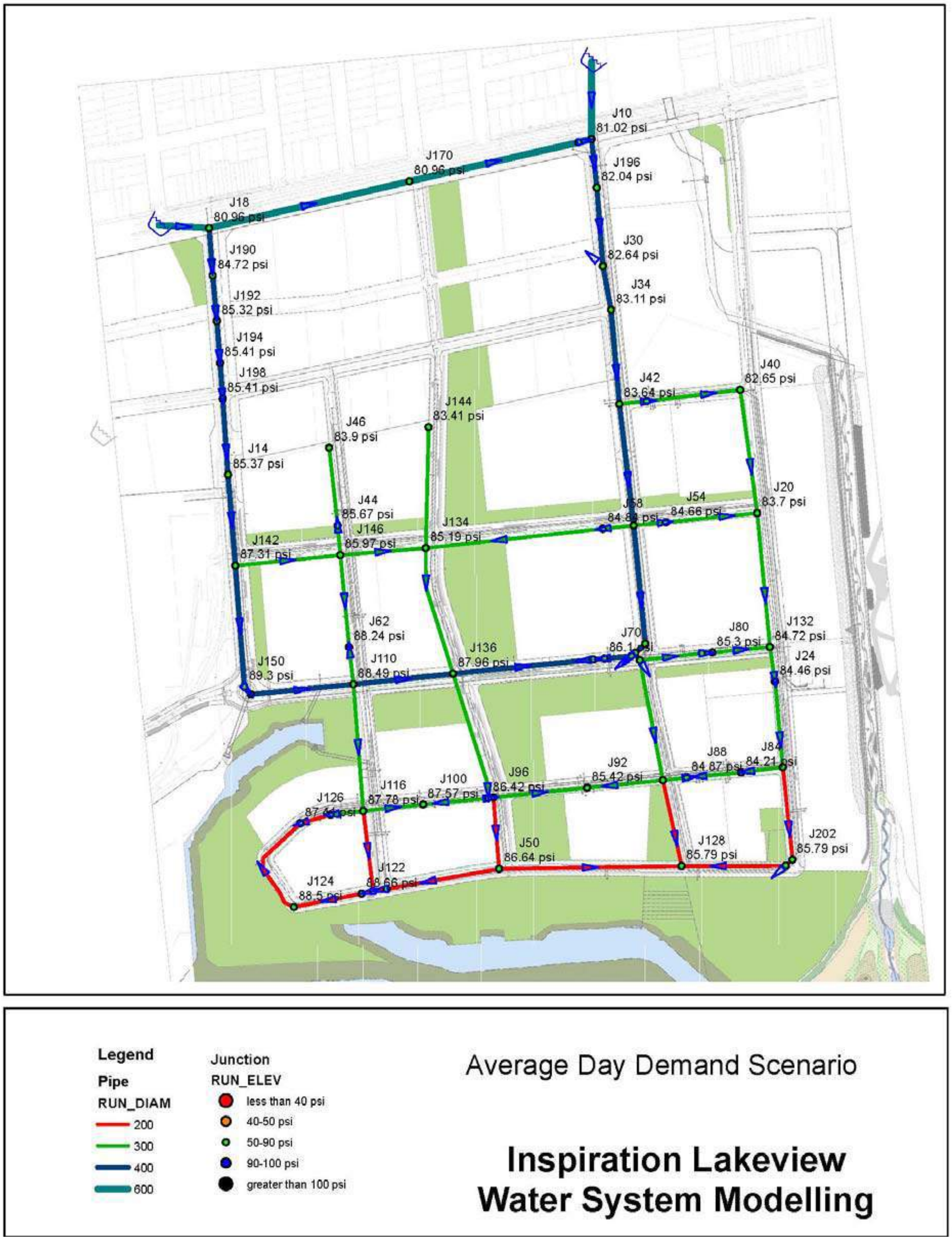


FIGURE 2 MAXIMUM DAY DEMAND SCENARIO PRESSURE

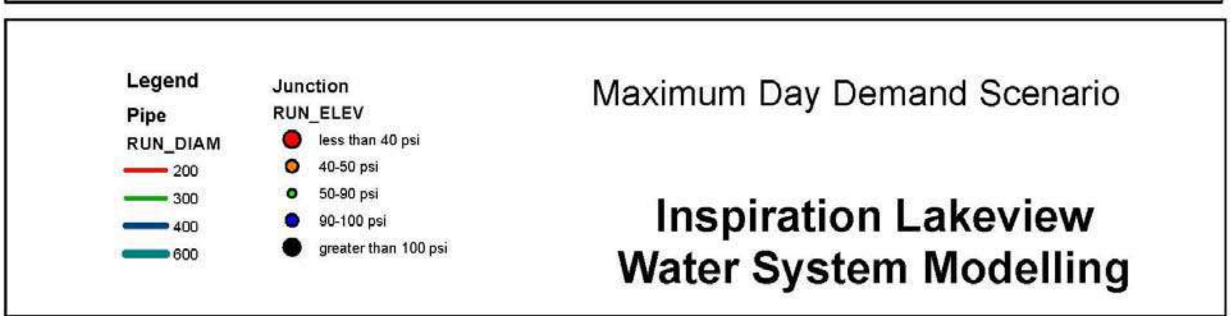


FIGURE 3 PEAK HOUR DEMAND SCENARIO PRESSURE

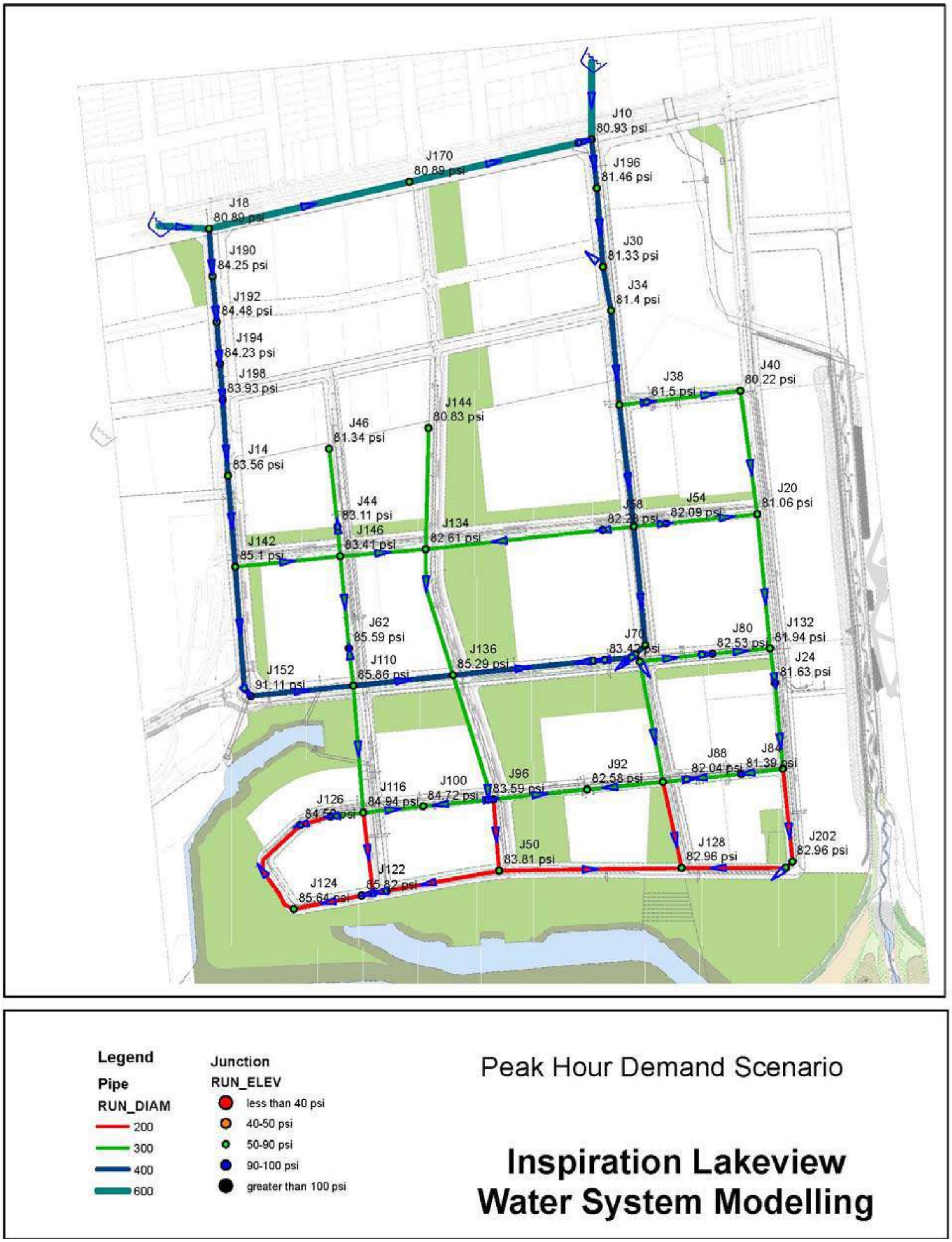


FIGURE 4 MAXIMUM DAY PLUS FIRE FLOW SCENARIO AVAILABLE FIREFLOW

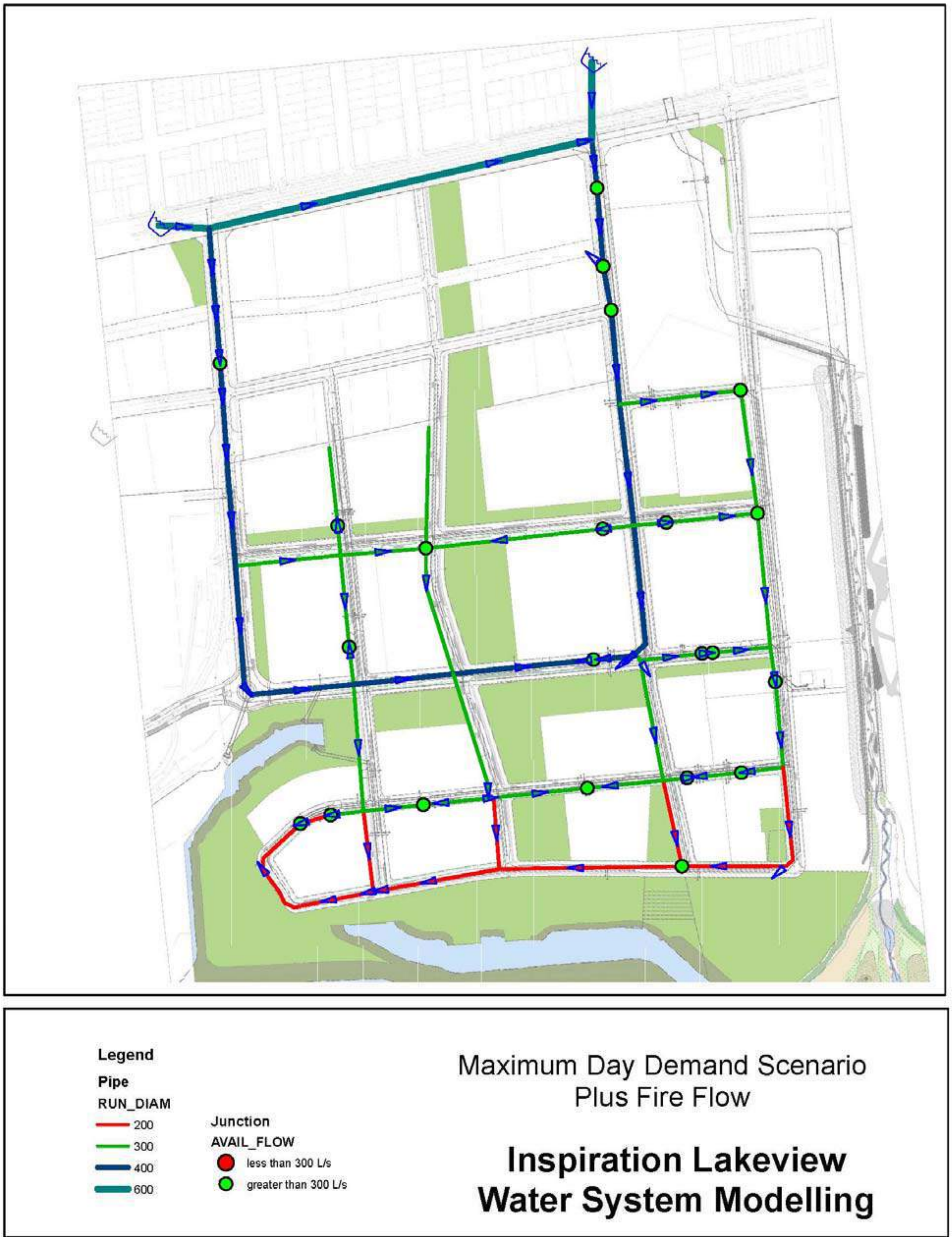
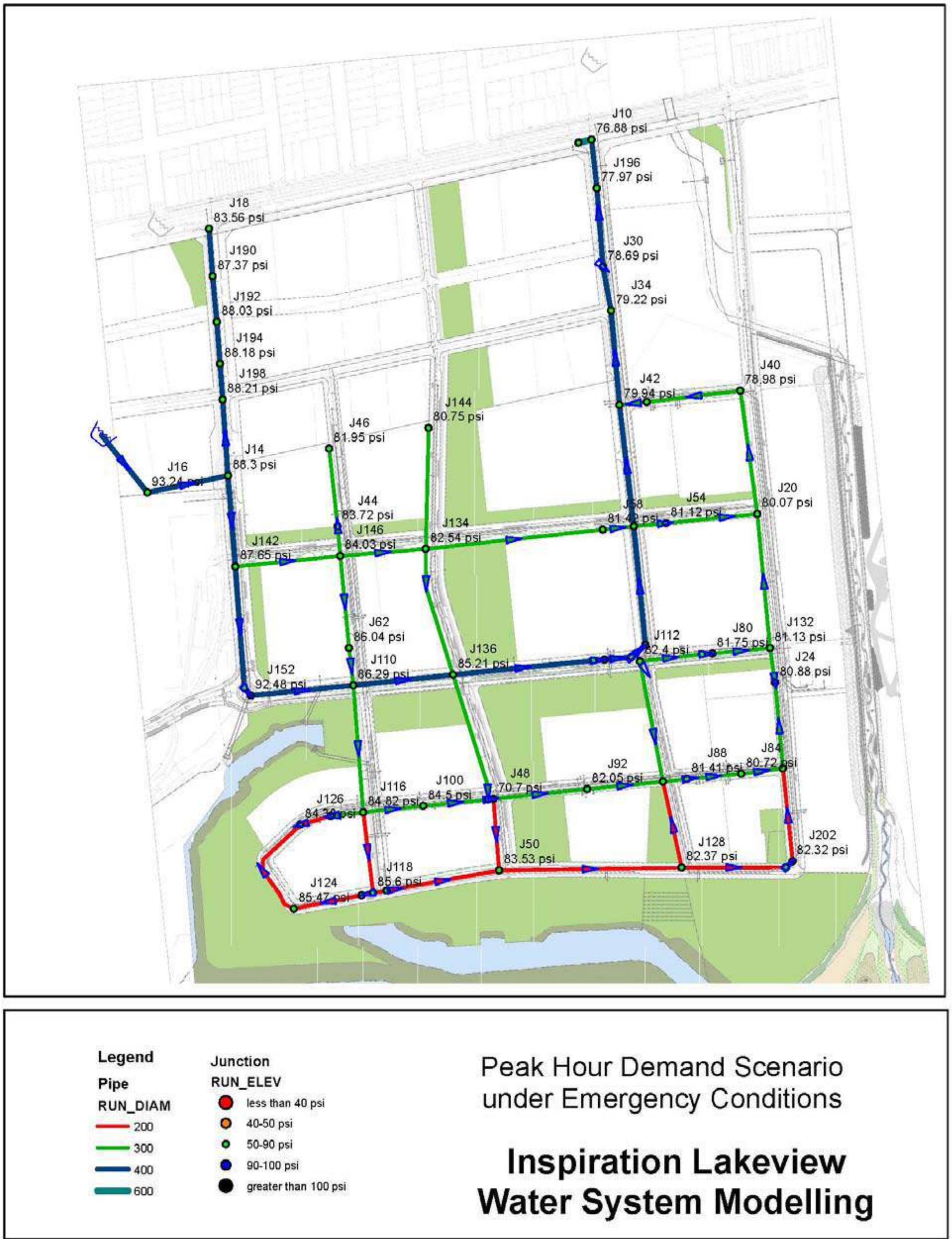


FIGURE 5 PEAK HOUR DEMAND UNDER EMERGENCY CONDITIONS



APPENDIX A


LEGEND
LAKESHORE ROAD EAST
G.E. BOOTH WASTEWATER TREATMENT FACILITY
LAKEVIEW WATER TREATMENT PLANT
LAKE ONTARIO
LIMIT OF PROPERTY
URBANTECH
LAKEVIEW COMMUNITY PARTNERS LTD.
CITY OF MISSISSAUGA
SANITARY SERVICING PLAN
17-549
AUG. 2020
1:2000
SAN-1

APPENDIX B

PN 17201 1
Date 6-May-21
By CBL

		RESIDENTIAL	EMPLOYMENT
Design Criteria	ADD	265 Lpcd	265
	MDD Factor	1.8	1.4
	PHD Factor	3	3

Populations from this file: G:\Projects\2017\17201 - Lakeview Community - Mississauga\Design\SAN WATER\2021 05 06 - 17201 - CALC - Water and Wastewater.xlsx

				DMD 1							SCALE TO 7995	DMD 2			
Block Number	**Junction in Model**	**Residential Population**	**Combined**	**ADD**	**MDD**	**PHD**	**FF**		**Employment Population**	**Combined**	**MODIFIED**	**ADD**	**MDD**	**PHD**	**FF**
1	J44	380					*300*	J44	0	0	0				
2	J44	620	1000	3.07	5.52	9.20	*300*	J44	0	0	0				
3	J58	1,052	1052	3.23	5.81	9.68	*300*	J58	0	0	0				
4	J30	836	836	2.56	4.62	7.69	*300*	J30	0	0	0				
5	J54	384	384	1.18	2.12	3.53	*300*	J54	0	0	0				
6	J62	2,128		0.00			*300*	J62	0	0	0				
7	J62	2,161	4289	13.16	23.68	39.47	*300*	J62	101	101	108	0.33	0.46	0.99	
8	J64	2,712	2712	8.32	14.97	24.95	*300*	J64	0	0	0				
9	J74	2,220	2220	6.81	12.26	20.43	*300*	J74	0	0	0				
10	J104	1,161	1161	3.56	6.41	10.69	*300*	J104	0	0	0				
11	J126	1,367	1367	4.19	7.55	12.58	*300*	J126	69	69	74	0.23	0.32	0.68	
12	J100	1,745					*300*	J100	0	0	0				
13	J100	1,194	2939	9.01	16.22	27.04	*300*	J100	81	81	87	0.27	0.37	0.80	
14	J92	1,359					*300*	J92	81		0				
15	J92	1,056	2415	7.41	13.33	22.22	*300*	J92	66	147	157	0.48	0.67	1.44	
16	J88	956		0.00	0.00	0.00	*300*	J88	45		0				
17	J88	0	956	2.93	5.28	8.80	*300*	J88	36	81	87	0.27	0.37	0.80	
18	J196	711	711	2.18	3.93	6.54	*300*	J196	46	46	46	0.14	0.20	0.42	
19	J84	0					*300*	J84	152		0				
20	J84	0					*300*	J84	51	203	217	0.67	0.93	2.00	
21	J80	0					*300*	J80	55	55	59	0.18	0.25	0.54	
22	J24	0					*300*	J24	2,790	2790	2980	9.14	12.80	27.42	
23	J40	0					*300*	J40	200	200	214	0.66	0.92	1.97	
24	J20	0					*300*	J20	2,993	2993	3197	9.81	13.73	29.42	
39	J128	0	0	0.00	0.00	0.00	*300*	J128	551	551	589	1.81	2.53	5.42	
31 (park)	J134			0.00	0.00	0.00	*300*	J134	214	214	229	0.70	0.98	2.10	
		22042	22042	67.61	121.69	202.82	7800.00		7531	7531	8041	24.66	34.53	73.99	
Lakeview				67.61	121.69	202.82						24.66	34.53	73.99	
Externals - West				16.26	29.26	48.77						0.00			
Externals - East				14.56	26.21	43.69						0.00			
TOTAL				98.42	177.16	295.27						24.66	34.53	73.99	

PN 17201
Date 2020 09 08
By CL

	RESIDENTIAL	EMPLOYMENT	JUNCTION
Pvt 01	593	0	West
Pvt 02	492	0	West
Pvt 03	366	0	West
Pvt 04	468	0	West
Pvt 05	858	0	East
Pvt 06	346	0	West
Pvt 07	500	0	West
Pvt 08	297	0	West
Pvt 09	297	0	West
Pvt 10	534	0	West
Pvt 11	641	0	East
Pvt 12	649	0	West
Pvt 13	303	0	West
Pvt 14	347	0	West
Pvt 15	608	0	East
Pvt 16	1,493	0	East
Pvt 17	1,254	0	East
	10,048	0	

ADD	265	Lpcd
MDD Factor - Res	1.8	
MDD Factor - Empl	1.4	
PHD	3	

		POPULATION		DMD 1	DMD 2	DMD 1	DMD 2	DMD 1	DMD 2
JUNCTION		RES	EMP	ADD RES	ADD EMP	MDD RES	MDD EMP	PHD RES	PHD EMP
west	J198	5,300	0	16.26	0.00	29.26	0.00	48.77	0.00
east	J34	4,748	0	14.56	0.00	26.21	0.00	43.69	0.00
		10,048	0	30.82	0.00	55.47	0.00	92.46	0.00
				30.82		55.47		92.46	

APPENDIX C


LEGEND
PROPOSED 400mm WATERMAIN
PROPOSED 300mm WATERMAIN
PROPOSED 200mm WATERMAIN
EXISTING WATERMAIN
FUTURE WATERMAIN
NOTE:
THE EXISTING 400mm WATERMAIN SHOWN WITHIN THE EXISTING EASEMENT SHALL BE REPLACED BY A DEDICATED 400mm WATERMAIN ON LAKEFRONT PROMENADE, STREET B, AND STREET I AS SHOWN ON THIS PLAN. THE EXISTING WATERMAIN IS A DEDICATED FEED FROM THE WATER TREATMENT TO WASTEWATER TREATMENT PLANT AND SHALL REMAIN IN OPERATION UNTIL THE NEW 400mm WATERMAIN IS COMMISSIONED.
urbantech
LAKEVIEW COMMUNITY PARTNERS LTD.
CITY OF MISSISSAUGA
PRELIMINARY WATER SERVICING PLAN
PROJECT No. 17-549
DATE JAN. 2020
SCALE 1:2000
DWG No. WM-1
KEY PLAN
G.E. BOOTH WASTEWATER TREATMENT FACILITY
LIMIT OF PROPERTY
SERSON CREEK
HYDRO ROAD
LAKEFRONT PROM.
STREET A
STREET B
STREET C
STREET D
STREET E
STREET F
STREET G
STREET H
STREET I
STREET J

APPENDIX D

17201 - Inspiration Lakeview Water Modelling - May 2021 InfoWater Output - Avg Day Demand Run				
ID	**Demand (L/s)**	**Elevation (m)**	**Head (m)**	**Pressure (psi)**
J10	0	85	141.99	81.02
J100	9.31	80.1	141.7	87.57
J104	3.57	79.92	141.7	87.82
J110	0	79.47	141.72	88.49
J112	0	81.34	141.71	85.83
J114	0	81.23	141.72	85.99
J116	0	79.95	141.7	87.78
J118	0	79.36	141.7	88.63
J120	0	78.33	141.7	90.09
J122	0	79.33	141.7	88.66
J124	0	79.44	141.7	88.5
J126	4.44	80.21	141.69	87.41
J128	1.81	81.35	141.7	85.79
J130	0	82.01	141.7	84.86
J132	0	82.11	141.71	84.72
J134	0.7	81.8	141.73	85.19
J136	0	79.85	141.72	87.96
J138	0	82.78	141.7	83.76
J14	0	81.75	141.81	85.37
J142	0	80.35	141.77	87.31
J144	0	83.05	141.73	83.41
J146	0	81.26	141.73	85.97
J150	0	78.92	141.74	89.3
J152	0	75.92	141.74	93.56
J154	0	82.07	141.73	84.82
J156	0	81.32	141.72	85.85
J158	0	81.44	141.72	85.69
J160	0	85.04	141.99	80.96
J170	0	85.04	141.99	80.96
J18	0	85.04	141.99	80.96
J190	0	82.36	141.95	84.72
J192	0	81.89	141.91	85.32
J194	0	81.79	141.88	85.41
J196	2.33	84.23	141.94	82.04
J198	16.26	81.77	141.84	85.41
J20	9.81	82.84	141.72	83.7
J200	0	81.35	141.7	85.79
J202	0	81.35	141.7	85.79
J24	9.14	82.29	141.7	84.46
J30	2.57	83.73	141.86	82.64
J34	14.56	83.36	141.82	83.11
J38	0	82.86	141.76	83.74
J40	0.66	83.61	141.74	82.65
J42	0	82.93	141.77	83.64
J44	3.08	81.47	141.73	85.67
J46	0	82.71	141.73	83.9
J48	0	89.79	141.7	73.79
J50	0	80.75	141.7	86.64
J54	1.18	82.17	141.73	84.66
J58	3.24	82.05	141.73	84.84
J62	13.2	79.65	141.72	88.24
J64	8.68	81.1	141.72	86.17
J70	0	81.15	141.72	86.1
J74	6.83	81.63	141.71	85.4
J80	0.18	81.7	141.71	85.3
J84	0.67	82.46	141.7	84.21
J88	3.21	82	141.7	84.87
J92	7.91	81.61	141.7	85.42
J96	0	80.91	141.7	86.42

17201 - Inspiration Lakeview Water Modelling - May 2021 InfoWater Output - Max Day Demand Run				
ID	**Demand (L/s)**	**Elevation (m)**	**Head (m)**	**Pressure (psi)**
J10	0	85	141.98	81
J100	16.64	80.1	141.19	86.84
J104	6.43	79.92	141.18	87.09
J110	0	79.47	141.25	87.82
J112	0	81.34	141.23	85.14
J114	0	81.23	141.24	85.31
J116	0	79.95	141.19	87.05
J118	0	79.36	141.19	87.9
J120	0	78.33	141.19	89.37
J122	0	79.33	141.19	87.93
J124	0	79.44	141.18	87.77
J126	7.9	80.21	141.17	86.67
J128	2.53	81.35	141.19	85.08
J130	0	82.01	141.2	84.14
J132	0	82.11	141.21	84.02
J134	0.98	81.8	141.26	84.53
J136	0	79.85	141.24	87.28
J138	0	82.78	141.2	83.04
J14	0	81.75	141.48	84.9
J142	0	80.35	141.36	86.74
J144	0	83.05	141.26	82.75
J146	0	81.26	141.27	85.31
J150	0	78.92	141.3	88.68
J152	0	75.92	141.3	92.94
J154	0	82.07	141.28	84.17
J156	0	81.32	141.24	85.17
J158	0	81.44	141.24	85.01
J160	0	85.04	141.98	80.94
J170	0	85.04	141.98	80.94
J18	0	85.04	141.98	80.95
J190	0	82.36	141.87	84.6
J192	0	81.89	141.76	85.1
J194	0	81.79	141.66	85.11
J196	4.14	84.23	141.83	81.89
J198	29.27	81.77	141.57	85.02
J20	13.73	82.84	141.26	83.04
J200	0	81.35	141.2	85.08
J202	0	81.35	141.2	85.08
J24	12.8	82.29	141.2	83.75
J30	4.63	83.73	141.62	82.31
J34	26.21	83.36	141.51	82.67
J38	0	82.86	141.36	83.17
J40	0.92	83.61	141.31	82.04
J42	0	82.93	141.38	83.08
J44	5.54	81.47	141.27	85.01
J46	0	82.71	141.27	83.24
J48	0	89.79	141.2	73.07
J50	0	80.75	141.19	85.92
J54	2.12	82.17	141.27	84.01
J58	5.83	82.05	141.27	84.18
J62	23.76	79.65	141.24	87.56
J64	15.49	81.1	141.24	85.49
J70	0	81.15	141.24	85.42
J74	12.29	81.63	141.21	84.7
J80	0.25	81.7	141.21	84.6
J84	0.93	82.46	141.2	83.5
J88	5.66	82	141.2	84.15
J92	14.04	81.61	141.19	84.7
J96	0	80.91	141.2	85.7

17201 - Inspiration Lakeview Water Modelling - May 2021
InfoWater Output - Max Day Demand Run - Pipe Report

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)
24	J44	J146	37.79	300	120	-5.54	0.08	0	0.04
25	J112	J114	11.08	300	120	-27.51	0.39	0.01	0.68
26	J110	J116	162.84	300	120	19.26	0.27	0.06	0.35
27	J116	J118	103.23	200	120	0.87	0.03	0	0.01
28	J120	J118	17.79	200	120	1.66	0.05	0	0.03
29	J118	J122	14.95	200	120	2.54	0.08	0	0.06
30	J122	J124	88.59	200	120	2.54	0.08	0.01	0.06
31	J126	J124	144.09	200	120	-2.54	0.08	0.01	0.06
32	J120	J50	146.51	200	120	-1.66	0.05	0	0.03
33	J128	J130	112.4	200	120	-1.83	0.06	0	0.03
34	J130	J112	156.59	300	120	-13.93	0.2	0.03	0.19
35	J112	J74	79.98	300	120	13.58	0.19	0.01	0.18
36	J14	J198	97.33	400	120	-71.06	0.57	0.09	0.97
37	J136	J134	166.63	300	120	-11.63	0.16	0.02	0.14
38	J138	J24	110.22	300	120	-4.22	0.06	0	0.02
40	J142	J146	135.17	300	120	27.84	0.39	0.09	0.7
41	J134	J144	154.56	300	120	0	0	0	0
42	J126	J104	40.45	200	120	-5.36	0.17	0.01	0.24
6	J40	J38	120.78	300	120	-20.41	0.29	0.05	0.39
8	J48	J50	91.46	200	120	1.12	0.04	0	0.01
P101	RES9002	J18	64.43	600	120	114.25	0.4	0.02	0.33
P105	J18	J170	263.81	600	120	13.92	0.05	0	0.01
P107	J160	J10	17.35	600	120	13.92	0.05	0	0.01
P121	J170	J160	222.37	600	120	13.92	0.05	0	0.01
P13	J146	J134	109.84	300	120	7.32	0.1	0.01	0.06
P143	J190	J18	61.03	400	120	-100.33	0.8	0.11	1.85
P145	J192	J190	58.87	400	120	-100.33	0.8	0.11	1.85
P147	J194	J192	53.81	400	120	-100.33	0.8	0.1	1.85
P15	J146	J62	118.8	300	120	14.99	0.21	0.03	0.22
P155	J196	J30	100.45	400	120	107.63	0.86	0.21	2.1
P157	J198	J194	45.99	400	120	-100.33	0.8	0.08	1.85
P159	J128	J200	133.31	200	120	-1.24	0.04	0	0.02
P163	J202	J138	119.12	200	120	-1.24	0.04	0	0.02
P165	J136	J96	166.15	300	120	16.72	0.24	0.05	0.27
P167	J200	J202	11.25	200	120	-1.24	0.04	0	0.02
P17	J62	J110	47.94	300	120	-8.77	0.12	0	0.08
P19	J20	J54	117.59	300	120	-10.23	0.14	0.01	0.11
P21	J14	J142	116.76	400	120	71.06	0.57	0.11	0.97
P25	J150	J152	12.66	400	120	43.22	0.34	0	0.39
P27	J152	J110	132.14	400	120	43.22	0.34	0.05	0.39
P29	J110	J136	128.24	400	120	15.18	0.12	0.01	0.06
P31	J136	J64	180.81	400	120	10.09	0.08	0	0.03
P33	J64	J70	14.43	400	120	-5.4	0.04	0	0.01
P35	J70	J156	34.75	400	120	-5.4	0.04	0	0.01
P37	J156	J114	6.2	400	120	-5.4	0.04	0	0.01
P39	J114	J158	17.17	400	120	-32.91	0.26	0	0.23
P41	J158	J154	153.05	400	120	-32.91	0.26	0.04	0.23
P43	J154	J42	156.43	400	120	-56.39	0.45	0.1	0.64
P45	J42	J34	120.68	400	120	-76.79	0.61	0.14	1.13
P47	J34	J30	57.66	400	120	-103	0.82	0.11	1.94
P51	J134	J58	228.31	300	120	-5.3	0.07	0.01	0.03
P53	J58	J154	39.98	300	120	-11.13	0.16	0.01	0.13
P55	J104	J116	41.94	300	120	-11.79	0.17	0.01	0.14
P57	J116	J100	77.25	300	120	6.6	0.09	0	0.05
P59	J100	J96	84.08	300	120	-10.04	0.14	0.01	0.11
P61	J96	J48	6.45	300	120	6.68	0.09	0	0.05
P63	J48	J92	120.82	300	120	5.56	0.08	0	0.04
P65	J92	J130	97.59	300	120	-8.48	0.12	0.01	0.08
P69	J88	J84	69.9	300	120	-2.05	0.03	0	0.01
P71	J84	J138	53.85	300	120	-2.98	0.04	0	0.01
P73	J24	J132	44.79	300	120	-17.02	0.24	0.01	0.28
P75	J132	J20	172.6	300	120	-15.98	0.23	0.04	0.25
P77	J20	J40	159.11	300	120	-19.49	0.28	0.06	0.36
P79	J50	J128	234.05	200	120	-0.54	0.02	0	0
P81	J38	J42	35.3	300	120	-20.41	0.29	0.01	0.39
P83	J54	J154	41.53	300	120	-12.35	0.17	0.01	0.15
P85	J74	J80	13.52	300	120	1.29	0.02	0	0
P87	J80	J132	74.26	300	120	1.04	0.01	0	0
P89	J10	J196	62.59	400	120	111.77	0.89	0.14	2.26
P93	J88	J130	30.88	300	120	-3.61	0.05	0	0.02
P95	J142	J150	156.08	400	120	43.22	0.34	0.06	0.39
P97	J46	J44	100.05	300	120	0	0	0	0
P99	RES9006	J10	99.44	600	120	97.85	0.35	0.02	0.24

17201 - Inspiration Lakeview Water Modelling - May 2021 InfoWater Output - Peak Hour Demand Run				
ID	**Demand (L/s)**	**Elevation (m)**	**Head (m)**	**Pressure (psi)**
J10	0	85	141.93	80.93
J100	27.93	80.1	139.69	84.72
J104	10.71	79.92	139.69	84.96
J110	0	79.47	139.87	85.86
J112	0	81.34	139.81	83.12
J114	0	81.23	139.83	83.31
J116	0	79.95	139.71	84.94
J118	0	79.36	139.7	85.78
J120	0	78.33	139.7	87.25
J122	0	79.33	139.7	85.82
J124	0	79.44	139.69	85.64
J126	13.32	80.21	139.66	84.52
J128	5.43	81.35	139.71	82.96
J130	0	82.01	139.72	82.03
J132	0	82.11	139.76	81.94
J134	2.1	81.8	139.91	82.61
J136	0	79.85	139.85	85.29
J138	0	82.78	139.71	80.93
J14	0	81.75	140.53	83.56
J142	0	80.35	140.21	85.1
J144	0	83.05	139.91	80.83
J146	0	81.26	139.93	83.41
J150	0	78.92	140.03	86.87
J152	0	75.92	140.02	91.11
J154	0	82.07	139.94	82.27
J156	0	81.32	139.83	83.17
J158	0	81.44	139.84	83.02
J160	0	85.04	141.93	80.88
J170	0	85.04	141.94	80.89
J18	0	85.04	141.94	80.89
J190	0	82.36	141.63	84.25
J192	0	81.89	141.32	84.48
J194	0	81.79	141.05	84.23
J196	6.99	84.23	141.53	81.46
J198	48.78	81.77	140.81	83.93
J20	29.43	82.84	139.87	81.06
J200	0	81.35	139.71	82.96
J202	0	81.35	139.71	82.96
J24	27.42	82.29	139.72	81.63
J30	7.71	83.73	140.94	81.33
J34	43.68	83.36	140.62	81.4
J38	0	82.86	140.18	81.5
J40	1.98	83.61	140.04	80.22
J42	0	82.93	140.23	81.45
J44	9.24	81.47	139.93	83.11
J46	0	82.71	139.93	81.34
J48	0	89.79	139.71	70.97
J50	0	80.75	139.71	83.81
J54	3.54	82.17	139.92	82.09
J58	9.72	82.05	139.93	82.28
J62	39.6	79.65	139.86	85.59
J64	26.04	81.1	139.83	83.49
J70	0	81.15	139.83	83.42
J74	20.49	81.63	139.76	82.63
J80	0.54	81.7	139.76	82.53
J84	2.01	82.46	139.71	81.39
J88	9.63	82	139.71	82.04
J92	23.73	81.61	139.7	82.58
J96	0	80.91	139.72	83.59

17201 - Inspiration Lakeview Water Modelling - May 2021 - Max Daily Demand with Fireflow Simulation Run

Note:- At any given node the Available Flow (at 140 kPa/20 psi) must be greater than Total demand.

ID	Static Demand (L/s)	Static Pressure (psi)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (psi)	Available Flow at Hydrant (L/s)	Available Flow Pressure (psi)
J100	16.64	86.84	141.19	300	76.51	958.97	20.31
J104	6.43	87.09	141.18	300	74.22	815.54	20.3
J126	7.9	86.67	141.17	300	61.36	532.60	20.3
J128	2.53	85.08	141.19	300	62.77	556.76	20.3
J134	0.98	84.53	141.26	300	77.15	1,142.28	20.31
J194	0	85.11	141.66	300	81.65	1,888.24	20.31
J196	4.14	81.89	141.83	300	80.03	2,710.09	20.31
J20	13.73	83.04	141.26	300	75.15	1,090.90	20.31
J24	12.8	83.75	141.2	300	74.12	965.73	20.31
J30	4.63	82.31	141.62	300	78.81	1,867.18	20.31
J34	26.21	82.67	141.51	300	78.50	1,701.62	20.31
J40	0.92	82.04	141.31	300	72.78	935.17	20.31
J44	5.54	85.01	141.27	300	74.83	912.19	20.31
J54	2.12	84.01	141.27	300	76.67	1,145.08	20.31
J58	5.83	84.18	141.27	300	76.73	1,137.01	20.31
J62	23.76	87.56	141.24	300	79.80	1,172.44	20.31
J64	15.49	85.49	141.24	300	78.83	1,291.49	20.31
J74	12.29	84.7	141.21	300	75.8	1,028.76	20.31
J80	0.25	84.6	141.21	300	75.63	1,008.51	20.31
J84	0.93	83.5	141.2	300	73.13	900.97	20.31
J88	5.66	84.15	141.2	300	74.60	969.62	20.31
J92	14.04	84.7	141.19	300	74.44	939.27	20.31

17201 - Inspiration Lakeview Water Modelling - May 2021 InfoWater Output - Peak Hour Demand Run Emergency Conditions				
ID	**Demand (L/s)**	**Elevation (m)**	**Head (m)**	**Pressure (psi)**
J10	0	85	139.08	76.88
J100	27.93	80.1	139.54	84.5
J104	10.71	79.92	139.6	84.84
J110	0	79.47	140.17	86.29
J112	0	81.34	139.3	82.4
J114	0	81.23	139.32	82.58
J116	0	79.95	139.62	84.82
J118	0	79.36	139.57	85.6
J120	0	78.33	139.56	87.05
J122	0	79.33	139.57	85.63
J124	0	79.44	139.57	85.47
J126	13.32	80.21	139.56	84.38
J128	5.43	81.35	139.29	82.37
J130	0	82.01	139.29	81.43
J132	0	82.11	139.19	81.13
J134	2.1	81.8	139.86	82.54
J136	0	79.85	139.79	85.21
J138	0	82.78	139.23	80.25
J14	0	81.75	143.87	88.3
J142	0	80.35	142	87.65
J144	0	83.05	139.86	80.75
J146	0	81.26	140.36	84.03
J150	0	78.92	141.05	88.32
J152	0	75.92	140.98	92.48
J154	0	82.07	139.26	81.31
J156	0	81.32	139.33	82.46
J158	0	81.44	139.31	82.27
J16	0	80.46	146.05	93.24
J160	0	85.04	139.08	76.82
J18	0	85.04	143.82	83.56
J190	0	82.36	143.82	87.37
J192	0	81.89	143.82	88.03
J194	0	81.79	143.82	88.18
J196	6.99	84.23	139.08	77.97
J198	48.78	81.77	143.82	88.21
J20	29.43	82.84	139.17	80.07
J200	0	81.35	139.26	82.33
J202	0	81.35	139.26	82.32
J24	27.42	82.29	139.19	80.88
J30	7.71	83.73	139.08	78.69
J34	43.68	83.36	139.08	79.22
J38	0	82.86	139.17	80.05
J40	1.98	83.61	139.17	78.98
J42	0	82.93	139.16	79.94
J44	9.24	81.47	140.36	83.72
J46	0	82.71	140.36	81.95
J48	0	89.79	139.53	70.7
J50	0	80.75	139.51	83.53
J54	3.54	82.17	139.23	81.12
J58	9.72	82.05	139.33	81.42
J62	39.6	79.65	140.17	86.04
J64	26.04	81.1	139.39	82.87
J70	0	81.15	139.37	82.77
J74	20.49	81.63	139.21	81.85
J80	0.54	81.7	139.21	81.75
J84	2.01	82.46	139.25	80.72
J88	9.63	82	139.27	81.41
J92	23.73	81.61	139.33	82.05

Appendix B-2

E-mail Correspondence with the Region of Peel: Equivalent Population Values

Jonathan Nishio

From: Janaani Pathmanapan
Sent: October 3, 2022 10:17 AM
To: Jonathan Nishio
Subject: FW: Request for some information - San Trunk under Lakeshore Road East draining to Beechwood SPS

Hi Jonathan,

We received a response back for the townhouse densities – 3.5ppu

---

From: Motamedi, Kolsoom <kolsoom.motamedi@peelregion.ca>
Sent: October 3, 2022 10:03 AM
To: Koryun Shahbikian <kshahbikian@schaeffers.com>; Polga, Miriam <miriam.polga@peelregion.ca>; Borowiec, Laura <laura.borowiec@peelregion.ca>; Lee, Justin <Justin.Lee@peelregion.ca>; Leyburne, Troy <troy.leyburne@peelregion.ca>
Cc: Michael May <mikem@deltaurban.com>; Andrew Lam <andrewl@deltaurban.com>; Myron Pestaluky <myronp@deltaurban.com>; Hovig Tozcu <hhtozcu@schaeffers.com>; Janaani Pathmanapan <jpathmanapan@schaeffers.com>; Heather Milukow <hmilukow@schaeffers.com>; LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Subject: RE: Request for some information - San Trunk under Lakeshore Road East draining to Beechwood SPS

Hi Koryun,

For your information, The plan is that all flow from the Beach Street Sewage Pumping Station drainage areas will be conveyed by gravity to the Beechwood SPS, through the proposed Aviation Trunk and Lakeshore Road East trunk.
My understanding is that the entire flow from the Rangeview development is planned to be conveyed to the future Lakeshore Road gravity sewer.
For the townhouse please use 3.5 people per unit.

Thanks and Regards,

Kolsoom Motamedi, P.Eng., PMP
Project Manager
Infrastructure Planning - Growth
Public Works, Region of Peel
10 Peel Centre Drive, Suite A, 4th Floor
Brampton, ON L6T 4B9
Tel. (905) 791-7800, ext. 4196
Kolsoom.Motamedi@peelregion.ca

From: Koryun Shahbikian <kshahbikian@schaeffers.com>
Sent: Monday, October 3, 2022 9:46 AM

To: Motamedi, Kolsoom <kolsoom.motamedi@peelregion.ca>; Polga, Miriam <miriam.polga@peelregion.ca>; Borowiec, Laura <laura.borowiec@peelregion.ca>; Lee, Justin <Justin.Lee@peelregion.ca>; Leyburne, Troy <troy.leyburne@peelregion.ca>
Cc: Michael May <mikem@deltaurban.com>; Andrew Lam <andrewl@deltaurban.com>; Myron Pestaluky <myronp@deltaurban.com>; Hovig Tozcu <hhtozcu@schaeffers.com>; Janaani Pathmanapan <jpathmanapan@schaeffers.com>; Heather Milukow <hmilukow@schaeffers.com>; LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Subject: RE: Request for some information - San Trunk under Lakeshore Road East draining to Beechwood SPS

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Hi Kolsoom,
Thanks for your prompt reply.
I will try to provide some clarifications but we will try to provide answers to all your four items through a separate email later.
Concerning item 4, we estimated the population based on units but we used the ppu that we got from the region for another project. The ppu was slightly less than what you have mentioned so we are going to revise our population based on 2.7 ppu per apartment unit. Please also let us know what ppu we should consider for townhouses.
Concerning trunk sewer, in our previous meetings with the region, we were told that all flows from range view should be drained to Beechwood SPS. If you recall, we originally had a plan to split the flow and use the lakeshore trunk as well as Beach Street SPS.
I will talk to LOG for phasing questions and we will provide information.
Thanks,

Koryun Shahbikian, LLB, LLM, M.Eng., P.Eng.
Partner

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CONSULTING ENGINEERS

6 Ronrose Drive, Concord, Ontario, L4K4R3
(905) 738-6100 – Ext. 203
Cell: (647) 212-0404
www.schaeffers.com

From: Motamedi, Kolsoom <kolsoom.motamedi@peelregion.ca>
Sent: October 3, 2022 9:00 AM
To: Koryun Shahbikian <kshahbikian@schaeffers.com>; Polga, Miriam <miriam.polga@peelregion.ca>; Borowiec, Laura <laura.borowiec@peelregion.ca>; Lee, Justin <Justin.Lee@peelregion.ca>; Leyburne, Troy

<troy.leyburne@peelregion.ca>
Cc: Michael May <mikem@deltaurban.com>; Andrew Lam <andrewl@deltaurban.com>; Myron Pestaluky <myronp@deltaurban.com>; Hovig Tozcu <hhtozcu@schaeffers.com>; Janaani Pathmanapan <jpathmanapan@schaeffers.com>; Heather Milukow <hmilukow@schaeffers.com>; LeDrew, Lyle <lyle.ledrew@peelregion.ca>
Subject: RE: Request for some information - San Trunk under Lakeshore Road East draining to Beechwood SPS

Hi Koryun,

Thank you for updating us about Rangview development. Troy Leyburne is the project manager for this project, so I have copied him and also Lyle LeDrew, Manager of wastewater Engineering Service.
The detailed drawings are not ready yet. I had a meeting with Engineering Service and the following information should be clarified.

1- Rangeview project phasing, when service be required
2- Coordination with regards to the connection point location
3- What is your plan for conveying sanitary flows to the future trunk on Lakeshore Road East
4- The final proposed population, at this stage people per unit, be considered (2.7 ppu for apartment buildings and 4.2 for single detached)

Please do not hesitate to contact me if you have any questions.

Thanks and Regards,

Kolsoom Motamedi, P.Eng., PMP
Project Manager
Infrastructure Planning - Growth
Public Works, Region of Peel
10 Peel Centre Drive, Suite A, 4th Floor
Brampton, ON L6T 4B9
Tel. (905) 791-7800, ext. 4196
Kolsoom.Motamedi@peelregion.ca

From: Koryun Shahbikian <kshahbikian@schaeffers.com>
Sent: Saturday, October 1, 2022 9:21 AM
To: Motamedi, Kolsoom <kolsoom.motamedi@peelregion.ca>; Polga, Miriam <miriam.polga@peelregion.ca>; Borowiec, Laura <laura.borowiec@peelregion.ca>; Lee, Justin <Justin.Lee@peelregion.ca>
Cc: Michael May <mikem@deltaurban.com>; Andrew Lam <andrewl@deltaurban.com>; Myron Pestaluky <myronp@deltaurban.com>; Hovig Tozcu <hhtozcu@schaeffers.com>; Janaani Pathmanapan <jpathmanapan@schaeffers.com>; Heather Milukow <hmilukow@schaeffers.com>
Subject: RE: Request for some information - San Trunk under Lakeshore Road East draining to Beechwood SPS

Appendix B-3

Water Demand Calculations

Water Supply Calculations

Project Title: 4938 - Rangeview
Last Edited: 2022-10-28

Municipality Region of Peel

Project: 4938 Rangeview Mississauga
2022-10-28

Design Criteria

Unit Type	Population Density	Unit	Source
Rowhouses/Other Multiples	3.5	ppu	Per correspondence with Region of Peel (Oct 3, 2022)
Apartment	2.7	ppu	Per correspondence with Region of Peel (Oct 3, 2022)

Land Use	Population Density	Unit	Source
Single Family (>10m frontage)	50	ppha	Per Region of Peel Sanitary Sewer Design Criteria (July 2009)
Single Family (<10m frontage)	70	ppha	Per Region of Peel Sanitary Sewer Design Criteria (July 2009)
Semi-detached	70	ppha	Per Region of Peel Sanitary Sewer Design Criteria (July 2009)
Row dwellings	175	ppha	Per Region of Peel Sanitary Sewer Design Criteria (July 2009)
Apartments	475	ppha	Per Region of Peel Sanitary Sewer Design Criteria (July 2009)

								Townhouse Units					Mid-rise Units	Tall Building Units	Equivalent Population					
								Townhouses	*Back-to-Back Townhouses*	*Stacked Townhouses*	*Stacked Back-to-Back Townhouses*	*Apartments*	*Mid-rise Buildings*	*Tall Buildings*	*Unit Type Method*			*Land Use Method*		
Parcel	**Landowners**	**Parcel Area (Gross)**		**Net Developable**		**Parcel Area (Townhouse)**	**Parcel Area (Apartments)**	*(Up to 4-Storeys)*					*(5- to 8-Storeys)*	*(9- to 15-Storeys)*	**Townhouses**	**Apartments**	**Total**	**Townhouses**	**Apartments**	**Total**
		sq.m.	*ha*	*sq.m.*	*ha*	*ha*	*ha*								*persons*	*persons*	*persons*	*persons*	*persons*	*persons*
1	ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	6,198.99	0.62	5,211.39	0.52		0.52						204	62		719	719		247	247
2	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	8,451.90	0.85	7,632.77	0.77	0.32	0.45				48		159		168	430	598	56	214	270
3	1127792 ONTARIO LIMITED (Dino Collini)	4,339.04	0.43	3,868.37	0.38		0.38						145			392	392		181	181
4	*896 Lakeshore Road East*	4,338.68	0.43	3,868.33	0.38		0.38						142			384	384		181	181
5	*910 - 920 Lakeshore Road East*	8,686.81	0.87	5,244.66	0.52		0.52						170	62		627	627		247	247
6	*946 Lakeshore Road East*	7,040.36	0.70	5,723.87	0.57		0.57						179	62		651	651		271	271
7	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	10,735.57	1.07	9,334.79	0.93	0.77	0.16			22	44		135		231	365	596	135	76	211
8	447111 ONTARIO LIMITED (Norstar)	7,833.20	0.78	7,133.15	0.71	0.54	0.17			12	24		138		126	373	499	95	81	176
9	RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	8,590.92	0.86	2,089.15	0.21		0.21						96	62		427	427		100	100
10	ILSCO OF CANADA LIMITED (Thomas Quinn)	6,980.11	0.70	5,820.65	0.59		0.59						197	62		700	700		281	281
11	*1076 Lakeshore Road East*	13,573.97	1.36	8,924.70	0.90	0.52	0.38	12					216	62	42	751	793	91	181	272
12	ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	15,357.62	1.54	8,586.32	0.86	0.45	0.41				68		159		238	430	668	79	195	274
13	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	4,189.30	0.42	2,036.86	0.20	0.20		10							35		35	35		35
14	*895 Rangeview Road*	4,465.52	0.45	3,975.17	0.40	0.40			22						77		77	70		70
15	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	5,653.29	0.57	3,403.54	0.34		0.34						148	62		567	567		162	162
16	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	7,259.45	0.73	7,109.98	0.72	0.27	0.45				20		194	62	70	692	762	48	214	262
17	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	3,627.10	0.36	1,120.74	0.11	0.11					40				140		140	20		20
18	2547046 ONTARIO INC./2545488 ONTARIO INC. (Vittorio Torchia)	3,627.76	0.36	1,856.79	0.18	0.18				18					63		63	32		32
19	DORSAY (LAKESHORE) INC./DORSAY (LAKEFRONT PROMENADE) INC./DORSAY (RANGEVIEW) INC.	5,075.55	0.51	3,554.25	0.36		0.36						154	62		584	584		171	171
20	RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	4,587.89	0.46	1,612.07	0.16		0.16						155	62		586	586		76	76
21	RANGEVIEW 1035 HOLDING INC./RANGEVIEW 1045 HOLDING INC./1207238 ONTARIO INC. (Oasis Banquet Hall)	4,829.66	0.48	4,205.37	0.42	0.42			18						63		63	74		74
22	2547046 ONTARIO INC./2545488 ONTARIO INC. (Vittorio Torchia)	6,054.50	0.61	5,493.77	0.55	0.27	0.28		16				144	62	56	557	613	48	133	181
23	*850 Rangeview Road*	10,354.01	1.04	9,964.00	1.00		1.00	16	20			54			126	146	272		475	475
24	WHITEROCK 880 RANGEVIEW INC. (Dream)	13,146.95	1.31	12,996.05	1.29		1.29	12	36				160	62	168	600	768		613	613
25	*890 Rangeview Road (Canada Post)*	8,627.44	0.86	6,034.17	0.60		0.60		14				120	62	49	492	541		285	285
26	ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	7,258.96	0.73	7,128.45	0.72	0.14	0.58			16			212	62	56	740	796	25	276	301
27	ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	3,621.46	0.36	2,087.67	0.21															
28	ELGROUP HOLDINGS INC./ELIAS BROS. CONSTRUCTION LIMITED (Elias Brothers Construction)	3,625.21	0.36	3,573.98	0.35	0.12	0.23			16			81		56	219	275	21	110	131
29	*1008 Rangeview Road*	3,621.63	0.36	3,569.56	0.35		0.35						108	62		459	459		167	167
30	*1024 Rangeview Road*	3,623.21	0.36	276.43	0.02															
31	2120412 ONTARIO INC. (Xtreme Tire)	7,248.77	0.72	6,069.05	0.60	0.27	0.33	5	12				138	62	60	540	600	48	157	205
32	*1062 Rangeview Road*	3,273.04	0.33	3,232.41	0.33	0.33		5	12						60		60	58		58
33	KOTYCK INVESTMENTS LTD. (Laurie McPherson)	3,491.56	0.35	3,244.53	0.33		0.33						100	62		438	438		157	157
	TOTALS	**219,389.45**	**21.94**	**165,982.98**	**16.58**	**5.31**	**11.04**	**60**	**150**	**84**	**244**	**54**	**3,654**	**1,054**	**1,884**	**12,869**	**14,753**	**935**	**5,251**	**6,186**

LEGEND

Non-participating Landowners

Water Supply Calculations

Project Title: 4938 - Rangeview
Last Edited: 2022-10-28

Municipality Region of Peel

Water Supply Parameters

Residential Parameters

Water Demand	280	L/cap./d
Max Day Factor	2.0	
Peak Hour Factor	3.0	

ICI Parameters

Water Demand	300	L/cap./d
Max Day Factor	1.4	
Peak Hour Factor	3.0	

Water Demand

Residential	280	L/cap./d	Per Region of Peel Watermain Design Criteria (June 2010)
ICI	300	L/emp./d	Per Region of Peel Watermain Design Criteria (June 2010)

Peaking Factors

Residential Max Day Factor	2.00	Per Region of Peel Watermain Design Criteria (June 2010)
Residential Peak Hour Factor	3.00	Per Region of Peel Watermain Design Criteria (June 2010)
ICI Max Day Factor	1.40	Per Region of Peel Watermain Design Criteria (June 2010)
ICI Peak Hour Factor	3.00	Per Region of Peel Watermain Design Criteria (June 2010)

Demands - Rangeview

(shaded) Non-participating Landowners

*Population data per Rangeview Statistics from Bousefield (September 30, 2022)

Parcel	Residential Population	Flow (L/s)				
		Average Day Demand	*Max Day Demand*	*Peak Hour Demand*	*Fire Flow*	*MDD + Fire Flow*
1	719	2.33	4.66	6.99	317	321.66
2	598	1.94	3.88	5.81	317	320.88
3	392	1.27	2.54	3.81	317	319.54
4	384	1.24	2.49	3.73	317	319.49
5	627	2.03	4.06	6.10	317	321.06
6	651	2.11	4.22	6.33	317	321.22
7	596	1.93	3.86	5.79	317	320.86
8	499	1.62	3.23	4.85	317	320.23
9	427	1.38	2.77	4.15	317	319.77
10	700	2.27	4.54	6.81	317	321.54
11	793	2.57	5.14	7.71	317	322.14
12	668	2.16	4.33	6.49	317	321.33
13	35	0.11	0.23	0.34	317	317.23
14	77	0.25	0.50	0.75	317	317.50
15	567	1.84	3.68	5.51	317	320.68
16	762	2.47	4.94	7.41	317	321.94
17	140	0.45	0.91	1.36	317	317.91
18	63	0.20	0.41	0.61	317	317.41
19	584	1.89	3.79	5.68	317	320.79
20	586	1.90	3.80	5.70	317	320.80
21	63	0.20	0.41	0.61	317	317.41
22	613	1.99	3.97	5.96	317	320.97
23	272	0.88	1.76	2.64	317	318.76
24	768	2.49	4.98	7.47	317	321.98
25	541	1.75	3.51	5.26	317	320.51
26	796	2.58	5.16	7.74	317	322.16
27		0.00	0.00	0.00	317	317.00
28	275	0.89	1.78	2.67	317	318.78
29	459	1.49	2.98	4.46	317	319.98
30		0.00	0.00	0.00	317	317.00
31	600	1.94	3.89	5.83	317	320.89
32	60	0.19	0.39	0.58	317	317.39
33	438	1.42	2.84	4.26	317	319.84
Total	14753	47.81	95.62	143.43		

Residential Demands - Lakeview

*Population data per TMIG Lakeview Community Water Modelling Methodology and Analysis Memo (May 6, 2021)

Block Number	Residential Population	Flow (L/s)				
		Average Day Demand	*Max Day Demand*	*Peak Hour*	*Fire Flow*	*MDD + Fire Flow*
1	380	1.23	2.46	3.69	300	302.46
2	620	2.01	4.02	6.03	300	304.02
3	1052	3.41	6.82	10.23	300	306.82
4	836	2.71	5.42	8.13	300	305.42
5	384	1.24	2.49	3.73	300	302.49
6	2128	6.90	13.79	20.69	300	313.79
7	2161	7.00	14.01	21.01	300	314.01
8	2712	8.79	17.58	26.37	300	317.58
9	2220	7.19	14.39	21.58	300	314.39
10	1161	3.76	7.53	11.29	300	307.53
11	1367	4.43	8.86	13.29	300	308.86
12	1745	5.66	11.31	16.97	300	311.31
13	1194	3.87	7.74	11.61	300	307.74
14	1359	4.40	8.81	13.21	300	308.81
15	1056	3.42	6.84	10.27	300	306.84
16	956	3.10	6.20	9.29	300	306.20
17	0	0.00	0.00	0.00	300	300.00
18	711	2.30	4.61	6.91	300	304.61
19	0	0.00	0.00	0.00	300	300.00
20	0	0.00	0.00	0.00	300	300.00
21	0	0.00	0.00	0.00	300	300.00
22	0	0.00	0.00	0.00	300	300.00
23	0	0.00	0.00	0.00	300	300.00
24	0	0.00	0.00	0.00	300	300.00
39	0	0.00	0.00	0.00	300	300.00
31 (park)	0	0.00	0.00	0.00	300	300.00
Total	**22042**	**71.43**	**142.86**	**214.30**		

Employment Demands - Lakeview

*Population data per TMIG Lakeview Community Water Modelling Methodology and Analysis Memo (May 6, 2021)

Block Number	Employment Population	Flow (L/s)		
		Average Day Demand	*Max Day Demand*	*Peak Hour Demand*
1	0	0.00	0.00	0.00
2	0	0.00	0.00	0.00
3	0	0.00	0.00	0.00
4	0	0.00	0.00	0.00
5	0	0.00	0.00	0.00
6	0	0.00	0.00	0.00
7	108	0.35	0.49	1.05
8	0	0.00	0.00	0.00
9	0	0.00	0.00	0.00
10	0	0.00	0.00	0.00
11	74	0.24	0.34	0.72
12	0	0.00	0.00	0.00
13	87	0.28	0.39	0.85
14	0	0.00	0.00	0.00
15	157	0.51	0.71	1.53
16	0	0.00	0.00	0.00
17	87	0.28	0.39	0.85
18	46	0.15	0.21	0.45
19	0	0.00	0.00	0.00
20	217	0.70	0.98	2.11
21	59	0.19	0.27	0.57
22	2980	9.66	13.52	28.97
23	214	0.69	0.97	2.08
24	3197	10.36	14.50	31.08
39	589	1.91	2.67	5.73
31 (park)	229	0.74	1.04	2.23
Total	**8044**	**26.07**	**36.50**	**78.21**

Demands - External Lands per Lakeview Report, PVT 16/17

*Population data per TMIG Lakeview Community Water Modelling Methodology and Analysis Memo (May 6, 2021)

ID	Residential Population	Flow (L/s)				
		Average Day Demand	*Max Day Demand*	*Peak Hour Demand*	*Fire Flow*	*MDD + Fire Flow*
Pvt 16	1493	4.84	9.68	14.52	300	309.68
Pvt 17	1254	4.06	8.13	12.19	300	308.13
Total	**2747**	**8.90**	**17.80**	**26.71**		

Appendix B-4

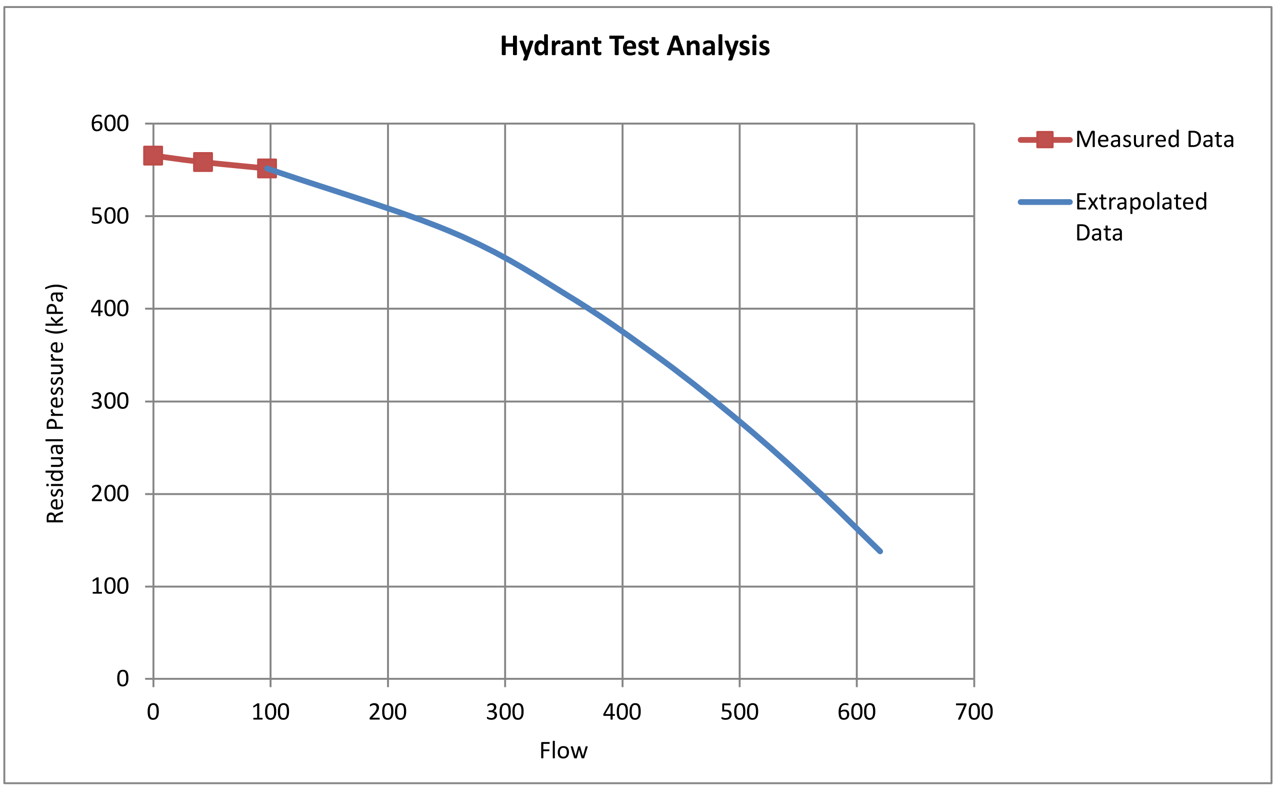
Hydrant Test Results

Rangeview Mississauga
Project No. 4938

Date of Test: 04/23/2021
Test Location: Residual: 1000 Lakeshore Road East, Mississauga
Flow: 1000 Lakeshore Road East, Mississauga

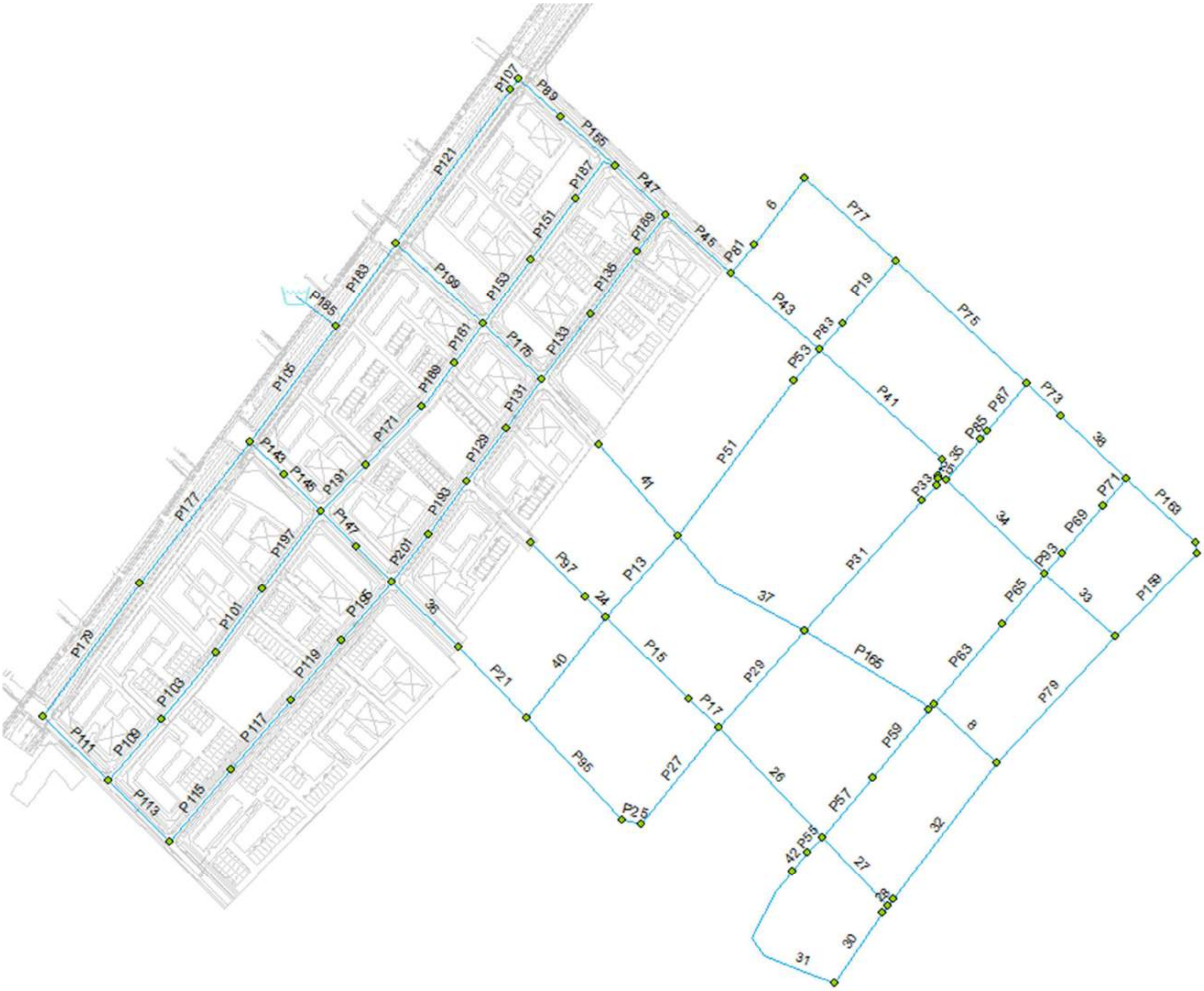
Test Results

	Flow		Residual Pressure	
	US. GPM	L/s	psi	kPa
Measured Data	0	0	82	565
	674	43	81	558
	1538	97	80	552
Extrapolated Data	4047	255	70	483
	5614	354	60	414
	6874	434	50	345
	7961	502	40	276
	8934	564	30	207
	9824	620	20	138



Appendix B-5

InfoWater Model Outputs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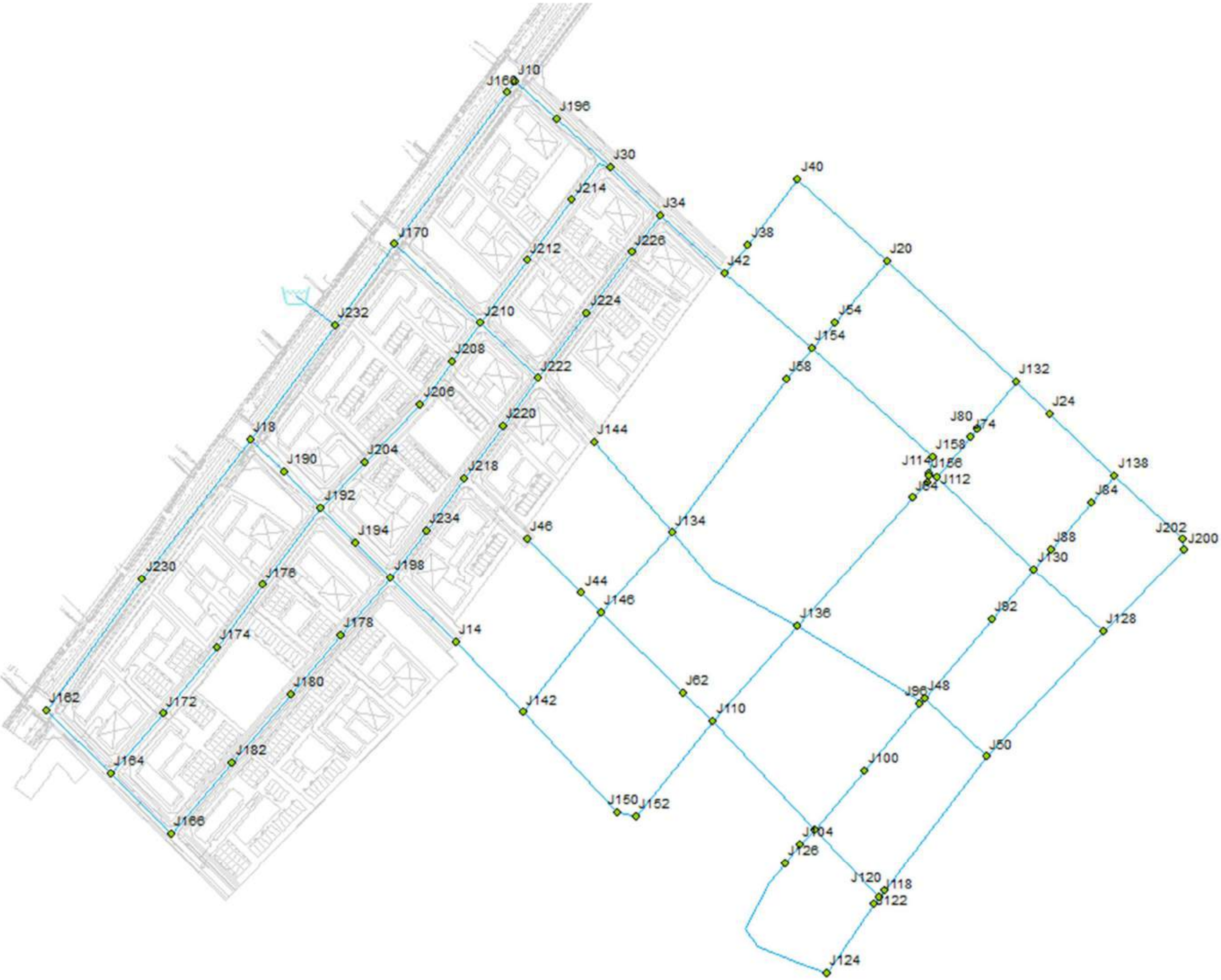
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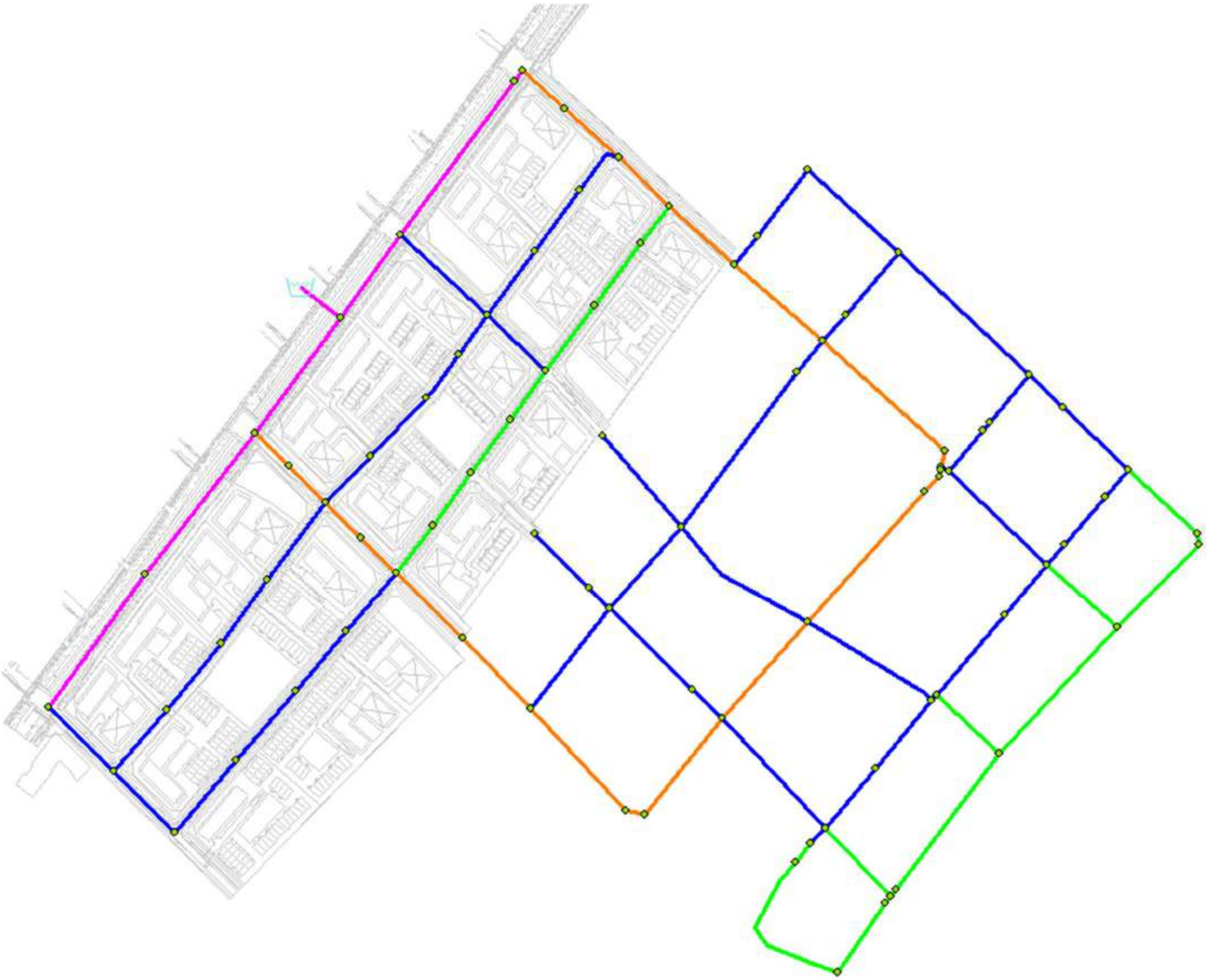

	Color	Size	Break	Label
1		2.00	250.00	less than 250.00
2		2.00	300.00	250.00 ~ 300.00
3		2.00	400.00	300.00 ~ 400.00
4		2.00	600.00	400.00 ~ 600.00

Hydraulic Model Results: Average Day Demand

Project Title: 4938 Rangeview Mississauga
Last Edited: 2022-10-24
Municipality Region of Peel

Junction Pressure (ADD)

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
J10	0	84.9	144.07	84.12
J100	9.81	80.1	143.82	90.58
J104	3.76	79.92	143.82	90.84
J110	0	79.47	143.84	91.51
J112	0	81.34	143.83	88.84
J114	0	81.23	143.84	89
J116	0	79.95	143.82	90.8
J118	0	79.36	143.82	91.63
J120	0	78.33	143.82	93.1
J122	0	79.33	143.82	91.68
J124	0	79.44	143.82	91.52
J126	4.67	80.21	143.81	90.42
J128	1.91	81.35	143.82	88.81
J130	0	82.01	143.82	87.87
J132	0	82.11	143.83	87.74
J134	0.74	81.8	143.85	88.21
J136	0	79.85	143.84	90.97
J138	0	82.78	143.82	86.78
J14	0	81.75	143.94	88.41
J142	0	80.35	143.89	90.33
J144	0	83.05	143.85	86.43
J146	0	81.26	143.85	88.98
J150	0	78.92	143.87	92.33
J152	0	75.92	143.86	96.59
J154	0	82.07	143.85	87.83
J156	0	81.32	143.84	88.87
J158	0	81.44	143.84	88.71
J160	0	85.03	144.07	83.94
J162	0	83.72	144.08	85.81
J164	0	81.79	144.03	88.48
J166	0	80.85	144.02	89.8
J170	0	86.05	144.09	82.51
J172	4.27	82.23	144.02	87.85
J174	1.27	82.89	144.02	86.9
J176	3.28	83.56	144.02	85.95
J178	3.84	82.34	143.98	87.63
J18	0	86.12	144.09	82.4
J180	2.6	82	143.99	88.12
J182	3.04	81.32	144	89.1
J190	0	82.36	144.05	87.7
J192	0	81.89	144.02	88.32
J194	0	81.79	144	88.43
J196	2.45	84.23	144.04	85.02
J198	0	81.77	143.98	88.44
J20	10.36	82.84	143.84	86.72
J200	0	81.35	143.82	88.81
J202	0	81.35	143.82	88.81
J204	2.11	84.51	144.01	84.59
J206	1.93	85.01	144.01	83.87
J208	1.62	85.31	144.01	83.45
J210	1.38	85.52	144.01	83.15
J212	2.27	84.83	144	84.11
J214	2.57	84.13	143.99	85.09
J218	0.66	83.55	143.98	85.9
J220	4.27	83.93	143.98	85.36
J222	0	83.84	143.99	85.5
J224	4.05	83.31	143.96	86.22
J226	3.61	82.99	143.95	86.66
J230	0	85.14	144.08	83.79
J232	0	86.44	144.11	81.98
J234	5.05	82.62	143.98	87.23
J24	9.66	82.29	143.82	87.47
J30	2.71	83.73	143.99	85.66
J34	8.9	83.36	143.95	86.14
J38	0	82.86	143.89	86.76
J40	0.69	83.61	143.87	85.66
J42	0	82.93	143.89	86.67
J44	3.24	81.47	143.85	88.68
J46	0	82.71	143.85	86.92
J48	0	80.79	143.82	89.6
J50	0	80.75	143.82	89.66
J54	1.24	82.17	143.85	87.68
J58	3.41	82.05	143.85	87.86
J62	14.25	79.65	143.84	91.25
J64	8.79	81.1	143.84	89.19
J70	0	81.15	143.84	89.12
J74	7.19	81.63	143.83	88.42
J80	0.19	81.7	143.83	88.32
J84	0.7	82.46	143.82	87.23
J88	3.38	82	143.82	87.88
J92	8.34	81.61	143.82	88.44
J96	0	80.91	143.82	89.43

Pipe Data (ADD)

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status
24	J44	J146	37.79	300	120	-3.24	0.05	0	0.01	Open
25	J112	J114	11.08	300	120	-17.92	0.25	0	0.31	Open
26	J110	J116	162.84	300	120	11.89	0.17	0.02	0.14	Open
27	J116	J118	103.23	200	120	0.74	0.02	0	0.01	Open
28	J120	J118	17.79	200	120	0.72	0.02	0	0.01	Open
29	J118	J122	14.95	200	120	1.46	0.05	0	0.02	Open
30	J122	J124	88.59	200	120	1.46	0.05	0	0.02	Open
31	J124	J126	144.09	200	120	1.46	0.05	0	0.02	Open
32	J50	J120	146.51	200	120	0.72	0.02	0	0.01	Open
33	J130	J128	112.4	200	120	1.08	0.03	0	0.01	Open
34	J130	J112	156.59	300	120	-8.84	0.12	0.01	0.08	Open
35	J74	J112	79.98	300	120	-9.08	0.13	0.01	0.09	Open
36	J198	J14	97.33	400	120	44.45	0.35	0.04	0.41	Open
37	J134	J136	166.63	300	120	7.15	0.1	0.01	0.06	Open
38	J138	J24	110.22	300	120	-1.44	0.02	0	0	Open
40	J142	J146	135.17	300	120	17.44	0.25	0.04	0.29	Open
41	J144	J134	154.56	300	120	0	0	0	0	Open
42	J126	J104	40.45	200	120	-3.21	0.1	0	0.09	Open
6	J40	J38	120.78	300	120	-13.02	0.18	0.02	0.17	Open
8	J48	J50	91.46	200	120	0.97	0.03	0	0.01	Open
P101	J176	J174	85.38	300	120	-3.8	0.05	0	0.02	Open
P103	J174	J172	93.42	300	120	-5.07	0.07	0	0.03	Open
P105	J18	J232	155.9	600	120	-74.85	0.26	0.02	0.15	Open
P107	J160	J10	17.35	600	120	52.78	0.19	0	0.08	Open
P109	J172	J164	87.09	300	120	-9.34	0.13	0.01	0.09	Open
P111	J162	J164	99.75	300	120	22.66	0.32	0.05	0.48	Open
P113	J164	J166	93.28	300	120	13.32	0.19	0.02	0.18	Open
P115	J166	J182	103.28	300	120	13.32	0.19	0.02	0.18	Open
P117	J182	J180	97.96	300	120	10.28	0.15	0.01	0.11	Open
P119	J180	J178	85.13	300	120	7.68	0.11	0.01	0.06	Open
P121	J170	J160	222.37	600	120	52.78	0.19	0.02	0.08	Open
P129	J218	J220	71.02	250	110	-2.07	0.04	0	0.02	Open
P13	J146	J134	109.84	300	120	5.01	0.07	0	0.03	Open
P131	J220	J222	64.95	250	110	-6.34	0.13	0.01	0.13	Open
P133	J222	J224	89.72	250	110	9.83	0.2	0.03	0.29	Open
P135	J224	J226	83.02	250	110	5.78	0.12	0.01	0.11	Open
P143	J18	J190	61.03	400	120	52.19	0.42	0.03	0.55	Open
P145	J190	J192	58.87	400	120	52.19	0.42	0.03	0.55	Open
P147	J192	J194	53.81	400	120	44.24	0.35	0.02	0.41	Open
P15	J146	J62	118.8	300	120	9.19	0.13	0.01	0.09	Open
P151	J214	J212	82.47	300	120	-9.56	0.14	0.01	0.1	Open
P153	J212	J210	85.62	300	120	-11.83	0.17	0.01	0.14	Open
P155	J196	J30	100.45	400	120	50.33	0.4	0.05	0.51	Open
P157	J194	J198	45.99	400	120	44.24	0.35	0.02	0.41	Open
P159	J128	J200	133.31	200	120	-0.58	0.02	0	0	Open
P161	J210	J208	52.95	300	120	-2.81	0.04	0	0.01	Open
P163	J202	J138	119.12	200	120	-0.58	0.02	0	0	Open
P165	J136	J96	166.15	300	120	10.41	0.15	0.02	0.11	Open
P167	J200	J202	11.25	200	120	-0.58	0.02	0	0	Open
P169	J208	J206	57.99	300	120	-4.43	0.06	0	0.02	Open
P17	J62	J110	47.94	300	120	-5.06	0.07	0	0.03	Open
P171	J206	J204	88.86	300	120	-6.36	0.09	0	0.05	Open
P175	J210	J222	86.86	300	120	16.17	0.23	0.02	0.26	Open
P177	J18	J230	193.5	600	120	22.66	0.08	0	0.02	Open
P179	J230	J162	178.15	600	120	22.66	0.08	0	0.02	Open
P183	J232	J170	110.92	600	120	79.35	0.28	0.02	0.17	Open
P185	RES9002	J232	1	600	120	154.21	0.55	0	0.57	Open
P187	J214	J30	62.97	300	120	6.99	0.1	0	0.05	Open
P189	J226	J34	51.07	250	110	2.17	0.04	0	0.02	Open
P19	J20	J54	117.59	300	120	-7.42	0.11	0.01	0.06	Open
P191	J204	J192	68.52	300	120	-8.47	0.12	0.01	0.08	Open
P193	J218	J234	71.16	250	110	1.41	0.03	0	0.01	Open
P195	J198	J178	83.36	300	120	-3.84	0.05	0	0.02	Open
P197	J192	J176	106.15	300	120	-0.52	0.01	0	0	Open
P199	J170	J210	128.03	300	120	26.57	0.38	0.08	0.64	Open
P201	J234	J198	64.68	250	110	-3.64	0.07	0	0.05	Open
P21	J14	J142	116.76	400	120	44.45	0.35	0.05	0.41	Open
P25	J150	J152	12.66	400	120	27.01	0.21	0	0.16	Open
P27	J152	J110	132.14	400	120	27.01	0.21	0.02	0.16	Open
P29	J110	J136	128.24	400	120	10.06	0.08	0	0.03	Open
P31	J136	J64	180.81	400	120	6.8	0.05	0	0.01	Open
P33	J64	J70	14.43	400	120	-1.99	0.02	0	0	Open
P35	J70	J156	34.75	400	120	-1.99	0.02	0	0	Open
P37	J156	J114	6.2	400	120	-1.99	0.02	0	0	Open
P39	J114	J158	17.17	400	120	-19.91	0.16	0	0.09	Open
P41	J154	J158	153.05	400	120	19.91	0.16	0.01	0.09	Open
P43	J42	J154	156.43	400	120	34.86	0.28	0.04	0.26	Open
P45	J34	J42	120.68	400	120	47.88	0.38	0.06	0.47	Open
P47	J30	J34	57.66	400	120	54.61	0.43	0.03	0.6	Open
P51	J58	J134	228.31	300	120	2.88	0.04	0	0.01	Open
P53	J154	J58	39.98	300	120	6.29	0.09	0	0.04	Open
P55	J104	J116	41.94	300	120	-6.97	0.1	0	0.05	Open
P57	J116	J100	77.25	300	120	4.18	0.06	0	0.02	Open
P59	J100	J96	84.08	300	120	-5.63	0.08	0	0.04	Open
P61	J96	J48	6.45	300	120	4.78	0.07	0	0.03	Open
P63	J48	J92	120.82	300	120	3.81	0.05	0	0.02	Open
P65	J92	J130	97.59	300	120	-4.53	0.06	0	0.02	Open
P69	J84	J88	69.9	300	120	0.15	0	0	0	Open
P71	J138	J84	53.85	300	120	0.85	0.01	0	0	Open
P73	J132	J24	44.79	300	120	11.1	0.16	0.01	0.13	Open
P75	J20	J132	172.6	300	120	9.39	0.13	0.02	0.09	Open
P77	J40	J20	159.11	300	120	12.33	0.17	0.02	0.15	Open
P79	J50	J128	234.05	200	120	0.25	0.01	0	0	Open
P81	J38	J42	35.3	300	120	-13.02	0.18	0.01	0.17	Open
P83	J54	J154	41.53	300	120	-8.66	0.12	0	0.08	Open
P85	J80	J74	13.52	300	120	-1.89	0.03	0	0	Open
P87	J132	J80	74.26	300	120	-1.7	0.02	0	0	Open
P89	J10	J196	62.59	400	120	52.78	0.42	0.04	0.56	Open
P93	J88	J130	30.88	300	120	-3.23	0.05	0	0.01	Open
P95	J142	J150	156.08	400	120	27.01	0.21	0.03	0.16	Open
P97	J46	J44	100.05	300	120	0	0	0	0	Open

Hydraulic Model Results: Maximum Day Demand

Project Title: 4938 Rangeview Mississauga
Last Edited: 2022-10-24
Municipality Region of Peel

Junction Pressure (MDD)

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
J10	0	84.9	143.99	84
J100	19.44	80.1	143.18	89.67
J104	7.53	79.92	143.18	89.93
J110	0	79.47	143.26	90.68
J112	0	81.34	143.24	87.99
J114	0	81.23	143.25	88.16
J116	0	79.95	143.19	89.89
J118	0	79.36	143.18	90.73
J120	0	78.33	143.19	92.2
J122	0	79.33	143.18	90.77
J124	0	79.44	143.18	90.61
J126	9.2	80.21	143.16	89.5
J128	2.67	81.35	143.19	87.92
J130	0	82.01	143.2	86.98
J132	0	82.11	143.22	86.87
J134	1.04	81.8	143.28	87.4
J136	0	79.85	143.25	90.13
J138	0	82.78	143.2	85.89
J14	0	81.75	143.56	87.87
J142	0	80.35	143.41	89.65
J144	0	83.05	143.28	85.62
J146	0	81.26	143.29	88.18
J150	0	78.92	143.33	91.57
J152	0	75.92	143.33	95.82
J154	0	82.07	143.3	87.04
J156	0	81.32	143.25	88.03
J158	0	81.44	143.25	87.87
J160	0	85.03	143.99	83.82
J162	0	83.72	144.01	85.71
J164	0	81.79	143.85	88.23
J166	0	80.85	143.8	89.49
J170	0	86.05	144.05	82.45
J172	8.54	82.23	143.83	87.57
J174	2.54	82.89	143.82	86.62
J176	6.55	83.56	143.81	85.66
J178	7.68	82.34	143.69	87.21
J18	0	86.12	144.03	82.33
J180	5.2	82	143.7	87.72
J182	6.07	81.32	143.74	88.73
J190	0	82.36	143.92	87.51
J192	0	81.89	143.81	88.03
J194	0	81.79	143.74	88.07
J196	4.82	84.23	143.87	84.79
J198	0	81.77	143.68	88.02
J20	14.5	82.84	143.28	85.91
J200	0	81.35	143.2	87.92
J202	0	81.35	143.2	87.92
J204	4.22	84.51	143.8	84.28
J206	3.86	85.01	143.78	83.55
J208	3.23	85.31	143.78	83.12
J210	2.77	85.52	143.78	82.82
J212	4.54	84.83	143.74	83.75
J214	5.14	84.13	143.72	84.71
J218	1.32	83.55	143.67	85.47
J220	8.54	83.93	143.68	84.94
J222	0	83.84	143.71	85.1
J224	8.1	83.31	143.62	85.74
J226	7.21	82.99	143.6	86.16
J230	0	85.14	144.02	83.7
J232	0	86.44	144.11	81.98
J234	10.1	82.62	143.67	86.79
J24	13.52	82.29	143.2	86.59
J30	5.42	83.73	143.71	85.26
J34	17.8	83.36	143.6	85.63
J38	0	82.86	143.41	86.07
J40	0.97	83.61	143.35	84.92
J42	0	82.93	143.42	86
J44	6.48	81.47	143.29	87.88
J46	0	82.71	143.29	86.12
J48	0	80.79	143.19	88.71
J50	0	80.75	143.19	88.77
J54	2.49	82.17	143.29	86.89
J58	6.82	82.05	143.29	87.06
J62	28.29	79.65	143.25	90.42
J64	17.58	81.1	143.25	88.35
J70	0	81.15	143.25	88.27
J74	14.39	81.63	143.22	87.55
J80	0.27	81.7	143.22	87.45
J84	0.98	82.46	143.2	86.35
J88	6.59	82	143.2	87
J92	16.37	81.61	143.19	87.54
J96	0	80.91	143.19	88.54

Pipe Data (MDD)

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status
24	J44	J146	37.79	300	120	-6.48	0.09	0	0.05	Open
25	J112	J114	11.08	300	120	-31.07	0.44	0.01	0.86	Open
26	J110	J116	162.84	300	120	22.16	0.31	0.07	0.46	Open
27	J116	J118	103.23	200	120	0.9	0.03	0	0.01	Open
28	J120	J118	17.79	200	120	2.08	0.07	0	0.04	Open
29	J118	J122	14.95	200	120	2.97	0.09	0	0.08	Open
30	J122	J124	88.59	200	120	2.97	0.09	0.01	0.08	Open
31	J124	J126	144.09	200	120	2.97	0.09	0.01	0.08	Open
32	J50	J120	146.51	200	120	2.08	0.07	0.01	0.04	Open
33	J130	J128	112.4	200	120	2.09	0.07	0	0.04	Open
34	J130	J112	156.59	300	120	-15.91	0.23	0.04	0.25	Open
35	J74	J112	79.98	300	120	-15.16	0.21	0.02	0.23	Open
36	J198	J14	97.33	400	120	81.98	0.65	0.12	1.27	Open
37	J134	J136	166.63	300	120	13.34	0.19	0.03	0.18	Open
38	J138	J24	110.22	300	120	-5.5	0.08	0	0.03	Open
40	J142	J146	135.17	300	120	32.13	0.45	0.12	0.91	Open
41	J144	J134	154.56	300	120	0	0	0	0	Open
42	J126	J104	40.45	200	120	-6.23	0.2	0.01	0.31	Open
6	J40	J38	120.78	300	120	-23	0.33	0.06	0.49	Open
8	J48	J50	91.46	200	120	1.14	0.04	0	0.01	Open
P101	J176	J174	85.38	300	120	-6.8	0.1	0	0.05	Open
P103	J174	J172	93.42	300	120	-9.34	0.13	0.01	0.09	Open
P105	J18	J232	155.9	600	120	-142.45	0.5	0.08	0.49	Open
P107	J160	J10	17.35	600	120	99.78	0.35	0	0.25	Open
P109	J172	J164	87.09	300	120	-17.88	0.25	0.03	0.31	Open
P111	J162	J164	99.75	300	120	43.21	0.61	0.16	1.58	Open
P113	J164	J166	93.28	300	120	25.33	0.36	0.05	0.59	Open
P115	J166	J182	103.28	300	120	25.33	0.36	0.06	0.59	Open
P117	J182	J180	97.96	300	120	19.26	0.27	0.03	0.35	Open
P119	J180	J178	85.13	300	120	14.06	0.2	0.02	0.2	Open
P121	J170	J160	222.37	600	120	99.78	0.35	0.06	0.25	Open
P129	J218	J220	71.02	250	110	-3.76	0.08	0	0.05	Open
P13	J146	J134	109.84	300	120	8.21	0.12	0.01	0.07	Open
P131	J220	J222	64.95	250	110	-12.3	0.25	0.03	0.44	Open
P133	J222	J224	89.72	250	110	18.34	0.37	0.08	0.92	Open
P135	J224	J226	83.02	250	110	10.24	0.21	0.03	0.31	Open
P143	J18	J190	61.03	400	120	99.24	0.79	0.11	1.81	Open
P145	J190	J192	58.87	400	120	99.24	0.79	0.11	1.81	Open
P147	J192	J194	53.81	400	120	83.26	0.66	0.07	1.31	Open
P15	J146	J62	118.8	300	120	17.45	0.25	0.03	0.29	Open
P151	J214	J212	82.47	300	120	-17.52	0.25	0.02	0.3	Open
P153	J212	J210	85.62	300	120	-22.06	0.31	0.04	0.45	Open
P155	J196	J30	100.45	400	120	94.96	0.76	0.17	1.67	Open
P157	J194	J198	45.99	400	120	83.26	0.66	0.06	1.31	Open
P159	J128	J200	133.31	200	120	-1.51	0.05	0	0.02	Open
P161	J210	J208	52.95	300	120	-4.92	0.07	0	0.03	Open
P163	J202	J138	119.12	200	120	-1.51	0.05	0	0.02	Open
P165	J136	J96	166.15	300	120	19.21	0.27	0.06	0.35	Open
P167	J200	J202	11.25	200	120	-1.51	0.05	0	0.02	Open
P169	J208	J206	57.99	300	120	-8.15	0.12	0	0.07	Open
P17	J62	J110	47.94	300	120	-10.84	0.15	0.01	0.12	Open
P171	J206	J204	88.86	300	120	-12.01	0.17	0.01	0.15	Open
P175	J210	J222	86.86	300	120	30.64	0.43	0.07	0.83	Open
P177	J18	J230	193.5	600	120	43.21	0.15	0.01	0.05	Open
P179	J230	J162	178.15	600	120	43.21	0.15	0.01	0.05	Open
P183	J232	J170	110.92	600	120	150.32	0.53	0.06	0.54	Open
P185	RES9002	J232	1	600	120	292.78	1.04	0	1.87	Open
P187	J214	J30	62.97	300	120	12.38	0.18	0.01	0.16	Open
P189	J226	J34	51.07	250	110	3.03	0.06	0	0.03	Open
P19	J20	J54	117.59	300	120	-10.99	0.16	0.01	0.12	Open
P191	J204	J192	68.52	300	120	-16.23	0.23	0.02	0.26	Open
P193	J218	J234	71.16	250	110	2.44	0.05	0	0.02	Open
P195	J198	J178	83.36	300	120	-6.38	0.09	0	0.05	Open
P197	J192	J176	106.15	300	120	-0.25	0	0	0	Open
P199	J170	J210	128.03	300	120	50.55	0.72	0.27	2.11	Open
P201	J234	J198	64.68	250	110	-7.66	0.16	0.01	0.18	Open
P21	J14	J142	116.76	400	120	81.98	0.65	0.15	1.27	Open
P25	J150	J152	12.66	400	120	49.85	0.4	0.01	0.51	Open
P27	J152	J110	132.14	400	120	49.85	0.4	0.07	0.51	Open
P29	J110	J136	128.24	400	120	16.84	0.13	0.01	0.07	Open
P31	J136	J64	180.81	400	120	10.97	0.09	0.01	0.03	Open
P33	J64	J70	14.43	400	120	-6.61	0.05	0	0.01	Open
P35	J70	J156	34.75	400	120	-6.61	0.05	0	0.01	Open
P37	J156	J114	6.2	400	120	-6.61	0.05	0	0.01	Open
P39	J114	J158	17.17	400	120	-37.68	0.3	0.01	0.3	Open
P41	J154	J158	153.05	400	120	37.68	0.3	0.05	0.3	Open
P43	J42	J154	156.43	400	120	64.15	0.51	0.13	0.81	Open
P45	J34	J42	120.68	400	120	87.15	0.69	0.17	1.42	Open
P47	J30	J34	57.66	400	120	101.92	0.81	0.11	1.9	Open
P51	J58	J134	228.31	300	120	6.17	0.09	0.01	0.04	Open
P53	J154	J58	39.98	300	120	12.99	0.18	0.01	0.17	Open
P55	J104	J116	41.94	300	120	-13.76	0.19	0.01	0.19	Open
P57	J116	J100	77.25	300	120	7.51	0.11	0	0.06	Open
P59	J100	J96	84.08	300	120	-11.93	0.17	0.01	0.15	Open
P61	J96	J48	6.45	300	120	7.27	0.1	0	0.06	Open
P63	J48	J92	120.82	300	120	6.13	0.09	0.01	0.04	Open
P65	J92	J130	97.59	300	120	-10.24	0.14	0.01	0.11	Open
P69	J84	J88	69.9	300	120	3.01	0.04	0	0.01	Open
P71	J138	J84	53.85	300	120	3.99	0.06	0	0.02	Open
P73	J132	J24	44.79	300	120	19.02	0.27	0.02	0.34	Open
P75	J20	J132	172.6	300	120	18.52	0.26	0.06	0.33	Open
P77	J40	J20	159.11	300	120	22.03	0.31	0.07	0.45	Open
P79	J50	J128	234.05	200	120	-0.93	0.03	0	0.01	Open
P81	J38	J42	35.3	300	120	-23	0.33	0.02	0.49	Open
P83	J54	J154	41.53	300	120	-13.48	0.19	0.01	0.18	Open
P85	J80	J74	13.52	300	120	-0.77	0.01	0	0	Open
P87	J132	J80	74.26	300	120	-0.5	0.01	0	0	Open
P89	J10	J196	62.59	400	120	99.78	0.79	0.11	1.83	Open
P93	J88	J130	30.88	300	120	-3.58	0.05	0	0.02	Open
P95	J142	J150	156.08	400	120	49.85	0.4	0.08	0.51	Open
P97	J46	J44	100.05	300	120	0	0	0	0	Open

Hydraulic Model Results: Peak Hour Demand

Project Title: 4938 Rangeview Mississauga
Last Edited: 2022-10-24
Municipality Region of Peel

Junction Pressure (PHD)

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
J10	0	84.9	143.82	83.76
J100	29.42	80.1	141.88	87.82
J104	11.29	79.92	141.87	88.07
J110	0	79.47	142.07	88.99
J112	0	81.34	142	86.24
J114	0	81.23	142.03	86.43
J116	0	79.95	141.89	88.05
J118	0	79.36	141.89	88.89
J120	0	78.33	141.89	90.35
J122	0	79.33	141.88	88.92
J124	0	79.44	141.87	88.75
J126	14.01	80.21	141.84	87.62
J128	5.73	81.35	141.89	86.06
J130	0	82.01	141.9	85.14
J132	0	82.11	141.94	85.06
J134	2.23	81.8	142.12	85.74
J136	0	79.85	142.04	88.41
J138	0	82.78	141.9	84.04
J14	0	81.75	142.81	86.8
J142	0	80.35	142.44	88.27
J144	0	83.05	142.12	83.97
J146	0	81.26	142.14	86.55
J150	0	78.92	142.25	90.03
J152	0	75.92	142.23	94.27
J154	0	82.07	142.15	85.41
J156	0	81.32	142.03	86.3
J158	0	81.44	142.04	86.15
J160	0	85.03	143.83	83.59
J162	0	83.72	143.88	85.53
J164	0	81.79	143.52	87.75
J166	0	80.85	143.39	88.91
J170	0	86.05	143.96	82.33
J172	12.8	82.23	143.46	87.04
J174	3.81	82.89	143.43	86.07
J176	9.83	83.56	143.42	85.1
J178	11.52	82.34	143.13	86.41
J18	0	86.12	143.93	82.18
J180	7.81	82	143.17	86.95
J182	9.11	81.32	143.25	88.04
J190	0	82.36	143.67	87.16
J192	0	81.89	143.42	87.47
J194	0	81.79	143.26	87.38
J196	7.36	84.23	143.55	84.33
J198	0	81.77	143.11	87.21
J20	31.08	82.84	142.07	84.2
J200	0	81.35	141.89	86.07
J202	0	81.35	141.9	86.07
J204	6.33	84.51	143.38	83.69
J206	5.79	85.01	143.35	82.94
J208	4.85	85.31	143.34	82.5
J210	4.15	85.52	143.34	82.19
J212	6.81	84.83	143.24	83.04
J214	7.71	84.13	143.18	83.95
J218	1.97	83.55	143.1	84.65
J220	12.81	83.93	143.1	84.12
J222	0	83.84	143.17	84.34
J224	12.14	83.31	142.97	84.81
J226	10.82	82.99	142.9	85.17
J230	0	85.14	143.9	83.54
J232	0	86.44	144.11	81.98
J234	15.15	82.62	143.09	85.97
J24	28.97	82.29	141.9	84.74
J30	8.13	83.73	143.16	84.48
J34	26.71	83.36	142.89	84.63
J38	0	82.86	142.41	84.66
J40	2.08	83.61	142.26	83.37
J42	0	82.93	142.46	84.63
J44	9.72	81.47	142.14	86.24
J46	0	82.71	142.14	84.48
J48	0	80.79	141.9	86.87
J50	0	80.75	141.89	86.92
J54	3.73	82.17	142.12	85.23
J58	10.23	82.05	142.13	85.41
J62	42.75	79.65	142.06	88.72
J64	26.37	81.1	142.03	86.61
J70	0	81.15	142.03	86.54
J74	21.58	81.63	141.95	85.75
J80	0.57	81.7	141.95	85.65
J84	2.11	82.46	141.9	84.5
J88	10.14	82	141.9	85.15
J92	25.01	81.61	141.88	85.68
J96	0	80.91	141.9	86.7

Pipe Data (PHD)

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status
24	J44	J146	37.79	300	120	-9.72	0.14	0	0.1	Open
25	J112	J114	11.08	300	120	-53.76	0.76	0.03	2.36	Open
26	J110	J116	162.84	300	120	35.67	0.5	0.18	1.1	Open
27	J116	J118	103.23	200	120	2.23	0.07	0	0.05	Open
28	J120	J118	17.79	200	120	2.17	0.07	0	0.04	Open
29	J118	J122	14.95	200	120	4.4	0.14	0	0.16	Open
30	J122	J124	88.59	200	120	4.4	0.14	0.01	0.16	Open
31	J124	J126	144.09	200	120	4.4	0.14	0.02	0.16	Open
32	J50	J120	146.51	200	120	2.17	0.07	0.01	0.04	Open
33	J130	J128	112.4	200	120	3.22	0.1	0.01	0.09	Open
34	J130	J112	156.59	300	120	-26.5	0.37	0.1	0.64	Open
35	J74	J112	79.98	300	120	-27.26	0.39	0.05	0.67	Open
36	J198	J14	97.33	400	120	133.36	1.06	0.3	3.13	Open
37	J134	J136	166.63	300	120	21.43	0.3	0.07	0.43	Open
38	J138	J24	110.22	300	120	-4.31	0.06	0	0.02	Open
40	J142	J146	135.17	300	120	52.32	0.74	0.3	2.25	Open
41	J144	J134	154.56	300	120	0	0	0	0	Open
42	J126	J104	40.45	200	120	-9.61	0.31	0.03	0.7	Open
6	J40	J38	120.78	300	120	-39.06	0.55	0.16	1.31	Open
8	J48	J50	91.46	200	120	2.93	0.09	0.01	0.08	Open
P101	J176	J174	85.38	300	120	-11.41	0.16	0.01	0.13	Open
P103	J174	J172	93.42	300	120	-15.22	0.22	0.02	0.23	Open
P105	J18	J232	155.9	600	120	-224.55	0.79	0.18	1.14	Open
P107	J160	J10	17.35	600	120	158.35	0.56	0.01	0.6	Open
P109	J172	J164	87.09	300	120	-28.02	0.4	0.06	0.71	Open
P111	J162	J164	99.75	300	120	67.99	0.96	0.36	3.65	Open
P113	J164	J166	93.28	300	120	39.97	0.57	0.13	1.36	Open
P115	J166	J182	103.28	300	120	39.97	0.57	0.14	1.36	Open
P117	J182	J180	97.96	300	120	30.86	0.44	0.08	0.84	Open
P119	J180	J178	85.13	300	120	23.05	0.33	0.04	0.49	Open
P121	J170	J160	222.37	600	120	158.35	0.56	0.13	0.6	Open
P129	J218	J220	71.02	250	110	-6.21	0.13	0.01	0.12	Open
P13	J146	J134	109.84	300	120	15.03	0.21	0.02	0.22	Open
P131	J220	J222	64.95	250	110	-19.02	0.39	0.06	0.98	Open
P133	J222	J224	89.72	250	110	29.5	0.6	0.2	2.22	Open
P135	J224	J226	83.02	250	110	17.36	0.35	0.07	0.83	Open
P143	J18	J190	61.03	400	120	156.56	1.25	0.26	4.21	Open
P145	J190	J192	58.87	400	120	156.56	1.25	0.25	4.21	Open
P147	J192	J194	53.81	400	120	132.73	1.06	0.17	3.1	Open
P15	J146	J62	118.8	300	120	27.57	0.39	0.08	0.69	Open
P151	J214	J212	82.47	300	120	-28.68	0.41	0.06	0.74	Open
P153	J212	J210	85.62	300	120	-35.49	0.5	0.09	1.09	Open
P155	J196	J30	100.45	400	120	150.99	1.2	0.4	3.94	Open
P157	J194	J198	45.99	400	120	132.73	1.06	0.14	3.1	Open
P159	J128	J200	133.31	200	120	-1.75	0.06	0	0.03	Open
P161	J210	J208	52.95	300	120	-8.44	0.12	0	0.08	Open
P163	J202	J138	119.12	200	120	-1.75	0.06	0	0.03	Open
P165	J136	J96	166.15	300	120	31.22	0.44	0.14	0.86	Open
P167	J200	J202	11.25	200	120	-1.75	0.06	0	0.03	Open
P169	J208	J206	57.99	300	120	-13.29	0.19	0.01	0.18	Open
P17	J62	J110	47.94	300	120	-15.18	0.21	0.01	0.23	Open
P171	J206	J204	88.86	300	120	-19.08	0.27	0.03	0.35	Open
P175	J210	J222	86.86	300	120	48.52	0.69	0.17	1.95	Open
P177	J18	J230	193.5	600	120	67.99	0.24	0.02	0.12	Open
P179	J230	J162	178.15	600	120	67.99	0.24	0.02	0.12	Open
P183	J232	J170	110.92	600	120	238.07	0.84	0.14	1.27	Open
P185	RES9002	J232	1	600	120	462.63	1.64	0	4.35	Open
P187	J214	J30	62.97	300	120	20.97	0.3	0.03	0.41	Open
P189	J226	J34	51.07	250	110	6.54	0.13	0.01	0.14	Open
P19	J20	J54	117.59	300	120	-22.27	0.32	0.05	0.46	Open
P191	J204	J192	68.52	300	120	-25.41	0.36	0.04	0.59	Open
P193	J218	J234	71.16	250	110	4.24	0.09	0	0.06	Open
P195	J198	J178	83.36	300	120	-11.53	0.16	0.01	0.14	Open
P197	J192	J176	106.15	300	120	-1.58	0.02	0	0	Open
P199	J170	J210	128.03	300	120	79.72	1.13	0.63	4.9	Open
P201	J234	J198	64.68	250	110	-10.91	0.22	0.02	0.35	Open
P21	J14	J142	116.76	400	120	133.36	1.06	0.37	3.13	Open
P25	J150	J152	12.66	400	120	81.03	0.64	0.02	1.24	Open
P27	J152	J110	132.14	400	120	81.03	0.64	0.16	1.24	Open
P29	J110	J136	128.24	400	120	30.18	0.24	0.03	0.2	Open
P31	J136	J64	180.81	400	120	20.39	0.16	0.02	0.1	Open
P33	J64	J70	14.43	400	120	-5.98	0.05	0	0.01	Open
P35	J70	J156	34.75	400	120	-5.98	0.05	0	0.01	Open
P37	J156	J114	6.2	400	120	-5.98	0.05	0	0.01	Open
P39	J114	J158	17.17	400	120	-59.74	0.48	0.01	0.71	Open
P41	J154	J158	153.05	400	120	59.74	0.48	0.11	0.71	Open
P43	J42	J154	156.43	400	120	104.6	0.83	0.31	1.99	Open
P45	J34	J42	120.68	400	120	143.66	1.14	0.43	3.59	Open
P47	J30	J34	57.66	400	120	163.83	1.3	0.26	4.58	Open
P51	J58	J134	228.31	300	120	8.63	0.12	0.02	0.08	Open
P53	J154	J58	39.98	300	120	18.86	0.27	0.01	0.34	Open
P55	J104	J116	41.94	300	120	-20.9	0.3	0.02	0.41	Open
P57	J116	J100	77.25	300	120	12.54	0.18	0.01	0.16	Open
P59	J100	J96	84.08	300	120	-16.88	0.24	0.02	0.28	Open
P61	J96	J48	6.45	300	120	14.35	0.2	0	0.2	Open
P63	J48	J92	120.82	300	120	11.42	0.16	0.02	0.13	Open
P65	J92	J130	97.59	300	120	-13.59	0.19	0.02	0.18	Open
P69	J84	J88	69.9	300	120	0.45	0.01	0	0	Open
P71	J138	J84	53.85	300	120	2.56	0.04	0	0.01	Open
P73	J132	J24	44.79	300	120	33.28	0.47	0.04	0.97	Open
P75	J20	J132	172.6	300	120	28.17	0.4	0.12	0.71	Open
P77	J40	J20	159.11	300	120	36.98	0.52	0.19	1.18	Open
P79	J50	J128	234.05	200	120	0.76	0.02	0	0.01	Open
P81	J38	J42	35.3	300	120	-39.06	0.55	0.05	1.31	Open
P83	J54	J154	41.53	300	120	-26	0.37	0.03	0.62	Open
P85	J80	J74	13.52	300	120	-5.68	0.08	0	0.04	Open
P87	J132	J80	74.26	300	120	-5.11	0.07	0	0.03	Open
P89	J10	J196	62.59	400	120	158.35	1.26	0.27	4.3	Open
P93	J88	J130	30.88	300	120	-9.69	0.14	0	0.1	Open
P95	J142	J150	156.08	400	120	81.03	0.64	0.19	1.24	Open
P97	J46	J44	100.05	300	120	0	0	0	0	Open

Hydraulic Model Results - MDD + Fire Flow

Project Title: 4938 Rangeview Mississauga
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Municipality Region of Peel

Fire Flow Data (MDD_FF)

ID	Static Demand (L/s)	Static Pressure (psi)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (psi)	Hydrant Available Flow (L/s)	Hydrant Pressure at Available Flow (psi)	Junctions with Pressure Violation
J10	0	84	143.99	317	82.66	3,573.26	20.01	0
J100	19.44	89.67	143.18	300	79.77	1,019.67	20	0
J104	7.53	89.93	143.18	300	77.45	858.37	20	0
J110	0	90.68	143.26	300	85.02	1,514.51	20	0
J112	0	87.99	143.24	300	81.74	1,377.63	20	0
J114	0	88.16	143.25	300	82.29	1,450.07	20	0
J116	0	89.89	143.19	300	80.36	1,027.02	20	0
J118	0	90.73	143.18	300	69.32	597.45	20	0
J120	0	92.2	143.19	300	68.17	563.24	20	0
J122	0	90.77	143.18	300	65.93	546.31	20	0
J124	0	90.61	143.18	300	55.31	444.25	20	0
J126	9.2	89.5	143.16	300	64.5	552.71	20	0
J128	2.67	87.92	143.19	300	66.08	579.13	20	0
J130	0	86.98	143.2	300	78.82	1,115.61	20	0
J132	0	86.87	143.22	300	78.91	1,125.28	20	0
J134	1.04	87.4	143.28	300	80.56	1,238.46	20	0
J136	0	90.13	143.25	300	84.36	1,490.95	20	0
J138	0	85.89	143.2	300	76.17	963.62	20	0
J14	0	87.87	143.56	300	83.98	1,855.57	20	0
J142	0	89.65	143.41	300	84.83	1,652.41	20	0
J144	0	85.62	143.28	300	66.26	601.55	20	0
J146	0	88.18	143.29	300	81.73	1,303.31	20	0
J150	0	91.57	143.33	300	85.88	1,474.94	20	0
J152	0	95.82	143.33	300	90.12	1,522.91	20	0
J154	0	87.04	143.3	300	81.8	1,547.18	20	0
J156	0	88.03	143.25	300	82.12	1,440.18	20	0
J158	0	87.87	143.25	300	81.99	1,440.57	20	0
J160	0	83.82	143.99	317	82.53	3,641.23	20.01	0
J162	0	85.71	144.01	317	84.15	2,811.48	20	0
J164	0	88.23	143.85	317	84.22	1,613.00	20	0
J166	0	89.49	143.8	317	82.56	1,173.32	20	0
J170	0	82.45	144.05	317	81.91	6,046.94	20.02	0
J172	8.54	87.57	143.83	317	81.23	1,229.52	20	0
J174	2.54	86.62	143.82	317	79.73	1,156.27	20	0
J176	6.55	85.66	143.81	317	79.67	1,262.29	20	0
J178	7.68	87.21	143.69	317	80.86	1,267.66	20	0
J18	0	82.33	144.03	317	81.63	5,193.72	20.01	0
J180	5.2	87.72	143.7	317	79.78	1,092.06	20	0
J182	6.07	88.73	143.74	317	80.48	1,067.16	20	0
J190	0	87.51	143.92	317	85.94	3,286.78	20.01	0
J192	0	88.03	143.81	317	86.1	3,017.45	20	0
J194	0	88.07	143.74	317	85.5	2,538.58	20	0
J196	4.82	84.79	143.87	317	82.61	2,691.96	20	0
J198	0	88.02	143.68	317	85.09	2,376.27	20	0
J20	14.5	85.91	143.28	300	78.59	1,180.75	20	0
J200	0	87.92	143.2	300	55.83	458.06	20	0
J202	0	87.92	143.2	300	56.32	462.22	20	0
J204	4.22	84.28	143.8	317	79.91	1,508.35	20	0
J206	3.86	83.55	143.78	317	78.52	1,359.55	20	0
J208	3.23	83.12	143.78	317	78.8	1,490.63	20	0
J210	2.77	82.82	143.78	317	80.13	2,077.07	20	0
J212	4.54	83.75	143.74	317	78.84	1,421.63	20	0
J214	5.14	84.71	143.72	317	80.06	1,509.81	20	0
J218	1.32	85.47	143.67	317	72.71	803.81	20	0
J220	8.54	84.94	143.68	317	73.71	870.36	20	0
J222	0	85.1	143.71	317	79.82	1,366.84	20	0
J224	8.1	85.74	143.62	317	74.59	882.14	20	0
J226	7.21	86.16	143.6	317	77.03	1,006.89	20	0
J230	0	83.7	144.02	317	82.5	3,344.08	20.01	0
J232	0	81.98	144.11	317	81.97	65,316.46	22.31	0
J234	10.1	86.79	143.67	317	76.34	932.46	20	0
J24	13.52	86.59	143.2	300	77.47	1,030.81	20	0
J30	5.42	85.26	143.71	317	82.39	2,366.11	20	0
J34	17.8	85.63	143.6	317	82.14	2,115.77	20	0
J38	0	86.07	143.41	300	79.8	1,280.50	20	0
J40	0.97	84.92	143.35	300	76.28	1,003.13	20	0
J42	0	86	143.42	300	81.48	1,686.74	20	0
J44	6.48	87.88	143.29	300	78.24	971.03	20	0
J46	0	86.12	143.29	300	68.37	637.93	20	0
J48	0	88.71	143.19	300	80.5	1,132.70	20	0
J50	0	88.77	143.19	300	69.14	618.63	20	0
J54	2.49	86.89	143.29	300	80.1	1,244.77	20	0
J58	6.82	87.06	143.29	300	80.14	1,233.05	20	0
J62	28.29	90.42	143.25	300	83.17	1,269.80	20	0
J64	17.58	88.35	143.25	300	82.2	1,416.58	20	0
J70	0	88.27	143.25	300	82.19	1,408.03	20	0
J74	14.39	87.55	143.22	300	79.15	1,103.47	20	0
J80	0.27	87.45	143.22	300	78.98	1,080.03	20	0
J84	0.98	86.35	143.2	300	76.46	957.72	20	0
J88	6.59	87	143.2	300	77.92	1,035.25	20	0
J92	16.37	87.54	143.19	300	77.72	999.60	20	0
J96	0	88.54	143.19	300	80.44	1,142.80	20	0

Appendix B-6

Water Age Analysis

Water Turnover Calculations

Project Title: 4938 - Rangeview Mississauga
Last Edited: 2022-10-24

Municipality Region of Peel

Average Consumption:	0.28	L/cap/day	(Residential Land Use)
	0.3	L/cap/day	(Employment Land Use)
Minimum Consumption:	0.196	L/cap/day[1]	

Turnover Rate Calculation								
Service	**Length**	**Diameter**	**Area**	**Volume**	**Average Consumption (100% Population)**	**Minimum Consumption (70% Population)**	**Minimum Consumption (20% Population)**	**Days for Turnover**
	(m)	**(mm)**	**(m^2)**	**(m^3)**	**(m^3/day)**	**(m^3/day)**	**(m^3/day)**	**(Day)**
Complete System	1257	200	0.03	39.50	13323.80	9326.66	1865.33	0.47
	496	250	0.05	24.33				
	4837	300	0.07	341.92				
	1767	400	0.13	222.06				
	879	600	0.28	248.59				

1 - Minimum consumption calculated using: average day consumption * 0.7

Appendix C
Sanitary Servicing Support Information

Sanitary Flow Calculation

Rangeview Estates Master Functional Servicing Plan (Ulimate

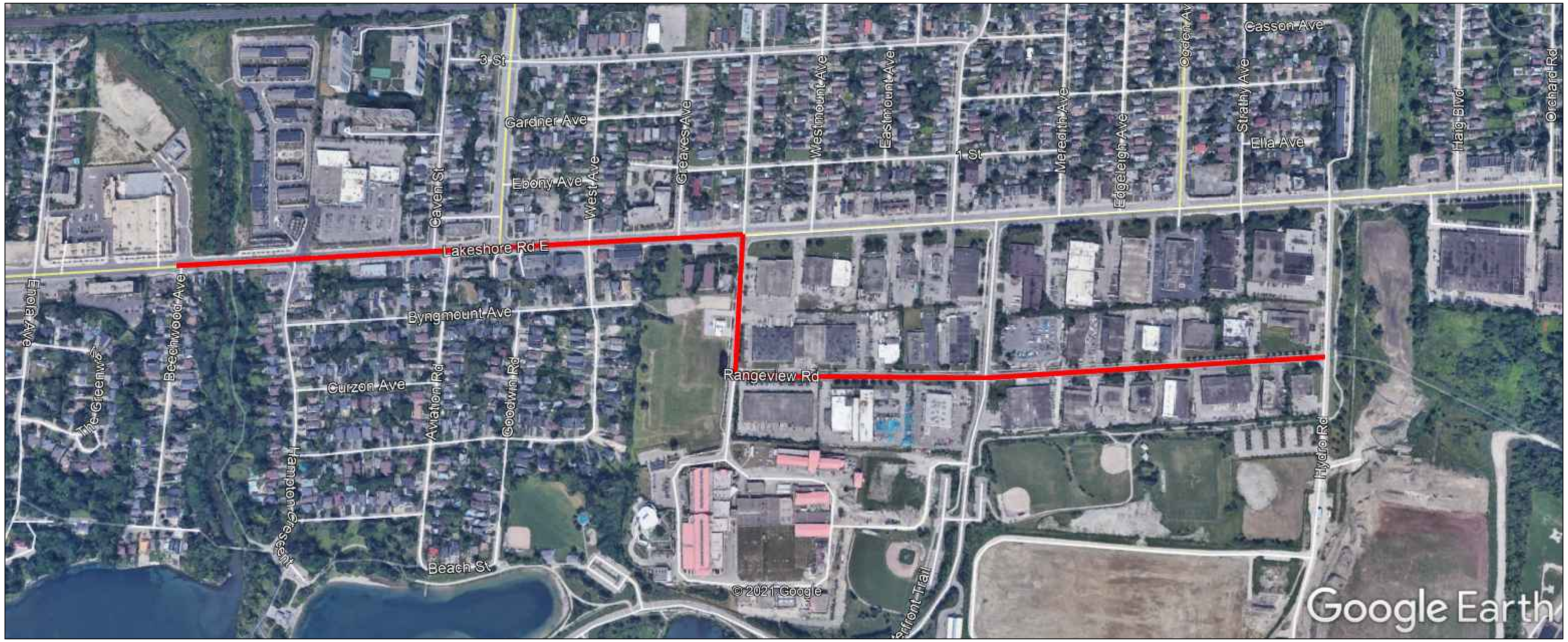
Project No 4938

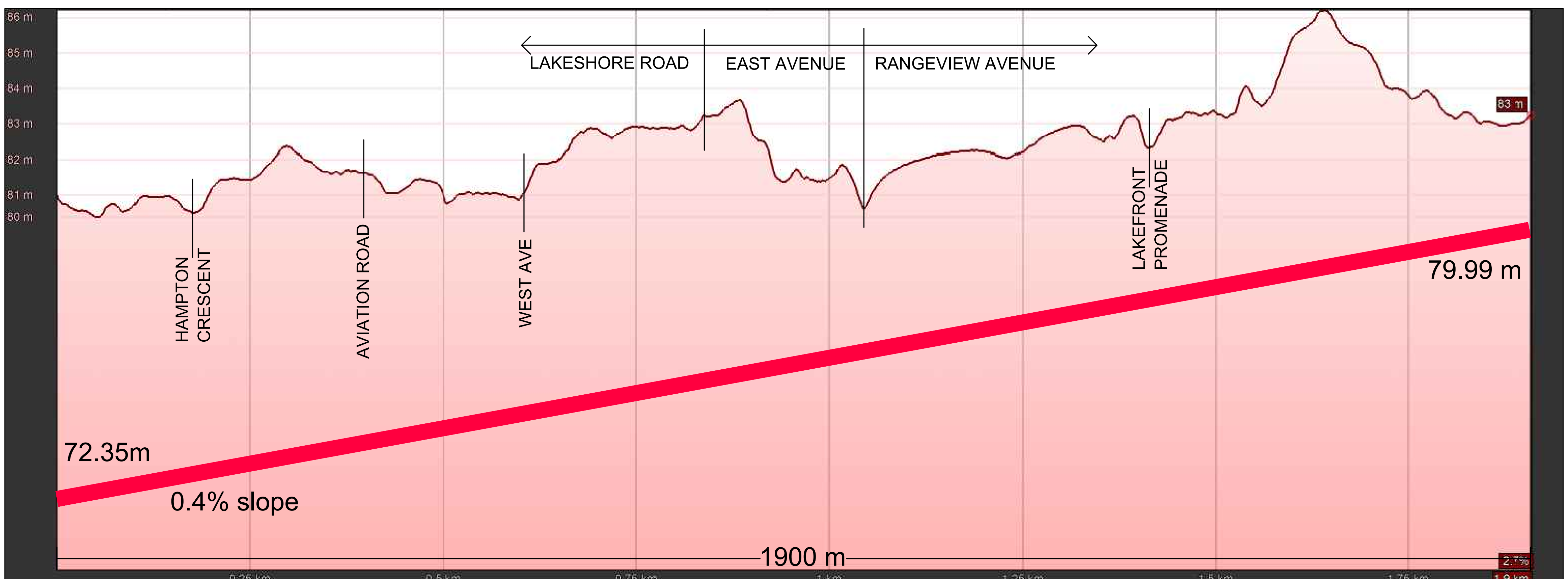
Infiltration Rate:		0.2	L/s/ha
Generation Rate:	Residential and Employment Areas	302.8	L/capita/day

Estimated Site Discharge

Site Discharge	Population****	Average Demand (L/S)	Harmon's Peaking Factor	Flow (L/s) **	Infiltration (L/s)***	Total PeakFlow (L/s)
Townhouse	1884	6.60	3.61	23.81	4.39	**23.81**
Apartment	12869	45.10	2.85	128.32		**128.32**
					Total Flow =	**156.52**

*As per Region of Peel Guidelines
**Sanitary flow as per Region of Peel Guidelines Drawing 2-9-2
*** Infiltration for the total site =21.94 (full Site)
****Refer to Population Statisitics





Pavel Resnik

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RANGEVIEW
MIXED USE DEVELOPMENT

LEGEND

SCHAEFFERS
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www.schaeffers.com

ATTACHMENT C-1
POTENTIAL TRUNK SEWER ALIGNMENT
AND PROFILE SCHEMATIC

2020-4938	OCTOBER 2022	SCALE: N.T.S

SANITARY SEWER DESIGN SHEET

CITY OF MISSISSAUGA

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SCHAEFFER & ASSOCIATES LTD

Rangeview Road Development
Pre-Development Condition

Designed By: J.P
Checked By: K.Sh
Date: October 11, 2022
Project No.: 4938

:(AutoRecovered).xls]PRE

STREET	SECTION		RESIDENTIAL						OTHER											Sewer Design				Remarks
	From MH	To MH	Sect Area (ha)	Apart. (ha)	ROW (ha)	SF >10m front. (ha)	SF <10m front. (ha)	Semi Detac. (ha)	Ind. (@ 70 ppha) (ha)	Comm. (@ 50 ppha) (ha)	Inst.	Pop	Acc Pop	Avg Day (L/s)	Peaking Factor	Peak Day (L/s)	ACC AREA (ha)	Infiltration (L/s)	TOTAL Peak Flow (L/s)	Pipe Dia Act. (mm)	Grade (%)	Length (m)	Capacity (L/s)	
Design Criteria																								
Residential																								
SF (> 10m frontage)	*50*	*persons/ha*																						
SF(< 10m frontage)	*70*	*persons/ha*																						
Semi-Detached	*70*	*persons/ha*																						
ROW Dwellings	*175*	*persons/ha*																						
Apartments	*475*	*persons/ha*																						
ICI																								
Industrial	*70*	*persons/ha*																						
Commercial	*50*	*persons/ha*																						
Infiltration	*0.20*	*L/s/ha*																						
Average Domestic Flow	*302.80*	*L/c/d*																						
Rangeview Rd Downstream System																								
Rangeview Rd	40	39	1.49						0.68	0.61		78	78	0.27	4.27	1.17	1.49	0.30	1.47	250	0.28	93.6	31.29	5%
Rangeview Rd	39	38	2.26						2.03			142	220	0.77	4.13	3.19	3.75	0.75	3.94	250	0.33	91.1	34.22	12%
Rangeview Rd	38	37	1.79						1.23	0.36		105	325	1.14	4.06	4.63	5.54	1.11	5.74	250	0.31	91.3	32.95	17%
Rangeview Rd	37	36	0.85						0.72			51	376	1.32	4.03	5.32	6.40	1.28	6.60	250	0.24	91.9	29.26	23%
Rangeview Rd	36	35	1.63						1.45			102	478	1.68	3.98	6.67	8.03	1.61	8.28	250	0.37	91.0	36.26	23%
Rangeview Rd	35	34	2.17						1.43			100	578	2.03	3.94	7.98	10.20	2.04	10.02	250	0.44	90.2	39.41	25%
Rangeview Rd	34	33	1.72						1.53			107	685	2.40	3.90	9.36	11.92	2.38	11.75	250	0.59	91.4	45.81	26%
Rangeview Rd	33	32	2.69						2.19			154	839	2.94	3.85	11.31	14.61	2.92	14.24	250	0.61	92.0	46.54	31%
Rangeview Rd	32	31	1.43						1.04			73	912	3.20	3.83	12.23	16.04	3.21	15.43	250	1.10	82.9	62.45	25%
Rangeview Rd	31	9	0.00									0	912	3.20	3.83	12.23	16.04	3.21	15.43	250	0.53	11.0	43.20	36%
Subtotal			**16.04**									**912**	**912**				**16.04**							
East Ave	9	10	1.84									0	912	3.20	3.83	12.23	17.87	3.57	15.80	250	0.30	83.5	32.73	48%
East Ave (Treatment Plant Lateral)		10	12.85						12.85			900	1812	6.35	3.62	22.98	30.73	6.15	29.13					
Easment - West of East Ave	10	11	0.35									0	1812	6.35	3.62	22.98	31.07	6.21	29.19	300	0.29	90.5	52.04	56%
Easment - West of East Ave	11	12	0.16									0	1812	6.35	3.62	22.98	31.23	6.25	29.23	300	0.35	39.6	56.89	51%
Easment - West of East Ave	12	13	0.06									0	1812	6.35	3.62	22.98	31.29	6.26	29.24	300	0.37	66.1	58.71	50%
Subtotal			**31.29**									**1812**	**1812**				**31.29**							
Lateral from Montbeck North		13	1.73			1.73						87	87				1.73							
Montbeck Cres	13	19	0.11			0.11						6	1905	6.68	3.60	24.05	33.13	6.63	30.68	375	0.14	27.00	64.90	47%
Montbeck Cres	19	20	0.62			0.62						31	1936	6.78	3.60	24.40	33.75	6.75	31.15	375	0.38	40.54	107.71	29%
Montbeck Cres	20	21	0.58			0.58						29	1965	6.89	3.59	24.73	34.32	6.86	31.60	375	0.28	91.74	92.43	34%
Subtotal			**34.32**									**1965**	**1965**				**34.32**							

SANITARY SEWER DESIGN SHEET

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Rangeview Road Development
Pre-Development Condition

Designed By: J.P
Checked By: K.Sh
Date: October 11, 2022
Project No.: 4938

(AutoRecovered).xls]PRE

STREET	SECTION From MH	SECTION To MH	RESIDENTIAL Sect Area (ha)	Apart. (ha)	ROW (ha)	SF >10m front. (ha)	SF <10m front. (ha)	Semi Detac. (ha)	OTHER Ind. (@ 70 ppha) (ha)	Comm. (@ 50 ppha) (ha)	Inst.	Pop	Acc Pop	Avg Day (L/s)	Peaking Factor	Peak Day (L/s)	ACC AREA (ha)	Infiltration (L/s)	TOTAL Peak Flow (L/s)	Sewer Design Pipe Dia Act. (mm)	Grade (%)	Length (m)	Capacity (L/s)	Remarks
*Lateral from North Goodwin & West Montbeck**		21	29.50	0.21	0.38	11.67		0.479	1.32	5.05		1582	1582				29.50							
Goodwin Rd	21	31	0.70			0.70						35	3582	12.55	3.38	42.38	64.52	12.90	55.28	375	0.46	91.44	118.81	47%
Goodwin Rd	31	32	0.41			0.41						21	3603	12.63	3.37	42.60	64.93	12.99	55.59	375	0.29	92.35	94.49	59%
Subtotal			**64.93**									**3603**	**3603**				**64.93**							
Beach St	32	25	0.44			0.44						23	3626	12.71	3.37	42.84	65.38	13.08	55.92	375	0.33	98.00	100.97	55%
Beach St to PS	25	26	0.09						0.091			7	3633	12.73	3.37	42.91	65.47	13.09	56.01	300	0.17	24.99	40.35	139%
Subtotal			**65.47**									**3633**	**3633**				**65.47**							
Lateral from West of PS via Aviation Rd		26	44.78	0.43	19.12	12.29		1.333		3.53		4435	4435				44.78							
Subtotal for Rangeview Rd Downstream System			**110.25**									**8068**	**8068**	**28.28**	**3.05**	**86.15**	**110.25**	**22.05**	**108.19**					
Lakeshore Rd Western Downstream System																								
Lakeshore Rd E	121	111	1.70						0.868	0.434		83	83	0.29	4.26	1.24	1.70	0.34	1.58	250	0.60	66.87	46.06	3%
Lakeshore Rd E	111	110	0.56						0.452			32	115	0.40	4.23	1.70	2.25	0.45	2.15	250	0.74	73.91	51.16	4%
Lakeshore Rd E	110	109	1.77							0.921		47	162	0.57	4.18	2.37	4.02	0.80	3.18	250	0.69	49.68	49.40	6%
Lakeshore Rd E	109	108	5.12			2.78				0.982		235	397	1.39	4.02	5.60	9.14	1.83	7.43	250	0.37	51.11	36.17	21%
Lakeshore Rd E	108	107	2.43			2.15				0.142		115	512	1.79	3.97	7.12	11.56	2.31	9.43	250	0.99	50.69	59.17	16%
Lakeshore Rd E	107	106	0.27							0.144		8	520	1.82	3.97	7.23	11.83	2.37	9.59	250	0.84	47.06	54.50	18%
Lakeshore Rd E	106	105	2.72	0.21		1.33						166	686	2.40	3.90	9.38	14.55	2.91	12.29	250	0.76	65.78	51.84	24%
Lakeshore Rd E	105	104	0.28							0.106		6	692	2.43	3.90	9.45	14.84	2.97	12.42	250	0.80	76.38	53.19	23%
Lakeshore Rd E	104	103	8.71		0.22	2.87		0.479		1.257		278	970	3.40	3.81	12.95	23.54	4.71	17.66	250	0.50	15.85	42.05	42%
Montbeck Cres	103	102	2.26		0.17					1.06		491	1461	5.12	3.69	18.88	25.80	5.16	24.04	250	0.46	86.26	40.33	60%
Byngmount Ave	102	101	0.79			0.79						40	1501	5.26	3.68	19.36	26.59	5.32	24.67	250	0.55	57.91	44.10	56%
Byngmount Ave	101	100	0.23			0.23						12	1513	5.30	3.68	19.50	26.82	5.36	24.86	250	0.44	49.07	39.45	63%
Goodwin Ave	100	99	1.42			1.01						51	1564	5.48	3.67	20.10	28.24	5.65	25.74	250	0.51	91.44	42.47	61%
Goodwin Ave	99	21	0.75			0.50						26	1590	5.57	3.66	20.40	28.99	5.80	26.20	250	0.49	96.32	41.63	63%
Subtotal			**28.99**									**1590**	**1590**				**28.99**							
Lateral from east of MH21		21	34.32									1965	1965				34.32							
Lateral from west of MH 21		21	0.51			0.25						13	1978				34.83							
Subtotal			**63.83**									**3568**	**3568**				**63.83**							
Goodwin Rd	21	31	0.70			0.70						35	3603	12.63	3.37	42.60	64.52	12.90	55.50	375	0.46	91.44	118.81	47%
Goodwin Rd	31	32	0.41			0.41						21	3624	12.70	3.37	42.82	64.93	12.99	55.81	375	0.29	92.35	94.49	59%
Subtotal			**64.93**									**3603**	**3603**				**64.93**							
Beach St	32	25	0.44			0.44						23	3626	12.71	3.37	42.84	65.38	13.08	55.92	375	0.33	98.00	100.97	55%
Beach St to PS	25	26	0.09						0.091			7	3633	12.73	3.37	42.91	65.47	13.09	56.01	300	0.17	24.99	40.35	139%
Subtotal			**65.47**									**3633**	**3633**				**65.47**							

SANITARY SEWER DESIGN SHEET

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Rangeview Road Development
Pre-Development Condition

Designed By: J.P
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Date: October 11, 2022
Project No.: 4938

:(AutoRecovered).xls]PRE

STREET	SECTION		RESIDENTIAL						OTHER												Sewer Design				Remarks
	From MH	To MH	Sect Area (ha)	Apart. (ha)	ROW (ha)	SF >10m front. (ha)	SF <10m front. (ha)	Semi Detac. (ha)	Ind. (@ 70 ppha) (ha)	Comm. (@ 50 ppha) (ha)	Inst.	Pop	Acc Pop	Avg Day (L/s)	Peaking Factor	Peak Day (L/s)	ACC AREA (ha)	Infiltration (L/s)	TOTAL Peak Flow (L/s)	Pipe Dia Act. (mm)	Grade (%)	Length (m)	Capacity (L/s)	
Lateral from West of PS via Aviation Rd		26	44.82	0.43	19.12	12.29		1.333		3.53		4435	4435				44.82							
Subtotal for Lakeshore Rd Western Downstream System			**110.29**									**8068**	**8068**	**28.28**	**3.05**	**86.15**	**110.29**	**22.06**	**108.20**					
Lakeshore Rd Eastern Downstream System																								
Lakeshore Rd E	7	6	1.06						0.70			50	50	0.18	4.31	0.76	1.06	0.21	0.97	300	0.35	86.26	57.19	2%
Lakeshore Rd E	6	5	1.29						1.074			76	126	0.44	4.21	1.86	2.35	0.47	2.33	300	0.23	91.44	46.71	5%
Lakeshore Rd E	5	4	1.91						0.783	0.858		98	224	0.79	4.13	3.24	4.27	0.85	4.10	300	0.38	91.44	59.35	7%
Lakeshore Rd E	4	3	0.84						0.70			49	273	0.96	4.10	3.92	5.11	1.02	4.94	300	0.20	62.48	42.72	12%
Lakeshore Rd E	3	2	0.00						0.00			0	273	0.96	4.10	3.92	5.11	1.02	4.94	300	0.43	63.70	63.10	8%
Lakeshore Rd E	2	1	1.57						1.356			95	368	1.29	4.04	5.21	6.68	1.34	6.54	300	0.34	65.99	56.15	12%
Lakeshore Rd E	1	001	0.00									0	368	1.29	4.04	5.21	6.68	1.34	6.54	300	1.56	28.50	120.70	5%
Lakeshore Rd E	001	002	126.88		2.04	86.34				2.409	1600	6396	6764	23.71	3.12	73.98	133.56	26.71	100.69	600	0.34	119.00	355.99	28%
Lakeshore Rd E	002	003	3.81									0	6764	23.71	3.12	73.98	137.37	27.47	101.46	600	0.11	91.00	203.54	50%
Subtotal for Lakeshore Rd Eastern Downstream System			**137.37**									**6764**	**6764**				**137.37**							

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Rangeview Road Development
Ultimate Conditions

STREET	SECTION From MH	SECTION To MH	RESIDENTIAL Sect Area (ha)	Apart. (ha)	ROW (ha)	SF (ha)	Semi Detac. (ha)	OTHER Ind. (@ 70 ppha) (ha)	Comm. (@ 50 ppha) (ha)	Inst.	Pop	Acc Pop	Avg Day (L/s)	Peaking Factor	Peak Day (L/s)	ACC AREA (ha)	Infiltration (L/s)	TOTAL Peak Flow (L/s)	Sewer Design Length (m)	Prop. Grade (%)	Proposed Pipe Dia Act. (mm)	Proposed Capacity (L/s)	Proposed Ratio
Design Criteria																							
Residential																							
SF (> 10m frontage)	*50*	*persons/ha*																					
SF(< 10m frontage)	*70*	*persons/ha*																					
Semi-Detached	*70*	*persons/ha*																					
ROW Dwellings	*175*	*persons/ha*																					
Apartments	*475*	*persons/ha*																					
ICI																							
Industrial	*70*	*persons/ha*																					
Commercial	*50*	*persons/ha*																					
Infiltration	*0.20*	*L/s/ha*																					
Average Domestic Flow	*302.80*	*L/c/d*																					
Rangeview Rd	40	39	1.45	507	112						1761	1761	6.17	3.63	22.39	1.45	0.29	22.68	93.6	1.00	250	59.47	38.1%
Rangeview Rd	39	38	1.39		18						63	1824	6.39	3.62	23.12	2.83	0.57	23.68	91.1	0.35	250	35.18	67.3%
Rangeview Rd	38	37	7.03	1652	130						4906	6730	23.59	3.12	73.66	9.86	1.97	75.63	91.3	0.35	**375**	103.73	72.9%
Rangeview Rd	37	36	1.45		58						203	6933	24.30	3.11	75.58	11.31	2.26	77.84	91.9	0.35	**375**	103.73	75.0%
Rangeview Rd	36	35	1.77	530	36						1547	8480	29.72	3.03	89.91	13.08	2.62	92.53	91.0	0.35	**450**	168.67	54.9%
Rangeview Rd	35	34	3.58	825							2218	10698	37.49	2.93	109.68	16.66	3.33	113.02	90.2	0.35	**450**	168.67	67.0%
Rangeview Rd	34	33	2.99	404	94						1420	12118	42.47	2.87	121.95	19.65	3.93	125.87	91.4	0.35	**450**	168.67	74.6%
Rangeview Rd	33	32	2.92	212	104						927	13045	45.72	2.84	129.80	22.57	4.51	134.32	92.0	0.35	**450**	168.67	79.6%
Rangeview Rd	32	31									0	13045	45.72	2.84	129.80	22.57	4.51	134.32	82.9	0.35	**450**	168.67	79.6%
Rangeview Rd to East Ave	31	9									0	13045	45.72	2.84	129.80	22.57	4.51	134.32	11.0	0.35	**450**	168.67	79.6%
East Ave to Lakeshore Rd E *(Proposed Subtrunk Sewer)*	8	7	2.25	570	48						1707	14752	51.70	2.79	144.01	24.82	4.96	148.98	108.1	0.35	**525**	254.43	58.6%
Subtotal for Rangeview Rd Downstream System			**24.82**	**4700**	**600**						**14752**	**14752**				**24.82**							

Appendix D
Stormwater Management Support Information

Project 4938 Rangeview Estates Development
Right of Way and Park SWM Requirements Summary

Rainfall intensity

Rainfall Intensity-City of Mississauga

Design Storm Event	A	B	C	I (mm/hr)
2-Year	610.0	4.6	0.78	59.9
5-Year	820.0	4.6	0.78	80.5
10-Year	1010.0	4.6	0.78	99.2
25-Year	1160.0	4.6	0.78	113.9
50-Year	1300.0	4.7	0.78	127.1
100-Year	1450.0	4.9	0.780	140.7

Tc= 15 minutes

I=A/((T+B)^C)

Description	Catchment #	Area (ha)	Runoff coefficent	Allowable Release (10-year flows) Rate (L/s)	Required On-site storage (m3)	Volumetric Requirement (m3)* (5mm)
Site Plan	201	0.52	0.90	128.92	75.58	26.00
Site Plan	202	0.76	0.90	188.41	110.46	38.00
Site Plan	203	0.39	0.90	96.69	56.68	19.50
Site Plan	204	0.39	0.90	96.69	56.68	19.50
Site Plan	205	0.52	0.90	128.92	75.58	26.00
Site Plan	206	0.54	0.90	133.87	78.48	27.00
Site Plan	207	0.93	0.90	230.56	135.17	46.50
Site Plan	208	0.92	0.90	228.08	133.71	46.00
Site Plan	209	0.58	0.90	143.79	84.30	29.00
Site Plan	210	0.89	0.90	220.64	129.35	44.50
Site Plan	211	0.86	0.90	213.21	124.99	43.00
Site Plan	212	0.20	0.90	49.58	29.07	10.00
Site Plan	213	0.40	0.90	99.17	58.14	20.00
Site Plan	214	0.34	0.90	84.29	49.42	17.00
Site Plan	215	0.86	0.90	213.21	124.99	43.00
Site Plan	216	0.19	0.90	47.10	27.61	9.50
Site Plan	217	0.36	0.90	89.25	52.32	18.00
Site Plan	218	0.58	0.90	143.79	84.30	29.00
Site Plan	219	0.55	0.90	136.35	79.94	27.50
Site Plan	220	1.00	0.90	247.91	145.34	50.00
Site Plan	221	1.30	0.90	322.29	188.94	65.00
Site Plan	222	0.60	0.90	148.75	87.20	30.00
Site Plan	223	0.82	0.90	203.29	119.18	41.00
Site Plan	224	0.46	0.90	114.04	66.86	23.00
Site Plan	225	0.38	0.90	94.21	55.23	19.00
Site Plan	226	0.61	0.90	151.23	88.66	30.50
Site Plan	227	0.32	0.90	79.33	46.51	16.00
Site Plan	228	0.33	0.90	81.81	47.96	16.50

* Volumetric Requirement =Area x TIMP x 5mm x 10

Storage Volume Calculation

Project: 4938 Catchment 201

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.520
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	128.92
	Actual Release Rate (l/s) =	128.92
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	254.88	0.00	0.00	254.88	152.93	77.35	75.58
11	167.60	242.28	0.00	0.00	242.28	159.91	85.08	74.82
12	159.81	231.03	0.00	0.00	231.03	166.34	92.82	73.52
13	152.81	220.90	0.00	0.00	220.90	172.30	100.55	71.75
14	146.46	211.73	0.00	0.00	211.73	177.85	108.29	69.56
15	140.69	203.38	0.00	0.00	203.38	183.04	116.02	67.02
16	135.41	195.75	0.00	0.00	195.75	187.92	123.76	64.16
17	130.56	188.74	0.00	0.00	188.74	192.52	131.49	61.02
18	126.09	182.28	0.00	0.00	182.28	196.86	139.23	57.64
19	121.96	176.31	0.00	0.00	176.31	200.99	146.96	54.02
20	118.12	170.76	0.00	0.00	170.76	204.91	154.70	50.21
21	114.55	165.59	0.00	0.00	165.59	208.65	162.43	46.21
22	111.21	160.77	0.00	0.00	160.77	212.22	170.17	42.05
85	43.39	62.73	0.00	0.00	62.73	319.93	657.47	0.00
90	41.60	60.14	0.00	0.00	60.14	324.74	696.14	0.00
100	38.47	55.62	0.00	0.00	55.62	333.70	773.49	0.00
105	37.10	53.63	0.00	0.00	53.63	337.89	812.17	0.00
110	35.84	51.80	0.00	0.00	51.80	341.91	850.84	0.00
115	34.66	50.11	0.00	0.00	50.11	345.77	889.52	0.00
120	33.58	48.54	0.00	0.00	48.54	349.49	928.19	0.00
125	32.57	47.08	0.00	0.00	47.08	353.07	966.87	0.00
130	31.62	45.71	0.00	0.00	45.71	356.53	1005.54	0.00
135	30.73	44.43	0.00	0.00	44.43	359.88	1044.22	0.00
140	29.90	43.23	0.00	0.00	43.23	363.13	1082.89	0.00

Required Storage (m^3):	**75.58**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 202

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.760
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	188.41
	Actual Release Rate (l/s) =	188.41
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time (min)	Intensity 100 year (mm/hr)	Total Runoff (l/s)	Rooftop Runoff (l/s)	External Runoff (l/s)	Total Runoff (l/s)	Runoff Volume (m^3)	Release Volume (m^3)	Storage Volume (m^3)
10	176.31	372.51	0.00	0.00	372.51	223.51	113.05	110.46
11	167.60	354.11	0.00	0.00	354.11	233.71	124.35	109.36
12	159.81	337.66	0.00	0.00	337.66	243.11	135.66	107.45
13	152.81	322.85	0.00	0.00	322.85	251.82	146.96	104.86
14	146.46	309.45	0.00	0.00	309.45	259.94	158.27	101.67
15	140.69	297.25	0.00	0.00	297.25	267.52	169.57	97.95
16	135.41	286.10	0.00	0.00	286.10	274.65	180.88	93.77
17	130.56	275.85	0.00	0.00	275.85	281.37	192.18	89.19
18	126.09	266.41	0.00	0.00	266.41	287.73	203.49	84.24
19	121.96	257.68	0.00	0.00	257.68	293.75	214.79	78.96
20	118.12	249.57	0.00	0.00	249.57	299.48	226.10	73.39
21	114.55	242.02	0.00	0.00	242.02	304.95	237.40	67.54
22	111.21	234.97	0.00	0.00	234.97	310.17	248.71	61.46
85	43.39	91.68	0.00	0.00	91.68	467.59	960.92	0.00
90	41.60	87.89	0.00	0.00	87.89	474.63	1017.44	0.00
100	38.47	81.29	0.00	0.00	81.29	487.72	1130.49	0.00
105	37.10	78.39	0.00	0.00	78.39	493.84	1187.01	0.00
110	35.84	75.71	0.00	0.00	75.71	499.71	1243.54	0.00
115	34.66	73.24	0.00	0.00	73.24	505.35	1300.06	0.00
120	33.58	70.94	0.00	0.00	70.94	510.79	1356.59	0.00
125	32.57	68.80	0.00	0.00	68.80	516.03	1413.11	0.00
130	31.62	66.81	0.00	0.00	66.81	521.09	1469.64	0.00
135	30.73	64.94	0.00	0.00	64.94	525.99	1526.16	0.00
140	29.90	63.18	0.00	0.00	63.18	530.73	1582.69	0.00

Required Storage (m^3):	**110.46**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 203

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.390
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	96.69
	Actual Release Rate (l/s) =	96.69
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	191.16	0.00	0.00	191.16	114.69	58.01	56.68
11	167.60	181.71	0.00	0.00	181.71	119.93	63.81	56.12
12	159.81	173.27	0.00	0.00	173.27	124.76	69.61	55.14
13	152.81	165.67	0.00	0.00	165.67	129.23	75.42	53.81
14	146.46	158.80	0.00	0.00	158.80	133.39	81.22	52.17
15	140.69	152.54	0.00	0.00	152.54	137.28	87.02	50.26
16	135.41	146.81	0.00	0.00	146.81	140.94	92.82	48.12
17	130.56	141.56	0.00	0.00	141.56	144.39	98.62	45.77
18	126.09	136.71	0.00	0.00	136.71	147.65	104.42	43.23
19	121.96	132.23	0.00	0.00	132.23	150.74	110.22	40.52
20	118.12	128.07	0.00	0.00	128.07	153.68	116.02	37.66
21	114.55	124.19	0.00	0.00	124.19	156.49	121.83	34.66
22	111.21	120.58	0.00	0.00	120.58	159.16	127.63	31.54
85	43.39	47.05	0.00	0.00	47.05	239.95	493.10	0.00
90	41.60	45.10	0.00	0.00	45.10	243.56	522.11	0.00
100	38.47	41.71	0.00	0.00	41.71	250.28	580.12	0.00
105	37.10	40.23	0.00	0.00	40.23	253.42	609.13	0.00
110	35.84	38.85	0.00	0.00	38.85	256.43	638.13	0.00
115	34.66	37.58	0.00	0.00	37.58	259.33	667.14	0.00
120	33.58	36.40	0.00	0.00	36.40	262.11	696.14	0.00
125	32.57	35.31	0.00	0.00	35.31	264.80	725.15	0.00
130	31.62	34.28	0.00	0.00	34.28	267.40	754.16	0.00
135	30.73	33.32	0.00	0.00	33.32	269.91	783.16	0.00
140	29.90	32.42	0.00	0.00	32.42	272.35	812.17	0.00

Required Storage (m^3):	**56.68**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 204

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.390
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	96.69
	Actual Release Rate (l/s) =	96.69
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	191.16	0.00	0.00	191.16	114.69	58.01	56.68
11	167.60	181.71	0.00	0.00	181.71	119.93	63.81	56.12
12	159.81	173.27	0.00	0.00	173.27	124.76	69.61	55.14
13	152.81	165.67	0.00	0.00	165.67	129.23	75.42	53.81
14	146.46	158.80	0.00	0.00	158.80	133.39	81.22	52.17
15	140.69	152.54	0.00	0.00	152.54	137.28	87.02	50.26
16	135.41	146.81	0.00	0.00	146.81	140.94	92.82	48.12
17	130.56	141.56	0.00	0.00	141.56	144.39	98.62	45.77
18	126.09	136.71	0.00	0.00	136.71	147.65	104.42	43.23
19	121.96	132.23	0.00	0.00	132.23	150.74	110.22	40.52
20	118.12	128.07	0.00	0.00	128.07	153.68	116.02	37.66
21	114.55	124.19	0.00	0.00	124.19	156.49	121.83	34.66
22	111.21	120.58	0.00	0.00	120.58	159.16	127.63	31.54
85	43.39	47.05	0.00	0.00	47.05	239.95	493.10	0.00
90	41.60	45.10	0.00	0.00	45.10	243.56	522.11	0.00
100	38.47	41.71	0.00	0.00	41.71	250.28	580.12	0.00
105	37.10	40.23	0.00	0.00	40.23	253.42	609.13	0.00
110	35.84	38.85	0.00	0.00	38.85	256.43	638.13	0.00
115	34.66	37.58	0.00	0.00	37.58	259.33	667.14	0.00
120	33.58	36.40	0.00	0.00	36.40	262.11	696.14	0.00
125	32.57	35.31	0.00	0.00	35.31	264.80	725.15	0.00
130	31.62	34.28	0.00	0.00	34.28	267.40	754.16	0.00
135	30.73	33.32	0.00	0.00	33.32	269.91	783.16	0.00
140	29.90	32.42	0.00	0.00	32.42	272.35	812.17	0.00

Required Storage (m^3):	**56.68**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 205

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.520
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	128.92
	Actual Release Rate (l/s) =	128.92
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	254.88	0.00	0.00	254.88	152.93	77.35	75.58
11	167.60	242.28	0.00	0.00	242.28	159.91	85.08	74.82
12	159.81	231.03	0.00	0.00	231.03	166.34	92.82	73.52
13	152.81	220.90	0.00	0.00	220.90	172.30	100.55	71.75
14	146.46	211.73	0.00	0.00	211.73	177.85	108.29	69.56
15	140.69	203.38	0.00	0.00	203.38	183.04	116.02	67.02
16	135.41	195.75	0.00	0.00	195.75	187.92	123.76	64.16
17	130.56	188.74	0.00	0.00	188.74	192.52	131.49	61.02
18	126.09	182.28	0.00	0.00	182.28	196.86	139.23	57.64
19	121.96	176.31	0.00	0.00	176.31	200.99	146.96	54.02
20	118.12	170.76	0.00	0.00	170.76	204.91	154.70	50.21
21	114.55	165.59	0.00	0.00	165.59	208.65	162.43	46.21
22	111.21	160.77	0.00	0.00	160.77	212.22	170.17	42.05
85	43.39	62.73	0.00	0.00	62.73	319.93	657.47	0.00
90	41.60	60.14	0.00	0.00	60.14	324.74	696.14	0.00
100	38.47	55.62	0.00	0.00	55.62	333.70	773.49	0.00
105	37.10	53.63	0.00	0.00	53.63	337.89	812.17	0.00
110	35.84	51.80	0.00	0.00	51.80	341.91	850.84	0.00
115	34.66	50.11	0.00	0.00	50.11	345.77	889.52	0.00
120	33.58	48.54	0.00	0.00	48.54	349.49	928.19	0.00
125	32.57	47.08	0.00	0.00	47.08	353.07	966.87	0.00
130	31.62	45.71	0.00	0.00	45.71	356.53	1005.54	0.00
135	30.73	44.43	0.00	0.00	44.43	359.88	1044.22	0.00
140	29.90	43.23	0.00	0.00	43.23	363.13	1082.89	0.00

Required Storage (m^3):	**75.58**
Provided Storage (m^3):	

<u>**Storage Volume Calculation**</u>

Project: 4938 Catchment 206

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.540
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	133.87
	Actual Release Rate (l/s) =	133.87
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	264.68	0.00	0.00	264.68	158.81	80.32	78.48
11	167.60	251.60	0.00	0.00	251.60	166.06	88.36	77.70
12	159.81	239.91	0.00	0.00	239.91	172.74	96.39	76.35
13	152.81	229.39	0.00	0.00	229.39	178.93	104.42	74.51
14	146.46	219.87	0.00	0.00	219.87	184.69	112.45	72.24
15	140.69	211.20	0.00	0.00	211.20	190.08	120.49	69.60
16	135.41	203.28	0.00	0.00	203.28	195.15	128.52	66.63
17	130.56	196.00	0.00	0.00	196.00	199.92	136.55	63.37
18	126.09	189.29	0.00	0.00	189.29	204.44	144.58	59.85
19	121.96	183.09	0.00	0.00	183.09	208.72	152.62	56.10
20	118.12	177.33	0.00	0.00	177.33	212.79	160.65	52.14
21	114.55	171.96	0.00	0.00	171.96	216.67	168.68	47.99
22	111.21	166.96	0.00	0.00	166.96	220.38	176.71	43.67
85	43.39	65.14	0.00	0.00	65.14	332.23	682.76	0.00
90	41.60	62.45	0.00	0.00	62.45	337.24	722.92	0.00
100	38.47	57.76	0.00	0.00	57.76	346.54	803.24	0.00
105	37.10	55.70	0.00	0.00	55.70	350.89	843.40	0.00
110	35.84	53.80	0.00	0.00	53.80	355.06	883.57	0.00
115	34.66	52.04	0.00	0.00	52.04	359.07	923.73	0.00
120	33.58	50.41	0.00	0.00	50.41	362.93	963.89	0.00
125	32.57	48.89	0.00	0.00	48.89	366.65	1004.05	0.00
130	31.62	47.47	0.00	0.00	47.47	370.25	1044.22	0.00
135	30.73	46.14	0.00	0.00	46.14	373.73	1084.38	0.00
140	29.90	44.89	0.00	0.00	44.89	377.10	1124.54	0.00

Required Storage (m^3):	**78.48**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 207

Modified Rational Method

Internal Area		
	Controlled Drainage Area (ha) =	0.930
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	230.56
	Actual Release Rate (l/s) =	230.56

External Area		
	Area (ha) =	0.00
	C =	0.00

External Flows

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	455.84	0.00	0.00	455.84	273.50	138.34	135.17
11	167.60	433.32	0.00	0.00	433.32	285.99	152.17	133.82
12	159.81	413.18	0.00	0.00	413.18	297.49	166.00	131.49
13	152.81	395.07	0.00	0.00	395.07	308.15	179.84	128.31
14	146.46	378.67	0.00	0.00	378.67	318.08	193.67	124.41
15	140.69	363.74	0.00	0.00	363.74	327.37	207.50	119.86
16	135.41	350.09	0.00	0.00	350.09	336.09	221.34	114.75
17	130.56	337.56	0.00	0.00	337.56	344.31	235.17	109.14
18	126.09	326.00	0.00	0.00	326.00	352.09	249.01	103.08
19	121.96	315.32	0.00	0.00	315.32	359.46	262.84	96.62
20	118.12	305.39	0.00	0.00	305.39	366.47	276.67	89.80
21	114.55	296.16	0.00	0.00	296.16	373.16	290.51	82.65
22	111.21	287.53	0.00	0.00	287.53	379.54	304.34	75.21
85	43.39	112.19	0.00	0.00	112.19	572.18	1175.86	0.00
90	41.60	107.55	0.00	0.00	107.55	580.79	1245.03	0.00
100	38.47	99.47	0.00	0.00	99.47	596.82	1383.36	0.00
105	37.10	95.92	0.00	0.00	95.92	604.31	1452.53	0.00
110	35.84	92.65	0.00	0.00	92.65	611.49	1521.70	0.00
115	34.66	89.62	0.00	0.00	89.62	618.39	1590.87	0.00
120	33.58	86.81	0.00	0.00	86.81	625.04	1660.03	0.00
125	32.57	84.19	0.00	0.00	84.19	631.45	1729.20	0.00
130	31.62	81.75	0.00	0.00	81.75	637.65	1798.37	0.00
135	30.73	79.46	0.00	0.00	79.46	643.64	1867.54	0.00
140	29.90	77.31	0.00	0.00	77.31	649.44	1936.71	0.00

Required Storage (m^3):	**135.17**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 208

Modified Rational Method

Internal Area		
	Controlled Drainage Area (ha) =	0.920
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	228.08
	Actual Release Rate (l/s) =	228.08
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	450.94	0.00	0.00	450.94	270.56	136.85	133.71
11	167.60	428.66	0.00	0.00	428.66	282.91	150.53	132.38
12	159.81	408.74	0.00	0.00	408.74	294.29	164.22	130.08
13	152.81	390.82	0.00	0.00	390.82	304.84	177.90	126.94
14	146.46	374.59	0.00	0.00	374.59	314.66	191.59	123.07
15	140.69	359.83	0.00	0.00	359.83	323.85	205.27	118.57
16	135.41	346.33	0.00	0.00	346.33	332.47	218.96	113.52
17	130.56	333.93	0.00	0.00	333.93	340.61	232.64	107.96
18	126.09	322.50	0.00	0.00	322.50	348.30	246.33	101.97
19	121.96	311.93	0.00	0.00	311.93	355.59	260.01	95.58
20	118.12	302.11	0.00	0.00	302.11	362.53	273.70	88.83
21	114.55	292.97	0.00	0.00	292.97	369.15	287.38	81.76
22	111.21	284.44	0.00	0.00	284.44	375.46	301.07	74.40
85	43.39	110.99	0.00	0.00	110.99	566.03	1163.21	0.00
90	41.60	106.40	0.00	0.00	106.40	574.55	1231.64	0.00
100	38.47	98.40	0.00	0.00	98.40	590.40	1368.49	0.00
105	37.10	94.89	0.00	0.00	94.89	597.81	1436.91	0.00
110	35.84	91.65	0.00	0.00	91.65	604.92	1505.34	0.00
115	34.66	88.66	0.00	0.00	88.66	611.75	1573.76	0.00
120	33.58	85.88	0.00	0.00	85.88	618.32	1642.18	0.00
125	32.57	83.29	0.00	0.00	83.29	624.66	1710.61	0.00
130	31.62	80.87	0.00	0.00	80.87	630.79	1779.03	0.00
135	30.73	78.61	0.00	0.00	78.61	636.72	1847.46	0.00
140	29.90	76.48	0.00	0.00	76.48	642.46	1915.88	0.00

Required Storage (m^3):	**133.71**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 209

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.580
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	143.79
	Actual Release Rate (l/s) =	143.79
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time (min)	Intensity 100 year (mm/hr)	Total Runoff (l/s)	Rooftop Runoff (l/s)	External Runoff (l/s)	Total Runoff (l/s)	Runoff Volume (m^3)	Release Volume (m^3)	Storage Volume (m^3)
10	176.31	284.29	0.00	0.00	284.29	170.57	86.27	84.30
11	167.60	270.24	0.00	0.00	270.24	178.36	94.90	83.46
12	159.81	257.69	0.00	0.00	257.69	185.53	103.53	82.00
13	152.81	246.39	0.00	0.00	246.39	192.18	112.16	80.02
14	146.46	236.16	0.00	0.00	236.16	198.37	120.78	77.59
15	140.69	226.85	0.00	0.00	226.85	204.16	129.41	74.75
16	135.41	218.34	0.00	0.00	218.34	209.60	138.04	71.56
17	130.56	210.52	0.00	0.00	210.52	214.73	146.67	68.06
18	126.09	203.31	0.00	0.00	203.31	219.58	155.29	64.29
19	121.96	196.65	0.00	0.00	196.65	224.18	163.92	60.26
20	118.12	190.46	0.00	0.00	190.46	228.55	172.55	56.00
21	114.55	184.70	0.00	0.00	184.70	232.72	181.18	51.55
22	111.21	179.32	0.00	0.00	179.32	236.71	189.80	46.90
85	43.39	69.97	0.00	0.00	69.97	356.84	733.33	0.00
90	41.60	67.08	0.00	0.00	67.08	362.22	776.47	0.00
100	38.47	62.03	0.00	0.00	62.03	372.21	862.74	0.00
105	37.10	59.82	0.00	0.00	59.82	376.88	905.88	0.00
110	35.84	57.78	0.00	0.00	57.78	381.36	949.02	0.00
115	34.66	55.89	0.00	0.00	55.89	385.67	992.15	0.00
120	33.58	54.14	0.00	0.00	54.14	389.81	1035.29	0.00
125	32.57	52.51	0.00	0.00	52.51	393.81	1078.43	0.00
130	31.62	50.98	0.00	0.00	50.98	397.67	1121.56	0.00
135	30.73	49.56	0.00	0.00	49.56	401.41	1164.70	0.00
140	29.90	48.22	0.00	0.00	48.22	405.03	1207.84	0.00

Required Storage (m^3):	**84.30**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 210

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.890
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	220.64
	Actual Release Rate (l/s) =	220.64
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

Time (min)	100 Year Intensity 100 year (mm/hr)	Total Runoff (l/s)	Rooftop Runoff (l/s)	External Runoff (l/s)	Total Runoff (l/s)	Total Runoff Volume (m^3)	Maximum Release Volume (m^3)	Required Storage Volume (m^3)
10	176.31	436.23	0.00	0.00	436.23	261.74	132.39	129.35
11	167.60	414.68	0.00	0.00	414.68	273.69	145.62	128.06
12	159.81	395.41	0.00	0.00	395.41	284.70	158.86	125.83
13	152.81	378.07	0.00	0.00	378.07	294.90	172.10	122.80
14	146.46	362.38	0.00	0.00	362.38	304.40	185.34	119.06
15	140.69	348.09	0.00	0.00	348.09	313.29	198.58	114.71
16	135.41	335.03	0.00	0.00	335.03	321.63	211.82	109.81
17	130.56	323.04	0.00	0.00	323.04	329.50	225.06	104.44
18	126.09	311.98	0.00	0.00	311.98	336.94	238.30	98.65
19	121.96	301.75	0.00	0.00	301.75	344.00	251.53	92.47
20	118.12	292.26	0.00	0.00	292.26	350.71	264.77	85.94
21	114.55	283.42	0.00	0.00	283.42	357.11	278.01	79.10
22	111.21	275.17	0.00	0.00	275.17	363.22	291.25	71.97
85	43.39	107.37	0.00	0.00	107.37	547.57	1125.28	0.00
90	41.60	102.93	0.00	0.00	102.93	555.81	1191.48	0.00
100	38.47	95.19	0.00	0.00	95.19	571.15	1323.86	0.00
105	37.10	91.80	0.00	0.00	91.80	578.32	1390.06	0.00
110	35.84	88.67	0.00	0.00	88.67	585.19	1456.25	0.00
115	34.66	85.77	0.00	0.00	85.77	591.80	1522.44	0.00
120	33.58	83.08	0.00	0.00	83.08	598.16	1588.64	0.00
125	32.57	80.57	0.00	0.00	80.57	604.29	1654.83	0.00
130	31.62	78.23	0.00	0.00	78.23	610.22	1721.02	0.00
135	30.73	76.04	0.00	0.00	76.04	615.96	1787.21	0.00
140	29.90	73.99	0.00	0.00	73.99	621.51	1853.41	0.00

Required Storage (m^3):	**129.35**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 211

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.860
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	213.21
	Actual Release Rate (l/s) =	213.21
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	421.53	0.00	0.00	421.53	252.92	127.92	124.99
11	167.60	400.70	0.00	0.00	400.70	264.46	140.72	123.75
12	159.81	382.08	0.00	0.00	382.08	275.10	153.51	121.59
13	152.81	365.33	0.00	0.00	365.33	284.96	166.30	118.66
14	146.46	350.16	0.00	0.00	350.16	294.14	179.09	115.04
15	140.69	336.36	0.00	0.00	336.36	302.73	191.89	110.84
16	135.41	323.74	0.00	0.00	323.74	310.79	204.68	106.11
17	130.56	312.15	0.00	0.00	312.15	318.39	217.47	100.92
18	126.09	301.47	0.00	0.00	301.47	325.58	230.26	95.32
19	121.96	291.58	0.00	0.00	291.58	332.40	243.06	89.35
20	118.12	282.41	0.00	0.00	282.41	338.89	255.85	83.04
21	114.55	273.87	0.00	0.00	273.87	345.07	268.64	76.43
22	111.21	265.89	0.00	0.00	265.89	350.98	281.43	69.54
85	43.39	103.75	0.00	0.00	103.75	529.11	1087.35	0.00
90	41.60	99.46	0.00	0.00	99.46	537.08	1151.31	0.00
100	38.47	91.98	0.00	0.00	91.98	551.90	1279.24	0.00
105	37.10	88.70	0.00	0.00	88.70	558.82	1343.20	0.00
110	35.84	85.68	0.00	0.00	85.68	565.46	1407.16	0.00
115	34.66	82.88	0.00	0.00	82.88	571.85	1471.12	0.00
120	33.58	80.28	0.00	0.00	80.28	578.00	1535.09	0.00
125	32.57	77.86	0.00	0.00	77.86	583.93	1599.05	0.00
130	31.62	75.60	0.00	0.00	75.60	589.65	1663.01	0.00
135	30.73	73.48	0.00	0.00	73.48	595.19	1726.97	0.00
140	29.90	71.50	0.00	0.00	71.50	600.56	1790.93	0.00

Required Storage (m^3):	**124.99**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 212

Modified Rational Method

Internal Area

Controlled Drainage Area (ha) =	0.200
5-year C =	0.90
100-year C =	1.00
Allocated Release Rate (l/s) =	49.58
Actual Release Rate (l/s) =	49.58

External Area

Area (ha) =	0.00
C =	0.00

External Flows

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time (min)	Intensity 100 year (mm/hr)	Total Runoff (l/s)	Rooftop Runoff (l/s)	External Runoff (l/s)	Total Runoff (l/s)	Runoff Volume (m^3)	Release Volume (m^3)	Storage Volume (m^3)
10	176.31	98.03	0.00	0.00	98.03	58.82	29.75	29.07
11	167.60	93.19	0.00	0.00	93.19	61.50	32.72	28.78
12	159.81	88.86	0.00	0.00	88.86	63.98	35.70	28.28
13	152.81	84.96	0.00	0.00	84.96	66.27	38.67	27.59
14	146.46	81.43	0.00	0.00	81.43	68.40	41.65	26.75
15	140.69	78.22	0.00	0.00	78.22	70.40	44.62	25.78
16	135.41	75.29	0.00	0.00	75.29	72.28	47.60	24.68
17	130.56	72.59	0.00	0.00	72.59	74.05	50.57	23.47
18	126.09	70.11	0.00	0.00	70.11	75.72	53.55	22.17
19	121.96	67.81	0.00	0.00	67.81	77.30	56.52	20.78
20	118.12	65.68	0.00	0.00	65.68	78.81	59.50	19.31
21	114.55	63.69	0.00	0.00	63.69	80.25	62.47	17.77
22	111.21	61.84	0.00	0.00	61.84	81.62	65.45	16.17
85	43.39	24.13	0.00	0.00	24.13	123.05	252.87	0.00
90	41.60	23.13	0.00	0.00	23.13	124.90	267.75	0.00
100	38.47	21.39	0.00	0.00	21.39	128.35	297.50	0.00
105	37.10	20.63	0.00	0.00	20.63	129.96	312.37	0.00
110	35.84	19.92	0.00	0.00	19.92	131.50	327.25	0.00
115	34.66	19.27	0.00	0.00	19.27	132.99	342.12	0.00
120	33.58	18.67	0.00	0.00	18.67	134.42	357.00	0.00
125	32.57	18.11	0.00	0.00	18.11	135.80	371.87	0.00
130	31.62	17.58	0.00	0.00	17.58	137.13	386.75	0.00
135	30.73	17.09	0.00	0.00	17.09	138.42	401.62	0.00
140	29.90	16.63	0.00	0.00	16.63	139.67	416.50	0.00

Required Storage (m^3):	**29.07**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 213

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.400
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	99.17
	Actual Release Rate (l/s) =	99.17
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	196.06	0.00	0.00	196.06	117.64	59.50	58.14
11	167.60	186.37	0.00	0.00	186.37	123.01	65.45	57.56
12	159.81	177.71	0.00	0.00	177.71	127.95	71.40	56.55
13	152.81	169.92	0.00	0.00	169.92	132.54	77.35	55.19
14	146.46	162.87	0.00	0.00	162.87	136.81	83.30	53.51
15	140.69	156.45	0.00	0.00	156.45	140.80	89.25	51.55
16	135.41	150.58	0.00	0.00	150.58	144.55	95.20	49.35
17	130.56	145.19	0.00	0.00	145.19	148.09	101.15	46.94
18	126.09	140.22	0.00	0.00	140.22	151.43	107.10	44.34
19	121.96	135.62	0.00	0.00	135.62	154.61	113.05	41.56
20	118.12	131.35	0.00	0.00	131.35	157.62	119.00	38.62
21	114.55	127.38	0.00	0.00	127.38	160.50	124.95	35.55
22	111.21	123.67	0.00	0.00	123.67	163.25	130.90	32.35
85	43.39	48.25	0.00	0.00	48.25	246.10	505.75	0.00
90	41.60	46.26	0.00	0.00	46.26	249.80	535.49	0.00
100	38.47	42.78	0.00	0.00	42.78	256.70	594.99	0.00
105	37.10	41.26	0.00	0.00	41.26	259.92	624.74	0.00
110	35.84	39.85	0.00	0.00	39.85	263.01	654.49	0.00
115	34.66	38.55	0.00	0.00	38.55	265.98	684.24	0.00
120	33.58	37.34	0.00	0.00	37.34	268.84	713.99	0.00
125	32.57	36.21	0.00	0.00	36.21	271.59	743.74	0.00
130	31.62	35.16	0.00	0.00	35.16	274.26	773.49	0.00
135	30.73	34.18	0.00	0.00	34.18	276.83	803.24	0.00
140	29.90	33.25	0.00	0.00	33.25	279.33	832.99	0.00

Required Storage (m^3):	**58.14**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 214

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.340
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	84.29
	Actual Release Rate (l/s) =	84.29
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	166.65	0.00	0.00	166.65	99.99	50.57	49.42
11	167.60	158.42	0.00	0.00	158.42	104.56	55.63	48.92
12	159.81	151.06	0.00	0.00	151.06	108.76	60.69	48.07
13	152.81	144.43	0.00	0.00	144.43	112.66	65.75	46.91
14	146.46	138.44	0.00	0.00	138.44	116.29	70.80	45.48
15	140.69	132.98	0.00	0.00	132.98	119.68	75.86	43.82
16	135.41	127.99	0.00	0.00	127.99	122.87	80.92	41.95
17	130.56	123.41	0.00	0.00	123.41	125.88	85.98	39.90
18	126.09	119.18	0.00	0.00	119.18	128.72	91.03	37.69
19	121.96	115.28	0.00	0.00	115.28	131.42	96.09	35.32
20	118.12	111.65	0.00	0.00	111.65	133.98	101.15	32.83
21	114.55	108.27	0.00	0.00	108.27	136.42	106.21	30.22
22	111.21	105.12	0.00	0.00	105.12	138.76	111.26	27.49
85	43.39	41.02	0.00	0.00	41.02	209.18	429.88	0.00
90	41.60	39.32	0.00	0.00	39.32	212.33	455.17	0.00
100	38.47	36.37	0.00	0.00	36.37	218.19	505.75	0.00
105	37.10	35.07	0.00	0.00	35.07	220.93	531.03	0.00
110	35.84	33.87	0.00	0.00	33.87	223.56	556.32	0.00
115	34.66	32.77	0.00	0.00	32.77	226.08	581.61	0.00
120	33.58	31.74	0.00	0.00	31.74	228.51	606.89	0.00
125	32.57	30.78	0.00	0.00	30.78	230.85	632.18	0.00
130	31.62	29.89	0.00	0.00	29.89	233.12	657.47	0.00
135	30.73	29.05	0.00	0.00	29.05	235.31	682.76	0.00
140	29.90	28.27	0.00	0.00	28.27	237.43	708.04	0.00

Required Storage (m^3):	**49.42**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 215

Modified Rational Method

Internal Area

Controlled Drainage Area (ha) =	0.860
5-year C =	0.90
100-year C =	1.00
Allocated Release Rate (l/s) =	213.21
Actual Release Rate (l/s) =	213.21

External Area

Area (ha) =	0.00
C =	0.00

External Flows

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time (min)	Intensity 100 year (mm/hr)	Total Runoff (l/s)	Rooftop Runoff (l/s)	External Runoff (l/s)	Total Runoff (l/s)	Runoff Volume (m^3)	Release Volume (m^3)	Storage Volume (m^3)
10	176.31	421.53	0.00	0.00	421.53	252.92	127.92	124.99
11	167.60	400.70	0.00	0.00	400.70	264.46	140.72	123.75
12	159.81	382.08	0.00	0.00	382.08	275.10	153.51	121.59
13	152.81	365.33	0.00	0.00	365.33	284.96	166.30	118.66
14	146.46	350.16	0.00	0.00	350.16	294.14	179.09	115.04
15	140.69	336.36	0.00	0.00	336.36	302.73	191.89	110.84
16	135.41	323.74	0.00	0.00	323.74	310.79	204.68	106.11
17	130.56	312.15	0.00	0.00	312.15	318.39	217.47	100.92
18	126.09	301.47	0.00	0.00	301.47	325.58	230.26	95.32
19	121.96	291.58	0.00	0.00	291.58	332.40	243.06	89.35
20	118.12	282.41	0.00	0.00	282.41	338.89	255.85	83.04
21	114.55	273.87	0.00	0.00	273.87	345.07	268.64	76.43
22	111.21	265.89	0.00	0.00	265.89	350.98	281.43	69.54
85	43.39	103.75	0.00	0.00	103.75	529.11	1087.35	0.00
90	41.60	99.46	0.00	0.00	99.46	537.08	1151.31	0.00
100	38.47	91.98	0.00	0.00	91.98	551.90	1279.24	0.00
105	37.10	88.70	0.00	0.00	88.70	558.82	1343.20	0.00
110	35.84	85.68	0.00	0.00	85.68	565.46	1407.16	0.00
115	34.66	82.88	0.00	0.00	82.88	571.85	1471.12	0.00
120	33.58	80.28	0.00	0.00	80.28	578.00	1535.09	0.00
125	32.57	77.86	0.00	0.00	77.86	583.93	1599.05	0.00
130	31.62	75.60	0.00	0.00	75.60	589.65	1663.01	0.00
135	30.73	73.48	0.00	0.00	73.48	595.19	1726.97	0.00
140	29.90	71.50	0.00	0.00	71.50	600.56	1790.93	0.00

Required Storage (m^3):	**124.99**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 216

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area		
	Controlled Drainage Area (ha) =	0.190
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	47.10
	Actual Release Rate (l/s) =	47.10

External Area		
	Area (ha) =	0.00
	C =	0.00

External Flows

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	93.13	0.00	0.00	93.13	55.88	28.26	27.61
11	167.60	88.53	0.00	0.00	88.53	58.43	31.09	27.34
12	159.81	84.41	0.00	0.00	84.41	60.78	33.91	26.86
13	152.81	80.71	0.00	0.00	80.71	62.96	36.74	26.21
14	146.46	77.36	0.00	0.00	77.36	64.98	39.57	25.42
15	140.69	74.31	0.00	0.00	74.31	66.88	42.39	24.49
16	135.41	71.52	0.00	0.00	71.52	68.66	45.22	23.44
17	130.56	68.96	0.00	0.00	68.96	70.34	48.05	22.30
18	126.09	66.60	0.00	0.00	66.60	71.93	50.87	21.06
19	121.96	64.42	0.00	0.00	64.42	73.44	53.70	19.74
20	118.12	62.39	0.00	0.00	62.39	74.87	56.52	18.35
21	114.55	60.51	0.00	0.00	60.51	76.24	59.35	16.89
22	111.21	58.74	0.00	0.00	58.74	77.54	62.18	15.36
85	43.39	22.92	0.00	0.00	22.92	116.90	240.23	0.00
90	41.60	21.97	0.00	0.00	21.97	118.66	254.36	0.00
100	38.47	20.32	0.00	0.00	20.32	121.93	282.62	0.00
105	37.10	19.60	0.00	0.00	19.60	123.46	296.75	0.00
110	35.84	18.93	0.00	0.00	18.93	124.93	310.88	0.00
115	34.66	18.31	0.00	0.00	18.31	126.34	325.02	0.00
120	33.58	17.74	0.00	0.00	17.74	127.70	339.15	0.00
125	32.57	17.20	0.00	0.00	17.20	129.01	353.28	0.00
130	31.62	16.70	0.00	0.00	16.70	130.27	367.41	0.00
135	30.73	16.23	0.00	0.00	16.23	131.50	381.54	0.00
140	29.90	15.80	0.00	0.00	15.80	132.68	395.67	0.00

Required Storage (m^3):	**27.61**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 217

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.360
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	89.25
	Actual Release Rate (l/s) =	89.25
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	176.45	0.00	0.00	176.45	105.87	53.55	52.32
11	167.60	167.74	0.00	0.00	167.74	110.71	58.90	51.80
12	159.81	159.94	0.00	0.00	159.94	115.16	64.26	50.90
13	152.81	152.93	0.00	0.00	152.93	119.28	69.61	49.67
14	146.46	146.58	0.00	0.00	146.58	123.13	74.97	48.16
15	140.69	140.80	0.00	0.00	140.80	126.72	80.32	46.40
16	135.41	135.52	0.00	0.00	135.52	130.10	85.68	44.42
17	130.56	130.67	0.00	0.00	130.67	133.28	91.03	42.25
18	126.09	126.20	0.00	0.00	126.20	136.29	96.39	39.90
19	121.96	122.06	0.00	0.00	122.06	139.15	101.74	37.40
20	118.12	118.22	0.00	0.00	118.22	141.86	107.10	34.76
21	114.55	114.64	0.00	0.00	114.64	144.45	112.45	31.99
22	111.21	111.30	0.00	0.00	111.30	146.92	117.81	29.11
85	43.39	43.43	0.00	0.00	43.43	221.49	455.17	0.00
90	41.60	41.63	0.00	0.00	41.63	224.82	481.95	0.00
100	38.47	38.50	0.00	0.00	38.50	231.03	535.49	0.00
105	37.10	37.13	0.00	0.00	37.13	233.93	562.27	0.00
110	35.84	35.86	0.00	0.00	35.86	236.71	589.04	0.00
115	34.66	34.69	0.00	0.00	34.69	239.38	615.82	0.00
120	33.58	33.60	0.00	0.00	33.60	241.95	642.59	0.00
125	32.57	32.59	0.00	0.00	32.59	244.43	669.37	0.00
130	31.62	31.65	0.00	0.00	31.65	246.83	696.14	0.00
135	30.73	30.76	0.00	0.00	30.76	249.15	722.92	0.00
140	29.90	29.93	0.00	0.00	29.93	251.40	749.69	0.00

Required Storage (m^3):	**52.32**
Provided Storage (m^3):	

Storage Volume Calculation

SCHAEFFERS CONSULTING ENGINEERS

Project: 4938 Catchment 218

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.580
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	143.79
	Actual Release Rate (l/s) =	143.79
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	284.29	0.00	0.00	284.29	170.57	86.27	84.30
11	167.60	270.24	0.00	0.00	270.24	178.36	94.90	83.46
12	159.81	257.69	0.00	0.00	257.69	185.53	103.53	82.00
13	152.81	246.39	0.00	0.00	246.39	192.18	112.16	80.02
14	146.46	236.16	0.00	0.00	236.16	198.37	120.78	77.59
15	140.69	226.85	0.00	0.00	226.85	204.16	129.41	74.75
16	135.41	218.34	0.00	0.00	218.34	209.60	138.04	71.56
17	130.56	210.52	0.00	0.00	210.52	214.73	146.67	68.06
18	126.09	203.31	0.00	0.00	203.31	219.58	155.29	64.29
19	121.96	196.65	0.00	0.00	196.65	224.18	163.92	60.26
20	118.12	190.46	0.00	0.00	190.46	228.55	172.55	56.00
21	114.55	184.70	0.00	0.00	184.70	232.72	181.18	51.55
22	111.21	179.32	0.00	0.00	179.32	236.71	189.80	46.90
85	43.39	69.97	0.00	0.00	69.97	356.84	733.33	0.00
90	41.60	67.08	0.00	0.00	67.08	362.22	776.47	0.00
100	38.47	62.03	0.00	0.00	62.03	372.21	862.74	0.00
105	37.10	59.82	0.00	0.00	59.82	376.88	905.88	0.00
110	35.84	57.78	0.00	0.00	57.78	381.36	949.02	0.00
115	34.66	55.89	0.00	0.00	55.89	385.67	992.15	0.00
120	33.58	54.14	0.00	0.00	54.14	389.81	1035.29	0.00
125	32.57	52.51	0.00	0.00	52.51	393.81	1078.43	0.00
130	31.62	50.98	0.00	0.00	50.98	397.67	1121.56	0.00
135	30.73	49.56	0.00	0.00	49.56	401.41	1164.70	0.00
140	29.90	48.22	0.00	0.00	48.22	405.03	1207.84	0.00

Required Storage (m^3):	**84.30**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 219

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.550
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	136.35
	Actual Release Rate (l/s) =	136.35
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	269.58	0.00	0.00	269.58	161.75	81.81	79.94
11	167.60	256.26	0.00	0.00	256.26	169.13	89.99	79.14
12	159.81	244.36	0.00	0.00	244.36	175.94	98.17	77.76
13	152.81	233.64	0.00	0.00	233.64	182.24	106.36	75.89
14	146.46	223.94	0.00	0.00	223.94	188.11	114.54	73.57
15	140.69	215.11	0.00	0.00	215.11	193.60	122.72	70.89
16	135.41	207.04	0.00	0.00	207.04	198.76	130.90	67.86
17	130.56	199.63	0.00	0.00	199.63	203.62	139.08	64.54
18	126.09	192.80	0.00	0.00	192.80	208.22	147.26	60.96
19	121.96	186.48	0.00	0.00	186.48	212.58	155.44	57.14
20	118.12	180.61	0.00	0.00	180.61	216.73	163.62	53.11
21	114.55	175.15	0.00	0.00	175.15	220.68	171.80	48.88
22	111.21	170.05	0.00	0.00	170.05	224.46	179.99	44.48
85	43.39	66.35	0.00	0.00	66.35	338.39	695.40	0.00
90	41.60	63.61	0.00	0.00	63.61	343.48	736.31	0.00
100	38.47	58.83	0.00	0.00	58.83	352.96	818.12	0.00
105	37.10	56.73	0.00	0.00	56.73	357.39	859.02	0.00
110	35.84	54.79	0.00	0.00	54.79	361.63	899.93	0.00
115	34.66	53.00	0.00	0.00	53.00	365.72	940.83	0.00
120	33.58	51.34	0.00	0.00	51.34	369.65	981.74	0.00
125	32.57	49.79	0.00	0.00	49.79	373.44	1022.65	0.00
130	31.62	48.35	0.00	0.00	48.35	377.10	1063.55	0.00
135	30.73	46.99	0.00	0.00	46.99	380.65	1104.46	0.00
140	29.90	45.72	0.00	0.00	45.72	384.08	1145.36	0.00

Required Storage (m^3):	**79.94**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 220

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	1.00
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	247.91
	Actual Release Rate (l/s) =	247.91
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time (min)	Intensity 100 year (mm/hr)	Total Runoff (l/s)	Rooftop Runoff (l/s)	External Runoff (l/s)	Total Runoff (l/s)	Runoff Volume (m^3)	Release Volume (m^3)	Storage Volume (m^3)
10	176.31	490.15	0.00	0.00	490.15	294.09	148.75	145.34
11	167.60	465.93	0.00	0.00	465.93	307.52	163.62	143.89
12	159.81	444.28	0.00	0.00	444.28	319.88	178.50	141.39
13	152.81	424.80	0.00	0.00	424.80	331.35	193.37	137.97
14	146.46	407.17	0.00	0.00	407.17	342.02	208.25	133.77
15	140.69	391.12	0.00	0.00	391.12	352.01	223.12	128.88
16	135.41	376.44	0.00	0.00	376.44	361.38	238.00	123.39
17	130.56	362.97	0.00	0.00	362.97	370.23	252.87	117.35
18	126.09	350.54	0.00	0.00	350.54	378.59	267.75	110.84
19	121.96	339.05	0.00	0.00	339.05	386.52	282.62	103.89
20	118.12	328.38	0.00	0.00	328.38	394.06	297.50	96.56
21	114.55	318.45	0.00	0.00	318.45	401.24	312.37	88.87
22	111.21	309.18	0.00	0.00	309.18	408.11	327.25	80.87
85	43.39	120.64	0.00	0.00	120.64	615.25	1264.36	0.00
90	41.60	115.65	0.00	0.00	115.65	624.51	1338.74	0.00
100	38.47	106.96	0.00	0.00	106.96	641.74	1487.49	0.00
105	37.10	103.14	0.00	0.00	103.14	649.79	1561.86	0.00
110	35.84	99.62	0.00	0.00	99.62	657.52	1636.23	0.00
115	34.66	96.37	0.00	0.00	96.37	664.94	1710.61	0.00
120	33.58	93.35	0.00	0.00	93.35	672.09	1784.98	0.00
125	32.57	90.53	0.00	0.00	90.53	678.98	1859.36	0.00
130	31.62	87.90	0.00	0.00	87.90	685.64	1933.73	0.00
135	30.73	85.44	0.00	0.00	85.44	692.09	2008.11	0.00
140	29.90	83.13	0.00	0.00	83.13	698.33	2082.48	0.00

Required Storage (m^3):	**145.34**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 221

Modified Rational Method

Internal Area		
	Controlled Drainage Area (ha) =	1.300
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	322.29
	Actual Release Rate (l/s) =	322.29

External Area		
	Area (ha) =	0.00
	C =	0.00

External Flows

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	637.19	0.00	0.00	637.19	382.32	193.37	188.94
11	167.60	605.71	0.00	0.00	605.71	399.77	212.71	187.06
12	159.81	577.57	0.00	0.00	577.57	415.85	232.05	183.80
13	152.81	552.24	0.00	0.00	552.24	430.75	251.39	179.36
14	146.46	529.32	0.00	0.00	529.32	444.63	270.72	173.90
15	140.69	508.45	0.00	0.00	508.45	457.61	290.06	167.55
16	135.41	489.38	0.00	0.00	489.38	469.80	309.40	160.40
17	130.56	471.86	0.00	0.00	471.86	481.29	328.73	152.56
18	126.09	455.71	0.00	0.00	455.71	492.16	348.07	144.09
19	121.96	440.76	0.00	0.00	440.76	502.47	367.41	135.06
20	118.12	426.89	0.00	0.00	426.89	512.27	386.75	125.53
21	114.55	413.98	0.00	0.00	413.98	521.62	406.08	115.53
22	111.21	401.93	0.00	0.00	401.93	530.55	425.42	105.13
85	43.39	156.83	0.00	0.00	156.83	799.82	1643.67	0.00
90	41.60	150.34	0.00	0.00	150.34	811.86	1740.36	0.00
100	38.47	139.04	0.00	0.00	139.04	834.26	1933.73	0.00
105	37.10	134.08	0.00	0.00	134.08	844.73	2030.42	0.00
110	35.84	129.51	0.00	0.00	129.51	854.77	2127.11	0.00
115	34.66	125.28	0.00	0.00	125.28	864.42	2223.79	0.00
120	33.58	121.35	0.00	0.00	121.35	873.72	2320.48	0.00
125	32.57	117.69	0.00	0.00	117.69	882.68	2417.16	0.00
130	31.62	114.27	0.00	0.00	114.27	891.34	2513.85	0.00
135	30.73	111.08	0.00	0.00	111.08	899.71	2610.54	0.00
140	29.90	108.07	0.00	0.00	108.07	907.82	2707.22	0.00

Required Storage (m^3):	**188.94**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 222

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area

Controlled Drainage Area (ha) =	0.600
5-year C =	0.90
100-year C =	1.00
Allocated Release Rate (l/s) =	148.75
Actual Release Rate (l/s) =	148.75

External Area

Area (ha) =	0.00
C =	0.00

External Flows

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	294.09	0.00	0.00	294.09	176.45	89.25	87.20
11	167.60	279.56	0.00	0.00	279.56	184.51	98.17	86.34
12	159.81	266.57	0.00	0.00	266.57	191.93	107.10	84.83
13	152.81	254.88	0.00	0.00	254.88	198.81	116.02	82.78
14	146.46	244.30	0.00	0.00	244.30	205.21	124.95	80.26
15	140.69	234.67	0.00	0.00	234.67	211.20	133.87	77.33
16	135.41	225.87	0.00	0.00	225.87	216.83	142.80	74.03
17	130.56	217.78	0.00	0.00	217.78	222.14	151.72	70.41
18	126.09	210.33	0.00	0.00	210.33	227.15	160.65	66.50
19	121.96	203.43	0.00	0.00	203.43	231.91	169.57	62.34
20	118.12	197.03	0.00	0.00	197.03	236.43	178.50	57.94
21	114.55	191.07	0.00	0.00	191.07	240.75	187.42	53.32
22	111.21	185.51	0.00	0.00	185.51	244.87	196.35	48.52
85	43.39	72.38	0.00	0.00	72.38	369.15	758.62	0.00
90	41.60	69.39	0.00	0.00	69.39	374.71	803.24	0.00
100	38.47	64.17	0.00	0.00	64.17	385.04	892.49	0.00
105	37.10	61.89	0.00	0.00	61.89	389.88	937.12	0.00
110	35.84	59.77	0.00	0.00	59.77	394.51	981.74	0.00
115	34.66	57.82	0.00	0.00	57.82	398.96	1026.37	0.00
120	33.58	56.01	0.00	0.00	56.01	403.25	1070.99	0.00
125	32.57	54.32	0.00	0.00	54.32	407.39	1115.61	0.00
130	31.62	52.74	0.00	0.00	52.74	411.39	1160.24	0.00
135	30.73	51.27	0.00	0.00	51.27	415.25	1204.86	0.00
140	29.90	49.88	0.00	0.00	49.88	419.00	1249.49	0.00

Required Storage (m^3):	**87.20**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 223

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.820
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	203.29
	Actual Release Rate (l/s) =	203.29
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	401.92	0.00	0.00	401.92	241.15	121.97	119.18
11	167.60	382.06	0.00	0.00	382.06	252.16	134.17	117.99
12	159.81	364.31	0.00	0.00	364.31	262.31	146.37	115.94
13	152.81	348.34	0.00	0.00	348.34	271.70	158.57	113.14
14	146.46	333.88	0.00	0.00	333.88	280.46	170.76	109.69
15	140.69	320.72	0.00	0.00	320.72	288.64	182.96	105.68
16	135.41	308.68	0.00	0.00	308.68	296.34	195.16	101.18
17	130.56	297.63	0.00	0.00	297.63	303.59	207.36	96.23
18	126.09	287.45	0.00	0.00	287.45	310.44	219.55	90.89
19	121.96	278.02	0.00	0.00	278.02	316.94	231.75	85.19
20	118.12	269.27	0.00	0.00	269.27	323.13	243.95	79.18
21	114.55	261.13	0.00	0.00	261.13	329.02	256.15	72.88
22	111.21	253.52	0.00	0.00	253.52	334.65	268.34	66.31
85	43.39	98.92	0.00	0.00	98.92	504.50	1036.78	0.00
90	41.60	94.83	0.00	0.00	94.83	512.10	1097.76	0.00
100	38.47	87.70	0.00	0.00	87.70	526.23	1219.74	0.00
105	37.10	84.58	0.00	0.00	84.58	532.83	1280.73	0.00
110	35.84	81.69	0.00	0.00	81.69	539.16	1341.71	0.00
115	34.66	79.02	0.00	0.00	79.02	545.25	1402.70	0.00
120	33.58	76.54	0.00	0.00	76.54	551.11	1463.69	0.00
125	32.57	74.24	0.00	0.00	74.24	556.77	1524.67	0.00
130	31.62	72.08	0.00	0.00	72.08	562.23	1585.66	0.00
135	30.73	70.06	0.00	0.00	70.06	567.51	1646.65	0.00
140	29.90	68.17	0.00	0.00	68.17	572.63	1707.63	0.00

Required Storage (m^3):	**119.18**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 224

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.460
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	114.04
	Actual Release Rate (l/s) =	114.04
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time (min)	Intensity 100 year (mm/hr)	Total Runoff (l/s)	Rooftop Runoff (l/s)	External Runoff (l/s)	Total Runoff (l/s)	Runoff Volume (m^3)	Release Volume (m^3)	Storage Volume (m^3)
10	176.31	225.47	0.00	0.00	225.47	135.28	68.42	66.86
11	167.60	214.33	0.00	0.00	214.33	141.46	75.27	66.19
12	159.81	204.37	0.00	0.00	204.37	147.15	82.11	65.04
13	152.81	195.41	0.00	0.00	195.41	152.42	88.95	63.47
14	146.46	187.30	0.00	0.00	187.30	157.33	95.79	61.54
15	140.69	179.91	0.00	0.00	179.91	161.92	102.64	59.29
16	135.41	173.16	0.00	0.00	173.16	166.24	109.48	56.76
17	130.56	166.96	0.00	0.00	166.96	170.30	116.32	53.98
18	126.09	161.25	0.00	0.00	161.25	174.15	123.16	50.99
19	121.96	155.96	0.00	0.00	155.96	177.80	130.01	47.79
20	118.12	151.06	0.00	0.00	151.06	181.27	136.85	44.42
21	114.55	146.49	0.00	0.00	146.49	184.57	143.69	40.88
22	111.21	142.22	0.00	0.00	142.22	187.73	150.53	37.20
85	43.39	55.49	0.00	0.00	55.49	283.01	581.61	0.00
90	41.60	53.20	0.00	0.00	53.20	287.27	615.82	0.00
100	38.47	49.20	0.00	0.00	49.20	295.20	684.24	0.00
105	37.10	47.45	0.00	0.00	47.45	298.90	718.46	0.00
110	35.84	45.83	0.00	0.00	45.83	302.46	752.67	0.00
115	34.66	44.33	0.00	0.00	44.33	305.87	786.88	0.00
120	33.58	42.94	0.00	0.00	42.94	309.16	821.09	0.00
125	32.57	41.64	0.00	0.00	41.64	312.33	855.30	0.00
130	31.62	40.44	0.00	0.00	40.44	315.40	889.52	0.00
135	30.73	39.30	0.00	0.00	39.30	318.36	923.73	0.00
140	29.90	38.24	0.00	0.00	38.24	321.23	957.94	0.00

Required Storage (m^3):	**66.86**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 225

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.380
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	94.21
	Actual Release Rate (l/s) =	94.21
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	186.26	0.00	0.00	186.26	111.75	56.52	55.23
11	167.60	177.05	0.00	0.00	177.05	116.86	62.18	54.68
12	159.81	168.83	0.00	0.00	168.83	121.56	67.83	53.73
13	152.81	161.43	0.00	0.00	161.43	125.91	73.48	52.43
14	146.46	154.72	0.00	0.00	154.72	129.97	79.13	50.83
15	140.69	148.62	0.00	0.00	148.62	133.76	84.79	48.98
16	135.41	143.05	0.00	0.00	143.05	137.33	90.44	46.89
17	130.56	137.93	0.00	0.00	137.93	140.69	96.09	44.59
18	126.09	133.21	0.00	0.00	133.21	143.86	101.74	42.12
19	121.96	128.84	0.00	0.00	128.84	146.88	107.40	39.48
20	118.12	124.78	0.00	0.00	124.78	149.74	113.05	36.69
21	114.55	121.01	0.00	0.00	121.01	152.47	118.70	33.77
22	111.21	117.49	0.00	0.00	117.49	155.08	124.35	30.73
85	43.39	45.84	0.00	0.00	45.84	233.79	480.46	0.00
90	41.60	43.95	0.00	0.00	43.95	237.31	508.72	0.00
100	38.47	40.64	0.00	0.00	40.64	243.86	565.24	0.00
105	37.10	39.19	0.00	0.00	39.19	246.92	593.51	0.00
110	35.84	37.86	0.00	0.00	37.86	249.86	621.77	0.00
115	34.66	36.62	0.00	0.00	36.62	252.68	650.03	0.00
120	33.58	35.47	0.00	0.00	35.47	255.39	678.29	0.00
125	32.57	34.40	0.00	0.00	34.40	258.01	706.56	0.00
130	31.62	33.40	0.00	0.00	33.40	260.54	734.82	0.00
135	30.73	32.47	0.00	0.00	32.47	262.99	763.08	0.00
140	29.90	31.59	0.00	0.00	31.59	265.36	791.34	0.00

Required Storage (m^3):	**55.23**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 226

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.610
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	151.23
	Actual Release Rate (l/s) =	151.23
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	298.99	0.00	0.00	298.99	179.39	90.74	88.66
11	167.60	284.22	0.00	0.00	284.22	187.58	99.81	87.77
12	159.81	271.01	0.00	0.00	271.01	195.13	108.88	86.25
13	152.81	259.13	0.00	0.00	259.13	202.12	117.96	84.16
14	146.46	248.37	0.00	0.00	248.37	208.63	127.03	81.60
15	140.69	238.58	0.00	0.00	238.58	214.72	136.10	78.62
16	135.41	229.63	0.00	0.00	229.63	220.44	145.18	75.27
17	130.56	221.41	0.00	0.00	221.41	225.84	154.25	71.59
18	126.09	213.83	0.00	0.00	213.83	230.94	163.33	67.61
19	121.96	206.82	0.00	0.00	206.82	235.77	172.40	63.38
20	118.12	200.31	0.00	0.00	200.31	240.37	181.47	58.90
21	114.55	194.25	0.00	0.00	194.25	244.76	190.55	54.21
22	111.21	188.60	0.00	0.00	188.60	248.95	199.62	49.33
85	43.39	73.59	0.00	0.00	73.59	375.30	771.26	0.00
90	41.60	70.55	0.00	0.00	70.55	380.95	816.63	0.00
100	38.47	65.24	0.00	0.00	65.24	391.46	907.37	0.00
105	37.10	62.92	0.00	0.00	62.92	396.37	952.73	0.00
110	35.84	60.77	0.00	0.00	60.77	401.09	998.10	0.00
115	34.66	58.78	0.00	0.00	58.78	405.61	1043.47	0.00
120	33.58	56.94	0.00	0.00	56.94	409.97	1088.84	0.00
125	32.57	55.22	0.00	0.00	55.22	414.18	1134.21	0.00
130	31.62	53.62	0.00	0.00	53.62	418.24	1179.58	0.00
135	30.73	52.12	0.00	0.00	52.12	422.17	1224.94	0.00
140	29.90	50.71	0.00	0.00	50.71	425.98	1270.31	0.00

Required Storage (m^3):	**88.66**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 227

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.320
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	79.33
	Actual Release Rate (l/s) =	79.33
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	156.85	0.00	0.00	156.85	94.11	47.60	46.51
11	167.60	149.10	0.00	0.00	149.10	98.40	52.36	46.05
12	159.81	142.17	0.00	0.00	142.17	102.36	57.12	45.24
13	152.81	135.94	0.00	0.00	135.94	106.03	61.88	44.15
14	146.46	130.29	0.00	0.00	130.29	109.45	66.64	42.81
15	140.69	125.16	0.00	0.00	125.16	112.64	71.40	41.24
16	135.41	120.46	0.00	0.00	120.46	115.64	76.16	39.48
17	130.56	116.15	0.00	0.00	116.15	118.47	80.92	37.55
18	126.09	112.17	0.00	0.00	112.17	121.15	85.68	35.47
19	121.96	108.50	0.00	0.00	108.50	123.69	90.44	33.25
20	118.12	105.08	0.00	0.00	105.08	126.10	95.20	30.90
21	114.55	101.90	0.00	0.00	101.90	128.40	99.96	28.44
22	111.21	98.94	0.00	0.00	98.94	130.60	104.72	25.88
85	43.39	38.60	0.00	0.00	38.60	196.88	404.60	0.00
90	41.60	37.01	0.00	0.00	37.01	199.84	428.40	0.00
100	38.47	34.23	0.00	0.00	34.23	205.36	476.00	0.00
105	37.10	33.01	0.00	0.00	33.01	207.93	499.80	0.00
110	35.84	31.88	0.00	0.00	31.88	210.41	523.60	0.00
115	34.66	30.84	0.00	0.00	30.84	212.78	547.39	0.00
120	33.58	29.87	0.00	0.00	29.87	215.07	571.19	0.00
125	32.57	28.97	0.00	0.00	28.97	217.27	594.99	0.00
130	31.62	28.13	0.00	0.00	28.13	219.41	618.79	0.00
135	30.73	27.34	0.00	0.00	27.34	221.47	642.59	0.00
140	29.90	26.60	0.00	0.00	26.60	223.46	666.39	0.00

Required Storage (m^3):	**46.51**
Provided Storage (m^3):	

Storage Volume Calculation

Project: 4938 Catchment 228

SCHAEFFERS CONSULTING ENGINEERS

Modified Rational Method

Internal Area	Controlled Drainage Area (ha) =	0.330
	5-year C =	0.90
	100-year C =	1.00
	Allocated Release Rate (l/s) =	81.81
	Actual Release Rate (l/s) =	81.81
External Area	Area (ha) =	0.00
	C =	0.00
External Flows		

100 Year Storm

Design Storm =	Mississauga
A =	1450
B =	4.9
C =	0.78

	100 Year					Total	Maximum	Required
Time	Intensity	Total	Rooftop	External	Total	Runoff	Release	Storage
(min)	100 year	Runoff	Runoff	Runoff	Runoff	Volume	Volume	Volume
	(mm/hr)	(l/s)	(l/s)	(l/s)	(l/s)	(m^3)	(m^3)	(m^3)
10	176.31	161.75	0.00	0.00	161.75	97.05	49.09	47.96
11	167.60	153.76	0.00	0.00	153.76	101.48	54.00	47.48
12	159.81	146.61	0.00	0.00	146.61	105.56	58.90	46.66
13	152.81	140.18	0.00	0.00	140.18	109.34	63.81	45.53
14	146.46	134.37	0.00	0.00	134.37	112.87	68.72	44.14
15	140.69	129.07	0.00	0.00	129.07	116.16	73.63	42.53
16	135.41	124.23	0.00	0.00	124.23	119.26	78.54	40.72
17	130.56	119.78	0.00	0.00	119.78	122.17	83.45	38.73
18	126.09	115.68	0.00	0.00	115.68	124.93	88.36	36.58
19	121.96	111.89	0.00	0.00	111.89	127.55	93.27	34.28
20	118.12	108.37	0.00	0.00	108.37	130.04	98.17	31.86
21	114.55	105.09	0.00	0.00	105.09	132.41	103.08	29.33
22	111.21	102.03	0.00	0.00	102.03	134.68	107.99	26.69
85	43.39	39.81	0.00	0.00	39.81	203.03	417.24	0.00
90	41.60	38.16	0.00	0.00	38.16	206.09	441.78	0.00
100	38.47	35.30	0.00	0.00	35.30	211.77	490.87	0.00
105	37.10	34.04	0.00	0.00	34.04	214.43	515.41	0.00
110	35.84	32.88	0.00	0.00	32.88	216.98	539.96	0.00
115	34.66	31.80	0.00	0.00	31.80	219.43	564.50	0.00
120	33.58	30.80	0.00	0.00	30.80	221.79	589.04	0.00
125	32.57	29.88	0.00	0.00	29.88	224.06	613.59	0.00
130	31.62	29.01	0.00	0.00	29.01	226.26	638.13	0.00
135	30.73	28.20	0.00	0.00	28.20	228.39	662.68	0.00
140	29.90	27.43	0.00	0.00	27.43	230.45	687.22	0.00

Required Storage (m^3):	**47.96**
Provided Storage (m^3):	

Project 4938 Rangeview Estates Development
Right of Way and Park SWM Requirements Summary

SCHAEFFERS CONSULTING ENGINEERS

Rainfall intensity
Rainfall Intensity-City of Mississauga

Design Storm Event	A	B	C	I (mm/hr)
2-Year	610.0	4.6	0.78	59.9
5-Year	820.0	4.6	0.78	80.5
10-Year	1010.0	4.6	0.78	99.2
25-Year	1160.0	4.6	0.78	113.9
50-Year	1300.0	4.7	0.78	127.1
100-Year	1450.0	4.9	0.780	140.7

Tc= 15 minutes
I=A/((T+B)^C)

Description	Catchment #	Area (ha)	Runoff coefficent	10-year minor flows (L/s)	100-year flows (L/s)	Volumetric Requirement (m3)*	LID Refrence ID**
Park	300	0.24	0.30	19.83	28.14	-	-
Park	301	0.33	0.30	27.27	38.69	-	-
Park	302	0.25	0.30	20.66	29.31	-	-
Park	303	0.62	0.30	51.24	72.69	-	-
Park	304	0.16	0.30	13.22	18.76	-	-
Park	305	0.35	0.30	28.92	41.03	-	-
Park	306	0.16	0.30	13.22	18.76	-	-
Park	307	0.29	0.30	23.97	34.00	-	-
Park	308	0.26	0.30	21.49	30.48	-	-
Municipal ROW	401	0.20	0.90	49.58	70.34	10.00	
Municipal ROW	402	0.19	0.90	47.10	66.83	9.50	1
Municipal ROW	403	0.27	0.90	66.94	94.97	13.50	
Municipal ROW	404	0.72	0.90	178.50	253.24	36.00	2
Municipal ROW	405	0.83	0.90	205.77	291.93	41.50	3
Municipal ROW	406	0.24	0.90	59.50	84.41	12.00	4
Municipal ROW	407	0.27	0.90	66.94	94.97	13.50	5
Municipal ROW	408	0.36	0.90	89.25	126.62	18.00	6
Municipal ROW	409	0.52	0.90	128.92	182.90	26.00	7
Municipal ROW	410	0.59	0.90	146.27	207.52	29.50	8
Municipal ROW	411	0.18	0.90	44.62	63.31	9.00	9
Municipal ROW	412	0.16	0.90	39.67	56.28	8.00	10
Municipal ROW	413	0.36	0.90	89.25	126.62	18.00	11
Municipal ROW	414	0.43	0.90	106.60	151.24	21.50	12
Municipal ROW	415	0.50	0.90	123.96	175.86	25.00	13
Municipal ROW	416	0.21	0.90	52.06	73.86	10.50	-
Municipal ROW	417	0.20	0.90	49.58	70.34	10.00	-
Municipal ROW	418	0.37	0.90	91.73	130.14	18.50	-
Municipal ROW	419	0.17	0.90	42.15	59.79	8.50	14

* Volumetric Requirement =Area x TIMP x 5mm x 10
**Refer to LID Figure Location and Volume Requirements

Project# 4938

Rangeview Estates

West of Lakefront Promenade Cumulative Requirements
WATER QUALITY REQUIREMENT CALCULATIONS

Table: Water Quality Storage Requirements Based on Receiving Waters

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level					
		0%	35%	55%	70%	85%	100%
Level 3	Infiltration/Filtration	20	20	20	20	20	20

Input:
Estimated Imperviousness = 100%
Total ROW Area = 2.21 ha
Level of Protection: 3
SWMP Type : ıfiltration/Filtration

Calculation:
Total Filter Volume Required = 20 m^3/ha → **44**

5mm Retention Requirement= 111 m^3
Use LID Sizing Greater of 5mm retention or volume required for 60% TSS removal filtration

Project# 4938

Rangeview Estates

East of Lakefront Promenade Treepit Cumulative Requirements
WATER QUALITY REQUIREMENT CALCULATIONS

Table: Water Quality Storage Requirements Based on Receiving Waters

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level					
		0%	35%	55%	70%	85%	100%
Level 3	Infiltration/Filtration	20	20	20	20	20	20

Input:

Estimated Imperviousness =	100%		
Total ROW Area =	2.56	ha	
Level of Protection:	3		
SWMP Type :	Infiltration/Filtration		

Calculation:

Total Filter Volume Required =	20	m^3/ha →	**51**

5mm Retention Requirement= 128 m^3

Use LID Sizing Greater of 5mm retention or volume required for 60% TSS removal filtration

Project# 4938

Rangeview Estates

Lakefront Promenade Cumulative Treepit Requirements
WATER QUALITY REQUIREMENT CALCULATIONS

Table: Water Quality Storage Requirements Based on Receiving Waters

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level					
		0%	35%	55%	70%	85%	100%
Level 1	Infiltration/Filtration	53	25	30	35	40	45

Input:
Estimated Imperviousness = 100%
Total ROW Area = 0.87 ha
Level of Protection: 1
SWMP Type : Infiltration/Filtration

Calculation:
Total Filter Volume Required = 45 m^3/ha → **39**

5mm Retention Requirement= 44 m^3
Use LID Sizing Greater of 5mm retention or volume required for 80% TSS removal filtration

Full Capture Flow Calulations

Street Name	Area ID	Capture MH	Trib. Area 10-Year Captured from Upstream CBs (ha)	Trib. Area 100-Year (ha)	R_{10}	R_{100}	AR_{10}	AR_{100}	Flow Length (m)	Flow Velocity (m/s)	Time of Conc. (min)	I_{10} (mm/hr)	I_{100} (mm/hr)	Q_{10} (L/s)	Q_{100} (L/s)	Q_{100}-Q_{10} (L/s)	Constant Flow (L/s)
Hydro Road / Rangeview (East)		5	0.34	1.25	0.9	1.00	0.31	1.25	200	1.5	20.0	83.1	118.1	70.6	410.2	339.6	339.6
Street L (East of Ogden)		15	0.16	0.72	0.9	1.00	0.14	0.72	215	1.5	20.4	82.1	116.8	32.8	233.5	200.7	200.7
East Ave / Rangeview (West)		31	1.11	1.20	0.9	1.00	1.00	1.20	370	1.5	24.3	73.4	104.5	203.6	348.2	144.7	144.7
Street L (West of Lakefront)		28	0.61	0.71	0.9	1.00	0.55	0.71	270	1.5	21.8	78.7	112.0	120.1	221.0	100.9	100.9
Ogden		7	0.48	0.97	0.9	1.00	0.43	0.97	210	1.5	20.3	82.4	117.2	98.9	315.8	216.9	216.9
Street L (West of Ogden)		23	0.35	0.51	0.9	1.00	0.32	0.51	260	1.5	21.5	79.3	112.9	69.4	159.9	90.5	90.5
Rangeview East		10	0.38	0.95	0.9	1.00	0.34	0.95	280	1.5	7	149.3	210.1	141.8	554.5	412.7	412.7
Lakeshore East (@ East)		Ex. F3-63	0.63	0.63	0.9	1.00	0.57	0.63	150	1.5	18.8	86.5	123.0	136.3	215.2	78.9	78.9
Lakeshore East (@ Lakefront)		Ex. 1	2.32	2.32	0.9	1.00	2.09	2.32	550	1.5	28.8	65.5	93.4	380.0	601.9	221.9	221.9
Hydro Road		4	0	0	0.9	1.00	0.00	0.00	90	1.5	17.3	91.1	129.4	0.0	0.0	0.0	0.0

IDF Parameters

	10-YR	100-YR
A	1010	1450
b	4.6	4.9
c	0.78	0.78

$I = A / (T.C.+b)^c$
T.C. = Time of Conc. (min)
I = Rainfall Intensity (mm/hr)
*Calculations Assume 10-year Minor Flows are Captured

Run-off Coefficients

R100 = R10 x 1.25
Max. R = 0.90

Time of Concentration

T.C. (min) = Flow Length (m) x Flow Velocity (m/s)

Flow Velocity Overland = 1.5 m/s

Caledon

Rangeview
Hydro Road / Rangeview (East)

Job: 4938 Oct-22

Input:

Design Specification (OPSD)	403.01	
100-Year Overland Flow =	0.340	m^3/s
Catchbasin Type =	2	*
Number of Catchbasins =	2	
Allowable Depth of Ponding =	250	mm
Actual Depth of Ponding =	200	mm

Output:

Flow Capacity per Inlet =	0.416	m^3/s **
Flow Capacity per Inlet with 50% Blockage =	0.208	m^3/s
Number of Inlet =	2	
Total Flow Capacity with 50% Blockage =	0.416	m^3/s

Total flow capacity with 50% blockage is greater than the incoming 100-Year overland flow, therefore the inlet structure is sized adequately.

Notes:

* Catchbasin Type (1 for single, 2 for twin)

** Calculation based on MTO Design Chart 4.19: Inlet Capacity at Road Sag

Allowable Depth of Ponding is based on Grading Plans

Caledon

Rangeview
Street L (East of Ogden)

Job: 4938 Oct-22

Input:

Design Specification (OPSD)	403.01	
100-Year Overland Flow =	0.201	m^3/s
Catchbasin Type =	2	*
Number of Catchbasins =	2	
Allowable Depth of Ponding =	250	mm
Actual Depth of Ponding =	150	mm

Output:

Flow Capacity per Inlet =	0.289	m^3/s **
Flow Capacity per Inlet with 50% Blockage =	0.144	m^3/s
Number of Inlet =	2	
Total Flow Capacity with 50% Blockage =	0.289	m^3/s

Total flow capacity with 50% blockage is greater than the incoming 100-Year overland flow, therefore the inlet structure is sized adequately.

Notes:

* Catchbasin Type (1 for single, 2 for twin)

** Calculation based on MTO Design Chart 4.19: Inlet Capacity at Road Sag

Allowable Depth of Ponding is based on Grading Plans

Caledon

Rangeview

East Ave / Rangeview (West)

Job: 4938 Oct-22

Input:

Design Specification (OPSD)	403.01	
100-Year Overland Flow =	0.145	m^3/s
Catchbasin Type =	2	*
Number of Catchbasins =	2	
Allowable Depth of Ponding =	250	mm
Actual Depth of Ponding =	150	mm

Output:

Flow Capacity per Inlet =	0.289	m^3/s **
Flow Capacity per Inlet with 50% Blockage =	0.144	m^3/s
Number of Inlet =	2	
Total Flow Capacity with 50% Blockage =	0.289	m^3/s

Total flow capacity with 50% blockage is greater than the incoming 100-Year overland flow, therefore the inlet structure is sized adequately.

Notes:

* Catchbasin Type (1 for single, 2 for twin)

** Calculation based on MTO Design Chart 4.19: Inlet Capacity at Road Sag

Allowable Depth of Ponding is based on Grading Plans

Caledon

Rangeview

Street L (West of Lakefront)

Job: 4938 Oct-22

Input:

Design Specification (OPSD)	403.01	
100-Year Overland Flow =	0.101	m^3/s
Catchbasin Type =	1	*
Number of Catchbasins =	1	
Allowable Depth of Ponding =	250	mm
Actual Depth of Ponding =	150	mm

Output:

Flow Capacity per Inlet =	0.204	m^3/s **
Flow Capacity per Inlet with 50% Blockage =	0.102	m^3/s
Number of Inlet =	1	
Total Flow Capacity with 50% Blockage =	0.102	m^3/s

Total flow capacity with 50% blockage is greater than the incoming 100-Year overland flow, therefore the inlet structure is sized adequately.

Notes:

* Catchbasin Type (1 for single, 2 for twin)

** Calculation based on MTO Design Chart 4.19: Inlet Capacity at Road Sag

Allowable Depth of Ponding is based on Grading Plans

Caledon

Rangeview
Ogden

Job: 4938 Oct-22

Input:

Design Specification (OPSD)	403.01	
100-Year Overland Flow =	0.217	m^3/s
Catchbasin Type =	2	*
Number of Catchbasins =	2	
Allowable Depth of Ponding =	250	mm
Actual Depth of Ponding =	150	mm

Output:

Flow Capacity per Inlet =	0.289	m^3/s **
Flow Capacity per Inlet with 50% Blockage =	0.144	m^3/s
Number of Inlet =	2	
Total Flow Capacity with 50% Blockage =	0.289	m^3/s

Total flow capacity with 50% blockage is greater than the incoming 100-Year overland flow, therefore the inlet structure is sized adequately.

Notes:

* Catchbasin Type (1 for single, 2 for twin)

** Calculation based on MTO Design Chart 4.19: Inlet Capacity at Road Sag

Allowable Depth of Ponding is based on Grading Plans

Caledon

Rangeview
Street L (West of Ogden)

Job: 4938 Oct-22

Input:

Design Specification (OPSD)	403.01	
100-Year Overland Flow =	0.090	m^3/s
Catchbasin Type =	2	*
Number of Catchbasins =	1	
Allowable Depth of Ponding =	250	mm
Actual Depth of Ponding =	150	mm

Output:

Flow Capacity per Inlet =	0.289	m^3/s **
Flow Capacity per Inlet with 50% Blockage =	0.144	m^3/s
Number of Inlet =	1	
Total Flow Capacity with 50% Blockage =	0.144	m^3/s

Total flow capacity with 50% blockage is greater than the incoming 100-Year overland flow, therefore the inlet structure is sized adequately.

Notes:

* Catchbasin Type (1 for single, 2 for twin)

** Calculation based on MTO Design Chart 4.19: Inlet Capacity at Road Sag

Allowable Depth of Ponding is based on Grading Plans

Caledon

Rangeview
Rangeview East

Job: 4938 Oct-22

Input:

Design Specification (OPSD)	403.01	
100-Year Overland Flow =	0.413	m^3/s
Catchbasin Type =	2	*
Number of Catchbasins =	2	
Allowable Depth of Ponding =	250	mm
Actual Depth of Ponding =	200	mm

Output:

Flow Capacity per Inlet =	0.416	m^3/s **
Flow Capacity per Inlet with 50% Blockage =	0.208	m^3/s
Number of Inlet =	2	
Total Flow Capacity with 50% Blockage =	0.416	m^3/s

Total flow capacity with 50% blockage is greater than the incoming 100-Year overland flow, therefore the inlet structure is sized adequately.

Notes:

* Catchbasin Type (1 for single, 2 for twin)

** Calculation based on MTO Design Chart 4.19: Inlet Capacity at Road Sag

Allowable Depth of Ponding is based on Grading Plans

MTO Design Chart 4.19: Inlet Capacity (OPSD 400.01,400.03)

SINGLE									
Depth	400.01	400.03	400.02	400.02B	400.07	400.10	400.11	400.12	403.01
	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.01	0.002	0.002	0.002	0.001	0.002	0.002	0.002	0.002	0.003
0.02	0.004	0.004	0.003	0.003	0.003	0.004	0.004	0.005	0.007
0.03	0.006	0.006	0.005	0.004	0.005	0.006	0.006	0.007	0.010
0.04	0.008	0.008	0.007	0.005	0.006	0.007	0.008	0.010	0.014
0.05	0.010	0.010	0.008	0.006	0.008	0.009	0.010	0.012	0.017
0.06	0.018	0.018	0.015	0.012	0.014	0.017	0.017	0.022	0.031
0.07	0.025	0.025	0.021	0.016	0.019	0.023	0.024	0.031	0.042
0.08	0.038	0.038	0.031	0.024	0.028	0.035	0.036	0.046	0.064
0.09	0.048	0.048	0.040	0.031	0.036	0.044	0.046	0.060	0.082
0.10	0.060	0.060	0.050	0.038	0.045	0.056	0.057	0.074	0.102
0.11	0.070	0.070	0.059	0.045	0.053	0.065	0.067	0.087	0.119
0.12	0.085	0.085	0.071	0.054	0.064	0.079	0.081	0.105	0.144
0.13	0.095	0.095	0.080	0.061	0.071	0.088	0.091	0.118	0.161
0.14	0.110	0.110	0.092	0.070	0.083	0.102	0.105	0.136	0.187
0.15	0.120	0.120	0.101	0.077	0.090	0.111	0.115	0.149	0.204
0.16	0.123	0.123	0.103	0.079	0.093	0.114	0.117	0.152	0.209
0.17	0.138	0.138	0.116	0.088	0.104	0.128	0.132	0.171	0.234
0.18	0.145	0.145	0.122	0.093	0.109	0.134	0.138	0.180	0.246
0.19	0.150	0.150	0.126	0.096	0.113	0.139	0.143	0.186	0.255
0.20	0.158	0.158	0.133	0.101	0.119	0.146	0.151	0.196	0.268
0.21	0.160	0.160	0.134	0.102	0.120	0.148	0.153	0.198	0.272
0.22	0.165	0.165	0.138	0.106	0.124	0.153	0.158	0.205	0.280
0.23	0.170	0.170	0.143	0.109	0.128	0.157	0.162	0.211	0.289
0.24	0.175	0.175	0.147	0.112	0.132	0.162	0.167	0.217	0.297
0.25	0.180	0.180	0.151	0.115	0.135	0.167	0.172	0.223	0.306
0.26	0.185	0.185	0.155	0.118	0.139	0.171	0.177	0.229	0.314
0.27	0.190	0.190	0.159	0.122	0.143	0.176	0.181	0.236	0.323
0.28	0.195	0.195	0.164	0.125	0.147	0.180	0.186	0.242	0.331
0.29	0.200	0.200	0.168	0.128	0.150	0.185	0.191	0.248	0.340
0.30	0.205	0.205	0.172	0.131	0.154	0.190	0.196	0.254	0.348

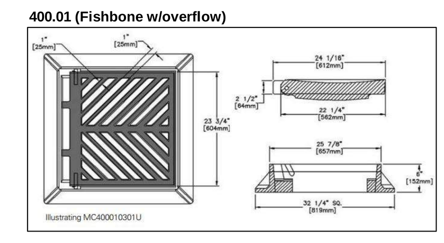
TWIN									
Depth	400.01	400.03	400.02	400.02B	400.07	400.10	400.11	400.12	403.01
	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.01	0.002	0.002	0.002	0.001	0.002	0.002	0.002	0.002	0.003
0.02	0.004	0.004	0.003	0.003	0.003	0.004	0.004	0.005	0.007
0.03	0.006	0.006	0.005	0.004	0.005	0.006	0.006	0.007	0.010
0.04	0.012	0.012	0.010	0.008	0.009	0.011	0.011	0.015	0.020
0.05	0.018	0.018	0.015	0.011	0.013	0.016	0.017	0.022	0.030
0.06	0.025	0.025	0.021	0.016	0.019	0.023	0.024	0.031	0.042
0.07	0.038	0.038	0.032	0.024	0.029	0.035	0.036	0.047	0.065
0.08	0.057	0.057	0.048	0.037	0.043	0.053	0.054	0.071	0.097
0.09	0.070	0.070	0.059	0.045	0.053	0.065	0.067	0.087	0.119
0.10	0.090	0.090	0.075	0.058	0.068	0.083	0.086	0.112	0.153
0.11	0.110	0.110	0.092	0.070	0.083	0.102	0.105	0.136	0.187
0.12	0.125	0.125	0.105	0.080	0.094	0.116	0.119	0.155	0.212
0.13	0.140	0.140	0.117	0.090	0.105	0.130	0.134	0.174	0.238
0.14	0.157	0.157	0.132	0.101	0.118	0.145	0.150	0.195	0.267
0.15	0.170	0.170	0.143	0.109	0.128	0.157	0.162	0.211	0.289
0.16	0.180	0.180	0.151	0.115	0.135	0.167	0.172	0.223	0.306
0.17	0.198	0.198	0.166	0.127	0.149	0.183	0.189	0.245	0.336
0.18	0.210	0.210	0.176	0.135	0.158	0.194	0.200	0.260	0.357
0.19	0.230	0.230	0.193	0.147	0.173	0.213	0.220	0.285	0.391
0.20	0.245	0.245	0.206	0.157	0.184	0.227	0.234	0.304	0.416
0.21	0.260	0.260	0.218	0.167	0.196	0.241	0.248	0.322	0.442
0.22	0.275	0.275	0.231	0.176	0.207	0.255	0.263	0.341	0.467
0.23	0.290	0.290	0.243	0.186	0.218	0.268	0.277	0.360	0.493
0.24	0.310	0.310	0.260	0.199	0.233	0.287	0.296	0.384	0.526
0.25	0.325	0.325	0.273	0.208	0.244	0.301	0.310	0.403	0.552
0.26	0.340	0.340	0.285	0.218	0.256	0.315	0.325	0.421	0.577
0.27	0.355	0.355	0.298	0.227	0.267	0.329	0.339	0.440	0.603
0.28	0.370	0.370	0.310	0.237	0.278	0.342	0.353	0.459	0.628
0.29	0.390	0.390	0.327	0.250	0.293	0.361	0.372	0.483	0.662
0.30	0.405	0.405	0.340	0.259	0.305	0.375	0.387	0.502	0.688

LEGEND

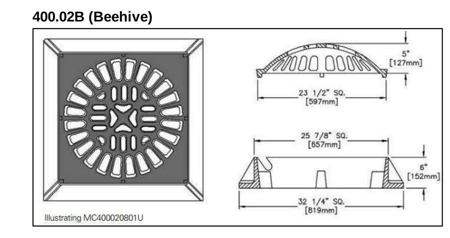
OPSD	Type	Open Area (sqin)	Open Area (sqm)
400.01	Fishbone w/overflow	242	0.156
400.03	Fishbone, V grate	203	0.131
400.02	Fishbone	203	0.131
400.02B	Beehive	155	0.100
400.07	Circular	182	0.117
400.10	Checkerboard	224	0.145
400.11	Checkerboard w/overflow	231	0.149
400.12	Birdcage	300	0.194
403.01	Honeycomb*	411	0.265

**72% open area per Stepcon, assumed total area = 400.01 type grate*

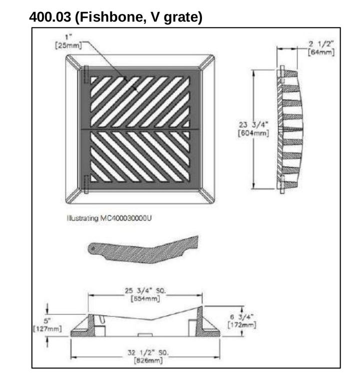
400.01 (Fishbone w/overflow)



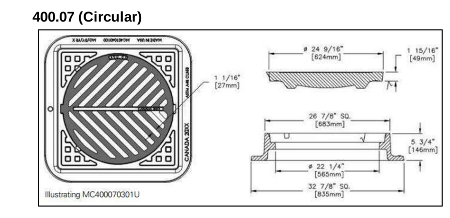
400.02B (Beehive)



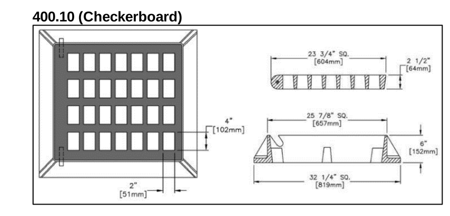
400.03 (Fishbone, V grate)



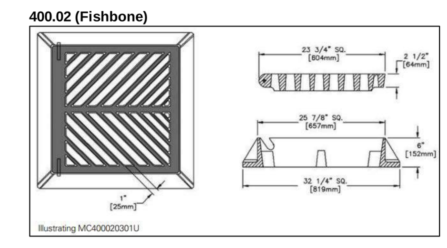
400.07 (Circular)



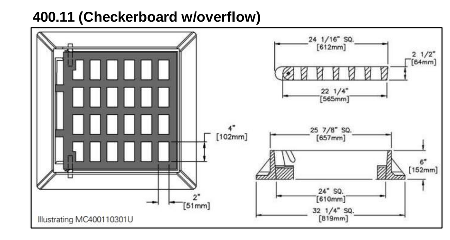
400.10 (Checkerboard)



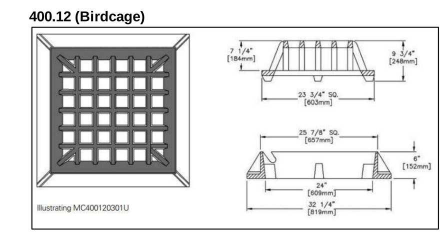
400.02 (Fishbone)

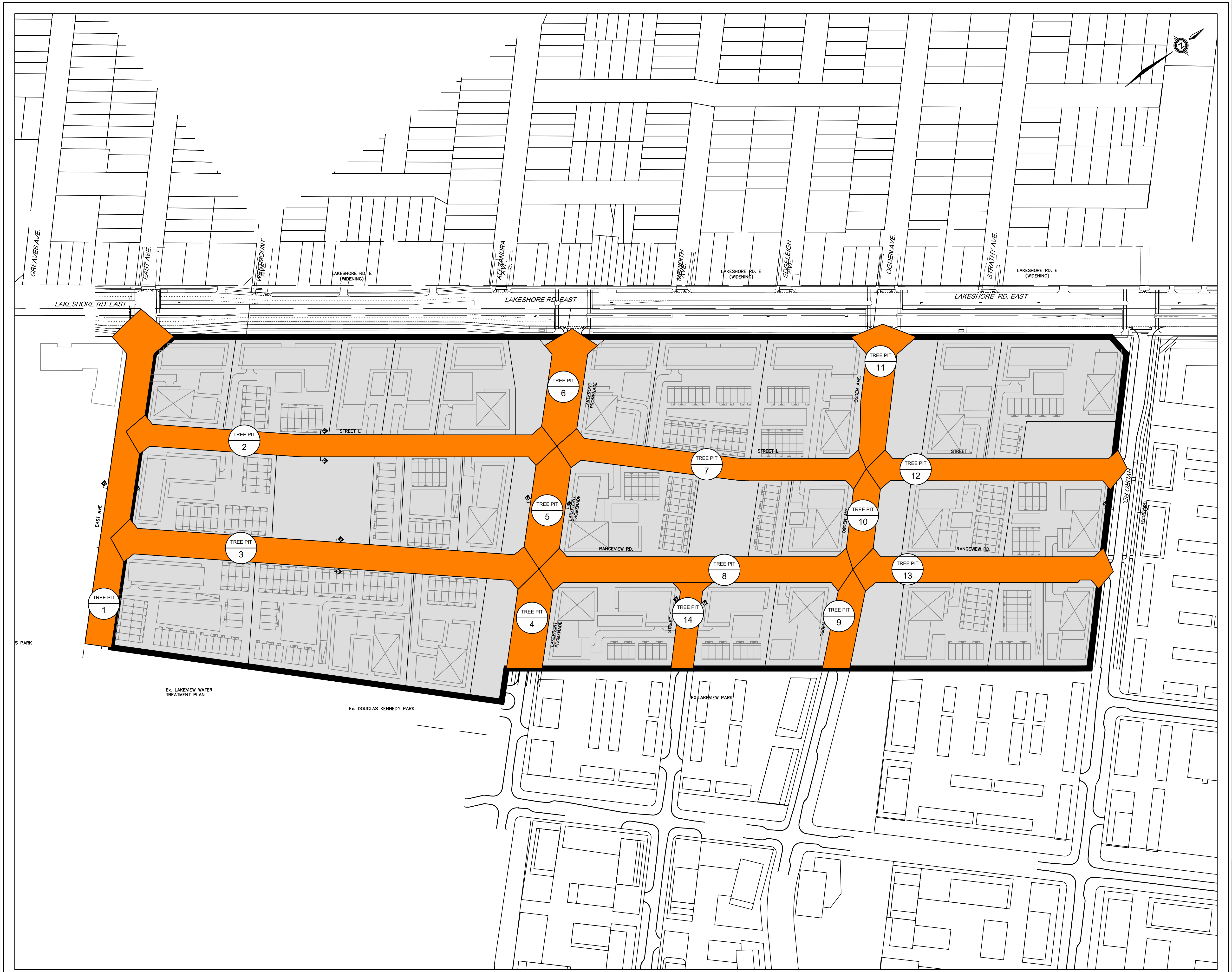


400.11 (Checkerboard w/overflow)



400.12 (Birdcage)





W:\4900's\4938 - Rangeview, Mississauga\Drawings\Drainage\2022-11-09-4938-Proposed Drainage.dwg

Phil Gotfried

RANGEVIEW ESTATES PRECINCT AREA
CITY OF MISSISSAUGA
COMMUNITY COST SHARING

LEGEND

SUBJECT AREA

TREE PIT
DRAINAGE AREA

SCHAEFFERS
CONSULTING ENGINEERS
6 Ronrose Drive, Concord, Ontario L4K 4R3
Tel: (905) 738-6100 Email: general@schaeffers.com
www.schaeffers.com

FIGURE D.2
TREE PID LID LOCATIONS

2020-4938	NOVEMBER 2022	SCALE: N.T.S.

Appendix E
Engineering Drawings

(See Submission Package)

C

Appendix:
Sustainability Strategy Report

RANGEVIEW ESTATES DEVELOPMENT MASTER PLAN

SUSTAINABILITY STRATEGY

Prepared by:

URBAN EQUATION

Prepared for:

Rangeview Landowner's Group

November 10, 2022

Land Acknowledgement

We recognize that the Rangeview Estates, located in the present-day City of Mississauga, as being part of the Treaty and Traditional Territory of the Mississauga's of the Credit First Nation, the Haudenosaunee Confederacy the Huron Wendat and Wyandot Nations. We recognize these peoples and their ancestors as peoples who inhabited these lands since time immemorial.

TABLE OF CONTENTS

SECTION 1 INTRODUCTION

1.1 Call to Action

Warming in Canada is approximately double that of the global average. Heat waves, coastal erosion, droughts, wildfires, flooding, and risks to critical infrastructure are already being felt across Canada. Research overwhelmingly ascribes these unprecedented changes to human behaviour and warns of significant risk to biodiversity, human health, security, and economic growth.

In 2019, the City of Mississauga joined a growing number of Canadian municipalities in declaring a climate emergency and committed to taking action against climate change. Cities are increasingly being relied upon to develop and implement sustainability strategies that consider their streets, buildings, open spaces, and people.

By adopting best-practice in sustainable development, the Rangeview Estates will be a future-focused community which will contribute to the City's climate action objectives. To achieve a balance between what we consume and what nature produces, we all have to do our part – regulators, developers, and citizens alike.

1.2 What is Sustainable Development?

Research has shown that North Americans are living, building, and consuming as if we have five planets worth of resources. Sustainable development is development which meets the needs of the present without impacting the availability of resources for future generations. Sustainable development is about creating communities which foster a healthy natural and built environment, a thriving society, and a stable economy, all within the means of our one planet

1.3 One Planet Living®: An Organizing Framework

At Rangeview Estates, the One Planet Living (OPL) Framework will be used to guide our approach to developing a complete and comprehensive plan that will tackle climate change, build resilient communities, and regenerate the living systems around us.

The OPL Framework offers a holistic approach to sustainability that goes beyond green building standards for materials, water and energy conservation, and indoor air quality. It aims to create a future where it is easy, attractive, and affordable for people to lead happy and healthy lives using a fair share of the earth's resources.

OPL is unique in that it is universal. Its 10 Guiding Principles cover all aspects of social, economic, and environmental sustainability. It addresses all phases of a project, from design to construction, through to operations, programming, and personal lifestyle choices. In this way, One Planet Living embeds sustainability into a projects' DNA rather than making it a stand-alone topic.

The ten OPL principles are:

- Health and Happiness
- Equity and Local Economy
- Culture and Community
- Land Use and Nature
- Sustainable Water
- Local and Sustainable Food
- Travel and Transport
- Materials and Products
- Zero Waste
- Zero Carbon

Note: While the Rangeview Estates is organized around the OPL principles, there is no commitment to pursue OPL endorsement at this time. The performance measures listed in the appendices are not equivalent to the level of performance required for full OPL endorsement.

1.4 Purpose of this Document

This document defines sustainability commitments for Rangeview Estates. For each OPL principle, this document outlines sustainability topics, performance measures, and strategies to meet the community's sustainability goals.

SECTION 2
PROJECT CONTEXT

Aerial View of Rangeview Estates Towards Lake Ontario

2.1 What Makes Rangeview Estates Unique

The Rangeview Estates area is a roughly 25 ha site in Mississauga. The site is located adjacent to Lakeview Village and is a roughly 5-minute walk from both Douglas Kennedy Park and Ogden Park. When complete, the Rangeview Estates area will be a healthy and sustainable community, complete with liveable neighbourhoods, integrated greenspaces, a connected transit system, and thriving commercial areas. The community is expected to accommodate approximately 5300 residential units and over two hectares of parkland.

The following are a few key sustainability relevant features of the existing Rangeview Estates site:

Strengths:

- Proximity to Lake Ontario
- Proximity to planned higher-order transit
- Adjacent to future Lakeview Village mixed-use development
- Proximity to several existing parks and open spaces (Lakeview Park, Douglas Kennedy Park, Lakefront Promenade Park, Lakeshore Park)
- Proximity to diversified services and retail on Lakeshore Road E

Opportunities:

- Industrial brownfield land area
- “Somewhat walkable” area (57 Walkscore) with “Some Transit” (42 Transit Score)
- Car oriented streetscape design
- Highly mineralized site

2.2 Policy Alignment

Five main policy documents are relevant for sustainable urban development in Mississauga, one being specific to the Lakeview redevelopment area. The Rangeview Estates Sustainability Strategy has been developed to support these policies and push Mississauga's sustainability objectives further.

Our Future Mississauga (2009)

Adopted in 2009, Our Future Mississauga serves as the City's Strategic Plan. This document guides decision-making, priority-setting and focuses the City's efforts on those specific areas of strategic change that will make its Vision for Our Future Mississauga a reality.

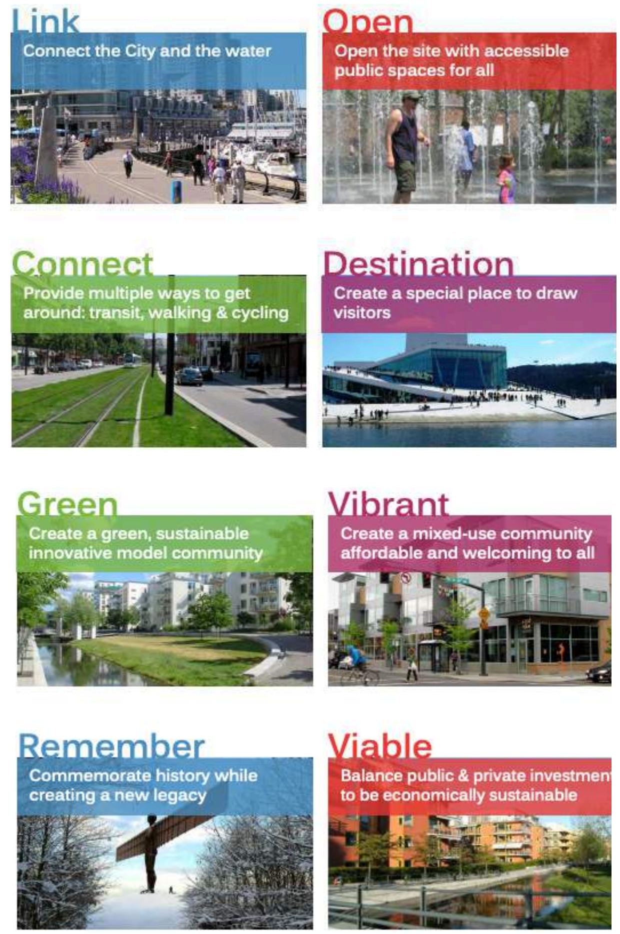
It is guided by the following five strategic pillars for change:

The sustainability principles outlined in the Rangeview Estates Sustainability Strategy align with the five strategic pillars of the Strategic Plan as seen in diagram below.

OPA 89 Lakeview (2018)

The Official Plan Amendment for Lakeview contains eight guiding principles developed with the community through City initiated Inspiration Lakeview visioning:

- **Link**: connect the City and the water
- **Open**: Open the site with accessible public spaces for all
- **Green**: Create a green, sustainable innovative model community
- **Vibrant**: Create a mixed-use community affordable and welcoming to all
- **Connect**: Provide multiple ways to get around: transit, walking & cycling
- **Destination**: Create a special place to draw visitors
- **Remember**: Commemorate history while creating a new legacy
- **Viable**: Balance public & private investment economically sustainable



The sustainability principles outlined in the Rangeview Estates Sustainability Strategy align with the eight principles of OPA 89 as seen in the diagram below.

	Link	Open	Green	Vibrant	Connect	Destination	Remember	Viable
Health and Happiness		✓		✓		✓		
Equity and Local Economy				✓				✓
Culture and Community						✓	✓	
Land Use and Nature			✓					
Sustainable Water	✓							
Local and Sustainable Food			✓					
Materials and Products			✓					
Travel and Transport					✓			
Zero Waste			✓					
Zero Carbon			✓					

Mississauga Green Development Standard (2012)

Developed in 2012 in response to the City Council's adoption of the Green Development Strategy, the Mississauga Green Development Standard defines "low impact development" requirements for local construction in the following four areas:

- Stormwater Retention
- Soft Material Landscape
- Pedestrian and Cycling Comfort
- Exterior Building Design

In 2021, the City received a grant to update the Mississauga Green Development Standard to reflect current best-practice in sustainable development. The new Green Development Standards will improve energy efficiency, building resiliency and sustainable sites for private development.

Living Green Master Plan (2012)

The Living Green Master Plan (LGMP), adopted in 2012, is Mississauga's environmental sustainability action plan. It provides a framework for the City, in collaboration with the community, businesses and other levels of government, to meet environmental goals in the Strategic Plan. The LGMP primarily focuses on three of Our Future Mississauga Strategic Plan Pillars Strategic Pillars for Change: "Move", "Connect" and "Green".

City of Mississauga Climate Change Action Plan (2020)

Adopted in 2020, the City of Mississauga Climate Change Action Plan includes actions to both mitigate and adapt to climate change. It is built around the central vision that Mississauga will be a low carbon and resilient community. This vision is the long-term outcome and end-state that the City aims to achieve over the next 30+ years across the following five 'action pathways':

Build Beautiful (Under Development)

Build Beautiful is the City of Mississauga's Stormwater Master Plan. Build Beautify is currently under development and will outline actions and recommendations for managing rainwater over the immediate and long-term in Mississauga. Managing stormwater is crucial to help protect public safety and health, reduce floor risks, control erosion, and maintain local water quality and waterways.

SECTION 3
VISION, PRINCIPLES AND GOALS

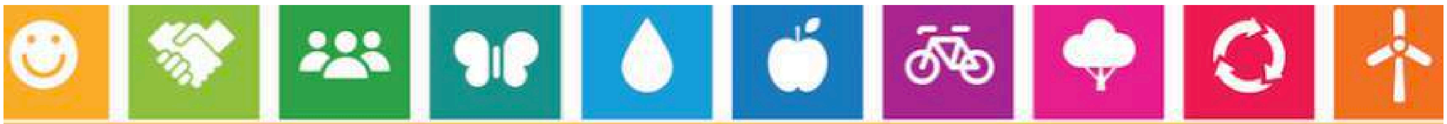
Aerial View of Ogden Park Towards Lake Ontario

3.1 Vision

Rangeview Estates will showcase exceptional design quality that will embrace holistic sustainability by addressing healthy environmental, social and economic practices. It will contribute to achieving local climate action ambition in Mississauga and respond to relevant sustainability policy.

3.2 Guiding Principles & Goals

The Rangeview Estates Sustainability Strategy used the ten OPL principles to organize its sustainability commitments. The diagram below describes the goals of each principle.



Health and happiness	Encouraging active, social, meaningful lives to promote good health and wellbeing
Equity and local economy	Creating safe, equitable places to live and work which support local prosperity and international fair trade
Culture and community	Nurturing local identity and heritage, empowering communities and promoting a culture of sustainable living
Land and nature	Protecting and restoring land for the benefit of people and wildlife
Sustainable water	Using water efficiently, protecting local water resources and reducing flooding and drought
Local and sustainable food	Promoting sustainable humane farming and healthy diets high in local, seasonal organic food and vegetable protein
Travel and transport	Reducing the need to travel, encouraging walking, cycling and low carbon transport
Materials and products	Using materials from sustainable sources and promoting products which help people reduce consumption.
Zero waste	Reducing consumption, re-using and recycling to achieve zero waste and zero pollution
Zero carbon energy	Making buildings and manufacturing energy efficient and supplying all energy with renewables

SECTION 4 STRATEGIES

Aerial View of Central Square Looking Northwest Towards Street 'L'

4.1 Overview

The following sustainability topics, performance measures, and strategies are the heart of the Sustainability Strategy. This section is meant to inspire creativity and innovation throughout the development of Rangeview Estates. Organized by the ten One Planet Living principles, the following pages give a holistic overview of how the sustainability vision can be achieved. For each principle, topics, performance measures, and location specific strategies have been identified which will help achieve the overall goal of each principle. Details for each performance measure can be found in the appendices.

HEALTH AND HAPPINESS

Encouraging active, social, meaningful lives to promote good health and wellbeing.

Topics

Access to Parks and Open Spaces: Providing access to a variety of green spaces close to residential and work places in an effort to encourage physical and mental health of residents, employees and visitors.

Physical Activity Spaces: Creating community spaces which support physical and mental health of its residents.

Heat Island Effect: Using infrastructure to mitigate high city temperatures.

Building Resilience: Designing communities and buildings to withstand the impact of extreme weather events and the changing climate.

Outdoor Amenity Space: Creating private spaces for community members.

Related Performance Measures

Community Scale:

- CS.HH1
- CS.HH2
- CS.HH3

Building Scale:

- BS.HH1
- BS.HH2
- BS.HH3


Intensive Green Roof


White Roof


Passive Park


Extensive Green Roofs


Green Walls


Plaza

HEALTH AND HAPPINESS

Encouraging active, social, meaningful lives to promote good health and wellbeing.

Location Specific Strategies

- Improve visibility and direct pedestrian connections towards the water through the addition of two linear parks along Lakefront Promenade and the Ogden Park extension along Ogden Avenue
- Create a human scaled street wall framing parks and streets to foster a pedestrian-scale experience at ground level
- Dedicate parkland area or parkette within each character area to serve the local residents
- Provide publicly accessible spaces and mid-block connections between buildings to create a permeable network of pedestrian routes connecting to public parks, the waterfront and other open spaces
- Include sports and active spaces such as: Play zones, Fitness POD, Games Tables, Pickle Ball, Water Play/ Cooling Spot, Soccer Pitch, Yoga Platform, Ice Rink

Additional Strategies Being Explored

- Planters (at-grade or raised)
- Shade with structures covered by energy generation systems
- Shade with architectural devices or structures
- Shade with vegetated structures.
- Paving materials with a three-year aged high solar reflectance (SR)
- Open-grid pavement system
- Refuge areas with heating, cooling, lighting, potable water, and power available and 72 hours
- Common roof terraces, pools, playgrounds, and spaces to cook and eat
- Green roofs and cool roofs
- Solar ready roofs
- Green walls

EQUITY AND LOCAL ECONOMY

Creating safe, equitable places to live and work which support local prosperity and international fair trade

Topics

Affordable Housing: Providing access to housing at reasonable costs to segments of society requirement assistance.

Accessibility: Ensuring public spaces and building are accessible and easily usable to residents, employees, and visitors of all ages and levels of ability.

Housing Types and Size: Enabling citizens from a wide range of economic levels, household sizes and age groups to live within the community by providing a sufficient variety of housing sizes and types.

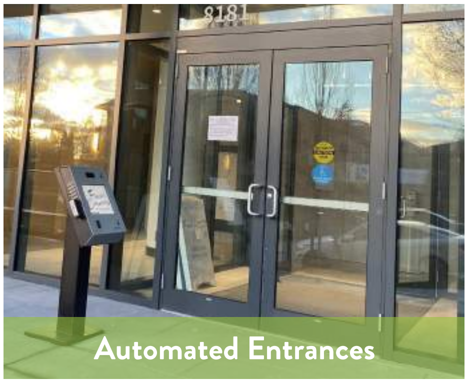
Related Performance Measures

Community Scale:

- CS.ELE1
- CS.ELE2
- CS.ELE3

Building Scale:

- BS.ELE1

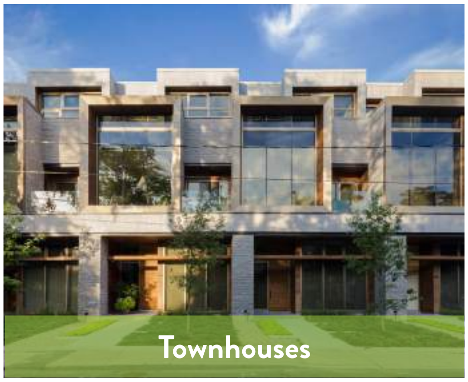


Automated Entrances

Mid-Rise Appartments

Affordable Ownership Housing

Tactile Surface Indicators



Townhouses

Affortable Rental Housing

EQUITY AND LOCAL ECONOMY

Creating safe, equitable places to live and work which support local prosperity and international fair trade

Location Specific Strategies

- Mix of tall buildings (9-15 storeys), mid (5-8 storeys) and low-rise (up to 4 storeys)
- Low-rise buildings range from 3-storey back-to-back town house and 4-storey back-to-back town house
- Non-stacked townhouses contemplated at a minimum unit dimension (per floor) of 6m x 14m
- Stacked townhouses contemplated at a minimum unit dimension (per floor) of 6m x 9m
- Mid-rise and tall buildings contemplate an average unit size of 80 sq m

Additional Strategies Being Explored

- Variety of housing types
- Variety of housing opportunities and values
- Variety of housing layouts and aesthetics
- Tactile walking surface indicators

CULTURE AND COMMUNITY

Nurturing local identity and heritage, empowering communities and promoting a culture of sustainable living

Topics

Public Art: Bolstering local identity, pride, and sense of belonging by featuring art through the community in a way that contributes value to its cultural, aesthetic and economic vitality.

Outdoor Community Spaces: Providing access to a variety of parks and public spaces to encourage community gatherings.

Indoor Gathering Spaces: To enhance community participation by providing facilities that enhance social interaction and networking.

Engagement: To create a shared vision for the community.

Related Performance Measures

Community Scale

- CS.CC1
- CS.CC2
- CS.CC3
- CS.CC4

Murals

Sculptures

Youth Art Activity

Indoor Community Space

Festive Park Gatherings

Programming with Local Artists

CULTURE AND COMMUNITY

Nurturing local identity and heritage, empowering communities and promoting a culture of sustainable living

Location Specific Strategies

- Gateway
- Public Art Features
- Gathering Circle
- Seating
- Seating Plaza
- Games Table
- Performance Area/Shelter
- Picnic Shelter
- Outdoor Cooking

Additional Strategies Being Explored

- Sculptures and murals
- Plaza
- Square
- Park
- Amphitheatre
- Community Center
- Woonerf / Pedestrian Street
- Atrium
- Engagement

LAND USE AND NATURE

Protecting and restoring land for the benefit of people and wildlife

Topics

Light Pollution: Minimizing ambient light levels to protect public and ecological health, increase night sky access, improve nighttime visibility, and reduce the consequences of development for wildlife and people.

Tree Planting Soil: Providing high quality soil to support urban landscaping.

Tree Planting Canopy: Providing adequate tree-lined and shaded streetscapes in order to reduce urban heat island effects, improve air quality, and reduce cooling loads in buildings.

On-Site Landscaping: Incorporating native plants and reducing the use of potable water for landscaped irrigation.

Bird-Friendly Glazing: Providing infrastructure to reduce bird collisions.

Related Performance Measures

Community Scale:

- CS.LUN1
- CS.LUN2
- CS.LUN3
- CS.LUN4

Building Scale:

- BS.LUN1
- BS.LUN2


On Street Trees


Downcast Lighting


Pollinator Friendly Landscapes


Soil Quantity and Quality


Wildflower Verges


Deeproot Urban Landscaping

LAND USE AND NATURE

Protecting and restoring land for the benefit of people and wildlife

Location Specific Strategies

- Street lined trees and planted public spaces

Additional Strategies Being Explored

- LED lighting
- Reduced backlight-uplight-glare (BUG) design
- Optimized circulation network lighting
- Deeproot urban landscaping
- Wildflower verges
- Protection of imperiled species
- Bird-friendly buildings
- Large growing shade trees along street and public space frontages
- Native, drought-tolerant plants
- Reduce the use of potable water for irrigation
- Absence of invasive species
- Visual markers applied to glass
- Non-reflective glass
- Visual markers for birds on balcony railings and fly-through conditions
- Visual markers on elevations facing high hazard area for birds

SUSTAINABLE WATER

Using water efficiently, protecting local water sources and reducing flooding and drought

Topics

Stormwater Quality: Creating infrastructure to properly manage and treat stormwater.

Stormwater Management: Employing design strategies to reduce runoff volume, prevent erosion, and flooding.

Water Friendly Landscaping: Using water-efficient landscaping strategies to limit the use of potable water for landscape irrigation.

Water Efficiency: Reducing the burden on potable water supple and wastewater systems by maximizing indoor water efficiency.

Related Performance Measures

Community Scale:

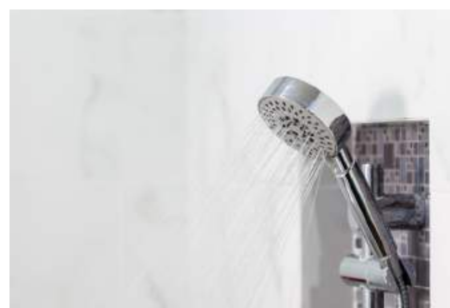
- CS.SW1
- CS.SW2
- CS.SW3
- CS.SW4
- CS.SW5

Building Scale:

- BS.SW1
- BS. SW2

Stormwater Capture

Self-Sustaining Plantings and Soils



Low-Flow Fixtures

Hydrozoned Irrigation Systems

Bioswales

On-Street Rain Garden

SUSTAINABLE WATER

Using water efficiently, protecting local water sources and reducing flooding and drought

Location Specific Strategies

- On street bio-retention areas 1.5-2.75m wide (with and without trees)
- Limited use of large, sodded areas

Additional Strategies Being Explored

- Blue/green infrastructure
- Exposed low impact development
- Pervious paving materials
- High-density planting
- Off street bio-retention areas (parking)
- Construction activity pollution prevention plan
- Sedimentation control plan for construction (including strategies like sediment controls, drain inlet protection, etc.)
- Water metering
- Low flow equipment
- Drought-tolerant plants

LOCAL AND SUSTAINABLE FOOD

Promoting sustainable human farming and healthy diets in local, seasonal organic food and vegetable protein

Topics

Local Food Production: Encouraging local involvement in and education about food production through community gardens, planters, and other design strategies, in an effort to improve health and wellbeing.

Rooftop Gardens: Providing space for residents to enjoy locally grown food.

Related Performance Measures

Community Scale:

- CS.LSF1

Building Scale:

- BS.LSF1


Planters and Terrace Growing


Edible Landscaping


Food Forest


Community Garden

LOCAL AND SUSTAINABLE FOOD

Promoting sustainable human farming and healthy diets in local, seasonal organic food and vegetable protein

Location Specific Strategies

- Community gardens in public parks

Additional Strategies Being Explored

- Rooftop gardens on mid and high-rise buildings
- Edible landscaping
- Planters and terrace growing
- Orchards
- Beehives
- Farmers Markets

MATERIALS AND PRODUCTS

Using materials from sustainable sources and promoting products which help people reduce consumption

Topics

Recycled/Reclaimed Materials: Using recycled and re-purposed materials in building design in order to reduce impacts stemming from material extraction and processing.

Sustainable Materials: Reducing the environmental impacts of building materials and products through design and operations strategies.

Related Performance Measures

Community Scale:

- CS.MP1

Building Scale:

- BS.MP1

Pavement Re-Use

Low Embodied Carbon Materials

Sustainable Labeled Products

Bio-Based and Non-Toxic Materials

MATERIALS AND PRODUCTS

Using materials from sustainable sources and promoting products which help people reduce consumption

Location Specific Strategies

- To be determined later

Strategies Being Explored

- Low embodied carbon materials
- Natural and biobased materials
- Renewable materials
- Reused/reclaimed content and recycled materials in landscaping materials

TRAVEL AND TRANSPORT

Reducing the need to travel, and encouraging walking, cycling and low carbon transport

Topics

Walkability: Encouraging walking by designing accessible and connected sidewalk and crosswalk networks as a means of improving public health and reducing environmental impacts.

Bikeability: Providing access to cycling networks, bike lanes, and related infrastructure to encourage active lifestyle and low carbon transportation.

Compact Development: To conserve land, promote livability, walkability, and transportation efficiency and reduce vehicle distance travelled while improving public health by encouraging daily physical activity and access to amenities

Car Dependency Reduction: To create communities which encourage people to take fewer and shorter vehicle trips and support public and active transportation.

Access to Transit: Providing adequate access to public transportation for all members of the community.

Parking: Providing enough public parking to support the community.

Bicycle Parking: Providing short- and long-term parking to residential buildings.

Electric Vehicle Charging: Providing infrastructure to support and encourage the use of electric vehicles.

Electric Vehicle Charging Stations

Reduced Parking Footprint

Small Blocks

Indoor Bike Storage

Protected Bike Lanes

Bike Network

TRAVEL AND TRANSPORT

Reducing the need to travel, and encouraging walking, cycling and low carbon transport

Related Performance Measures

Community Scale:

- CS.TT1
- CS.TT2
- CS.TT3
- CS.TT4
- CS.TT5
- CS.TT6
- CS.TT7
- CS.TT8
- CS.TT9
- CS.TT10
- CS.TT11
- CS.TT12
- CS.TT13

Building Scale:

- BS.TT1
- BS.TT2

Location Specific Strategies

- New street grid network with compact new blocks
- Woonerf/living street
- Midblock pedestrian connections
- POPS connections
- Continuous sidewalk provision (2m wide)
- Dual Cycling Tracks
- Two new one directional bike lanes on Lakeshore Road Est
- Transportation Demand Management (TDM) Plan
- Minimizing surface / reduced parking footprint
- Maximizing underground parking
- Optimizing on-street parking

Additional Strategies Being Explored

- Electric vehicle charging stations
- All-weather routes
- Public transit shelters
- Crime Preventions through Environmental Design (CPTED)
- Building-height to street ratio
- Promoting car-sharing
- Protected bike parking in parks
- Support the provision of bicycle and/or scooter sharing on-site to connect residents and visitors to local transit or area amenities

ZERO WASTE

Reducing consumption, resting and recycling to achieve zero waste and zero pollution

Topics

Waste Collection and Storage: Providing adequate waste collection storage space to facilitate effective waste management and disposal.

Construction Waste Management: Ensuring appropriate treatment and diversion of non-hazardous construction and demolition debris while reducing construction waste sent to landfills

Related Performance Measures

Building Scale:

- BS.ZW1
- BS.ZW2

Tri-sorter Waste Chutes

Waste Haulers Dedicated Area

3R Regulations

Landfill Diverted Materials

Organics Collection (Green Bin)

Waste Management Plan

ZERO WASTE

Reducing consumption, resting and recycling to achieve zero waste and zero pollution

Location Specific Strategies

- To be determined later

Additional Strategies Being Explored

- Areas accessible to waste haulers and building occupants for the collection and storage of recyclable material
- Satisfy provincial "3R's" regulations for construction activities
- Construction waste management plan
- Diversion target for construction, demolition and land clearing waste from landfill

ZERO CARBON

Making building and manufacturing energy efficient and supplying all energy with renewables

Topics

Community Energy Plan: Reducing the environmental and economic impacts at the commmunity scale associated with excessive energy use by employing various design strategies that promote energy conservation and minimize heat loss.

Energy Efficiency: Reducing the environmental and economic impacts at the building scale associated with excessive energy use by employing various design strategies that promote energy conservation and minimize heat loss.

Related Performance Measures

Community Scale:

- CS.ZC1

Building Scale:

- BS.ZC1

Increased Insulation

High-Performance Glazing

Renewable Energy

High-Efficiency Mechanical System

ZERO CARBON

Making building and manufacturing energy efficient and supplying all energy with renewables

Location Specific Strategies

- To be determined later

Additional Strategies Being Explored

- Renewable Energy
- Increased insulation
- High-Performance Glazing
- Reduced Thermal Bridging
- High-Efficiency Mechanical System
- Solar Readiness
- Passive Solar Alignment
- Off-Site Generation
- Solar Walls

5.1 Overview

The following sections present suggested tasks and responsibilities for each phase of the community build-out. The intent of this Plan is to provide guidance to set the project up for success, while remaining inherently flexible to adapt to the realities of design and construction. Additional potential strategies for each performance measures are further outlined in other parts of the document.

Stakeholders, including local energy providers, regional authorities, conservation authorities, and the public will act as participants through the implementation of the Rangeview Estates Sustainability Strategy and the annual reporting. The Rangeview Estates project team will also rely on the City of Mississauga Staff to provide input and confirm sustainability compliance during the development of the community.

5.2 Master Plan

To achieve the sustainability goals for Rangeview Estates, a coordinated effort is required across a variety of disciplines and teams. By embedding sustainability within existing processes rather than an "add-on", these goals are more likely to be achieved. This is important to consider right from the Master Plan Phase, to realize synergies and cost efficiencies most effectively. As well as communicate the goals and values to regulatory bodies, and to set a clear direction for subsequent phases.

Task 1: Review all project delivery processes against the Sustainability Strategy and allow the time and space to effectively address sustainability. This includes allowing for an effective integrated design process and incorporating decision-making criteria into proforma evaluations that address the sustainability goals.

Responsibility: The Rangeview Landowner's Group

Task 2: Bring the sales and marketing teams on board early to help communicate the market value and benefits of sustainability features that are included in the Strategy. Their input can help inform implementation of various design features based on market value.

Responsibility: The Rangeview Landowner's Group; Sales & Marketing Teams

Task 3: Maintain Sustainability Performance Measures as part of Master Planning and contract documents. The partners should ensure the Performance Measures are maintained throughout the evolution of the Master Plan and Contract Documents. This includes reviewing documents against sustainability goals and proposing any revisions that will result in a more positive outcome for the project. Criteria that are recommended to be included in contract documents are identified under the Implementation Strategies in section 4.

Responsibility: The Rangeview Landowner's Group

5.3 Design & Construction

The foundation for success is advanced in the Master Plan phase. During Design & Construction, it is critical that expectations are clear and that all parties involved are on board to ensure the Performance Measures are achieved. The steps in this Phase are iterative for each development block.

Task 1: Ensure consultant and contractor procurement documents effectively communicate project goals and performance measures. When procuring products and services that push the envelope of conventional design and construction, it is critical that expectations are clearly set from the beginning. This can help alleviate costly change orders and will more likely achieve the project goals.

Responsibility: The Rangeview Landowner's Group

Task 2: Define and implement process for progress/compliance tracking. This includes defining the level of tracking, acceptable deliverables, and who is responsible for submitting and reviewing. The process will vary depending on whether individual performance thresholds are being reviewed by a 3rd party verification entity, such as LEED, EnergyStar or One Planet Living. Other options for consideration include whether the project will comply with a particular target vs prescriptive requirements. Once the process is defined, having consistent implementation is key. Embed the agreed upon tracking approach into the design and construction processes, with clear roles and responsibilities that can be passed along to others as needed.

Responsibility: The Rangeview Landowner's Group

Task 3: Update Implementation Strategies and Plan to reflect any changes during design. Regular and ongoing review of the Implementation Strategies and this more detailed Plan are required to ensure the design and construction progress towards successful achievement of the Performance Targets. The Rangeview Landowner's Group will review progress and make any adjustments to the documents necessary based on the current status of the project.

Responsibility: The Rangeview Landowner's Group. As the project evolves, this will eventually become the community members' responsibility.

APPENDIX A
COMMUNITY SCALE PERFORMANCE MEASURES

Topics	No.	Performance Measure
Culture and Community		
Public Art	CS.CC1	Incorporate at least one public art feature into at least one open public space or a public building
Outdoor Community Spaces	CS.CC2	Include at least three of the following public use spaces where people can interact and congregate at no cost are within the project boundary: Plaza or square, Park, Amphitheatre, Pedestrian street, Community garden.
Indoor Gathering Spaces	CS.CC3	Include at least one indoor public use spaces such as an atrium or a senior center where people can interact and congregate at no cost within the project boundary
Engagement	CS.CC4	Engage members of the community in a shared vision for the development
Equity and Local Economy		
Affordable Housing	CS.ELE1	Include a minimum of 5% affordable ownership housing units for moderate-income households OR 2.5% affordable rental housing units for moderate-income households as per by-law 0213-2022.
Accessibility	CS.ELE2	Include tactile Walking Surface Indicators on all new and repaired infrastructure, per Ontario's Integrated Accessibility Standards including: - Stairs that connect to exterior paths of travel - Curb ramps and depressed curbs on an exterior path of travel AND Pedestrian infrastructure that meets the Accessibility for Ontarians with Disabilities Act (AODA)
Housing Types and Size	CS.ELE3	Include a variety of housing sizes and types in the project such that the total variety of planned housing is approximately 11% Low-Rise Building (Up to 4 Storeys), 69% Mid-Rise Buildings (5-8 Storeys) and 20% Tall Buildings (9-15 Storeys)
Health and Happiness		
Access to Parks and Open Spaces	CS.HH1	Locate 90% of planned and existing dwelling units and nonresidential use entrances within a ¼ mile (400 meters) walk of at least one civic or passive use space, such as a square, park, or plaza. The spaces must be at least 1/6 acre (0.067 hectare) in area. Spaces less than 1 acre (0.4 hectare) must have a proportion no narrower than 1 unit of width to 4 units of length. Projects larger than 10 acres (4 hectares) must have a median space size of at least 1 acre (0.4 hectare). Spaces over ½ acre (0.2 hectare) that are used to meet the 90% threshold are included in the median calculation. All civic or passive use space to be flanked by at least one public street or be clearly identified and fully visible if located internal to a block (CPTED standards).
Physical Activity Spaces	CS.HH2	At least two sports and active spaces are available for public use (at no-cost) within an 800 m walk distance of all residential buildings.
Heat Island Effect	CS.HH3	Per LEED ND v4, Use any combination of the following strategies for 50% of the nonroof site paving (including roads, sidewalks, courtyards, parking lots, parking structures, and driveways). • Use the existing plant material or install plants that provide shade over the paving areas on the site within 10 years of plant material installation. • Install and plant planters, either at grade or raised. Plant material cannot include artificial turf. • Provide shade with structures covered by energy generation systems, such as solar thermal collectors, photovoltaics, and wind turbines, that produce energy used to offset some nonrenewable resource use. • Provide shade with architectural devices or structures that have a three-year aged solar reflectance (SR) value of at least 0.28. If three-year aged value information is not available, use materials with an initial SR of at least 0.33 at installation, • Provide shade with vegetated structures. • Use paving materials with a three-year aged solar reflectance (SR) value of at least 0.28. If three-year aged value information is not available, use materials with an initial SR of at least 0.33 at installation. • Use an open-grid pavement system (at least 50% unbound).

APPENDIX A
COMMUNITY SCALE PERFORMANCE MEASURES

Topics	No.	Performance Measure
Land Use and Nature		
Light Pollution	CS.LUN1	All exterior fixtures must be Dark Sky compliant and must be controlled by motion detectors or timers to reduce or extinguish non-essential lights between 11 pm and 6 am. In addition, meet the requirements of LEED ND v4 (Light Pollution Reduction) related to exterior lighting for residential areas; exterior lighting for circulation network; uplight and light trespass requirements in exterior lighting; etc.
Tree Planting Soil	CS.LUN2	Provide the following volumes of high-quality soil: 1. 30 m^3 high quality soil for large street trees. Soil calculations are not to be shared between public and private properties. High quality soil excludes compacted soil, further details are provided in the Landscape Plan Terms of Reference. 2. 15m^3 for orgnamental trees. Ornamental trees are to be planted where large street are not feasible. AND Provide the total amount of soil required on the site and in the adjacent public boulevard to support tree canopy by using the following formula: 40% of the site area ÷ 66 m^2 x 30 m^3 = total soil volume required. AND Trees to be maintained and warrantied for a minimum of 2 years.
Tree Planting Canopy	CS.LUN3	Plant large growing shade trees along street and public space frontages that are spaced appropriately. Ensure that space is provided to accommodate mature trunk and root flare growth of each tree.
On-Site Landscaping	CS.LUN4	Plant the at-grade landscaped site area using a minimum of 50% native plants (including trees, shrubs and herbaceous plants) comprising at least two native flowering species that provide continuous bloom throughout all periods of the growing season. AND Where potable water is used for irrigation, native and non-native plants must also be drought-tolerant; AND Do not plant any invasive species. AND Include pollinator plant species in at least 10% of the landscapred area.
Local and Sustainable Food		
Local food production	CS.LSF1	Dedicate permanent and viable growing space within the project public spaces as specified below: Ensure solar access and provide fencing, watering systems, garden bed enhancements (such as raised beds), secure storage space for tools, and pedestrian access for these spaces. Ensure that the spaces are owned and managed by an entity that includes occupants of the project in its decision making, such as a community group, homeowners association, or public body. Establish covenants, conditions, and restrictions (CC&R) or other forms of deed restrictions stating that the growing of produce is not prohibited in any project area.
Materials and Products		
Recycled/Reclaimed Materials	CS.MP1	At least 10% reused/reclaimed content in landscaping materials (hardscaping such as paving or walkways) is provided. AND At least 10% recycled content in landscaping materials (hardscaping such as paving or walkways).

APPENDIX A
COMMUNITY SCALE PERFORMANCE MEASURES

Topics	No.	Performance Measure
Sustainable Water		
Stormwater Quality	CS.SW1	Demonstrate best management practices (BMPs) are used to treat runoff, removing at least 80% of the average annual post-development total suspended solids (TSS).
Stormwater Management	CS.SW2	In a manner best replicating natural site hydrology processes, manage on site the runoff from the developed site for the 80th percentile of regional or local rainfall events, using low-impact development (LID) and green infrastructure.
Water Friendly Landscaping	CS.SW3	Where irrigation is required, irrigate for the first four years after planting and then decommission AND Limit the use of large, sodded areas AND Where potable water is used for irrigation, native and non-native plants must be drought-tolerant.
	CS.SW4	Limit the use of large, sodded areas
	CS.SW5	Where potable water is used for irrigation, native and non-native plants must be drought-tolerant.
Travel and Transport		
Walkability	CS.TT1	FUNCTIONAL ENTRIES: At least 90% of new buildings have a functional entry onto the circulation network or other public space, such as a park or plaza, but not a parking lot, per LEED ND v4.
	CS.TT2	BLOCK LENGTHS: Provide neighbourhood permeability by designing blocks to be no more than 400 metres in length to promote active transportation, discourage excessive driver speed, and disperse traffic movements. No cul de sacs are included.
	CS.TT3	SIDEWALK PROVISION: Design the public realm to ensure efficient walking routes forming a continuous network to key destinations with continuous sidewalks, or equivalent provisions for walking like multi-use paths.
	CS.TT4	SIDEWALK PROVISION: Continuous sidewalks OR equivalent all-weather routes for walking are provided along both sides of at least 90% of the circulation network block length within the project, including the project side of circulation network bordering the project, per LEED ND v4.
Bikeability	CS.TT5	Develop a cycling plan that illustrates the route from the boundary street(s) to the on-site occupant and visitor bicycle parking locations. The route must operate at 30 km/hr for mixed traffic or provide a separate facility for cyclists. The plan must illustrate that bicycle parking is accessible (5% grade maximum) and that there is opportunity for passive supervision for visitors and tenants when accessing bicycles and leaving the site.
	CS.TT6	BIKE NETWORK: Incorporating additional cycling infrastructure that goes beyond the bike network design requirements of the City of Mississauga Cycling Master Plan.
Compact Development	CS.TT7	DENSITY: Achieve a density that is greater than the minimum density targets applicable to the area, but is consistent with the policies of the Official Plan regarding compatibility with the built form OR For areas in a Secondary Plan, provide the maximum when there is a minimum/maximum range given for density and/or storeys.
	CS.TT8	ACESS TO SERVICES: 50% of dwelling units are within a 400-meter walking distance of at least 10 diverse uses, per LEED ND v4

APPENDIX A
COMMUNITY SCALE PERFORMANCE MEASURES

Topics	No.	Performance Measure
Travel and Transport		
Car Dependency Reduction	CS.TT9	Develop and implement a comprehensive Transportation Demand Management (TDM) Plan that includes measures that encourage people to take fewer and shorter vehicle trip, support transit and active transportation choices, enhance public health and reduce harmful environmental impacts of travel
Access to Transit	CS.TT10	If the building is next to a transit stop or requires that a new transit stop is added, install a shelter space for transit users with size based on mode share target. This space is preferred in the right-of-way but can be provided in the building if insufficient right-of-way is available. Shelter space refers to transit waiting area that provides protection from sun and rain.
Parking	CS.TT11	FLEXIBLE PARKING STRUCTURES: For each major parking structure, develop a strategy that details how the parking structure could be adapted to accommodate a 50% reduction in parking stalls.
	CS.TT12	SURFACE PARKING: Where it is not feasible to locate parking in structures either below or above grade, parking should be located to the rear of the principal buildings or within the interior side yard. Appropriate landscaping and screening measures shall be provided AND Surface parking lots should be screened from view from roads, open spaces, and adjacent residential areas with low fencing, architectural features, landscaping and/or other mitigating design measures, such as lowered parking surfaces with landscaped buffers.
	CS.TT13	SURFACE PARKING: Less than 20% of the total development footprint area is used for new off-street surface parking facilities, with no individual surface parking lot larger than 0.8 hectares, per LEED ND v4.
Zero Carbon		
Community Energy Plan	CS.ZC1	Complete a Community Energy Plan and establish target for TEUI, GHG intensity, and TEDI by building type. AND Hold a meeting with Lakeview partners and Endwave on the potential implementation of district energy AND Minimally explore options to integrate district energy by completing a feasability study.

APPENDIX B
BUILDING SCALE PERFORMANCE MEASURES

Note: Additional building scale performances measures will be identified as the master plan phase progresses towards site plan applications

Topics	No.	Performance Measure
Equity and Local Economy		
Accessibility	BS.ELE1	Accessibility measures and design features are provided in accordance with the Accessibility for Ontarians with Disabilities Act (AODA) AND the Ontario Building Code or beyond
Health and Happiness		
Building Resilience	BS.HH1	For residential buildings four storeys or more and non-residential buildings, provide a refuge area with heating, cooling, lighting, potable water, and power available and 72 hours of backup power to the refuge area and essential building systems AND Implement measures for basement flood protection, extreme wind protection or extreme heat protection.
Heat Island Effect	BS.HH3	For flat roofs (low slope ≤2:12) over 500 m^2, buildings must provide: Green roof for at least 50% of available roof space; OR Cool roof installed for 90% of available roof space and if the roof is over 2,500 m^2 a minimum of 1,000 m^2 will be designated solar ready. OR A combination of a green roof, cool roof and solar PV installed for at least 75% of available roof space.
Land Use and Nature		
Bird-Friendly Glazing	BS.LUN1	For Mid and High-Rise Buidlings, use a combination of the following strategies to treat a minimum of 85% of all exterior glazing within the first 16 m of the building above grade, or to the height of the mature tree canopy, whichever is greater: Visual markers applied to the 1st surface of glass with a maximum spacing of 50 mm x 50 mm; Building-integrated structures to mute reflections on glass surfaces; or, Non-reflective glass. Areas where visual markers are required include: Balcony railings and fly-through conditions; Elevations facing a High Hazard Area.
On-Site Landscaping	BS.LUN2	Plant the at-grade landscaped site area using a minimum of 50% native plants (including trees, shrubs and herbaceous plants) comprising at least two native flowering species that provide continuous bloom throughout all periods of the growing season. Where potable water is used for irrigation, native and non-native plants must also be drought-tolerant; Do not plant any invasive species. Include pollinator plant species in at least 10% of the landscapred area.

APPENDIX B
BUILDING SCALE PERFORMANCE MEASURES

Topics	No.	Performance Measure
Local and Sustainable Food		
Rooftop Gardens	BS.LSF1	Create space for rooftop gardens of mid and high-rise buildings that can be managed by the condo corporation and/or a resident's association group. To be appropriate for growing food, those spaces must: be located where there is excellent sun exposure (min. 7-8 hours). access to potable water for watering purposes
Materials and Products		
Sustainable Materials	BS.MP1	Will be identified at a later time for Site Plan Applications
Sustainable Water		
Water Efficiency	BS.SW1	Reduce indoor water consumption by 40% (residential) or 20% (commercial) compared to baseline (see LEED water use calculation methodology).
Water Runoff	BS. SW2	Achieve 5mm retention through reuse tanks for greywater irrigation
Travel and Transport		
Bicycle Parking	BS.TT1	For mid and high-rise residental and non residential buildings, provide: 0.75 long-term bicycle parking spaces per unit in weather protected areas located within a secure area of the building or common garage. AND At least 5% of the required long-term bicycle parking spaces, or one parking space, whichever is greater, shall include an Energized Outlet (120 V) adjacent to the bicycle rack or parking space. AND For residential buildings, provide 0.1 short-term bicycle parking spaces per dwelling unit in locations that are highly visible and in close proximity to primary entrances. AND For non-residential buildings, provide at least one on-site shower with changing facilities for the first 100 regular building occupants and one additional shower for every 150 regular building occupants thereafter.
Electric Vehicle Charging Stations	BS.TT2	For residential buildings four storeys or more and non-residential buildings: At least 20% of parking spaces are equipped with electric vehicle charging stations. All remaining spaces are designed to EV-Ready.
Zero Carbon		
Energy Efficiency	BS.ZC1	Achieve building level energy targets in line with EnergyStar Certification for residential and LEED Gold levels of performance for office. Further targets will be defined as part of the Community Energy Plan

APPENDIX B
BUILDING SCALE PERFORMANCE MEASURES

Topics	No.	Performance Measure
Zero Waste		
Waste Collection and Storage	BS.ZW1	Provide dedicated areas accessible to waste haulers and building occupants for the collection and storage of recyclable materials for the entire building, per LEED BD+C v4.1. Collection and storage areas may be separate locations. Recyclable materials must include mixed paper, corrugated cardboard, glass, plastics, and metals AND Take appropriate measures for the safe collection, storage, and disposal of two of the following: batteries, mercury-containing lamps, electronic waste. AND For Mid-High Rise residential buildings, provide a waste collection and sorting system for garbage, recycling and organics.
Construction Waste Management	BS.ZW2	Recycle, reuse, or salvage at least 80% of nonhazardous construction, demolition, and renovation debris AND Prioritize reuse where possible following the 3 Rs waste hierarchy of reduce, reuse and recycle AND Develop and implement a construction waste management plan that identifies the materials to be diverted from disposal and specifies whether the materials will be stored on site or commingled.

APPENDIX C
CERTIFICATION

Topics	No.	Performance Measure
LEED	C1	Achieve LEED-BD&C certification for all non-residential buildings. Include requirement for Gold certification using the most recent version of LEED in the contract documents.
	C2	Complete a LEED-ND certification feasability study to determine the potential applicability for the site.
EnergyStar	C3	Achieve EnergyStar certification for all residential buildings. Include requirement that all single family and multifamily residential buildings are EnergyStar certified in the bid documents.
OPL Endorsement	C4	Consider becoming a One Planet Living endorsed community. Peform feasiblity study to confirm effort required to achieve OPL Endorsement.

Neighbourhood Gathering Space within Central Square

Rangeview

Prepared by:

BOUSFIELDS INC.

PLANNING | DESIGN | ENGAGEMENT