ARCADIS

Urban Design Brief

3033 Dundas Street West / **City of Mississauga, Ontario**

APRIL 2025

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Introduction

Section 01

1.1 OVERVIEW

Arcadis Professional Services (Canada) Inc. ("Arcadis") has prepared this urban design brief on behalf of 2504228 Ontario Inc. to support the submission of an official plan amendment and zoning by-law amendment application for a mixed-use residential building on lands municipally known as 3033 Dundas Street West (the "subject site"). The proposal is composed of a 12-storey mid-rise development with 156 residential units and 1,065 sq.m. of non-residential mixed uses.

This urban design brief describes the proposed development and outlines how the site conditions, surrounding context, and key land use policies have informed the design of the site. Beyond aligning with the existing and planned context, the proposed development will provide community value and positively contribute toward neighbourhood functions.

It is determined that the proposed development aligns with municipal objectives and design guidance identified by the planning policy framework in the City of Mississauga. Further, the proposed development is representative of good planning and urban design principles.

Subject Site

Aerial view of the subject site (Source: Google Earth).

Subject Site Municipal Boundary Contour Line

Subject site within the larger neighbourhood context.

The Site Today

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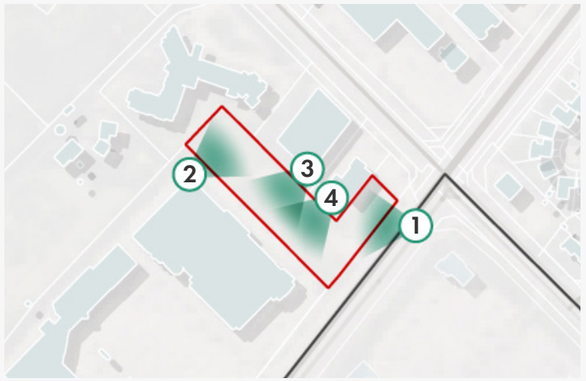
Section 02

2.1 SITE CONTEXT

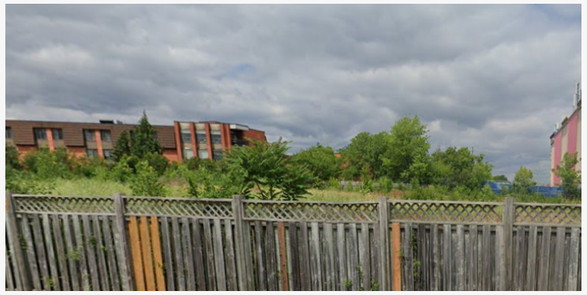
The subject site is generally located at the intersection of Dundas Street West and Winston Churchill Boulevard in the City of Mississauga.

The site is composed of a singular 'L-shaped' parcel with an approximate area of 9,492 sq.m. or 0.94 hectares. Prior to 2017, a single detached dwelling and motel were located on the subject site before later being demolished. In the present day, the site is vacant and has a relatively flat topography, with shrubs and vegetation enveloping much of the subject lands. Despite several trees lining its perimeter, the lack of placemaking elements and intentionally placed natural features on the site create an environment that is not conducive to pedestrian activity. Additionally, fences line the site boundary and separate the subject site from surrounding lands.



Site context key map.

1. Dundas Street West looking west (Source: Google Earth).



2. 3055 Dundas Street West looking northeast (Source: Google Earth).

3. 3022 Winston Churchill Boulevard looking southwest (Source: Google Earth).

4. 3018 Winston Churchill Boulevard looking southwest (Source: Google Earth).

NORTH

Immediately north of the subject site are a retirement home, storage facility, and retail plaza. Low rise residential uses are located north of Laird Rd, taking the form of townhouses and single detached dwellings. Beyond Laird Rd, two elementary schools and Garthwood Park are located within a low rise residential neighbourhood.

EAST

The area across from Winston Churchill Blvd is dominated by retail plazas, in addition to big box stores and an industrial business park. Although buildings are typically fronted by parking lots, where parking is provided to the side or rear of buildings, the number of parking lots and access entrances still contribute toward a car-centric pedestrian environment. The area east of Winston Churchill Blvd and south of Dundas St W can almost entirely be characterized by low rise residential uses in the form of single detached dwellings. Within this residential block, a gas station, townhouses, and two elementary schools are also located.

SOUTH

Retail plazas, big box stores, and employment uses, supported by a significant supply of associated parking, are positioned along the Dundas St W and Winston Churchill Blvd south of the site. A large scale industrial park is located beyond the uses that front these major arterials and is contained by Hwy 403 and Queen Elizabeth Way.

WEST

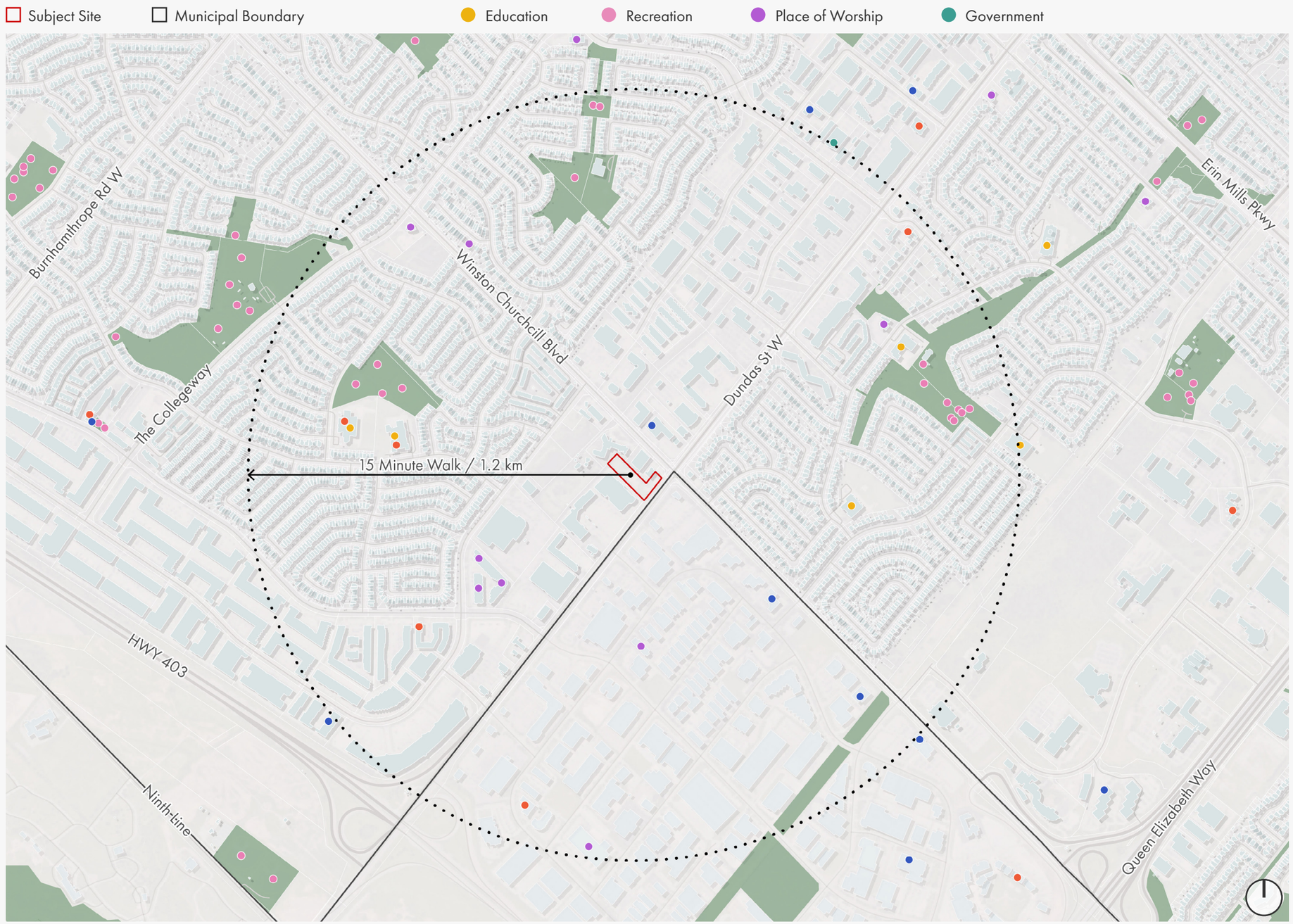
Within the block, retail plazas, employment uses, big box stores, associated retail parking, and two stormwater management ponds are situated west of the subject site.

2.2 SURROUNDING COMMUNITY

Within the broader neighbourhood context, the subject site is situated in an area characterized by commercial, industrial, and residential uses. Lands located along Dundas Street West are defined by retail plazas, big box stores, and business parks that are supported by a significant supply of surface parking. Low rise residential uses, in the form of single detached dwellings and townhouses, are also located in proximity to the site; south of Dundas St W as well as north of Laird Rd.

Notwithstanding its location in a low density area, a range of community amenities remain available within the neighbourhood that surrounds the subject site. The community amenities located within a 15 minute walk of the site would serve the introduction of higher-density residential uses at this location.

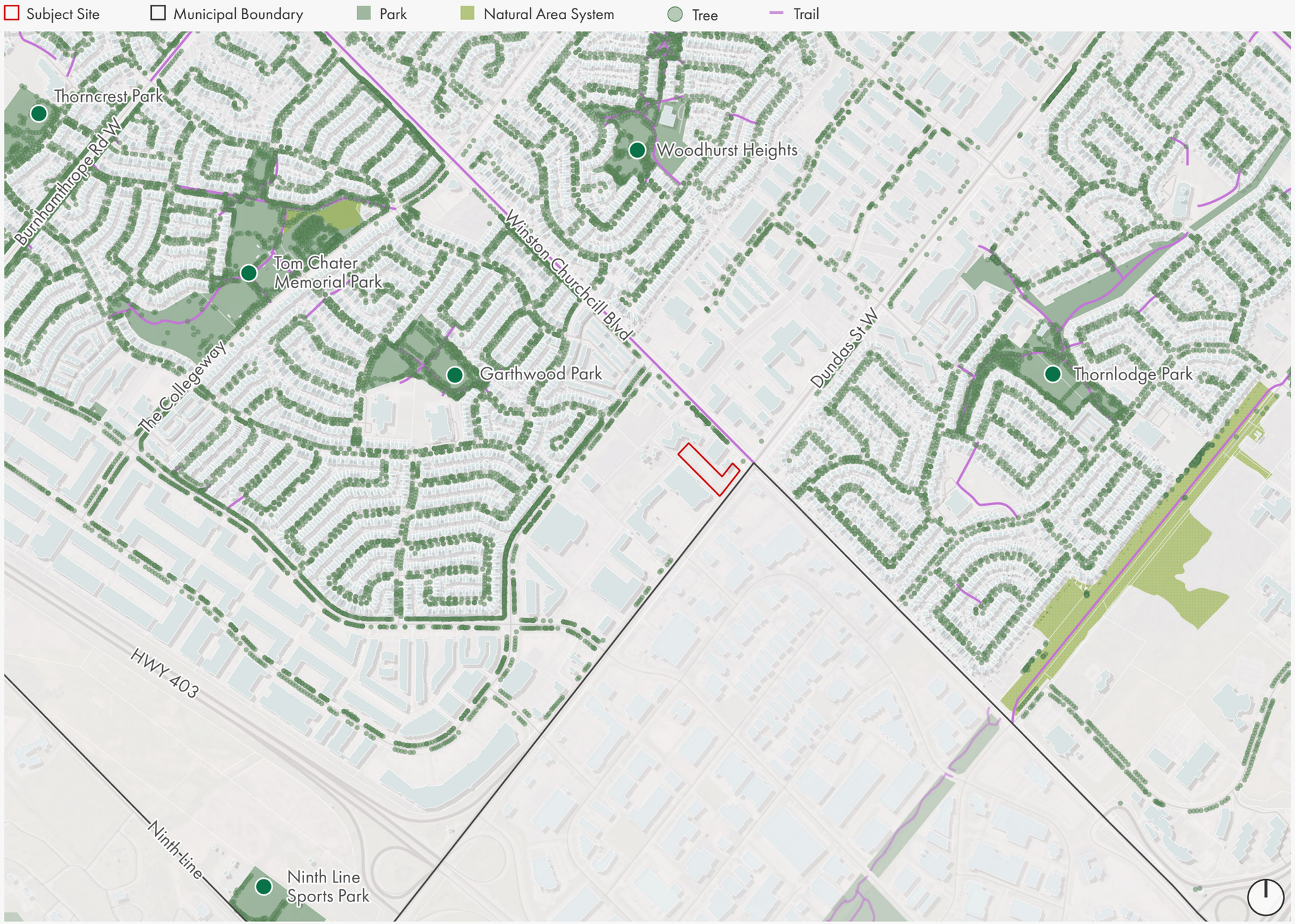
The emerging context of the area includes commercial, industrial, and low to mid-rise residential development dispersed across the neighbourhood. Along major arterials and throughways, including Dundas Street West, Erin Mills Parkway, and Highway 403, a masterplanned community and several smaller scale developments have been proposed, which largely consist of townhouses and mid-rise buildings, with heights of up to twelve storeys.



Community amenities within a 15-minute walking distance.

2.3 NATURAL ENVIRONMENT

The site is surrounded by several community-scale parks connected through a system of multi-use trails. Within residential neighbourhoods, shade and aesthetic value is provided by trees planted along local roads and clustered within municipal parks. A green corridor, beginning at the intersection of Plymouth Dr and Winston Churchill Blvd, runs parallel to Dundas St W, enhancing connectivity and access to open spaces, including a large woodland and outdoor recreational fields. In contrast, industrial areas surrounding the site are largely devoid of any significant natural features to break up the industrial character of the site surroundings.



Natural environment surrounding the subject site.

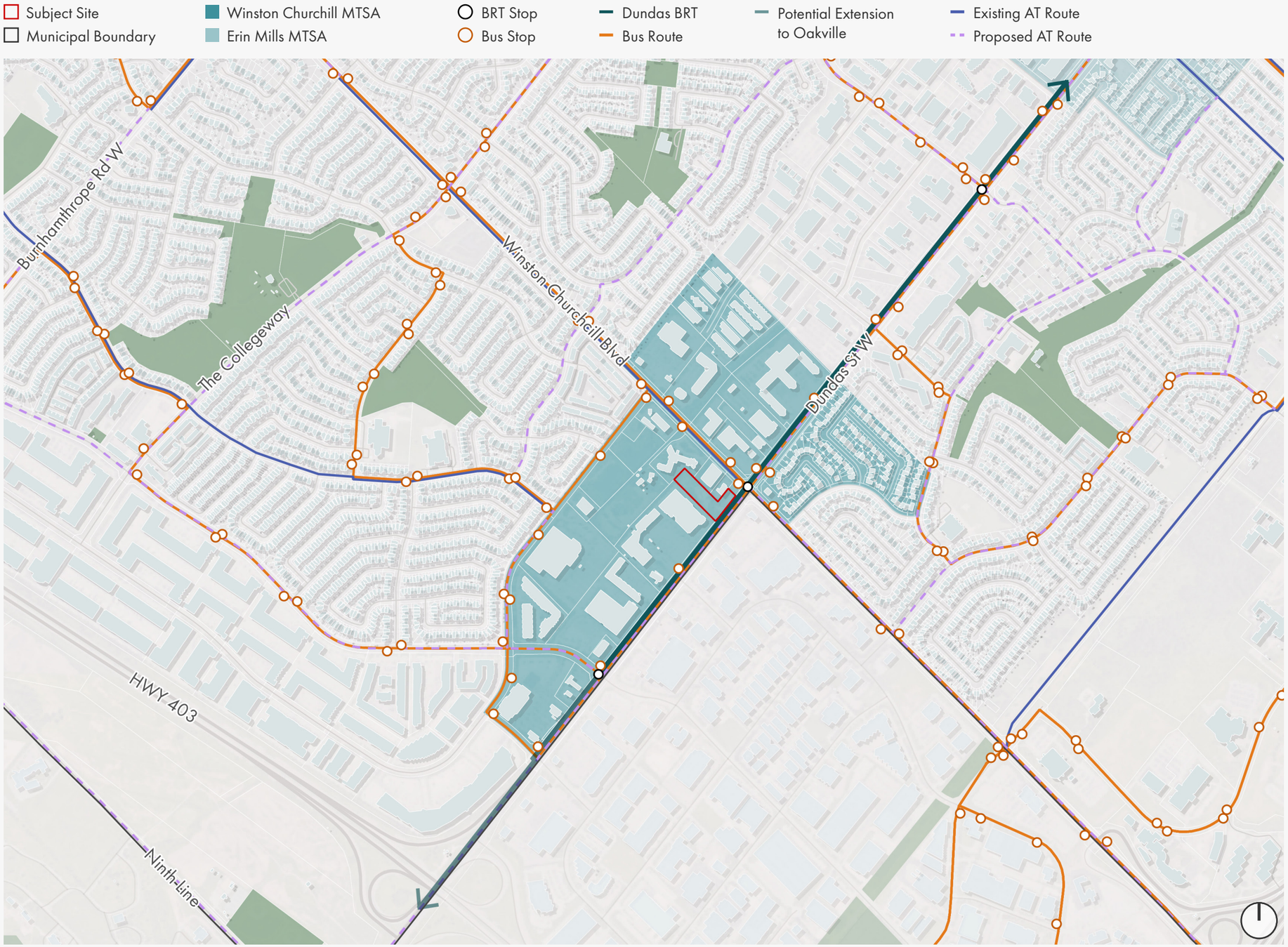
2.4 EXISTING CONNECTIONS

The subject site has strong access to vehicular, transit, and active transportation routes. Located at the intersection of Dundas St W and Winston Churchill Blvd, the subject site is well connected to the surrounding neighbourhood and wider municipal context.

Schedule 5 of the Mississauga Official Plan: Long Term Road Network identifies Dundas St W and Winston Churchill Blvd as arterials, while the portion of Winston Churchill Blvd south of Dundas St W is designated a regional arterial. Schedule 8 of the Official Plan goes onto identify the designated right-of-way width as 40 m for the portion of Dundas St W that the site fronts onto.

Several MiWay stops are positioned adjacent to the subject site, with bus routes running along Dundas St W and Winston Churchill Blvd. Transit service is also provided in residential neighbourhoods, connecting dispersed community uses and supporting first mile / last mile connectivity. At the municipal level, higher order transit is planned along the Dundas Street corridor, enhancing mobility across Mississauga and neighbouring municipalities. The planned Dundas Bus Rapid Transit (BRT) line will connect Toronto to Hamilton, with approximately 17 km of the route located within the City of Mississauga. The subject site is located in the Winston Churchill Major Transit Station Area (MTSA) and within walking distance of two proposed BRT stops (Dundas / Winston Churchill & Dundas / Ridgeway), connecting the site to the GTHA in the future.

The local active transportation network connects the site to much of the surrounding neighbourhood. Existing multi-use trails, signed bike routes, and bike lanes provide active transportation connectivity in proximity to the site. Proposed active transportation facilities will expand the existing network, with the potential of connecting Mississauga and Oakville along municipal boundaries.



Existing connections within the site surroundings.

Policy Context

Section 03

Policy Context

Section 03

The proposal has been informed by key urban design policies and guidelines within the City of Mississauga's planning framework. The following section identifies relevant policies and guidance for development on the subject lands and highlights urban design elements within the proposal that achieve the best practices identified in these documents. Key documents reviewed include:

- Mississauga Official Plan (2024)
- Dundas Connects Master Plan (2018)
- Mississauga CPTED Principles (2014)

3.1 MISSISSAUGA OFFICIAL PLAN (2024)

The Mississauga Official Plan (2024) is a long range document that guides land use and development planning in the City of Mississauga to promote an urban form that is sustainable, transit-supportive, and pedestrian-oriented.

Schedule 9 of the Official Plan identifies the subject site as being located within the Western Business Park Employment Area. In the context of Character Areas, Employment Areas are expected to accommodate the lowest densities and building heights, yielding modifications to the site's Mixed-Use designation. The site is also located within two Intensification Areas: the Dundas Street Intensification Corridor and Winston Churchill MTSA. In alignment with the Provincial Planning Statement (2024), future growth should be directed toward Intensification Areas and Major Transit Station Areas. The minimum density target for MTSAs served by bus rapid transit is 160 residents and jobs combined per hectare and development that is characterized by mixed uses, transit-supportive densities, and a range of community amenities should be encouraged in support of this density target. Being positioned along the planned Dundas BRT, the subject site is a prime location for intensified development that promotes the creation of complete, mixed-use communities that leverage major transit connections.

To accommodate growth and achieve the planned character of this community, it is important for the built form of development to represent a high quality of urban design. In line with urban design goals established by the Official Plan, development should enhance the existing built environment while accommodating the needs of future generations by promoting natural heritage, pedestrian activity, and a vibrant public realm.

The City is currently undertaking an Official Plan Review and will be seeking adoption of the new Mississauga Official Plan 2051 by City Council. Given the status of the Official Plan Review, the most recent office consolidation of the Mississauga Official Plan - August 7, 2024 has been reviewed for this urban design brief.

The following policies from the Mississauga Official Plan have been identified as being applicable to the subject lands and highlight the alignment between the proposed development and Official Plan guidance:

5.5 Intensification Areas

5.5.5 Development will promote the qualities of complete communities.

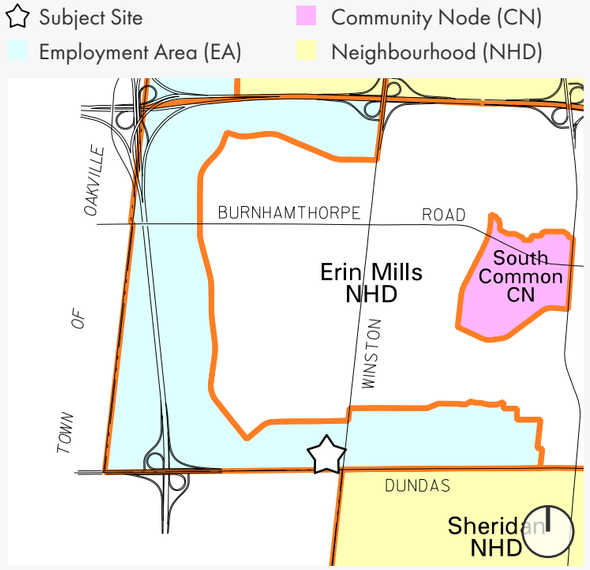
5.5.7 A mix of medium and high density housing, community infrastructure, employment, and commercial uses, including mixed use residential/commercial buildings and offices will be encouraged.

9.1 Introduction (Build a Desirable Urban Form)

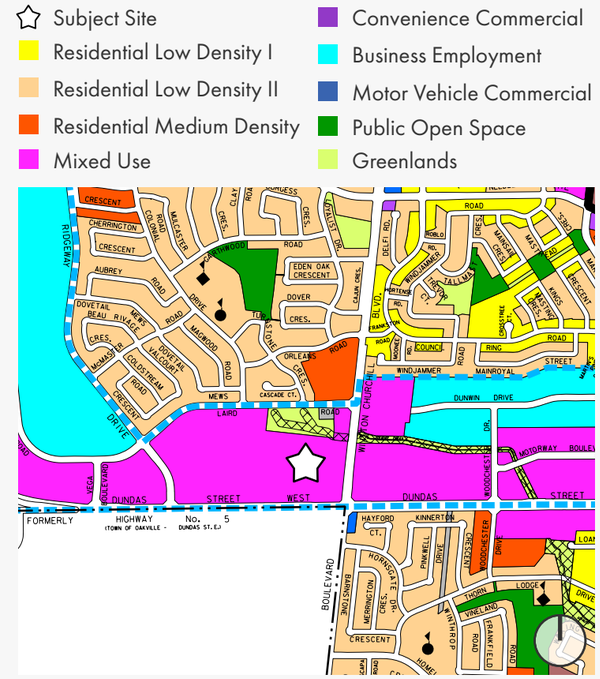
9.1.9 Urban form will support the creation of an efficient multi-modal transportation system that encourages a greater utilization of transit and active transportation modes.

UD RESPONSE

The proposed development consists of residential, medical, and retail uses in a medium to high density format. The mix of uses and built form represented in the proposal encourages greater community interaction and activity along the street. By orienting the proposed development toward Dundas St W, the primary street frontage is reinforced, thereby framing the public realm and contributing to a sense of main street along this planned higher order transit corridor. The provision of active ground floor uses and building entrances along Dundas St W further promotes street-level animation and connectivity to planned Dundas BRT stations.



Schedule 9 - Character Areas of the Mississauga Official Plan.



Schedule 10 - Land Use Designations of the Mississauga Official Plan.

9.2.1 Intensification Areas

9.2.1.10 Appropriate height and built form transitions will be required between sites and their surrounding areas.

9.2.1.11 Tall buildings will be sited and designed to enhance an area's skyline.

9.2.1.13 Tall buildings will be appropriately spaced to provide privacy and permit light and sky views.

9.2.1.15 Tall buildings will address pedestrian scale through building articulation, massing and materials.

9.2.1.17 Principal streets should have continuous building frontages that provide continuity of built form from one property to the next with minimal gaps between buildings.

UD RESPONSE

The massing of the proposed development has been designed to ensure visual interest is added to the Dundas St W corridor while a functional and aesthetically-pleasing pedestrian environment is created. The three-storey podium sets a streetwall height that is fitting with the lower-scale neighbourhood context and establishes a continuous building frontage along Dundas St W. Metal mesh, glazing, and concrete are thoughtfully repeated across the building facade to promote visual cohesion and a sense of rhythm in the architectural design. The visual impact of the building from the street is further enhanced by incorporating stepbacks at the podium level, upper storeys, and middle of the building form.

9.2.1.31 Buildings should be positioned along the edge of the public streets and public open spaces, to define their edges and create a relationship with the public sidewalk.

9.2.1.32 Buildings should be oriented to, and positioned along the street edge, with clearly defined primary entry points that directly access the public sidewalk, pedestrian connections and transit facilities.

9.2.1.36 Streetscape improvements including trees, pedestrian scale lighting, special paving and street furniture in sidewalks, boulevards, open spaces and walkways, will be coordinated and well designed.

UD RESPONSE

The scale and orientation of the proposed building is intended to support an active public realm, while creating a coherent streetscape that fits within the existing built environment. The placement of the podium defines the street edge while providing sufficient space for streetscape improvements and clearance to accommodate the planned BRT and an associated ROW widening. In coordination with the future streetscape design for the Dundas St corridor, planting and permeable paving have been provided along a widened sidewalk for the length of the street frontage.

9.3.1 Streets and Blocks

9.3.1.5 The improvement of existing streets and the design of new streets should enhance connectivity by:

a. developing a fine-grained system of roads;

b. using short streets and small blocks as much as possible, to encourage pedestrian movement;

UD RESPONSE

An internal road network that establishes a pedestrian-scale environment and divides the depth of the site is introduced as a part of the proposal. Vehicular and pedestrian connections enable site access toward the intersection of Dundas St W and Winston Churchill Blvd, where pedestrian activity and transit service are closest to the site. Within the block, connections to existing roads on adjacent properties (3018 Winston Churchill Blvd and 3055 Dundas St W) are also provided, enabling permeability through the subject site and connectivity from the site to the surrounding community.

9.5.1 Context

9.5.1.1 Buildings and site design will be compatible with site conditions, the surrounding context and surrounding landscape of the existing or planned character of the area.

9.5.1.9 Development proposals will demonstrate compatibility and integration with surrounding land uses and the public realm by ensuring that adequate privacy, sunlight and sky views are maintained and that microclimatic conditions are mitigated.

UD RESPONSE

The design of the proposed development is intended to fit harmoniously with the surrounding built environment and respect the scale of adjacent streets and buildings. The three-storey base building relates the proposal to the existing uses and scale of the surrounding neighbourhood while introducing a range of uses that will be supportive of a transit-oriented community planned around the adjacent Dundas BRT corridor. With an understanding of the planned context, the maximum height for development (12 storeys) is proposed on the subject site. The overall building has also been massed to provide adequate separation from existing and future development and minimize sun / shadow impacts on the public realm.

9.5.2 Site Development

9.5.2.2 Developments will be sited and massed to contribute to a safe and comfortable environment for pedestrians by:

a. providing walkways that are connected to the public sidewalk, are well lit, attractive and safe;

b. fronting walkways and sidewalks with doors and windows and having visible active uses inside;

c. avoiding blank walls facing pedestrian areas;

UD RESPONSE

Public realm attributes proposed as a part of this development contribute to a safe and comfortable pedestrian experience on the subject site. The proposed building is setback from the Dundas St W property line, providing a widened sidewalk with trees that line Dundas St W to improve separation from the wide roadway and to accommodate future streetscape improvements. Walkways continue to be provided throughout the site, including the surface parking lot, with the intent of enhancing pedestrian comfort and movement in a car-oriented space. A strong pedestrian connection is further reinforced through the inclusion of glazing along the entirety of the building facade, retail / residential entrances on the majority of building sides, and active ground floor uses that allow for multiple points of interaction and natural surveillance from inside the building.

9.5.5 Parking, Servicing and Loading

9.5.5.2 Above grade parking structures should be screened in such a manner that vehicles are not visible from public view and have appropriate directional signage to the structure.

9.5.5.3 Where surface parking is permitted, the following will apply. Parking should:

a. not be located between the building and the street;

b. incorporate stormwater best management practices, such as, permeable paving, bioretention areas and tree clusters;

c. provide safe and legible raised walkways, with curb ramps, within parking areas to buildings and streets;

f. have appropriate landscape treatment including trees and lighting, throughout parking lots;

g. provide appropriate landscape treatment to provide shading of parking areas; and

h. provide landscape buffering at the street edge.

9.5.5.6 Site plans will demonstrate the ability for shared servicing developments.

UD RESPONSE

Layby parking, surface parking, and three levels of underground parking are included in the design of the subject site. Public view of parking and other back-of-house facilities are screened by shifting surface parking toward the rear of the site and using soft landscaping. Provided the placement of servicing and loading between the proposed building and 3018 Winston Churchill Blvd, access can be shared with future development on this adjacent site. Plantings, trees and outdoor amenity space are also integrated into the surface parking lot, providing a larger permeable area that can support stormwater management and filter negative effects related to noise, air, and visuals from the public realm. Walkways connect the surface parking lot to building entrances and primary roadways, enhancing pedestrian comfort and movement through the site.

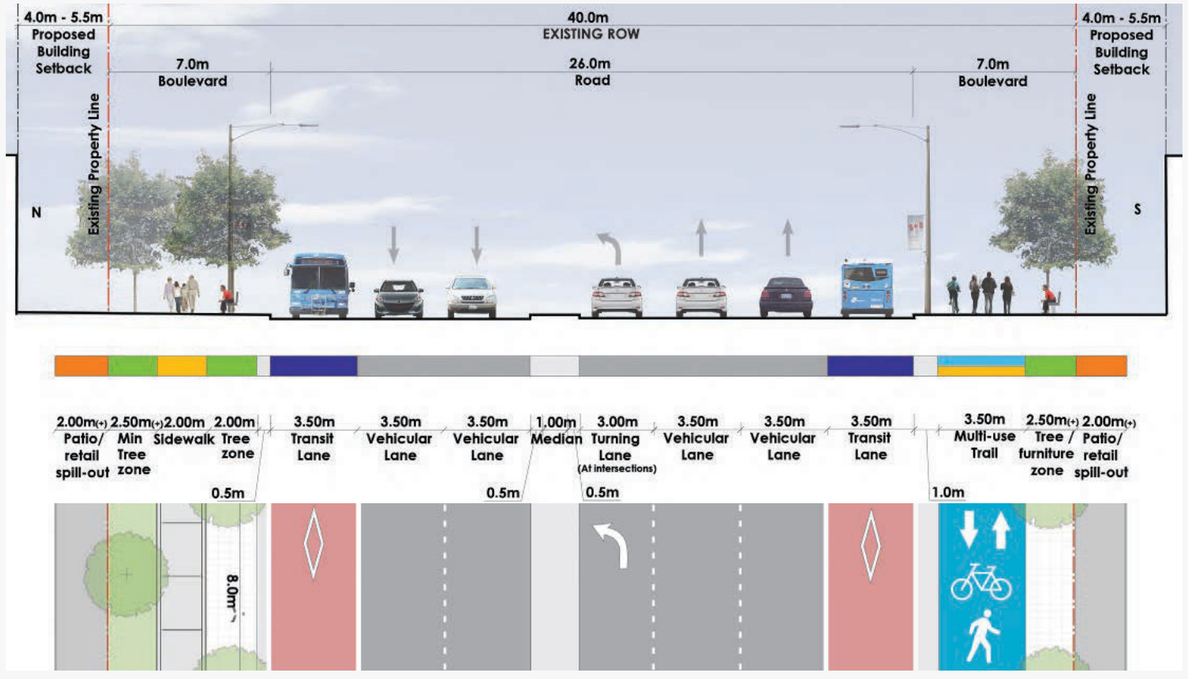
DUNDAS CONNECTS MASTER PLAN (2018)

The Dundas Connects Master Plan is a detailed plan that integrates land use and transportation planning to develop a vibrant and connected Dundas BRT Corridor in the City of Mississauga. With the ongoing development of the Dundas BRT, the Dundas Connects Master Plan provides further guidance related to intensification, land use, urban design, and transportation to encourage the evolution of each Focus Area into a transit-supportive community that can sustain higher order transit.

The subject site is located within the Winston Churchill Focus Area, which the Master Plan envisions as consisting of "moderate mixed-use redevelopment, up to 12 storeys, and with enhanced access to open space, on sites with high surface parking lot coverage."

Section V of the document identifies the proposed corridor condition for the portion of Dundas St W that the subject site fronts onto, referenced below. The proposal aligns with the corridor design represented in the cross section and ongoing development of the interim streetscape condition will be aligned with the ultimate ROW and continue to be coordinated in later submissions.

The following policies from the Dundas Connects Master Plan have been identified as being applicable to the subject lands and highlight the alignment between the proposed development and Master Plan guidance:



Condition 1: West of Winston Churchill Boulevard (Source: Dundas Connects Master Plan 2018)

5.1.1 Encourage Mixed-Use, Transit Supportive Intensification Across Dundas Street

Employment Area Mixed Use

Lands that are currently designated Mixed Use along the corridor and near proposed major transit stations should also allow for residential, major office, and institutional uses in order to support the achievement of intensification targets.

5.1.2.7 Winston Churchill Focus Area

The following are recommended for the Winston Churchill Focus Area:

- *Mixed Use should be encouraged along the Dundas Street corridor and Winston Churchill Boulevard corridor*
- *Uses that promote active frontages (e.g., restaurants and retail stores) will be encouraged on the ground floor as identified on Figure 5-19 as Mixed Use Active Frontage*
- *New open spaces (e.g., Destination Parkland, Community Parks, Urban Parks / Squares)*

5.1.6.4 Other Focus Areas / Major Transit Station Areas - West of Cooksville Focus Area

Height

- *Maximum height, north side of Dundas Street: Equivalent to width of Dundas Street right-of-way, up to a maximum of 12 storeys (40 metres)*

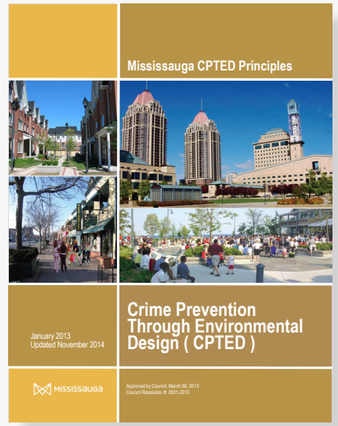
Setbacks and Massing

- *Minimum Building Setbacks from recommended Dundas Street Right-of-Way (ROW): 4.0 metres*
- *Maximum Building Setbacks from recommended Dundas Street ROW: 5.5 metres*
- *Minimum commercial floor height: 4.5 metres*

UD RESPONSE

The development proposes the maximum height for Focus Areas West of Cooksville (12 storeys) and consists of a mixed of uses that support intensification targets associated with MTSAs. An active frontage along Dundas Street includes street-related retail, open space, and entrances / windows along the street edge to enable a visual connection to the public realm and encourage social interaction. The overall building is setback at least 5.9m from the front property line to accommodate future ROW widening for the Dundas BRT and to provide an adequate building setback in support of an enhanced public realm per the proposed Dundas Street cross section.

MISSISSAUGA CPTED PRINCIPLES (2014)



The Mississauga Crime Prevention Through Environmental Design (CPTED) Principles are based on a design approach centred around shaping the built environment to create safer communities. Based on this understanding, four design strategies: Natural Surveillance, Natural Access Control, Territorial Reinforcement, and Mechanical Forms of Surveillance and Access Control, should be applied in the design of proposed developments.

UD RESPONSE

The CPTED principles are incorporated into design of the proposed development. A sense of safety is developed through the placement of windows, entrances, and the building itself to create a street edge that supports natural surveillance, natural access control, and territoriality. Additionally, active frontages, mixed uses, and the density of residential units proposed for the site generate a critical mass of people gathering, moving through, and surveilling the site internally; further promoting CPTED principles.

The Proposal

Section 04

The Proposal

Section 04

4.1 SITE DESIGN

The development of the proposed site plan followed an iterative design process that focused on fostering vibrancy along the Dundas BRT corridor by establishing an intensified mix of uses that would attract residents and businesses while maintaining the character of the Winston Churchill Focus Area.

The site plan transforms the existing vacant site by introducing an internal road system that establishes a pedestrian-scale environment. Vehicular and pedestrian connections facilitate site access from Dundas Street West, with the possibility of mid block connections being delineated from adjacent properties to Winston Churchill Boulevard.

A 12-storey mixed use building is proposed to establish moderate density on the site, helping to generate a critical mass of people in support of the planned BRT corridor and to enable the creation of a transit-oriented built form. To begin achieving transit-supportive densities where the BRT is planned, the proposal includes residential, retail, medical, and restaurant uses that diversify site activities and support street-level animation. The proposed building is strategically positioned along Dundas St W to establish a retail edge for the site and to animate this future transit corridor. Surface parking is positioned behind the building to minimize the visual presence of parking on site, mitigate impacts on the public realm, and transition away from the car-centric conditions of the surrounding neighbourhood.

With intensified uses and a pedestrian-friendly site design initialized through the proposed development, the gradual development of a vibrant and livable transit-supportive community can begin to be realized.

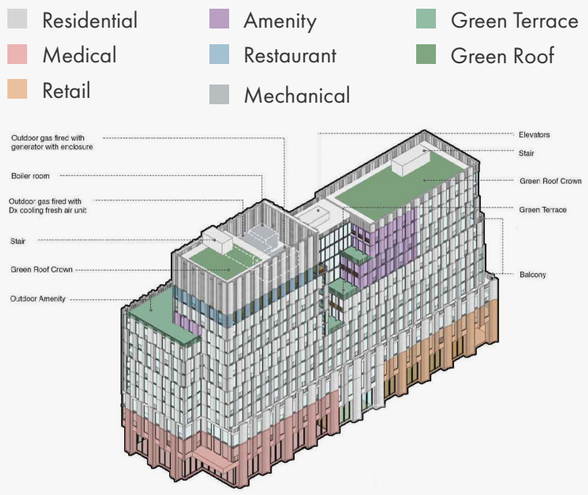
Future Development

The overall block that the site is located within currently consists of retail plazas, big box stores, stand alone retail buildings, a long term care facility, and a significant supply of associated surface parking. With the introduction of a planned BRT station at the intersection of Dundas St W and Winston Churchill Blvd, development that supports intensification and a range of uses can be expected within the block. In addition to the proposed development, the site plan demonstrates what future development may look like at 3018 & 3020 Winston Churchill Blvd and has strategically considered future development of the larger block. Within the larger context of this conceptual development, a connected, at grade outdoor amenity space with planting in between buildings and adequate separation distances that respect privacy and sun / shadow impacts is illustrated. The private road internal to the site also has the potential to form mid block connections to adjacent properties and the opportunity for shared servicing and loading spaces with adjacent properties. While this Urban Design Brief focuses solely on the development the subject lands, the site design works to enable future development and ensure a cohesive network of connections, with adequate separation, is created within the larger block.

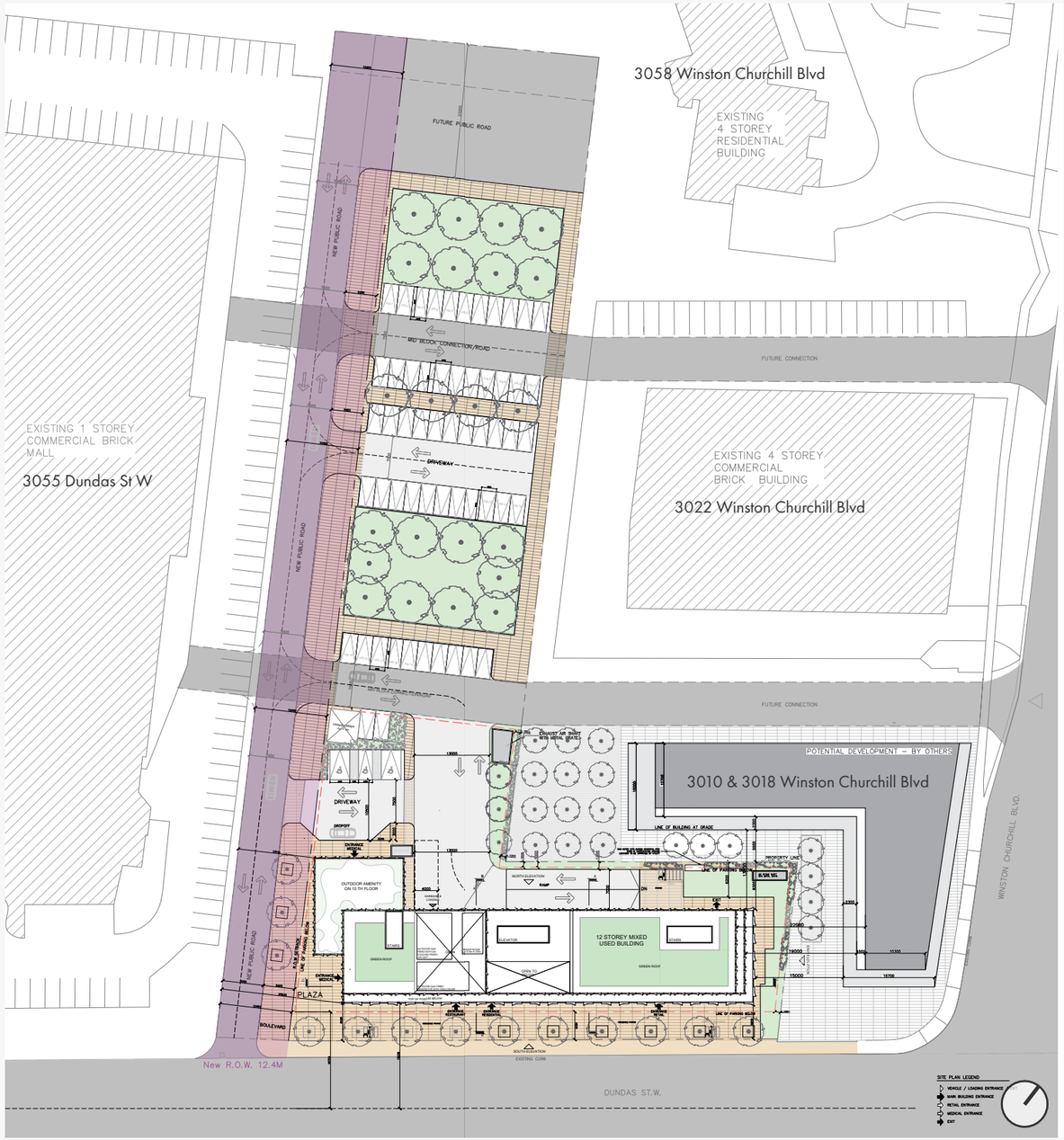
The following massing provides a breakdown of the building uses incorporated within the site design. The mix of uses aims to provide a diversity of activities to the site and to create destinations that attract users during all hours of the day.

Storeys	Unit Count	Total GFA	Mixed Use GFA	Amenity GFA
12	156	13,534 m^2	1,065 m^2	1,457 m^2

Development statistics.



3D massing of building uses within the proposed development.



Site plan with the potential development plan at 3010 & 3018 Winston Churchill Blvd.

Site boundary Underground parking boundary

4.2 BUILT FORM

The scale and orientation of the proposed building is intended to support an active public realm, while creating a pedestrian-scale streetscape that enhances the existing built environment. The proposal introduces a 12-storey building that balances the scale and character of the surrounding community with a moderate increase of in density. The proposed mixed-use building is appropriately scaled to created a continuous street wall that will frame the public realm and help encourage grade-related activity with ground level retail uses. The proposed podium fits the overall development into the neighbourhood context and transitions proposed heights to heights observed in adjacent buildings. With consideration for the proportions of the proposed building, the 3-storey podium defines a human-scale streetscape that supports the integration of the proposed development with existing and planned neighbourhood heights.

Particular attention has been given to the ground floor architectural treatment, as the site fronts onto the future Dundas BRT corridor and will be essential to animating the streetscape. The ground floor has been set at 4.5m in height and is inset to provide protected entrances to retail spaces lining Dundas Street W. The rhythmic placement of glazed entrances along the Dundas Street West facade provides visual cohesion as well as transparency to animate the public realm.

The upper storeys include a combination of materials, alternating between glass and a light coloured metal mesh facade treatment, reducing the visual bulk of the 12-storey building. Gradual stepbacks include a 3rd storey stepback at the podium-level, as well as a vertical void cut into the facade adjacent to amenity spaces beyond the sixth storey. This provides a visual break in the facade and creates enclosed green roof and terrace spaces adjacent to upper level amenity and restaurant uses.

Drawing from urban design standards and architectural best practices, the built form, articulation and materiality of the proposed development embodies design excellence and connects the subject site with the existing community. A consistent palette of materials is used for the development, from the ground floors to the rooftop, expressing visual cohesion throughout the proposed development. Façade articulation and the repetition of architectural elements help further advance a unified visual identity for the proposed building, while adding visual interest to the site. Overall, the design of the proposed buildings fits harmoniously with the surrounding neighbourhood while offering visually interesting and cohesive elements that enhance the street-level experience of the site.

Consideration has been given to reduce the visual bulk of the proposal and mitigate adverse sun and shadow impacts on the public realm. Further evaluation of these built form elements is detailed in Section 4.5 Shadow Analysis.

The following pages highlight the conceptual building renderings, as well as the elevations proposed for the site.

Conceptual rendering of proposed development from internal road.

Conceptual rendering of the proposed development and potential development from Dundas St W.

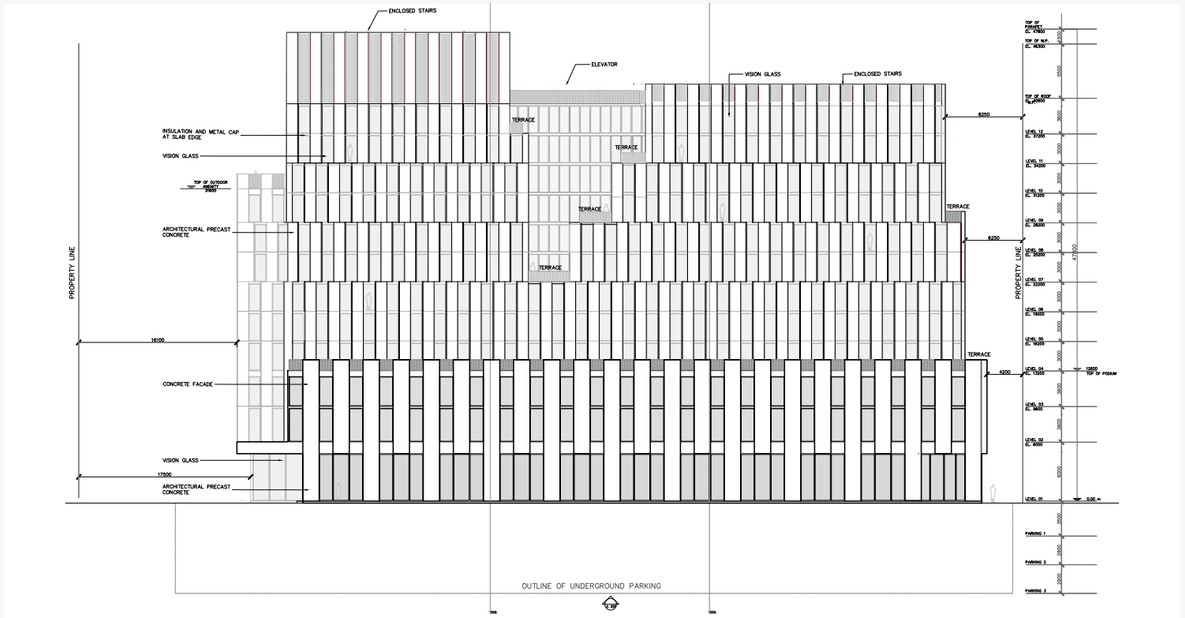
Conceptual rendering of proposed development and possible shared open space with potential development from Dundas St W.

Conceptual rendering of the proposed streetscape design along Dundas St W.

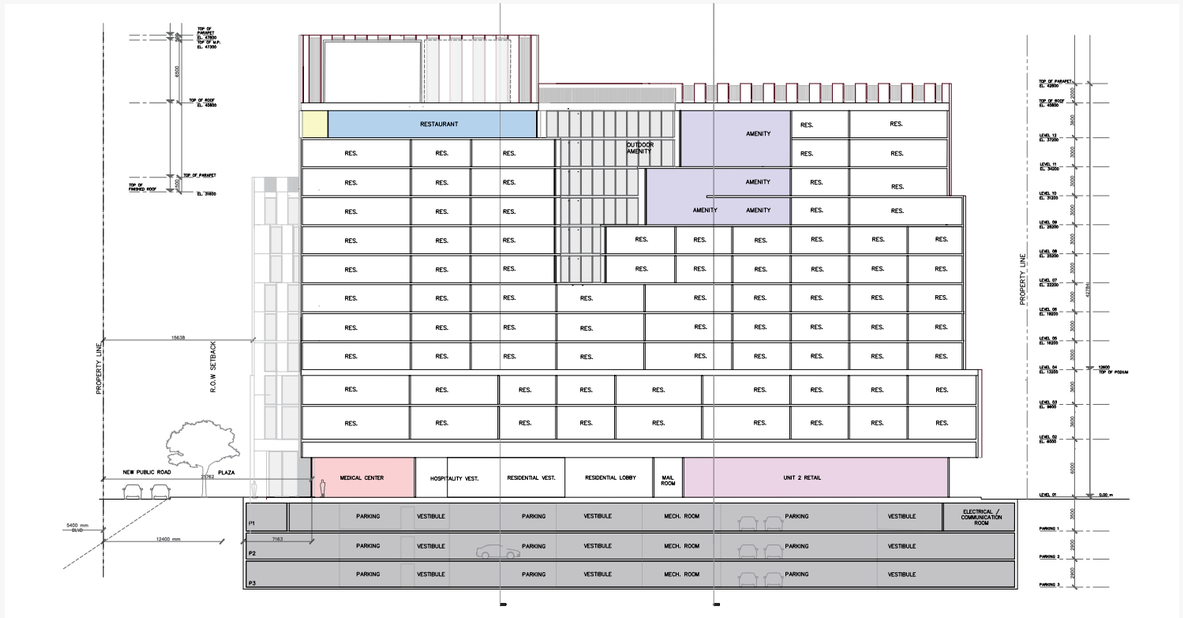
Conceptual rendering of proposed development from parking lot on site.

Conceptual rendering of medical office entrance.

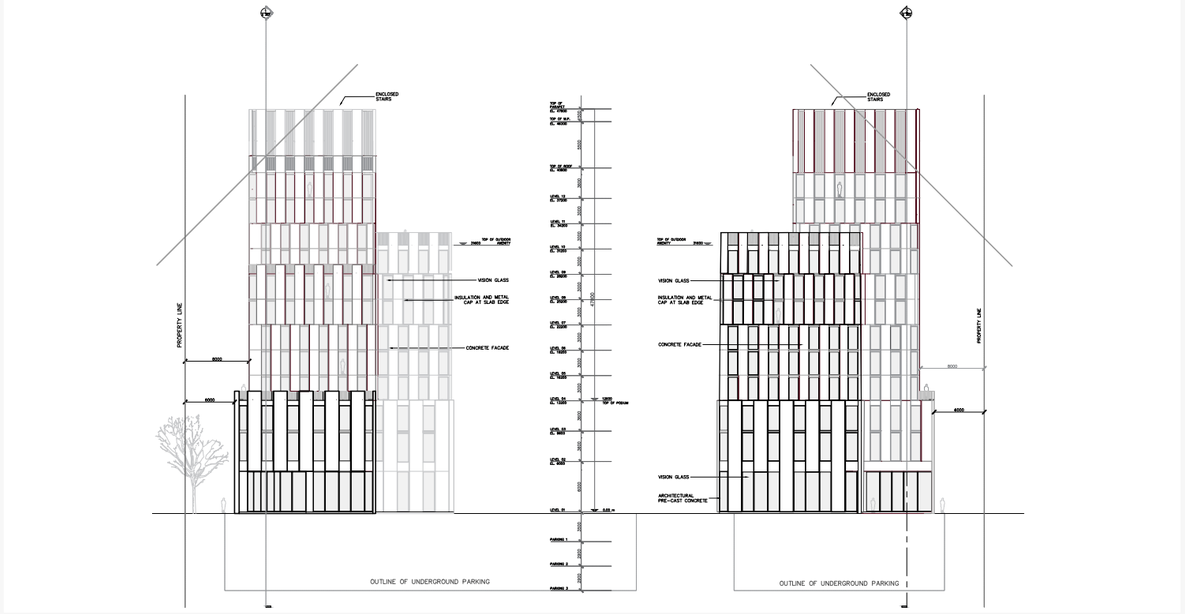
Conceptual rendering of articulated green rooftop amenity.



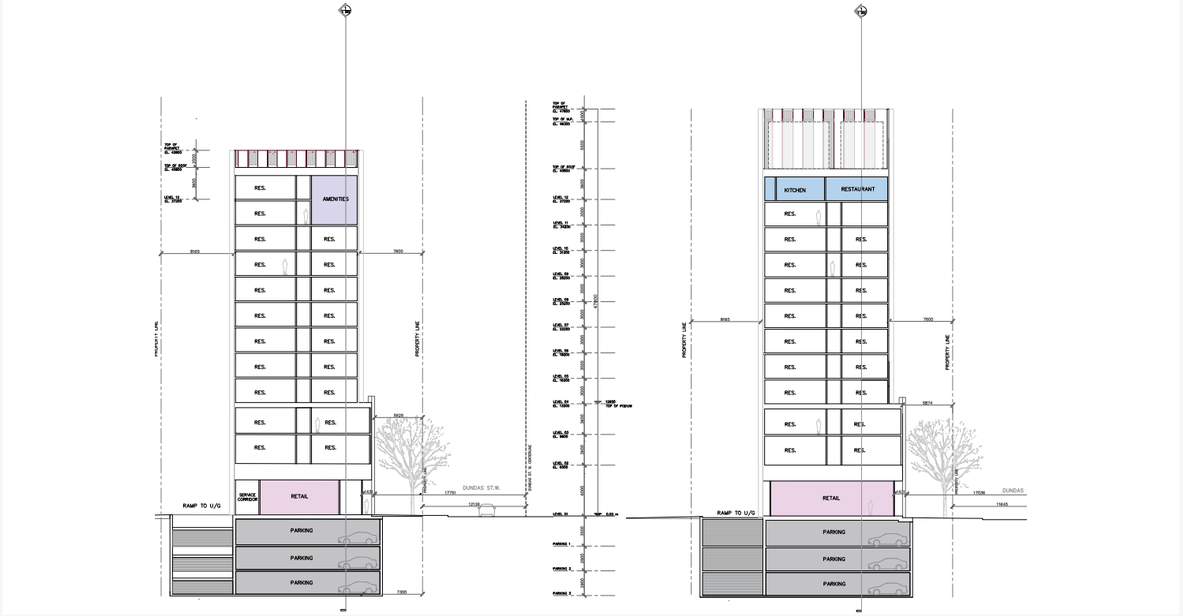
South elevation.



South elevation highlighting distribution of non-residential uses.



East and west elevation.



West and east elevation highlighting distribution of non-residential uses.

4.3 OPEN SPACE

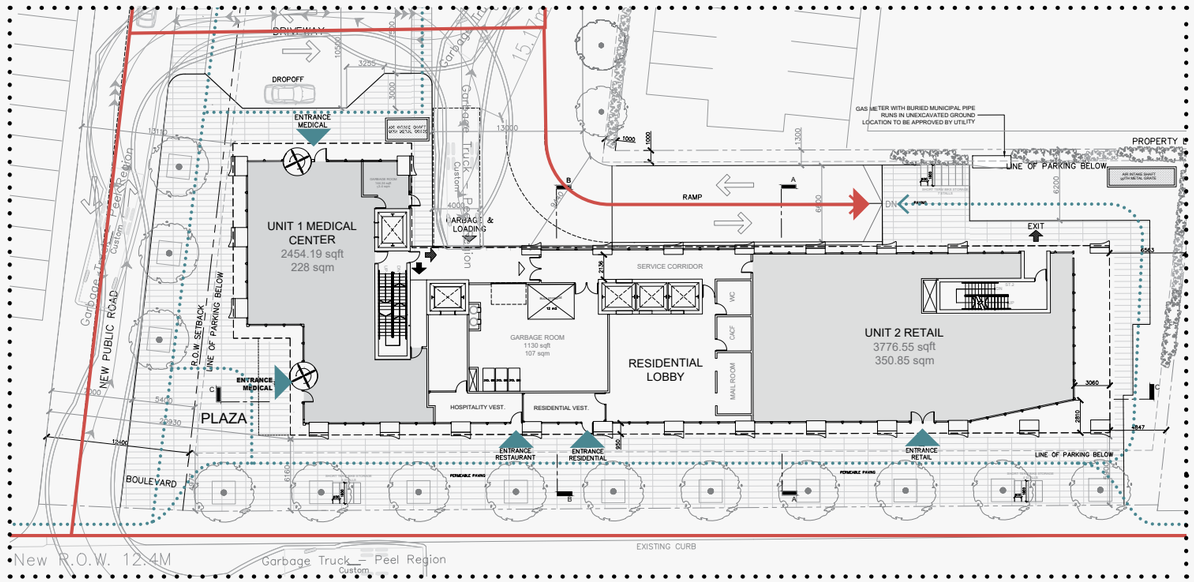
While the subject site is surrounded by a dispersed collection of community scale parks, the neighbourhood built environment is dominated by hardscapes and parking lots. Where the site currently sits vacant, the proposal imagines an animated community that positively contributes to the pedestrian experience in the neighbourhood.

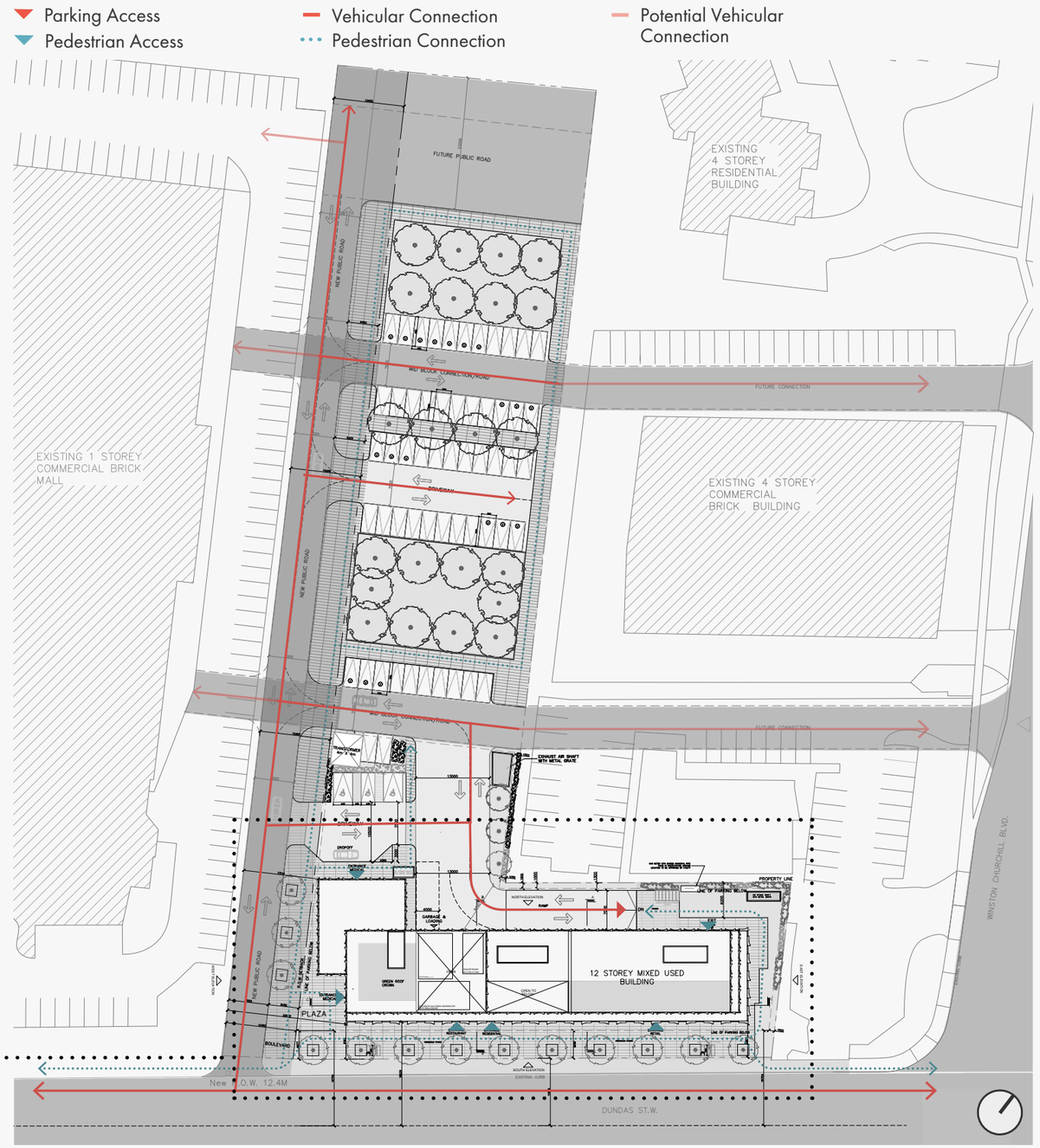
The proposal will introduce a plaza at the southwest corner of the site that leads into a series of small scale open spaces that start in the middle of the site and move toward the rear. There is also possibility of creating an expanded courtyard in coordination with future development at 3018 and 3020 Winston Churchill Blvd. The location of both open spaces behind the proposed building provides for an intimate and protected amenity space that is connected by a series of wide pedestrian walkways. In conjunction with the publicly accessible open spaces on the ground floor, private outdoor amenity space is provided on the upper levels of the proposed development. Outdoor amenity space is located on the 10th floor and on the 7th, 9th, 11th, and 12th floors, green terrace amenity space is provided and shaped by gradual stepbacks in the centre of the building form. The mechanical penthouse and building rooftop are capped with a green roof crown.

In addition to the proposed amenity spaces, the public realm is designed to enhance street-level animation and facilitate pedestrian movement. Soft landscaping frames Dundas St W and internal roads, guiding pedestrians through the site and towards open spaces. The landscape approach focuses on enhancing pedestrian connectivity and contributing to an attractive streetscape that is connected to the wider community.

4.4 STREETS & SITE CIRCULATION

Vehicular and pedestrian access to the site is provided along Dundas St W, with the opportunity to establish two midblock connections to Winston Churchill Blvd and three connections to internal roads through adjacent properties to the east and west of the site. The proposal takes the first step in establishing a pedestrian-scale block pattern that improves walkability and permeability through the site and surrounding properties. Surface parking is located from the centre to the north of the site, with underground parking access provided between the subject site and 3018 Winston Churchill Blvd. A total of 59 surface parking spaces, 164 underground parking spaces, and 105 bike parking spaces have been provided. Based on pedestrian and vehicular movement around the site, building entrances are located north, west and south of the building.





Site access and circulation.

4.5 SHADOW STUDY

To understand the microclimate impacts of the proposed development, the following shadow study has been undertaken. It should be noted that there are no impacts to open spaces caused by shadows cast from the proposed buildings. There are also no shadow impacts to nearby residential neighbourhoods to the southeast, with access to sunlight maximized during all times of the year. During June and September past 4pm and December past noon, minimal shadows are cast on the sidewalk as a result of the proposed development.

June 21

Subject Site Proposed Shadows

June 21 5:37 am

June 21 7:07 am

June 21 11:20 am

June 21 12:20 pm

June 21 7:20 am

June 21 8:20 am

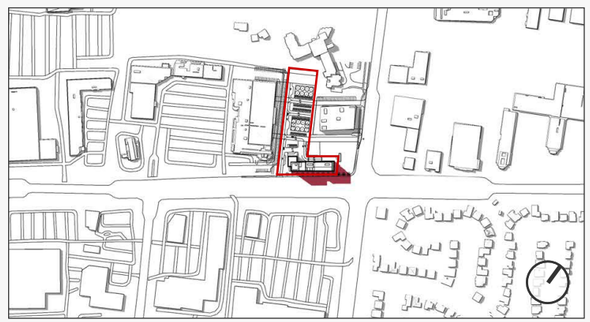
June 21 1:20 pm

June 21 2:20 pm

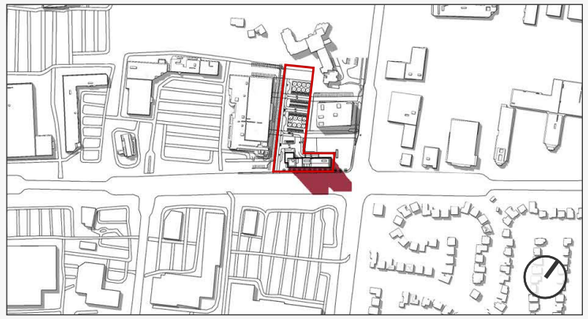
June 21 9:20 am

June 21 10:20 am

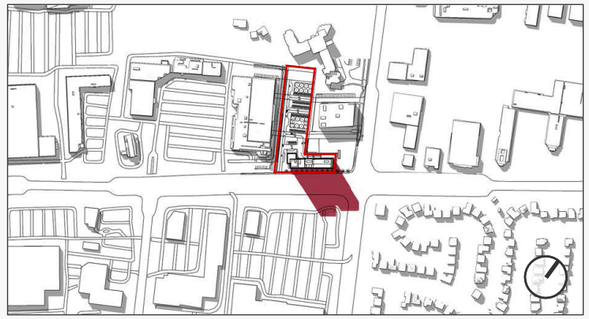
June 21 3:20 pm



June 21 4:20 pm



June 21 5:20 pm



June 21 6:20 pm

June 21 7:20 pm

June 21 7:33 pm

June 21 9:03 pm

September 21

September 21 7:05 am

June 21 8:35 am

June 21 9:12 am

June 21 10:12 am

June 21 11:12 am

June 21 12:12 pm

Subject Site

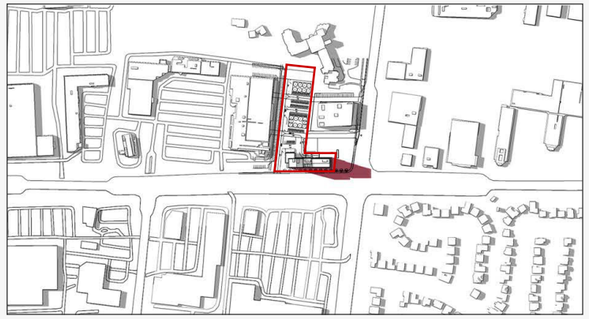
Proposed Shadows

June 21 1:12 pm

June 21 2:12 pm

June 21 7:18 pm

June 21 3:12 pm



June 21 4:12 pm

June 21 5:12 pm

June 21 5:35 pm

December 21

December 21 7:49 am

December 21 9:19 am

December 21 10:17 am

December 21 11:17 am

☐ Subject Site ■ Proposed Shadows

December 21 12:17 pm

December 21 1:17 pm

December 21 2:17 pm

December 21 3:17 pm

Subject Site

Proposed Shadows

4.6 PEDESTRIAN WIND COMFORT & SAFETY STUDY

A pedestrian wind comfort and safety study was conducted to evaluate and mitigate pedestrian-level wind impacts associated with the proposed development.

From an urban design perspective, the site has been designed to minimize adverse impacts to pedestrian comfort and safety through the site. While some wind impacts are anticipated surrounding the building, the conditions remain suitable for pedestrians and are considered safe at all times of the year. The incorporation of stepbacks at the podium-level and within the centre of the facade, enclosing amenity space terraces, will be used to reduce any undesirable wind flows and to minimize street-level wind impacts. Additionally, retail entrances along the ground floor have been inset, with an overhang to protect from downward wind flows and adverse weather conditions. These recessed entrances, as well as planting and street trees within outdoor amenities and along the Dundas Street West frontage, aim to further improve wind impacts to the pedestrian environment. In the summer, when it is expected pedestrians will remain in outdoor spaces for longer, wind conditions are suited for all intended purposes.

Appendix B provides further detail related to the pedestrian wind comfort and safety study completed for the proposed development.

4.7 ACOUSTIC IMPACT & VIBRATION STUDY

To identify and mitigate noise impacts caused by the proposed development, an acoustic impact and vibration study was completed as a part of the supporting studies for this UDB.

Predicted sounds levels for almost all night and daytimes on all facades exceeded the applicable criteria, although sound levels on above grade outdoor amenity areas were identified as compliant.

Further detail related to the development and recommendations to mitigate acoustic impacts are provided in a separate Noise Feasibility Study submitted as a part of the development application package.

Summary

Section 05

The proposed development represents the first step in the long-term evolution of the Winston Churchill station area along the planned Dundas BRT. The proposal offers a strategic opportunity to activate the site by introducing greater densities and a mix of uses that will be connected to the future development of the block it is located within. Positioned within the Winston Churchill MTSA, along the planned Dundas BRT corridor and by a gateway between Mississauga and Oakville, the proposed development possesses the ability to catalyze growth and encourage social vibrancy within the neighbourhood.

The proposal transforms a vacant site along Dundas St W through the development of a 12-storey mixed-use building. The proposed development will offer a total of 156 residential units, ranging from studio to 2 bedroom plus den typologies, in addition to 1,457 sq.m. of total amenity space. The design also includes 164 underground parking spaces, 59 surface parking spaces, 105 bike parking spaces.

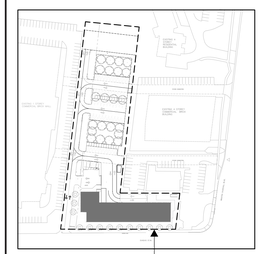
The proposal is aligned with the relevant policies outlined in the Mississauga Official Plan (2024), Dundas Connects Master Plan (2018), and Mississauga CPTED Principles (2014). Overall, the proposal is representative of good planning and urban design practices that will support the evolution of the Winston Churchill MTSA into a thriving and animated community, as envisioned by the City.

Appendix A

ISSUANCES

REZONING APPLICATION	11 APRIL 2024
ISSUED	DATE

KEY PLAN



Project North

True North

Project Location
3033 Dundas Street West,
Mississauga, Ontario

DRAFT

HOUTARCHITECTURE

131 Bloor Street West,
Toronto Ontario, M5S 1S3
www.hout.ca
office@hout.ca

3033 Dundas Street West,
Mississauga, Ontario

GROUND FLOOR

SCALE	As Shown
DATE	08 APRIL 2025
PROJECT NO.	00

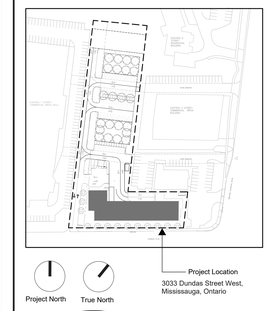
A013

PARKING DIMENSION LEGEND

ISSUANCES

REZONING APPLICATION	11 APRIL 2024
ISSUED	DATE

KEY PLAN



DRAFT

HOUTARCHITECTURE

131 Bloor Street West,
Toronto Ontario, M5S 1S3
www.hout.ca
office@hout.ca

3033 Dundas Street West,
Mississauga, Ontario

UNDERGROUND PARKING 1

SCALE	As Shown
DATE	08 APRIL 2025
PROJECT NO.	00

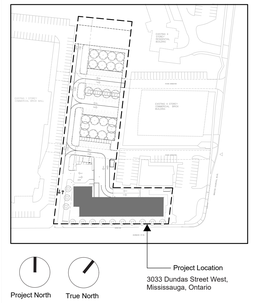
A014

PARKING DIMENSION LEGEND

ISSUANCES

REZONING APPLICATION	11 APRIL 2024
ISSUED	DATE

KEY PLAN



DRAFT

HOUTARCHITECTURE

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Toronto Ontario, M5S 1S3
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office@hout.ca

3033 Dundas Street West,
Mississauga, Ontario

UNDERGROUND PARKING 2

SCALE	As Shown
DATE	08 APRIL 2025
PROJECT NO.	00

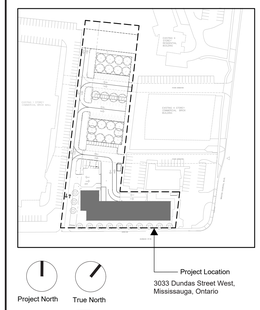
A015

PARKING DIMENSION LEGEND

ISSUANCES

REZONING APPLICATION	11 APRIL 2024
ISSUED	DATE

KEY PLAN



DRAFT

HOUTARCHITECTURE

131 Bloor Street West,
Toronto Ontario, M5S 1S3
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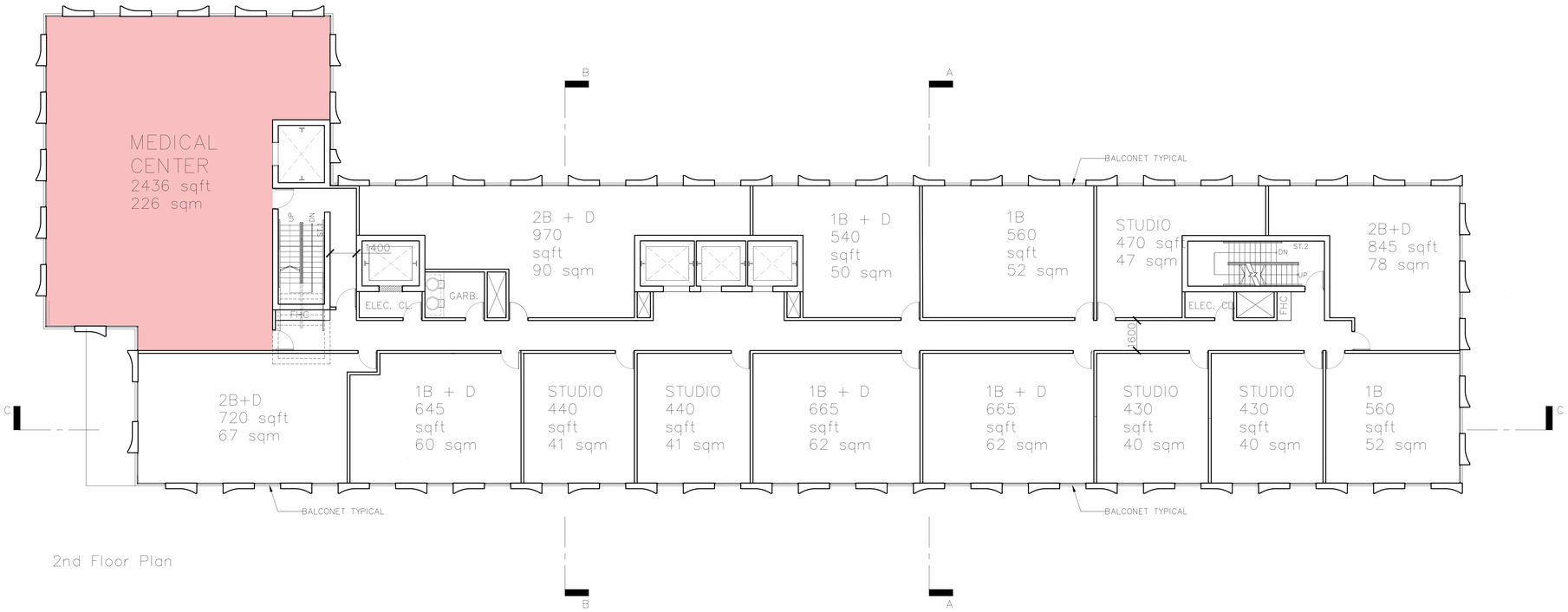
office@hout.ca

3033 Dundas Street West,
Mississauga, Ontario

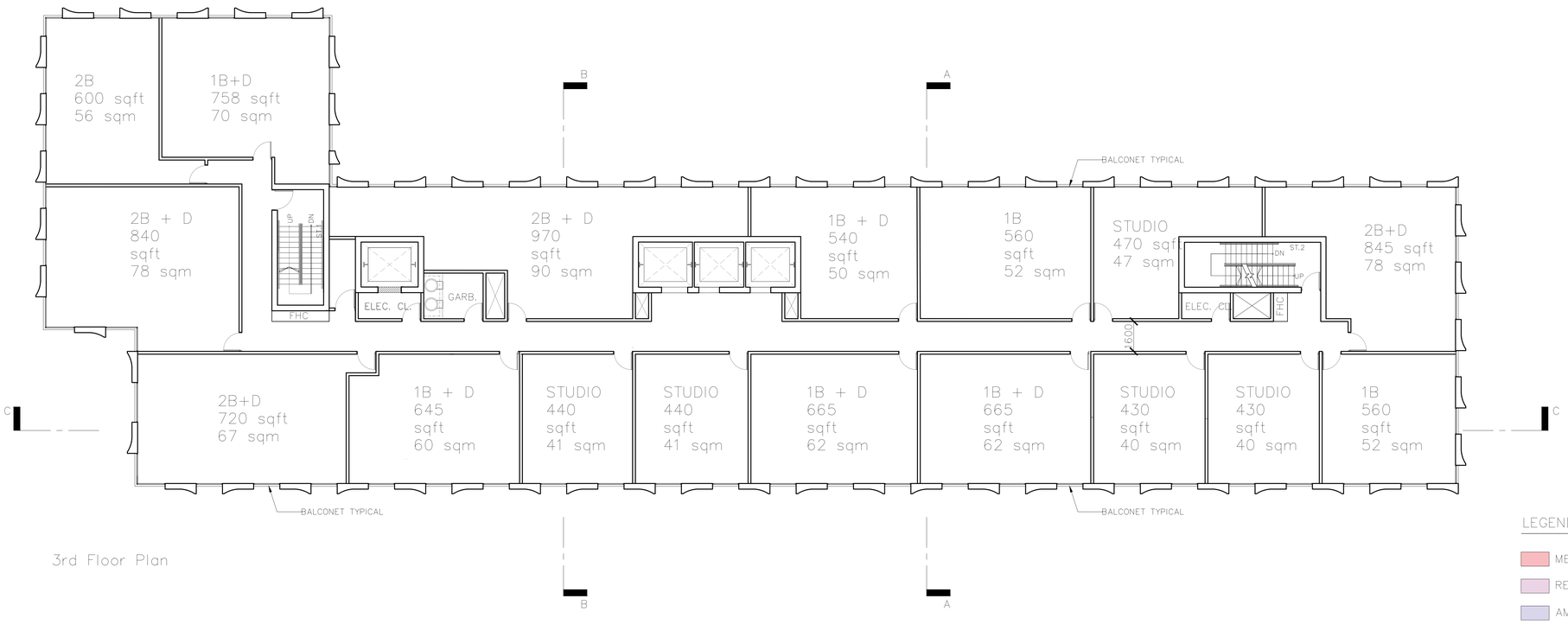
UNDERGROUND PARKING 3

SCALE	As Shown
DATE	08 APRIL 2025
PROJECT NO.	00

A016



2nd Floor Plan



3rd Floor Plan

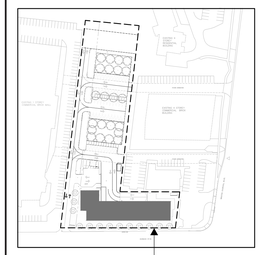
LEGEND

- MEDICAL CENTER
- RETAIL
- AMENITIES
- RESTAURENT
- TERRACE

ISSUANCES

REZONING APPLICATION	11 APRIL 2024
ISSUED	DATE

KEY PLAN



Project North

True North

DRAFT

HOUTARCHITECTURE

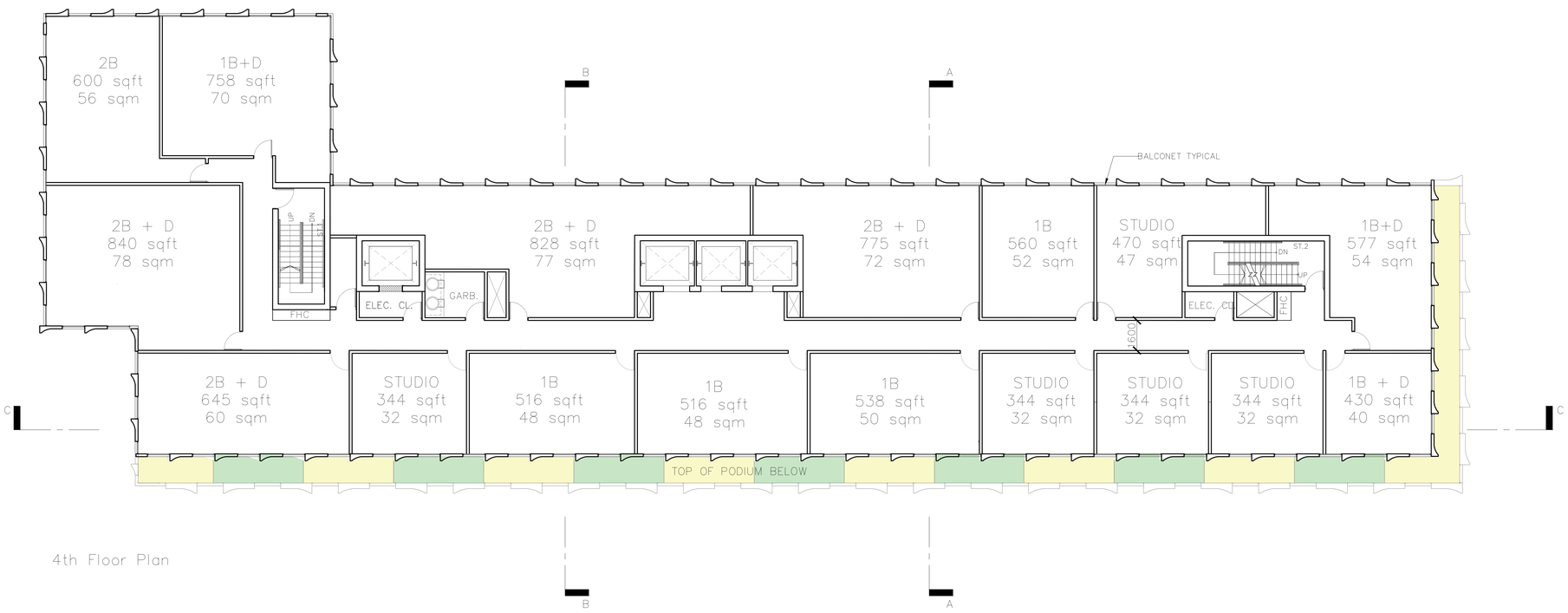
131 Bloor Street West,
Toronto Ontario, M5S 1S3
www.hout.ca
office@hout.ca

3033 Dundas Street West,
Mississauga, Ontario

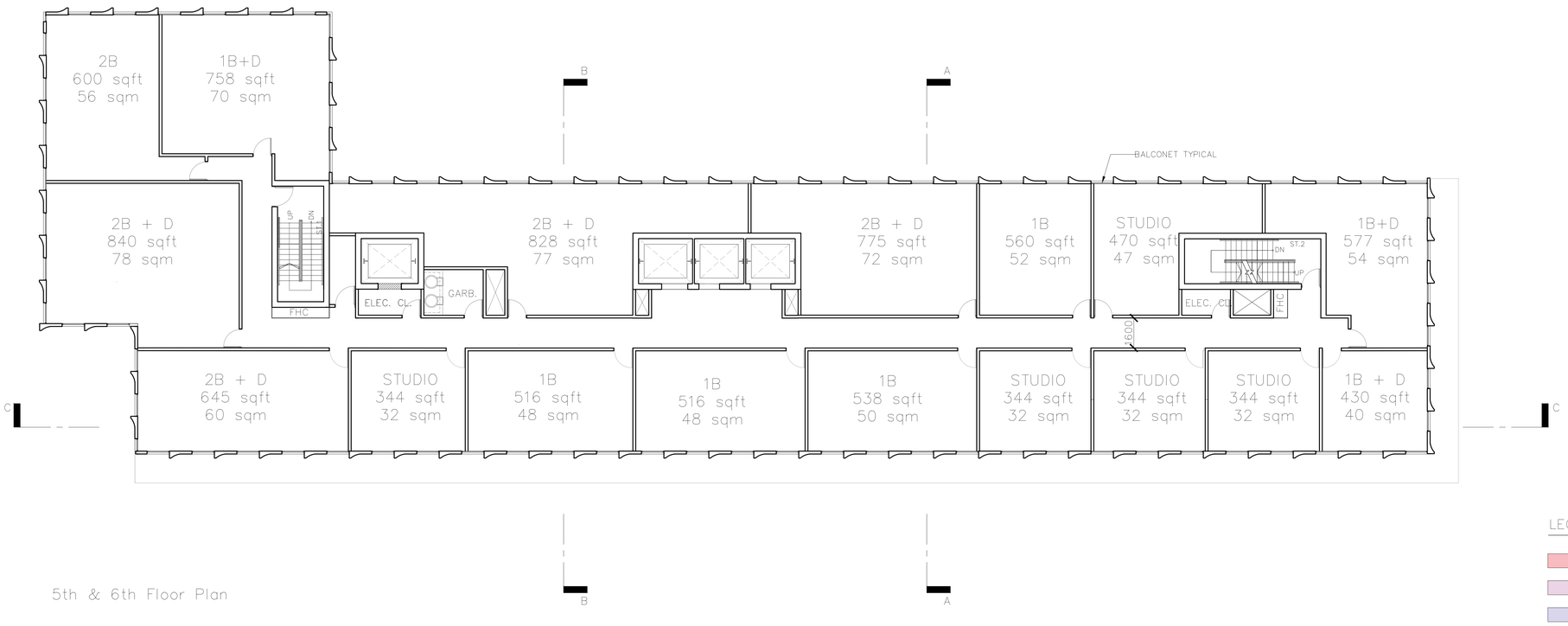
2ND & 3RD FLOOR PLAN

SCALE	As Shown
DATE	08 APRIL 2025
PROJECT NO.	00

A017



4th Floor Plan



5th & 6th Floor Plan

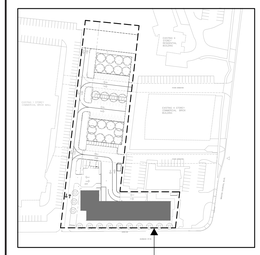
LEGEND

- MEDICAL CENTER
- RETAIL
- AMENITIES
- RESTAURENT
- TERRACE

ISSUANCES

REZONING APPLICATION	11 APRIL 2024
ISSUED	DATE

KEY PLAN



Project Location
3033 Dundas Street West,
Mississauga, Ontario

Project North

True North

DRAFT

HOUTARCHITECTURE

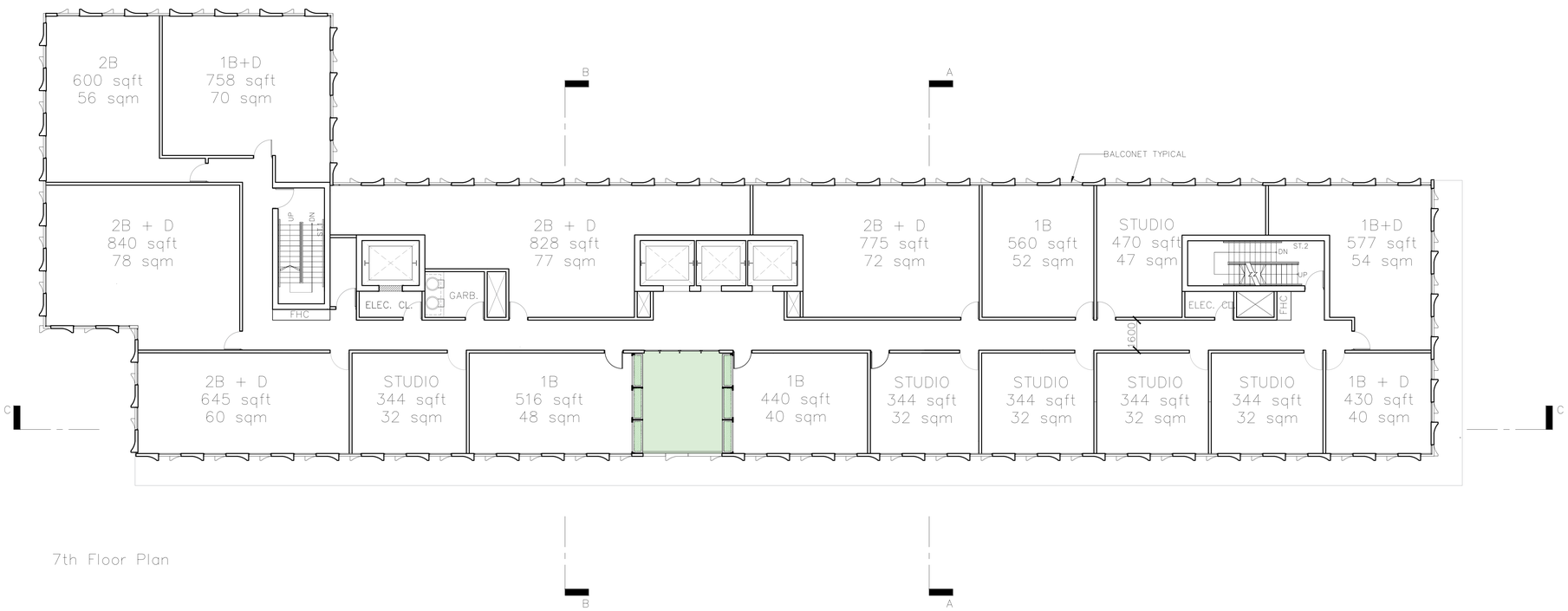
131 Bloor Street West,
Toronto Ontario, M5S 1S3
www.hout.ca
office@hout.ca

3033 Dundas Street West,
Mississauga, Ontario

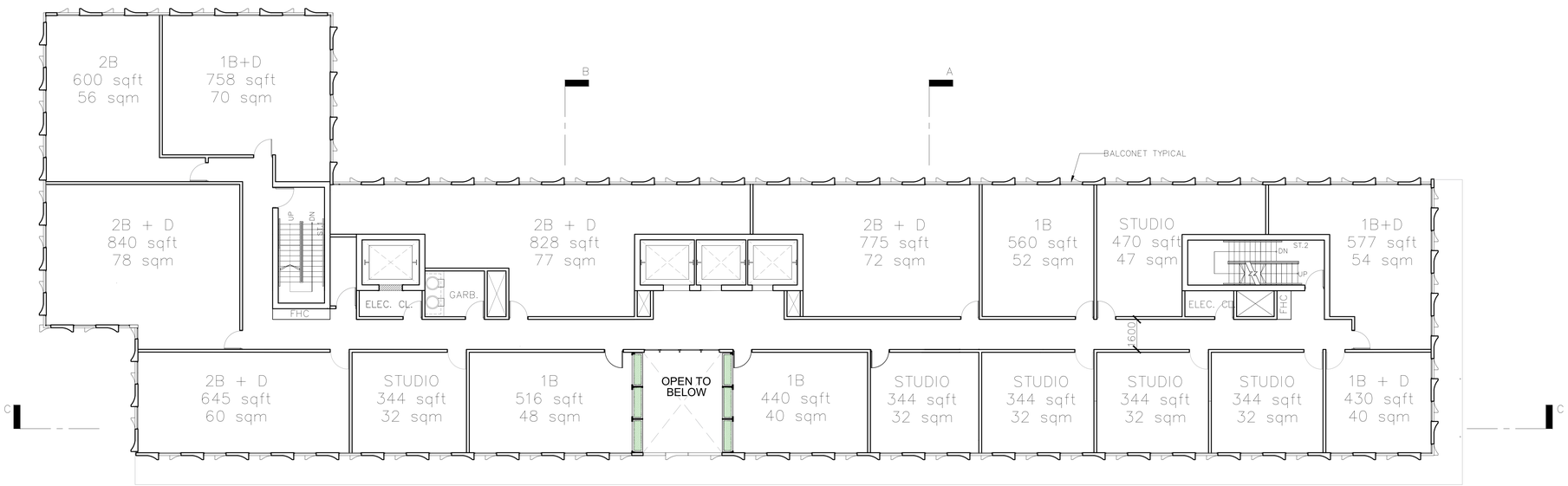
4TH, 5TH & 6TH FLOOR PLAN

SCALE	As Shown
DATE	08 APRIL 2025
PROJECT NO.	00

A017



7th Floor Plan



8th Floor Plan

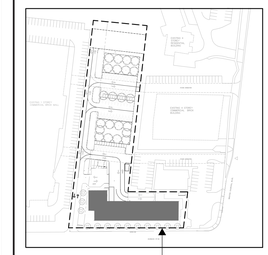
LEGEND

- MEDICAL CENTER
- RETAIL
- AMENITIES
- RESTAURENT
- TERRACE

ISSUANCES

REZONING APPLICATION	11 APRIL 2024
ISSUED	DATE

KEY PLAN



Project North

True North

DRAFT

HOUTARCHITECTURE

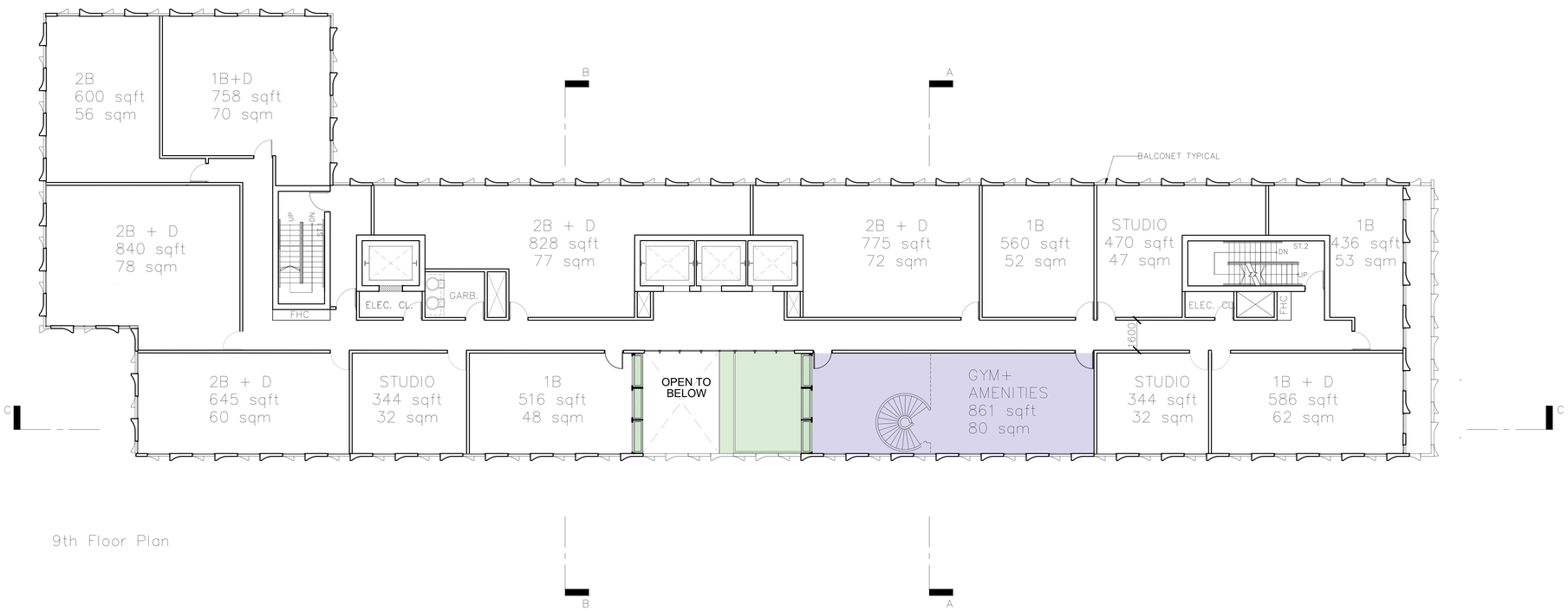
131 Bloor Street West,
Toronto Ontario, M5S 1S3
www.hout.ca
office@hout.ca

3033 Dundas Street West,
Mississauga, Ontario

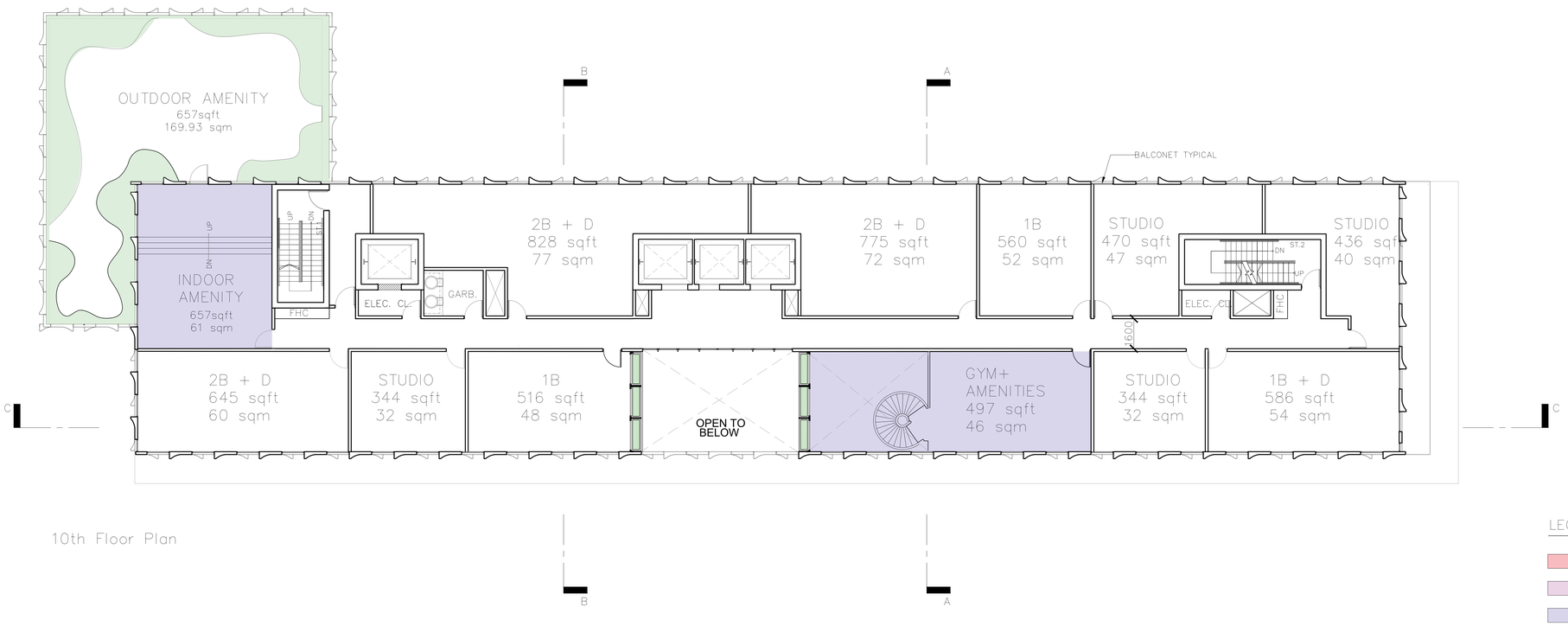
7TH & 8TH FLOOR PLAN

SCALE	As Shown
DATE	08 APRIL 2025
PROJECT NO.	00

A019



9th Floor Plan



10th Floor Plan

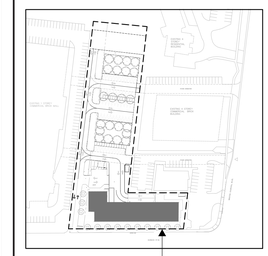
LEGEND

- MEDICAL CENTER
- RETAIL
- AMENITIES
- RESTAURENT
- TERRACE

ISSUANCES

REZONING APPLICATION	11 APRIL 2024
ISSUED	DATE

KEY PLAN



Project Location
3033 Dundas Street West,
Mississauga, Ontario

Project North

True North

DRAFT

HOUTARCHITECTURE

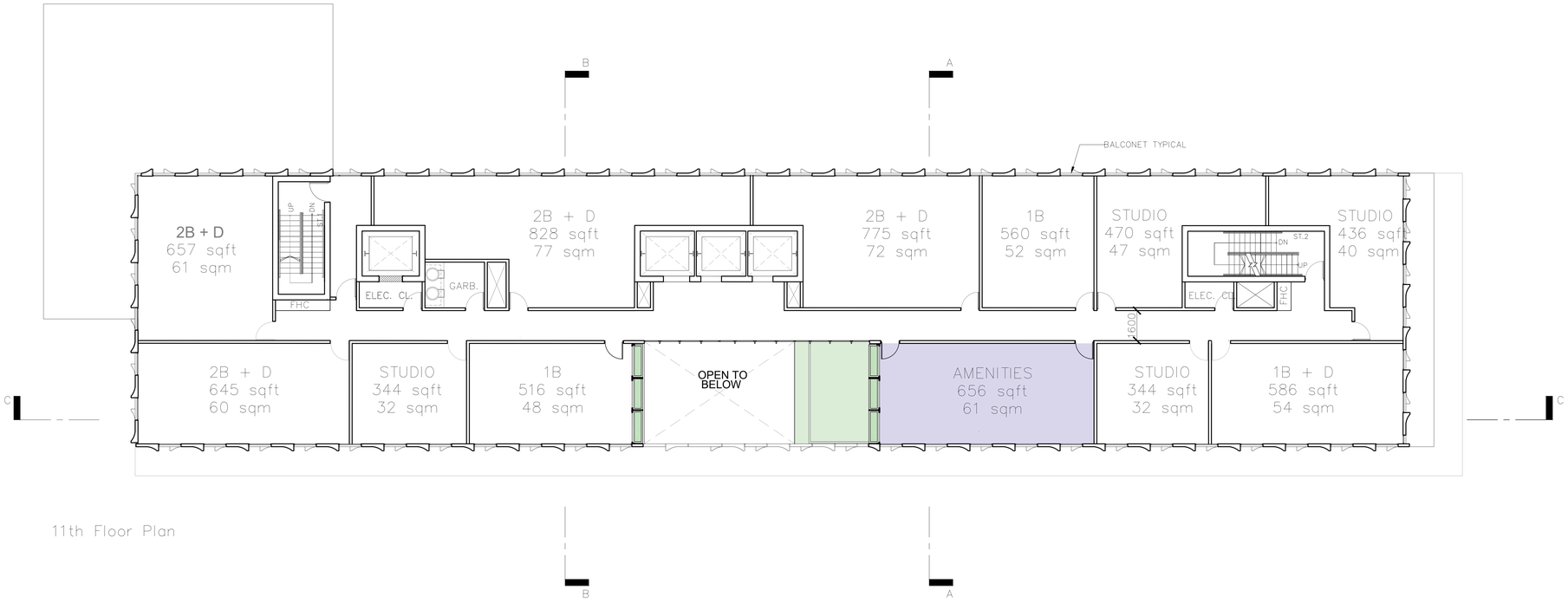
131 Bloor Street West,
Toronto Ontario, M5S 1S3
www.hout.ca
office@hout.ca

3033 Dundas Street West,
Mississauga, Ontario

9TH & 10TH FLOOR PLAN

SCALE	As Shown
DATE	08 APRIL 2025
PROJECT NO.	00

A020



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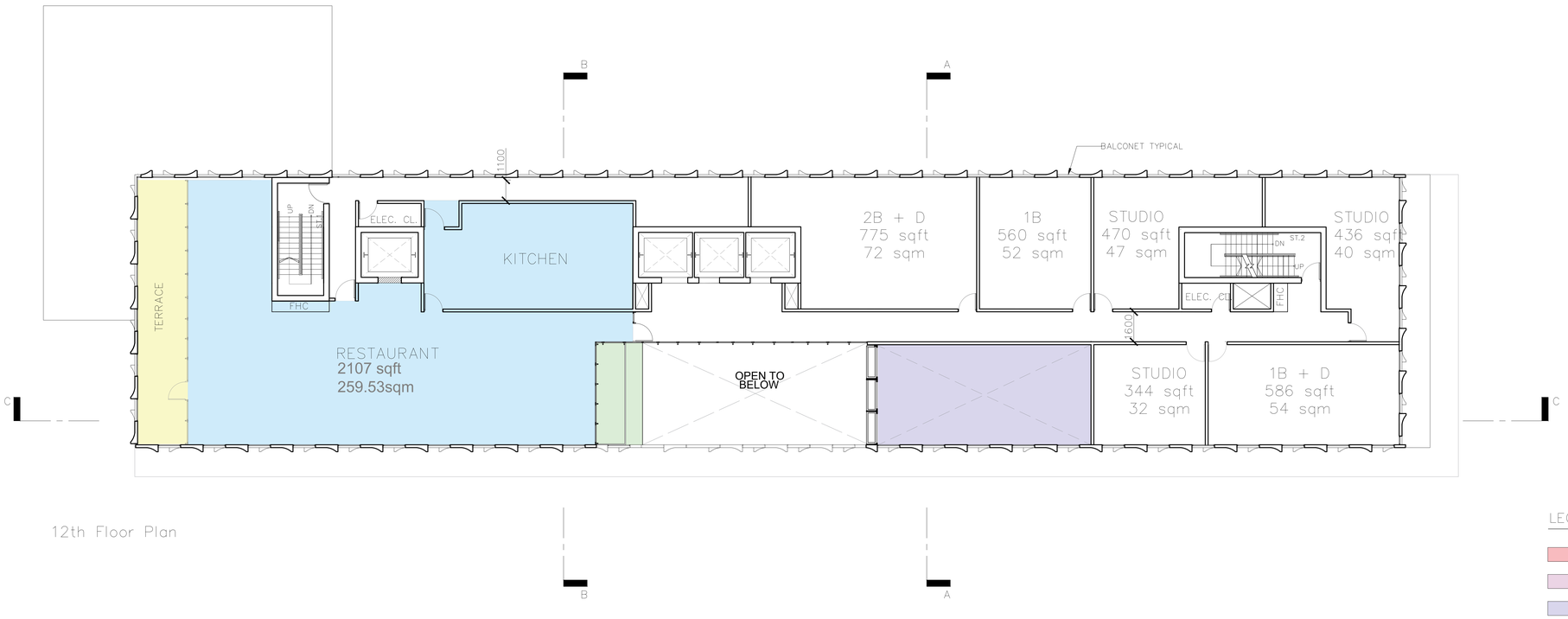


12th Floor Plan

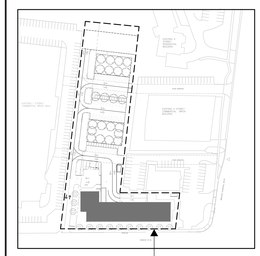
LEGEND

- MEDICAL CENTER
- RETAIL
- AMENITIES
- RESTAURENT
- TERRACE

ISSUANCES

REZONING APPLICATION	11 APRIL 2024
ISSUED	DATE

KEY PLAN



Project Location
3033 Dundas Street West,
Mississauga, Ontario

Project North

True North

DRAFT

HOUTARCHITECTURE

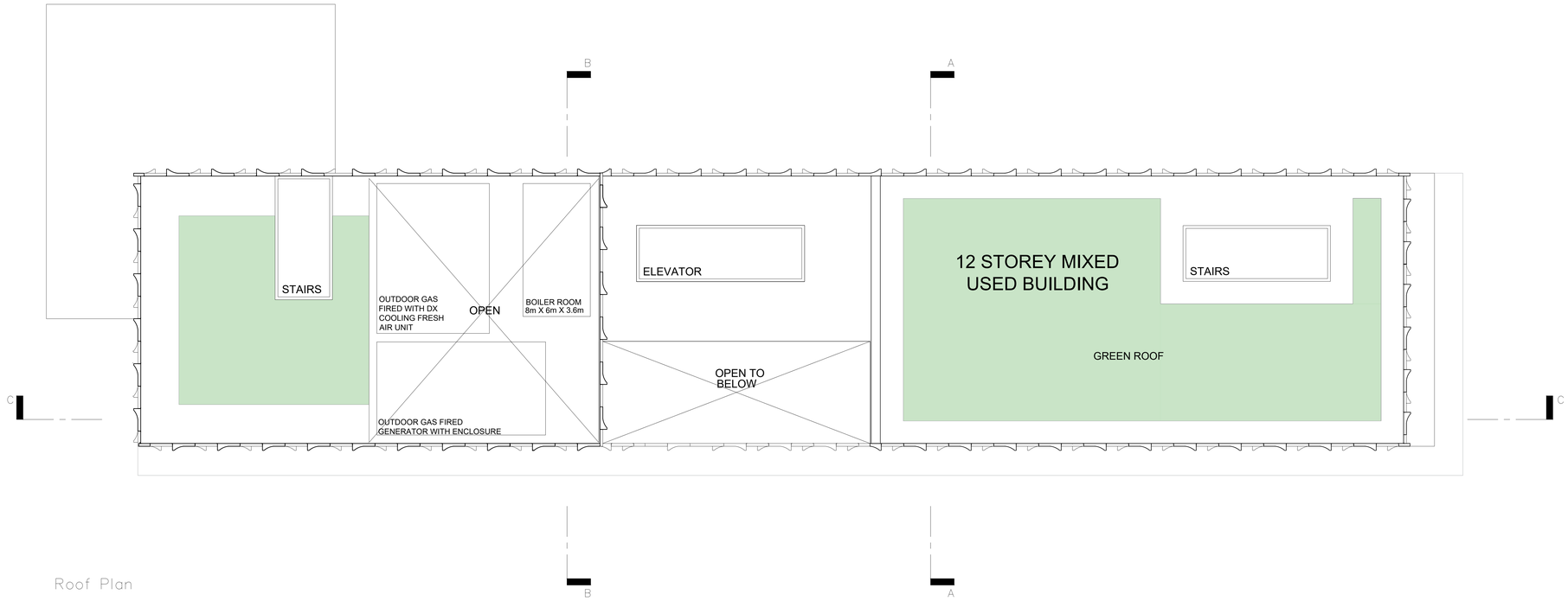
131 Bloor Street West,
Toronto Ontario, M5S 1S3
www.hout.ca
office@hout.ca

3033 Dundas Street West,
Mississauga, Ontario

11TH & 12TH FLOOR PLAN

SCALE	As Shown
DATE	08 APRIL 2025
PROJECT NO.	00

A021

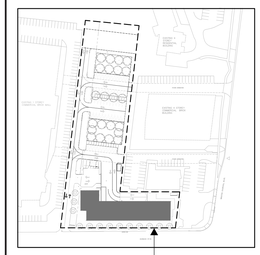


Roof Plan

ISSUANCES

REZONING APPLICATION	11 APRIL 2024
ISSUED	DATE

KEY PLAN



Project North

True North

Project Location
3033 Dundas Street West,
Mississauga, Ontario

DRAFT

HOUTARCHITECTURE

131 Bloor Street West,
Toronto Ontario, M5S 1S3
www.hout.ca
office@hout.ca

3033 Dundas Street West,
Mississauga, Ontario

ROOF PLAN

SCALE	As Shown
DATE	08 APRIL 2025
PROJECT NO.	00

A022

Appendix B

B **Pedestrian Level Wind Study**

The Boundary Layer Wind Tunnel Laboratory

Pedestrian Level Wind Study

3033 Dundas Street W
Mississauga, Ontario

BLWT-D082-IR1-2025
March 18, 2025

Submitted To:

2504228 Ontario Inc.
3033 Dundas Street W,
Mississauga, Ontario
L5L 3R8 Canada

Submitted By:

The Boundary Layer Wind Tunnel Laboratory
The University of Western Ontario
Faculty of Engineering
London, Ontario
N6A 5B9

D. Garnham, Project Manager
P. Case, Director

TABLE OF CONTENTS

LIST OF FIGURES

MAIN FINDINGS

This report describes the pedestrian-level wind study performed at the Boundary Layer Wind Tunnel Laboratory for the proposed development at 3033 Dundas Street W, Mississauga ON. The site is described in more detail below. A detailed discussion of the results is contained in Section 3.5. A description of the criteria used can be found in Section 3.4.

Tests were carried out for two configurations described as follows, and as pictured in Figure 5:

> **Existing Site** - The existing is bare. An aerial view of the existing site can be seen in Figure 2.
>
> **Proposed Site** – The proposed development consists of a 12-storey multi-unit residential building. A perspective view of the building is shown in Figure 1.

Figure 9 indicates the 88 locations at which wind speeds were measured for the Existing configuration. Figure 10 indicates the 93 locations at which wind speeds were measured for the Proposed configuration. Locations 1-3 are on the Level 10 outdoor amenity space, Location 4 is on the Level 7 outdoor amenity space and Location 5 is on the Level 11 outdoor amenity space; these were only tested in the Proposed configuration.

The evaluation for safety is summarized schematically in Figure 11. Comfort results for each of summer and winter seasons are summarized schematically in Figures 12 and 13, respectively. These summarize the suitability of each measurement location with respect to pedestrian-level safety or comfort. The comfort and safety categories used correspond to those summarized in section 3.4.

Colour-coded diagrams further summarize the suitability of each measurement location with respect to pedestrian-level safety and pedestrian comfort for each tested configuration. Figure 14 presents these for safety considerations for the Existing configuration and Figure 15 for the Proposed configuration. For comfort considerations these are presented for the summer season in Figures 16 and 17 for the Existing and Proposed configurations, respectively. Figures 18 and 19 present comfort colour diagrams for the winter season for the Existing and Proposed configurations, respectively. The comfort and safety categories used in these figures correspond to those summarized in section 3.4, and consistent of those specified in the Mississauga Terms of Reference.

The introduction of a mid-rise building development in a suburban environment will invariably create local wind speed-ups for some wind directions. With that expectation, the focus is to identify and develop strategies to make wind conditions suitable for the intended usage for negatively affected areas.

Existing Site

The immediate site surroundings are comprised of a typical single storey retail environment, which includes large low-buildings with moderate sized open parking lots; this environment extends further toward the south. Beyond this there is typical suburban environment for directions northwesterly through to southwesterly directions (clockwise). Toward the west quadrant there is a substantial stretch of relatively open exposure. Aerial views of the Existing site are shown in Figure 2.

Given the suburban surroundings with expansive open exposure from the prominent westerly wind directions, it is not surprising that the measured wind speeds for the consistent with that for a typical suburban environment or marginally greater.

With respect to pedestrian safety, all tested locations meet the recommended criterion (see Figure 14) in the Existing configuration.

With respect to pedestrian comfort, in summer all measurement areas are rated for standing or sitting (see Figures 16). In winter, some nearby sidewalk areas are rated for walking while most are rating for standing (see Figure 18). In all cases, the measured wind speeds are suited for the intended usage for their respective areas.

Influence of Proposed Development

The proposed development was tested without any on-site or off-site landscaping and results can therefore be expected to be somewhat conservative. This may particularly be the case for the proposed parkette areas in the northwest part of the site property.

Given that the Existing Site and surroundings are comprised of many low buildings, the inclusion of a multi-level building will undoubtedly influence local winds at ground and over raised amenity areas. The proposed development is no exception, and its influence is most noticeable on and near the building site. The expectation then should not be to return winds to their pre-development state, but rather ensure that the winds in all areas are appropriate for the intended usage. For example, entry areas should be suited for standing or better, while walking classification would be suitable for typical sidewalk areas.

Typically, for a building of the height proposed, observed changes in wind speed at locations somewhat removed from the proposed development (say more than 50m away) are minimal, and not substantial enough to affect the comfort from a usage perspective. As such, those locations generally remain suited for the intended usage, or unchanged from the Existing configuration. Closer to the site, increases in the wind locally can often lead to a change of the comfort classification. However, this change in and of itself does not suggest that the associated wind speeds are unacceptable. For example, wind speeds at Locations 67, 68, and 69 along the sidewalk directly east of the development increase from standing to walking in the winter months, yet remain suitable for the intended sidewalk usage.

In summer, all ground level locations are rated for standing or better. Wind conditions during the summer season are therefore expected to be suited for the intended usage at all tested locations.

During the winter season, wind speeds are typically higher than those during the summer. At ground level locations throughout and near the development site some locations increase to a walking category. This is suitable for areas where pedestrians are passing through, such as sidewalk locations. At entry areas, a walking category would require mitigation to improve to standing. In this respect for comfort considerations, at ground level locations the following are noted for the winter season:

- Sidewalk locations along the northwest side of the intersection of Winston Churchill Boulevard with Dundas Street W increase to walking, yet remain suitable for sidewalk usage.
- Locations 10 and 12 at the corners of the northeast end of the building are rated for walking. These are not near entries and anticipated to be suited for the intended usage.
- Areas around the southwest end of the building are rated for walking during the winter season. Specifically, Location 6 on the north side of the building is near a drop-off and entrance to the medical center, and Location 17 is a medical entrance near the south corner. Both are rated for walking during the winter and will require mitigation to improve winds to the recommended comfort level of standing year-round for entryways.

With respect to the Level 9 outdoor amenity terrace, during the summer season winds are suited for standing activities along the north portion of the terrace, with the southwest area suited for walking. In the winter, the north side of the Level 9 outdoor amenity space is suitable for walking with the southwest area rated uncomfortable. Often, a summer sitting rating is recommended for terrace spaces where people are expected to linger. The winter rating will depend on the intended usage, but should be rated for walking or better unless access is to be restricted.

The small amenity terraces at Levels 7, 9, and 11 (Probe Locations 4, 5) on south side of the building are suitable for standing or better year-round.

Neighbouring properties and their entry areas are largely unaffected by the introduction of the proposed development.

With respect to safety, all tested locations meet the recommended criterion (see Figure 15) in the Existing configuration.

Mitigation Strategies

In areas that are windier than desired for the intended usage incorporating mitigation strategies will be beneficial.

Recessing the entrance doors on the northern and western sides of the building, near probe locations 6 and 17, would be beneficial. Alternatively, dense evergreens or locally placed windscreens will be required to improve the winds near these entryways. Planned landscaping will be beneficial around the entry areas (especially at Location 17 where the wind only marginally exceeds the standing category). Where possible, landscaping should incorporate evergreens to have greater winter benefit.

For the outdoor amenity terraces, testing was conducted modelling a 1m solid railing around the terrace perimeters. Increasing the perimeter railing height (to 2m or greater) would add some benefit at the main Level 9 terrace. In addition, localized windscreens or planters with coniferous plantings along the northern and western portions of the Level 9 amenity space should be considered. Examples of effective pedestrian level wind mitigation options can be seen in Figure 20. Depending on the level of comfort required, amenity features (vertical fireplaces, moderate height landscaping, windscreens, overhead trellises) may be required throughout the space.

1 THE WIND CLIMATE FOR MISSISSAUGA

1.1 Meteorological Data

The Integrated Surface Data (ISD) records are maintained by the National Climatic Data Center (NCDC), and provide a climatological database of approximately 20,000 stations around the world. The ISD contains many meteorological variables, typically recorded at intervals of 1 hour. An analysis of historical wind data from the Lester B. Pearson International Airport (ISD Station 716240) was performed to develop a statistical wind climate for Mississauga. The historical data consists of the time period 1982 – 2017.

Based on the analysis of hourly wind records probability distributions of wind speed and wind direction are developed for each of Safety and Comfort purposes. The models predict similar hourly mean wind speeds at 10m of about 14 m/s and 18.3m/s for return periods of 1 month and 1 year, respectively. These have been adjusted to be consistent with standard open country exposure and are shown in Figure 3.

1.2 Statistical Wind Climate Model

For the analysis of the wind tunnel data, the wind climate models are converted to a reference height of 500m using a standard open country exposure profile. The predicted wind speeds are similar between each model (safety and comfort) and are shown in Figure 3. The predicted hourly mean wind speed at the 500m reference height, used in the analysis and reporting of pedestrian-level wind speeds, is 33.4 m/s for a return period of 1 year.

The directional characteristics of winds associated with various return periods are plotted in terms of Relative Importance (%) in Figure 3a for the Safety climate, and Figure 3b for the Comfort climate. Both wind climate models indicate that westerly winds are the most important.

Based on the Urban Design Terms of Reference: Pedestrian Wind Comfort and Safety Studies, issued by the City of Mississauga [Ref 4], separate wind climates were developed to be used for the Comfort and Safety criteria. The development of the Safety climate utilized the complete set of historical wind data (i.e. 24 hours), while the development of the Comfort climate utilized a subset of historical wind data (i.e. between 06:00 and 23:00). The wind climate data are grouped on a two-season basis as follows:

- Summer: May through October
- Winter: November through April

The directional characteristics of winds associated with various return periods are plotted in terms of Relative Importance (%) in Figures 4a and 4b for the Safety (Annual) and Comfort (Seasonal) climates, respectively. Each wind climate model indicates that southwesterly winds are the most important.

The design probability distribution of hourly mean wind speed at 500m reference height and wind direction is shown in Appendix A. Annual and seasonal distributions are shown.

2 THE MODELLING OF THE SITE AND THE WIND

2.1 Overall Approach

The basic tool used is the Laboratory's boundary layer wind tunnel. The tunnel is designed with a very long test section, which allows extended models of upwind terrain to be placed in front of the model of the building under test. The modelling is done in more detail close to the site. The wind flow then develops characteristics which are similar to the wind over the terrain approaching the actual site. This methodology has been highly developed (see References 2 and 3) and is detailed below.

2.2 Model Design

Close-up views of the 1:400 scale model are shown in Figure 5a for the Existing configuration and Figure 5b for the Proposed configuration.

Aerodynamic model components:

The model of the 3033 Dundas Street W development model 3D printed in detail.

1. A detailed proximity model of the surrounding city built in block outline from Styrofoam for a radius of approximately 500m.
2. Generic models of upstream terrain, modelled by setting appropriate heights of generic roughness blocks and by turbulence-generating spires to produce wind characteristics representative of those at the project site.

The building model and the proximity model are rotated to simulate different wind directions with the upstream terrain being changed as appropriate.

The upstream terrain was modelled using generic roughness blocks and turbulence-generating spires to produce wind characteristics representative of those at the project site. Two different terrain models were used, these are shown in Figure 6 and the azimuth ranges over which they were used are shown in Figure 7.

Testing was carried out for 2 configurations of the surroundings, namely the Existing and Proposed. Photographs of each configuration during wind tunnel testing are shown in Figure 5.

Existing Site – The existing site consists of a bare lot. An aerial view of the existing site can be seen in Figure 2.

Proposed Site – The proposed 3033 Dundas Street W development consists of a 12-storey multi-unit residential building. A perspective view of the building is shown in Figure 1.

2.3 Characteristics of the Modelled Wind

Figure 8 presents the vertical profiles of the mean speed and of the intensity of the longitudinal component of turbulence, measured just upstream of the centre of the turntable, for the upstream terrain exposure.

The model profiles are good representations of the expected variation of full-scale wind speed and turbulence over relevant heights. The reference wind speed measured in the wind tunnel has been scaled such that the expected full-scale wind speeds over the lower 50m are achieved.

3 THE DETERMINATION OF PEDESTRIAN-LEVEL WIND SPEEDS

3.1 Overall Approach

Detailed measurements were made of pedestrian-level wind speeds at locations of interest around the project. Views of the model in the wind tunnel are shown in Figure 6 for each of the tested configurations. These wind-tunnel findings were then combined with the comfort and safety extratropical wind climates to provide statistical predictions of expected pedestrian-level wind speeds around the site.

Assessment for pedestrian safety is based on the gust wind speed predicted to occur 0.1% of time or approximately 9 hours in a year. Assessment for pedestrian comfort is based on the gust equivalent mean wind speed predicted to occur 80% of the time.

General descriptions of the testing and analysis procedure are given in Reference 1.

3.2 Model Instrumentation

Figure 9 indicates the 88 locations at which wind speeds were measured for the Existing configuration. Figure 10 indicates the 93 locations at which wind speeds were measured for the Proposed configuration. Locations 1-3 are on the Level 9 outdoor amenity space, Location 4 is on the Level 7 outdoor amenity space and Location 5 is on the Level 11 outdoor amenity space and were only tested in the Proposed configuration. Wind speed measurement locations were placed systematically along the sidewalk areas around the proposed development and on existing neighbouring pedestrian traffic routes and entrances.

Measurements were made using omni-directional pressure sensors which measure both mean and fluctuating components of the wind speed parallel to the ground at a height of about 1.5 to 2m in full scale.

3.3 Aerodynamic Data

Measurements were taken at 10° intervals for the full range of azimuths. Evaluation were made of the gust equivalent mean (GEM) wind speed and the gust speeds. The GEM wind speed is defined as the maximum of the mean wind speed or the gust wind speed divided by 1.85. The gust speed is evaluated as the mean speed + (3 x RMS speed).

The polar plots in Appendix B show the GEM wind speed at each of the sensors, expressed as a ratio of the mean wind speed at reference height. The angular coordinate gives the direction of the approach wind, relative to true North.

The radial magnitudes and the shapes of the polar plots in Appendix B provide valuable indications of the relative magnitudes of wind speeds at different locations and their sensitivity to the direction of the approach wind.

These plots can be useful to identify important wind directions that can influence conditions at a particular location. In turn, this information can be used to inform and develop mitigation strategies.

3.4 Statistical Prediction of Pedestrian-Level Winds

The directional characteristics of the extratropical wind climate are shown in Figure 4.

The predicted wind speeds are obtained by combining the statistical wind climate model of wind speed and direction with the aerodynamic data measured in the wind tunnel. Two types of prediction are provided:

1. Wind speeds exceeded during 0.1% of the time on an annual basis.
2. Wind speeds exceeded 20% of the time on a seasonal basis.

These predictions are compared against the following specified criteria to evaluate pedestrian comfort and safety:

CRITERIA	DESCRIPTION	GEM WIND SPEED EXCEEDED 20% OF THE TIME
Comfort level 4	**Sitting**	**≤ 10 km/h**
Comfort level 3	**Standing**	**≤ 15 km/h**
Comfort level 2	**Walking**	**≤ 20 km/h**
Comfort level 1	**Uncomfortable**	**> 20 km/h**

CRITERIA	DESCRIPTION	GUST WIND SPEED EXCEEDED 0.1% OF THE TIME
Safety level	**Exceeded**	**> 90 km/h**

The comfort categories are described as follows:

- **Comfort Level 4 - Sitting:** Calm or light breezes desired at outdoor restaurants and seating areas where one can read a paper without having it blown away
- **Comfort Level 3 - Standing:** Gentle breezes suitable for main building entrances and bus stops
- **Comfort Level 2 - Walking:** Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering
- **Comfort Level 1 - Uncomfortable:** Strong winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended

The safety category is described as follows:

- **Areas which exceed the Safety Level**: Excessive gust speeds that can adversely affect a pedestrian's balance and footing. Wind mitigation is typically required.

These criteria are consistent with pedestrian level wind study Terms of Reference for the City of Mississauga [Ref. 4].

3.5 Test Results and Discussion

The tested configurations include the Existing site and the Proposed development. These configurations are described in Section 2.2.

General broad-scale landscaping was not modelled during wind tunnel testing. Results can therefore be expected to reflect a somewhat conservative representation of expected wind conditions around the development in areas where trees and other landscaping elements will be present.

Figure 11 compares the predicted wind speeds at the various locations for the two tested configurations along with the criteria for pedestrian safety. Similar plots of predicted wind speeds compared to the criteria for pedestrian comfort can be found in Figures 12 and Figure 13 for summer and winter seasons, respectively.

Colour-coded diagrams are also used to summarize the suitability of each measurement location with respect to pedestrian safety and pedestrian comfort for each tested configuration. Figures 14 and 15 present these for safety considerations for the Existing and Proposed configurations, respectively. For comfort considerations colour-coded diagrams for the summer season are presented in Figures 16 and 17 for Existing and Proposed configurations, respectively. Similarly, Figures 18 and 19 present the comfort results for the winter season.

Results are discussed below for each of the tested configurations.

3.5.1 Existing Site Configuration

Results for the Existing configuration reflect current expected wind conditions at and around the 3033 Dundas Street W site.

With respect to pedestrian safety for the Existing Configuration (Figure 14):

1. All tested locations meet the recommended criterion.

With respect to pedestrian comfort for the Existing Configuration (Figures 16 and 18):

1. In summer (see Figure 16) all measurement areas are rated for standing or sitting.
2. In winter (see Figure 18) some local sidewalk areas are rated for walking; most areas are rating for standing.
3. In all cases, the measured wind speeds are expected to be suited for the intended usage for their respective areas.

Given the suburban surroundings with some local open spaces, it is not surprising that the measured wind speeds for the Existing site are generally consistent with a typical suburban environment or marginally greater.

3.5.2 Proposed Development Configuration

Tests of the Proposed development were carried out with the addition of the 12-storey 3033 Dundas Street W building installed in its planned location. All other details of the surroundings are unchanged from the Existing configuration.

With respect to pedestrian safety (Figure 15):

1. All tested locations meet the recommendations for pedestrian safety.

With respect to pedestrian comfort (Figures 17 and 19):

1. The proposed development has a moderate influence to wind speeds in and around it's immediate vicinity. As can be expected, the influence is generally most noticeable adjacent to the site and diminishes as the distance from the site increases.
2. At locations farther away from the project site small changes in wind speed do not notably affect the comfort classification, particularly in summer season. In the winter season, there are some sidewalk locations south and east of the building where the comfort category shifts from standing in the Existing condition to a walking category in the Proposed configuration, with just a marginal increase in the local wind speed. Nonetheless, the locations all remain suited for the intended sidewalk usage.
3. Neighbouring properties and their entry areas are largely unaffected by the introduction of the proposed development.
4. For ground level locations near or directly adjacent to the site, some variations in the predicted wind speeds are observed:
    - In summer (see Figure 17), all ground level locations are rated for standing or better. Wind conditions during the summer season are therefore expected to be suited for the intended usage.
    - During winter season (see Figure 19) wind speeds are typically higher than in summer. At locations near the development site, some sidewalk locations along increase to walking from standing. Sidewalk locations along the northwest side of the intersection of Winston Churchill Boulevard with Dundas Street W increase to walking. In all these cases, the areas remain suitable for typical sidewalk usage.
    - Locations 10 and 12 at the corners of the northeast end of the Proposed building are rated for walking. These are not near entries and therefore anticipated to be suited for the intended usage.

- The area around the southwest end of the building is largely rated for walking during the winter season. Specifically, Location 6 on the north side of the building is near a drop-off and entrance to the medical center, and Location 17 is a medical entrance near the south corner. These entry locations will require mitigation to improve winds to the recommended comfort level of standing year-round for entrances.

5. With respect to the rooftop amenity spaces:

   - Measurements at the Level 9 outdoor amenity space indicate that during the summer season winds are suited for standing activities along the north portion of the terrace, with the southwest area suited for walking. In the winter, the north side of the Level 9 outdoor amenity space is suitable for walking with the southwest area rated uncomfortable. Generally, a summer sitting rating is recommended for terrace spaces where people are expected to linger. The targeted winter rating will depend on the intended usage, but should be rated for walking or better unless access is to be restricted.
   - The smaller amenity terraces at Levels 7, 9, and 11 (Probe Locations 4, 5) on south side of the building are suitable for standing or better year-round.
   - The Level 12 terrace on the southwest end of the building was too shallow to permit wind measurement instrumentation at the model scale. As it is enclosed on three sides and overhead, it is expected that this area will be rated for standing or better year-round.

3.6 Seasonal Differences

The amount and type of activity for a given location can vary by season. For example, a terrace or outdoor amenity area may have limited or restricted usage during the winter season. Thus, in some cases it is valuable to look at the wind speeds and the corresponding classification of pedestrian comfort on a more detailed season-by-season basis.

In general, compared to annual wind speeds, wind speeds during the winter months are about 8% higher, and in the summer they are about 16% lower.

3.7 Summary Remarks

The proposed development can be expected to affect wind patterns locally in regions throughout the development site. This is consistent with the introduction of a relatively tall development to an otherwise homogeneous site with low-rise buildings. Nonetheless, conditions are expected to remain suitable for their intended uses subject to suggested mitigation, and to be confirmed at the detailed design stage.

With an expectation to changes in the local wind speeds, the focus should not be to return wind conditions to an ‘as-it-was’ state, but rather identify and develop strategies to make wind conditions suitable for the intended usage. For example, entry areas should have a comfort category consistent with standing activities, while sidewalks should meet the condition of being comfortable for walking.

In areas that are windier than that desired for the intended usage, incorporating mitigation strategies will be beneficial.

Recessing the entrance doors on the northern and western side of the building near the medical entrances, near probe Locations 6 and 17, would be beneficial for these entry areas. Alternatively, densely spaced evergreens or locally placed windscreens on either side of each entryway will be required to improve the winds in these areas.

For the Level 9 main outdoor amenity terrace, testing was conducted modelling a 1m tall solid railing around the terrace perimeter. Increasing the perimeter railing height (to 2m or greater) would be beneficial. In addition, localized windscreens or planters with coniferous plantings along the northern and western portions of the amenity space should be considered. Examples of effective pedestrian level wind mitigation options can be seen in Figure 20. Depending on the level of comfort required,

amenity features (vertical fireplaces, moderate height landscaping, windscreens, overhead trellises) may be required throughout the space.

REFERENCES

1) "Wind Tunnel Testing: A General Outline", The Boundary Layer Wind Tunnel Laboratory, The University of Western Ontario, May 2007.

2) Davenport, A.G. and Isyumov, N., "The Application of the Boundary Layer Wind Tunnel to the Prediction of Wind Loading", International Research Seminar on Wind Effects on Buildings and Structures, Ottawa, Canada, September 1967, University of Toronto Press, 1968.

3) Surry, D. and Isyumov, N., "Model Studies of Wind Effects - A Perspective on the Problems of Experimental Technique and Instrumentation", Int. Congress on Instrumentation in Aerospace Simulation Facilities, 1975 Record, pp. 76-90.

4) Urban Design Terms of Reference, City of Mississauga Planning and Building Department, Development and Design Division. February 2023.

FIGURES

VIEW FROM THE SOUTHWEST

FIGURE 1 PERSPECTIVE VIEWS OF THE PROPOSED BUILDINGS

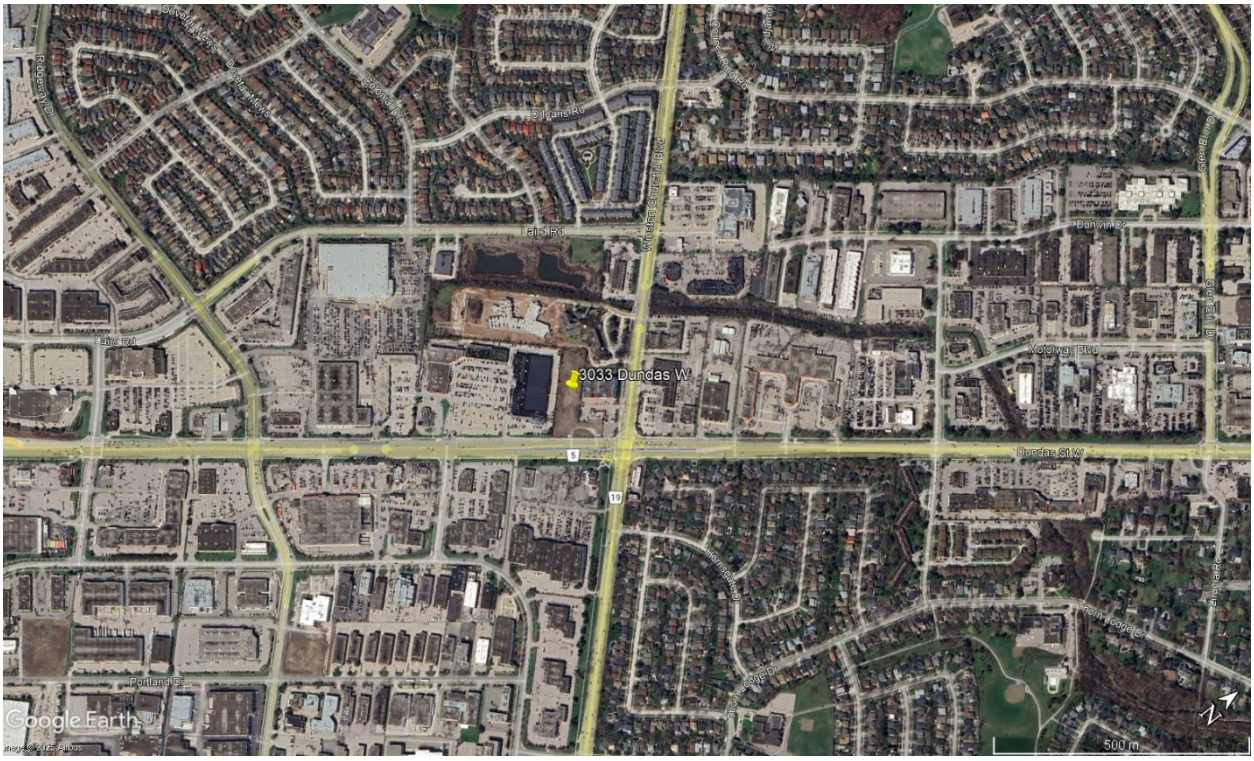


Photo Credit: Google

Photo Credit: Google

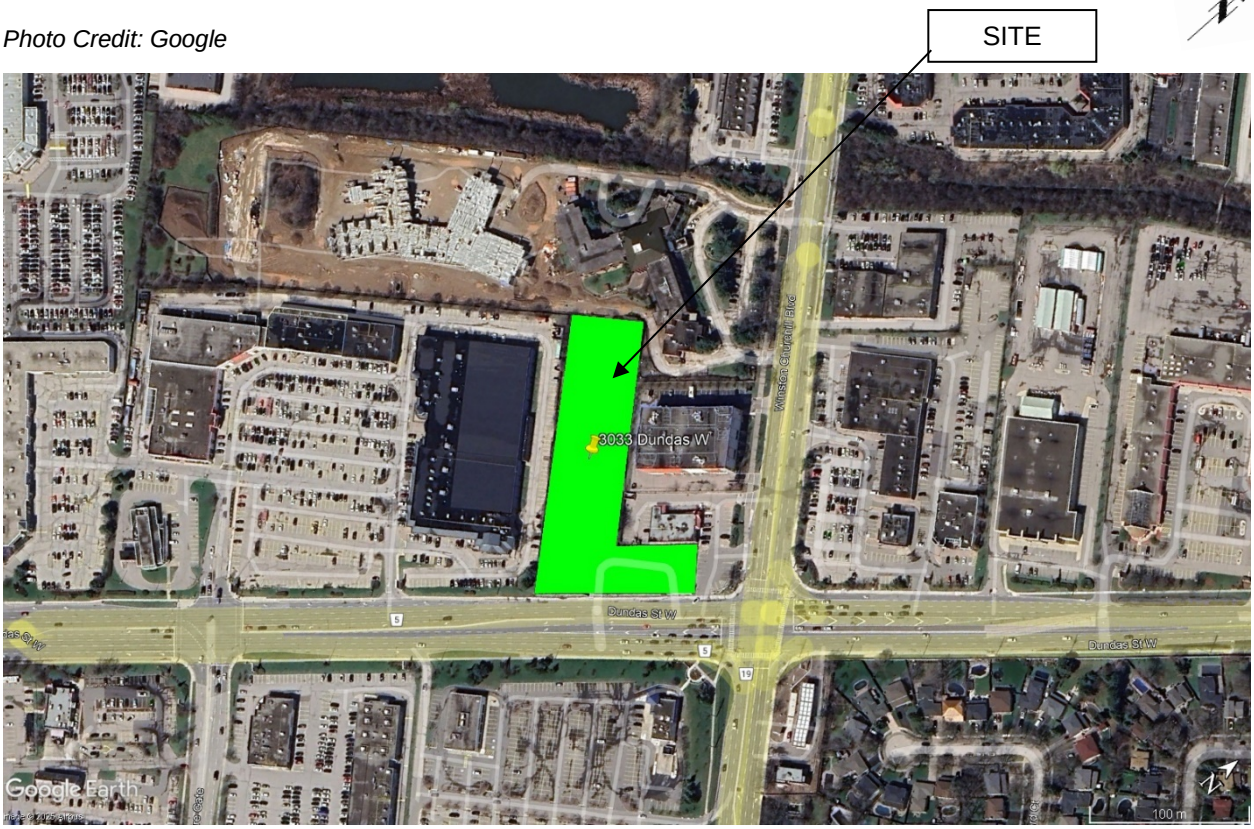


FIGURE 2 AERIAL VIEWS OF EXISTING SITE LOCATION

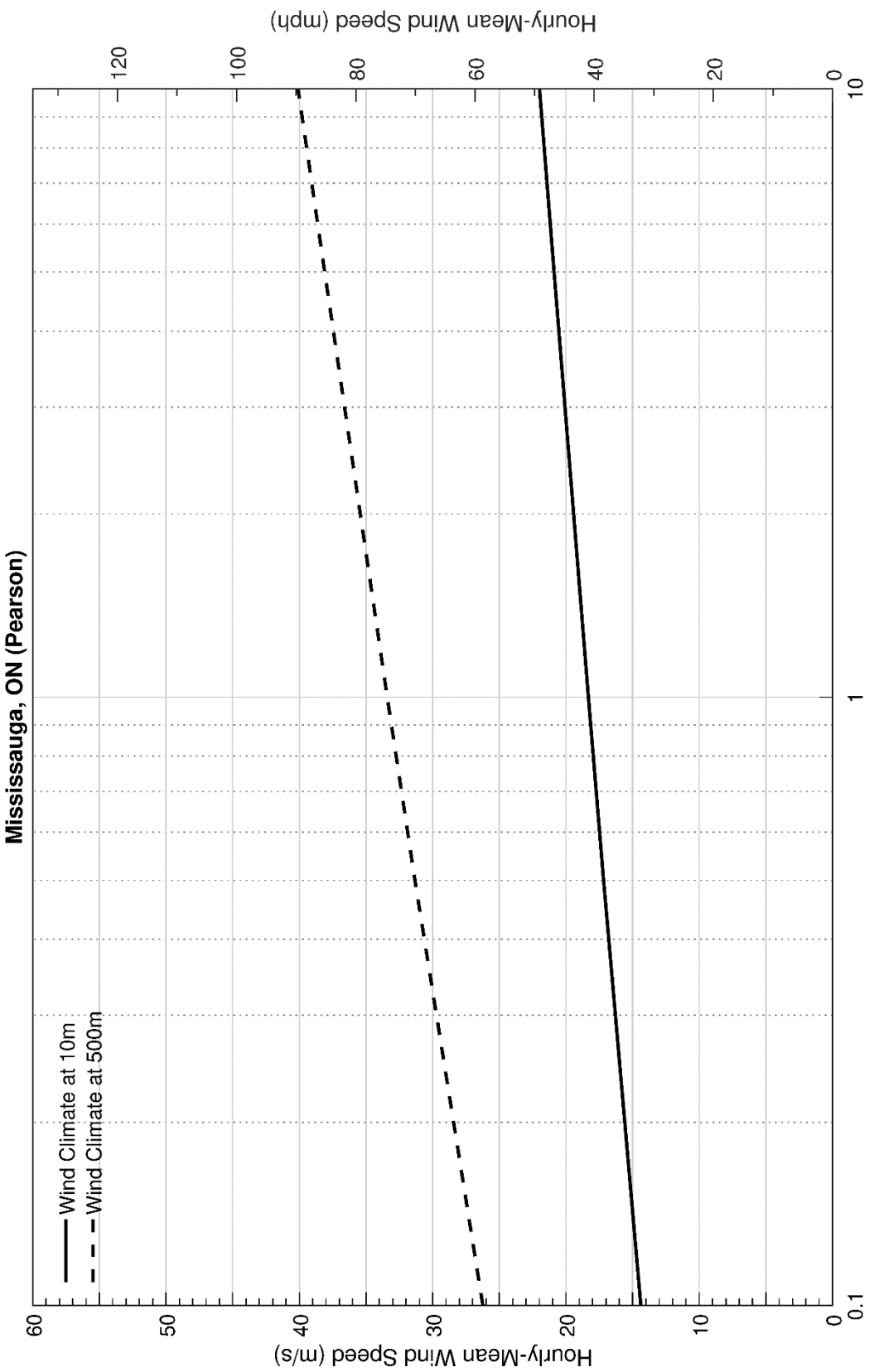


FIGURE 3 PREDICTED ANNUAL EXTREME WINDS SPEEDS FOR VARIOUS RETURN PERIODS

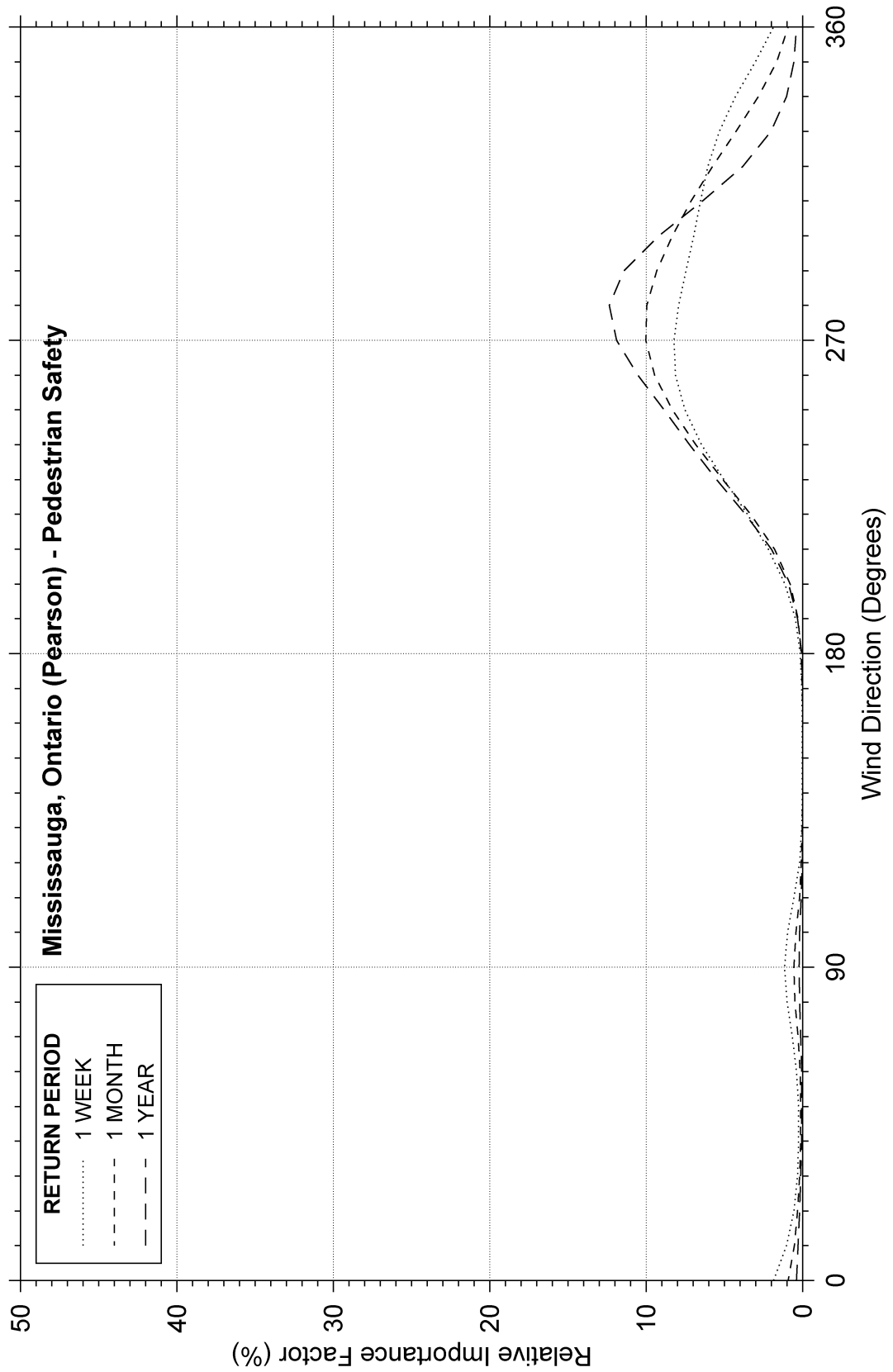
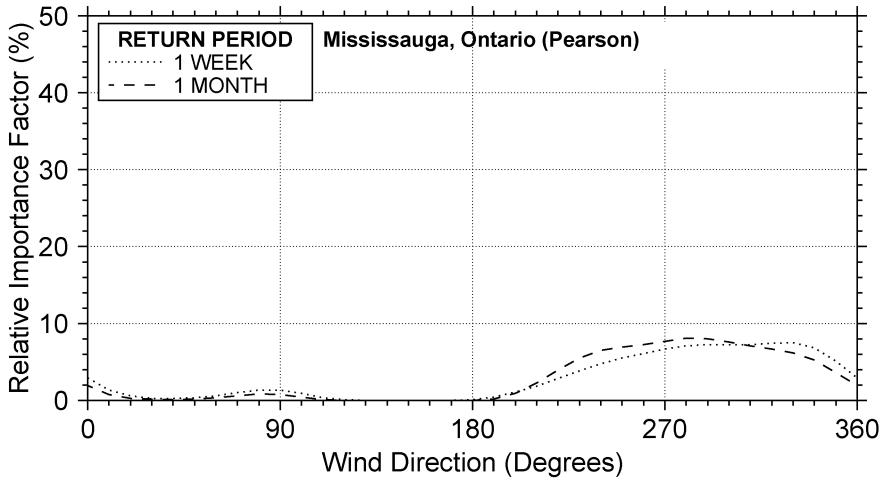
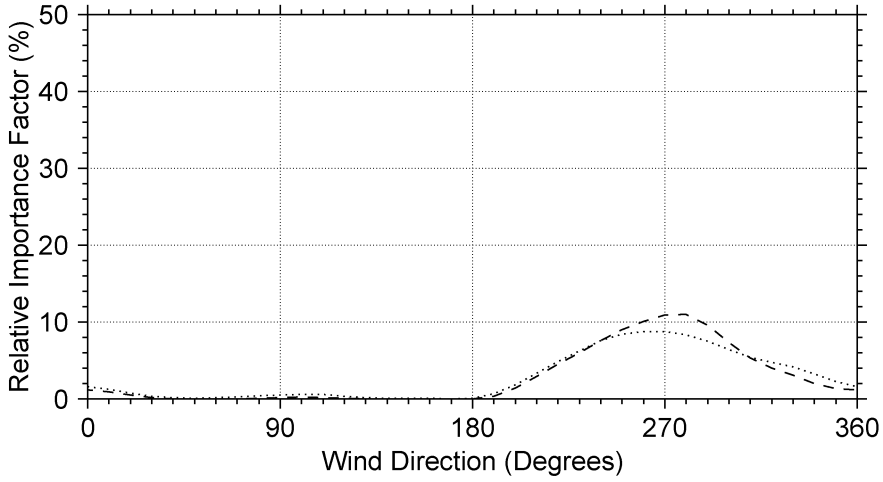


FIGURE 4a RELATIVE IMPORTANCE OF AZIMUTHAL SECTOR TO THE PROBABILITY OF EXCEEDING VARIOUS RETURN-PERIOD WIND SPEEDS - ANNUAL



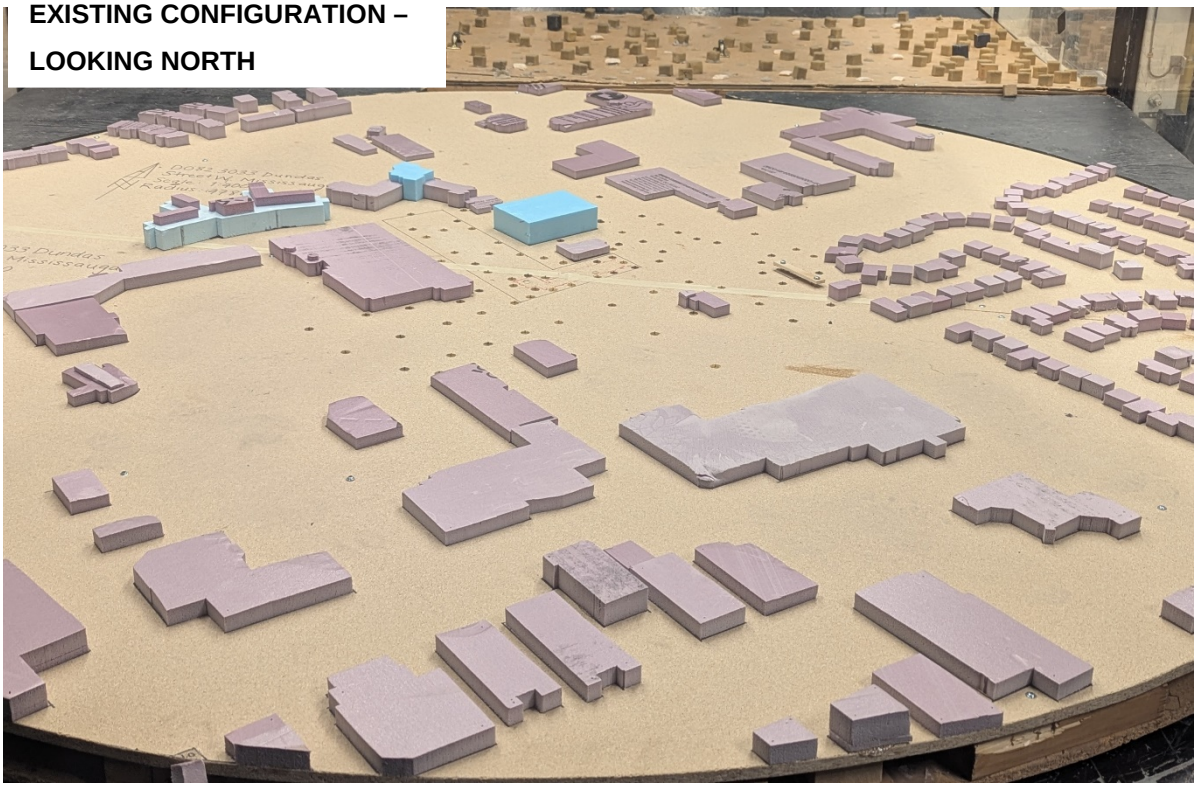
SUMMER (May - October)



WINTER (November - April)

FIGURE 4b RELATIVE IMPORTANCE OF AZIMUTHAL SECTOR TO THE PROBABILITY OF EXCEEDING VARIOUS RETURN-PERIOD WIND SPEEDS - SEASONAL

EXISTING CONFIGURATION – LOOKING NORTH



EXISTING CONFIGURATION – LOOKING SOUTH

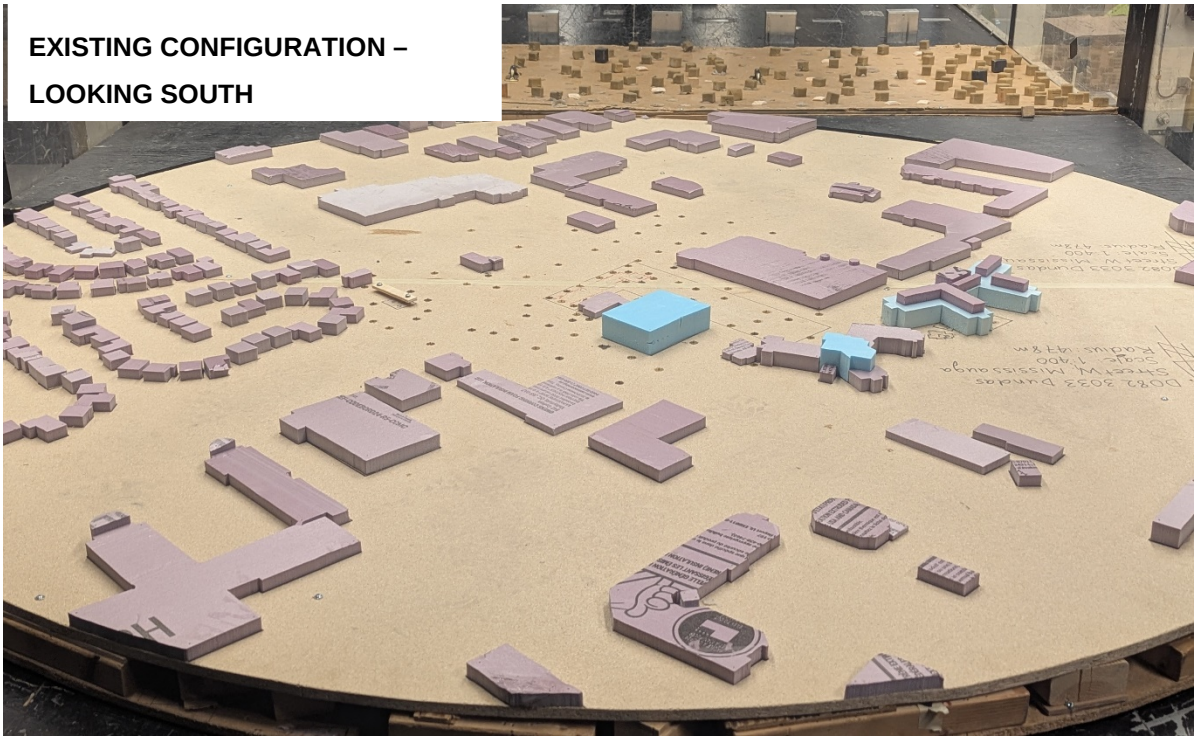
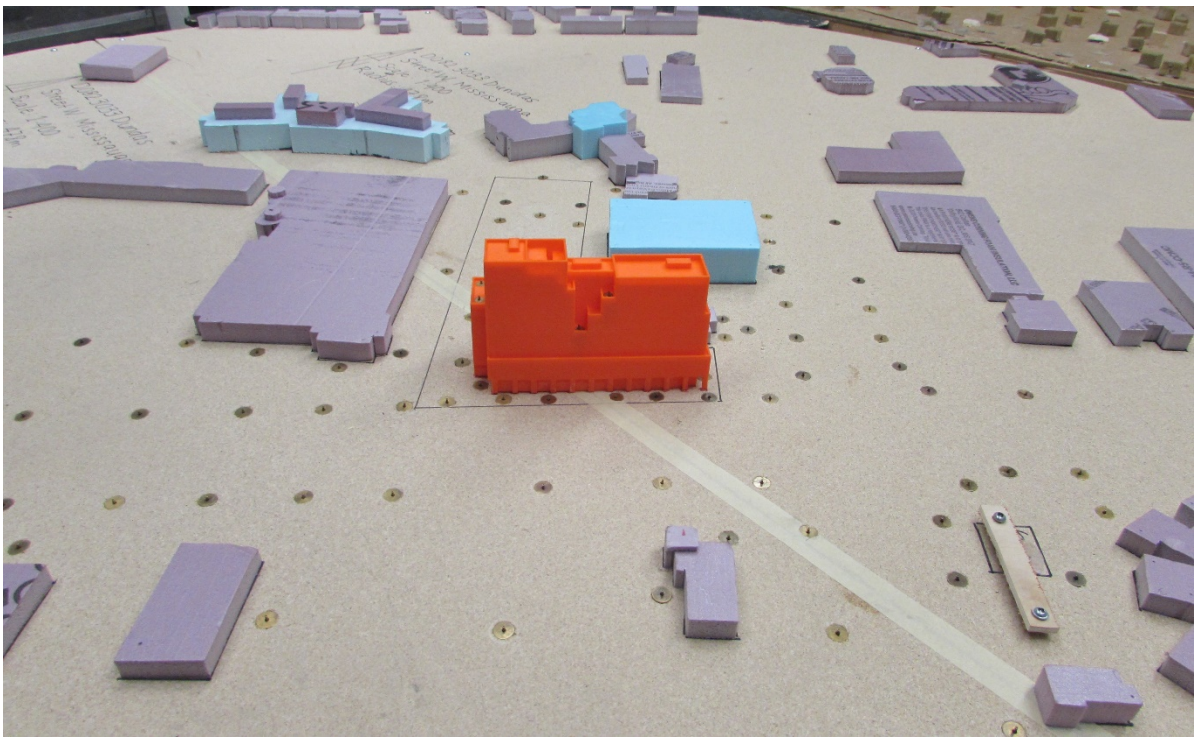


FIGURE 5a CLOSE UP VIEWS OF THE PEDESTRIAN LEVEL WIND SPEED MODEL FOR THE 'EXISTING' CONFIGURATION

PROPOSED CONFIGURATION –

LOOKING NORTHWEST



PROPOSED CONFIGURATION –

LOOKING SOUTHEAST

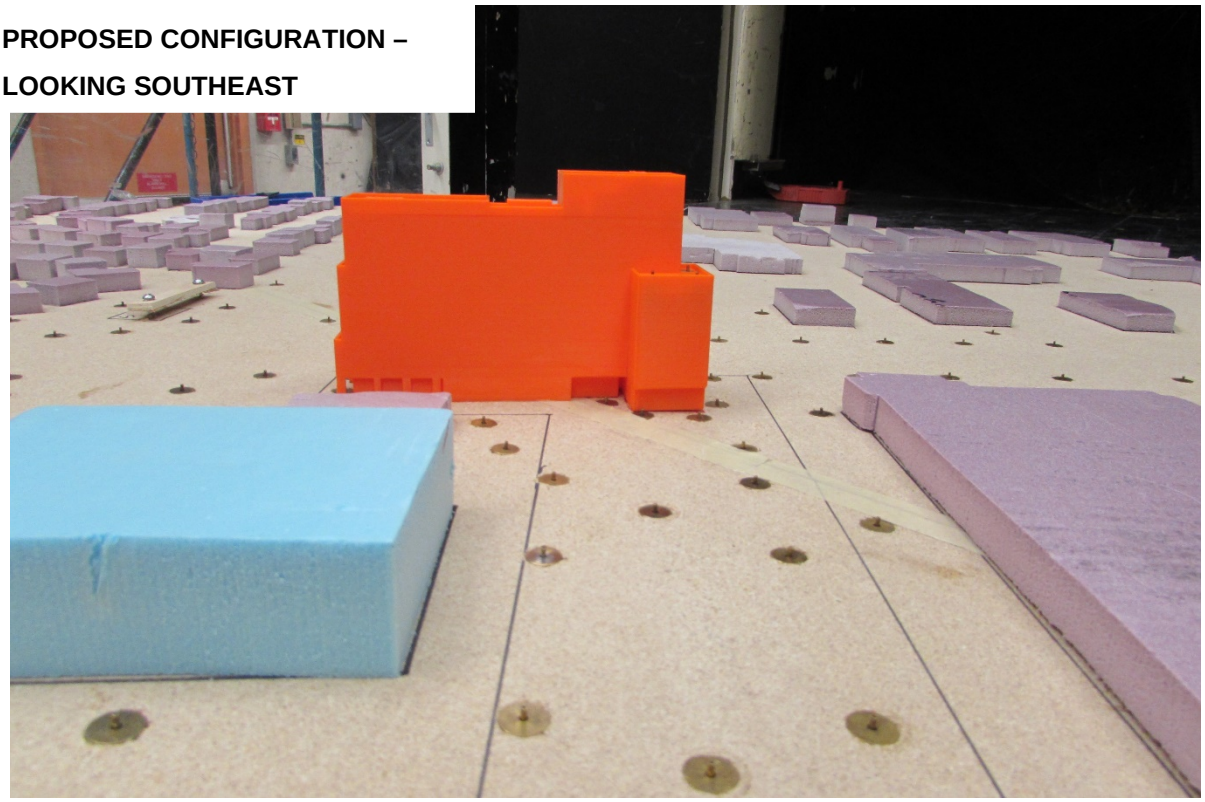
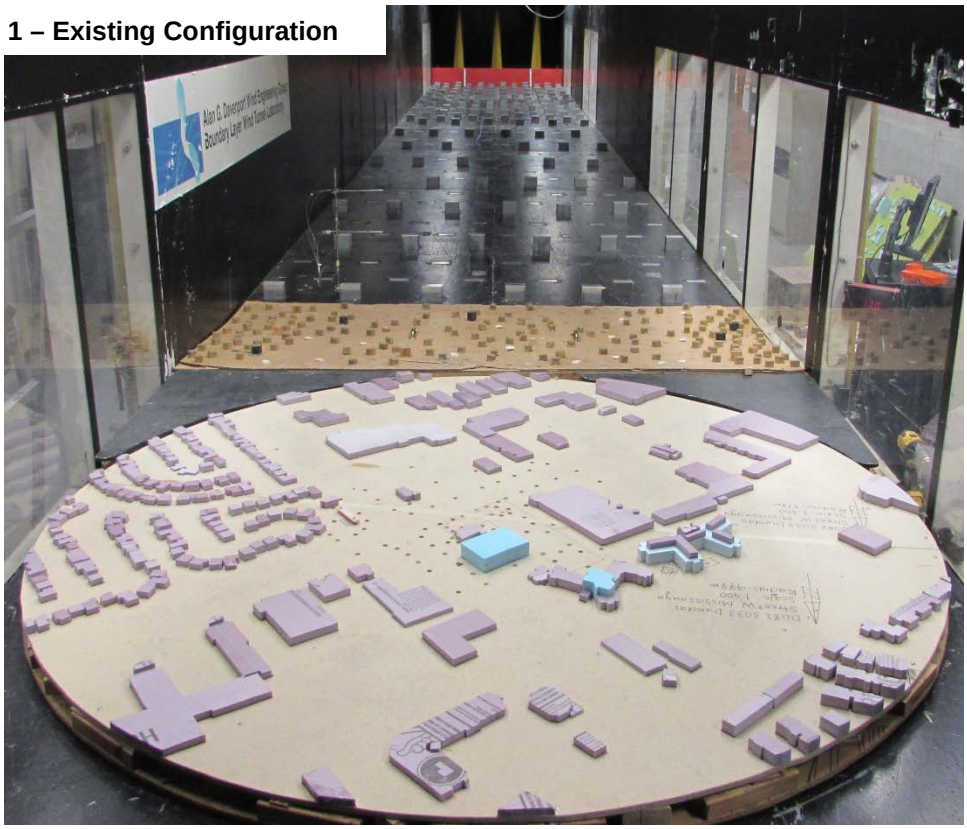


FIGURE 5b CLOSE UP VIEWS OF THE PEDESTRIAN LEVEL WIND SPEED MODEL FOR THE 'PROPOSED' CONFIGURATION

Exposure 1 – Existing Configuration



Exposure 2 – Proposed Configuration

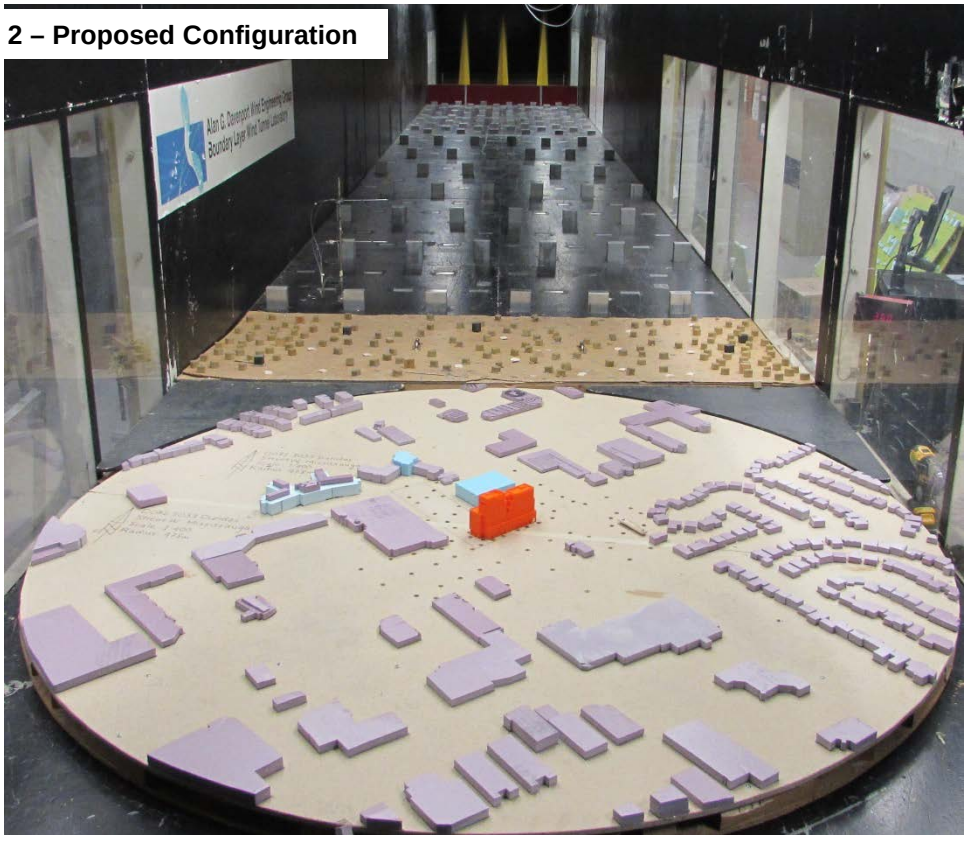


FIGURE 6 PHOTOGRAPHS OF THE MODEL IN THE WIND TUNNEL SHOWING THE UPSTREAM TERRAIN MODEL (EXPOSURES) USED

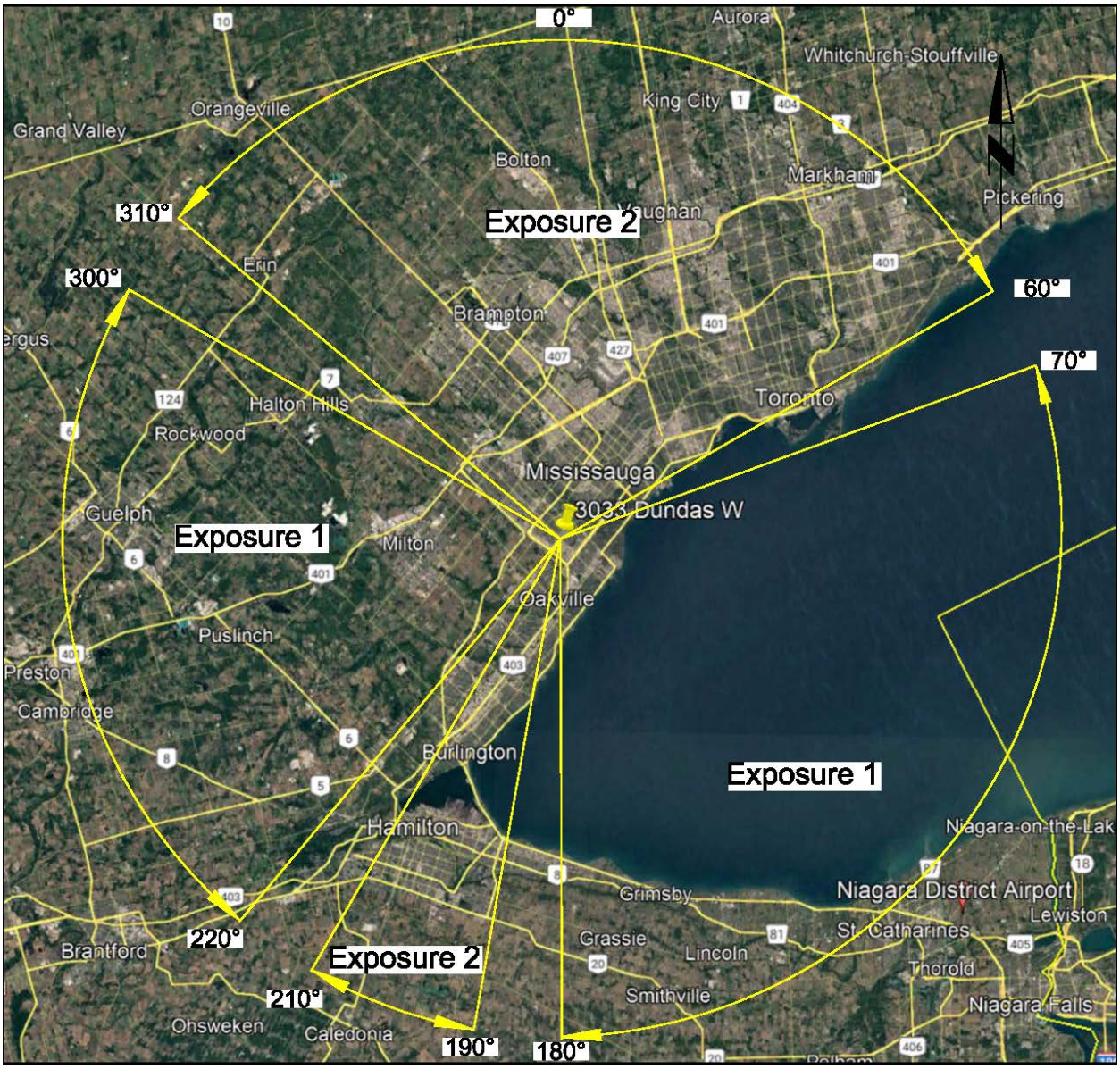


FIGURE 7 AZIMUTH RANGES OVER WHICH THE UPSTREAM TERRAIN MODELS WERE USED

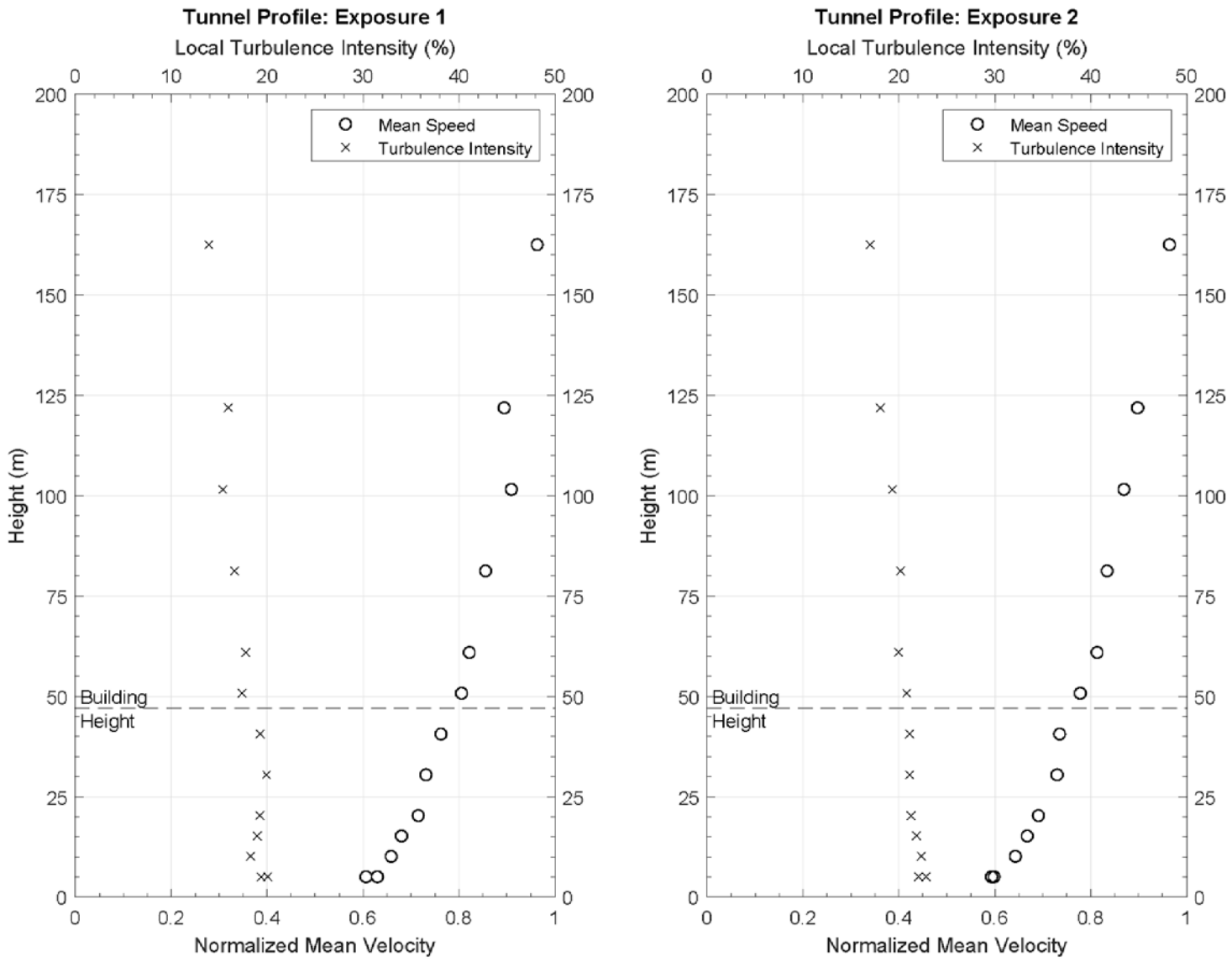


FIGURE 8 VERTICAL PROFILES OF MEAN WIND SPEED AND LONGITUDINAL TURBULENCE INTENSITY MEASURED JUST UPSTREAM OF THE PROXIMITY MODEL.

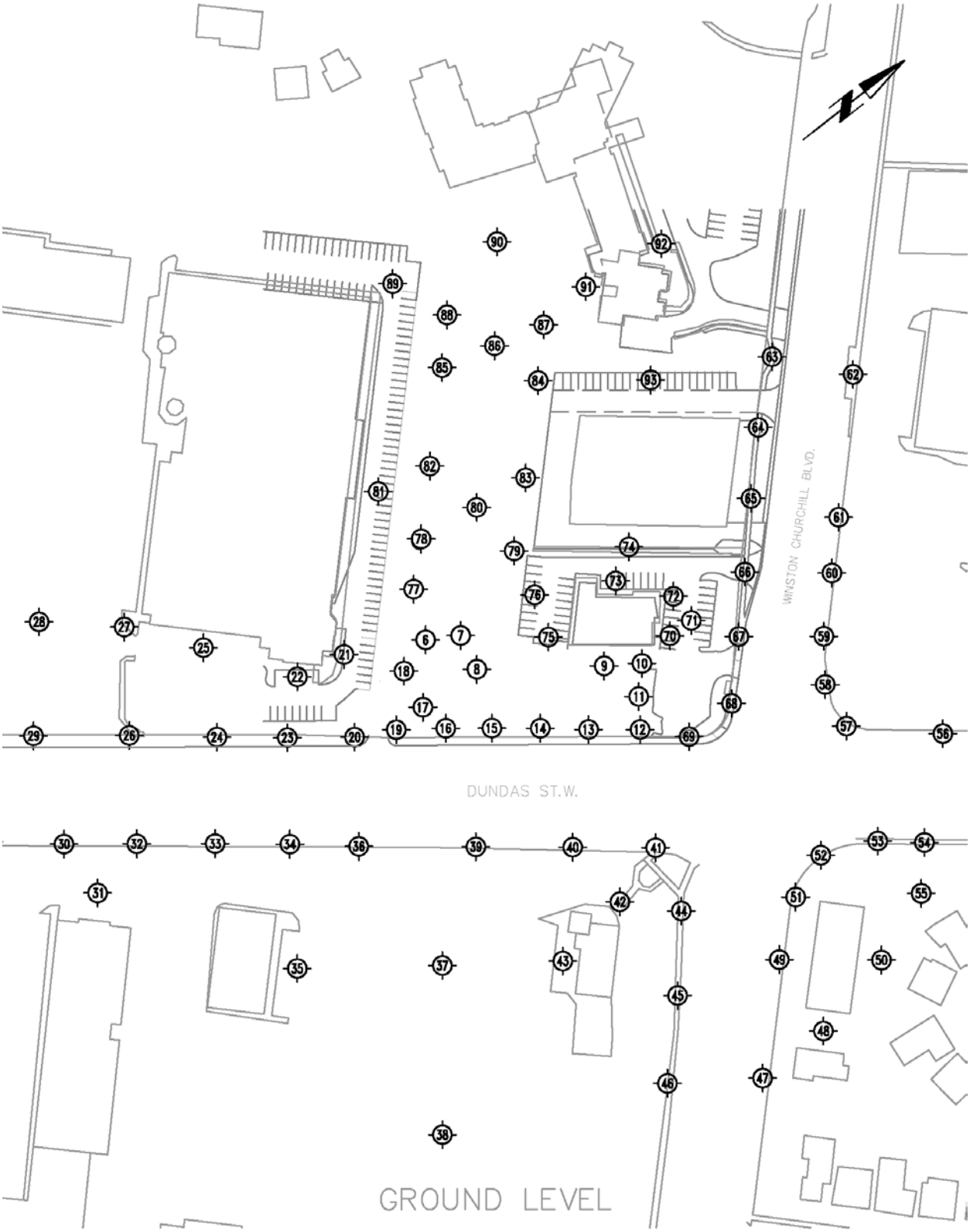


FIGURE 9 MEASUREMENT LOCATIONS FOR PEDESTRIAN-LEVEL WIND SPEEDS –EXISTING SITE

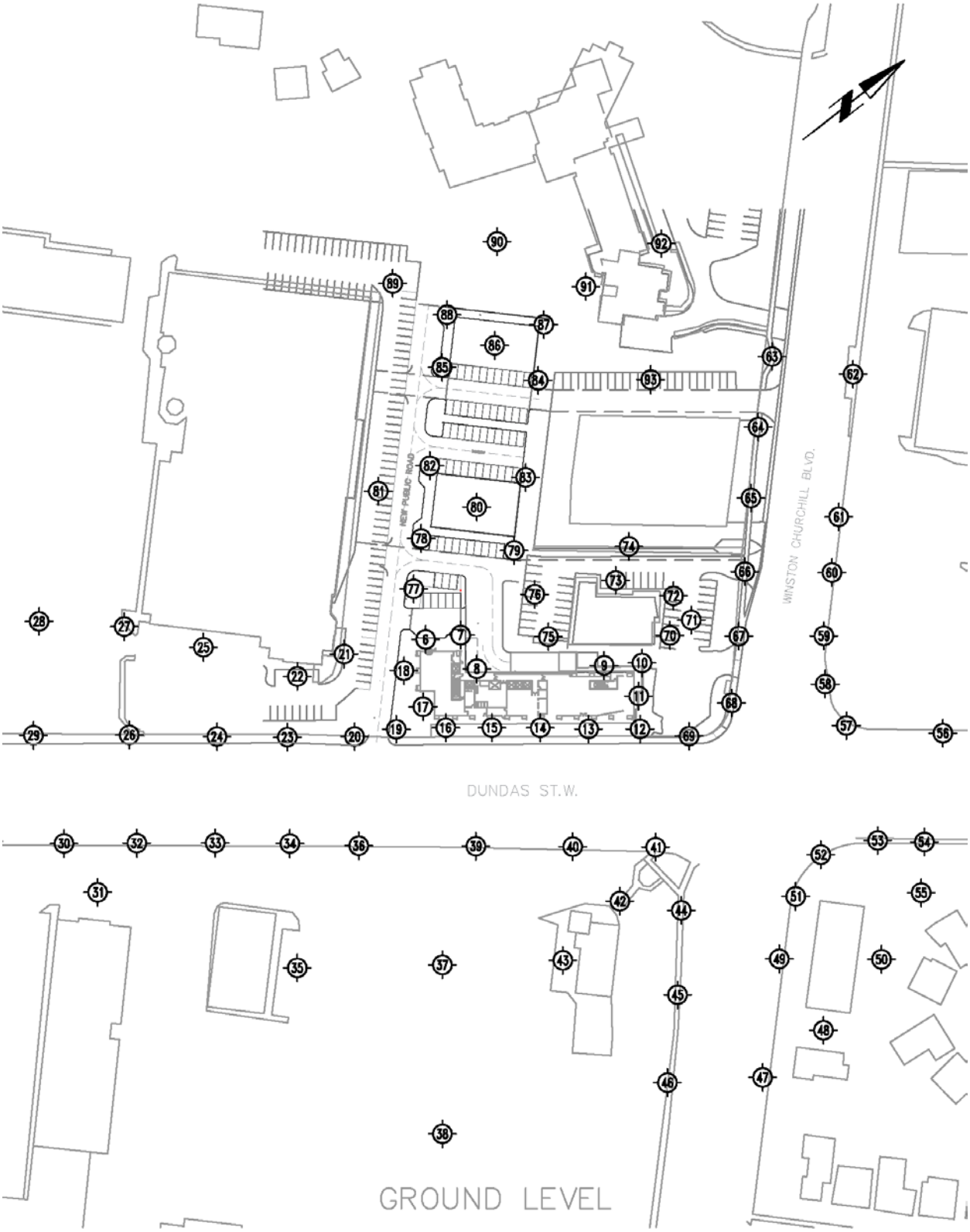
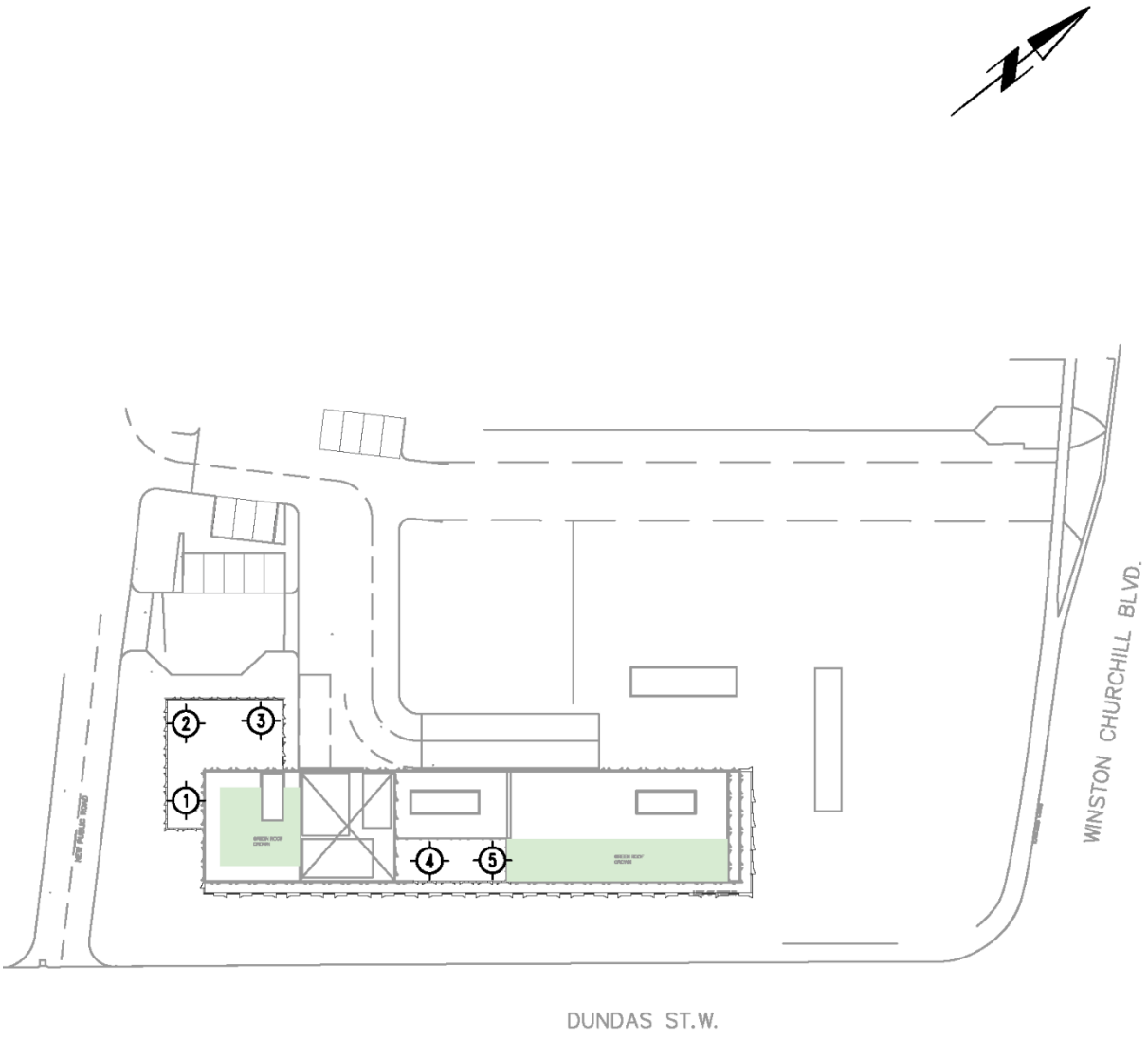


FIGURE 10a MEASUREMENT LOCATIONS FOR PEDESTRIAN-LEVEL WIND SPEEDS – PROPOSED DEVELOPMENT



AMENITY LEVELS

FIGURE 10b MEASUREMENT LOCATIONS FOR PEDESTRIAN-LEVEL WIND SPEEDS – PROPOSED DEVELOPMENT

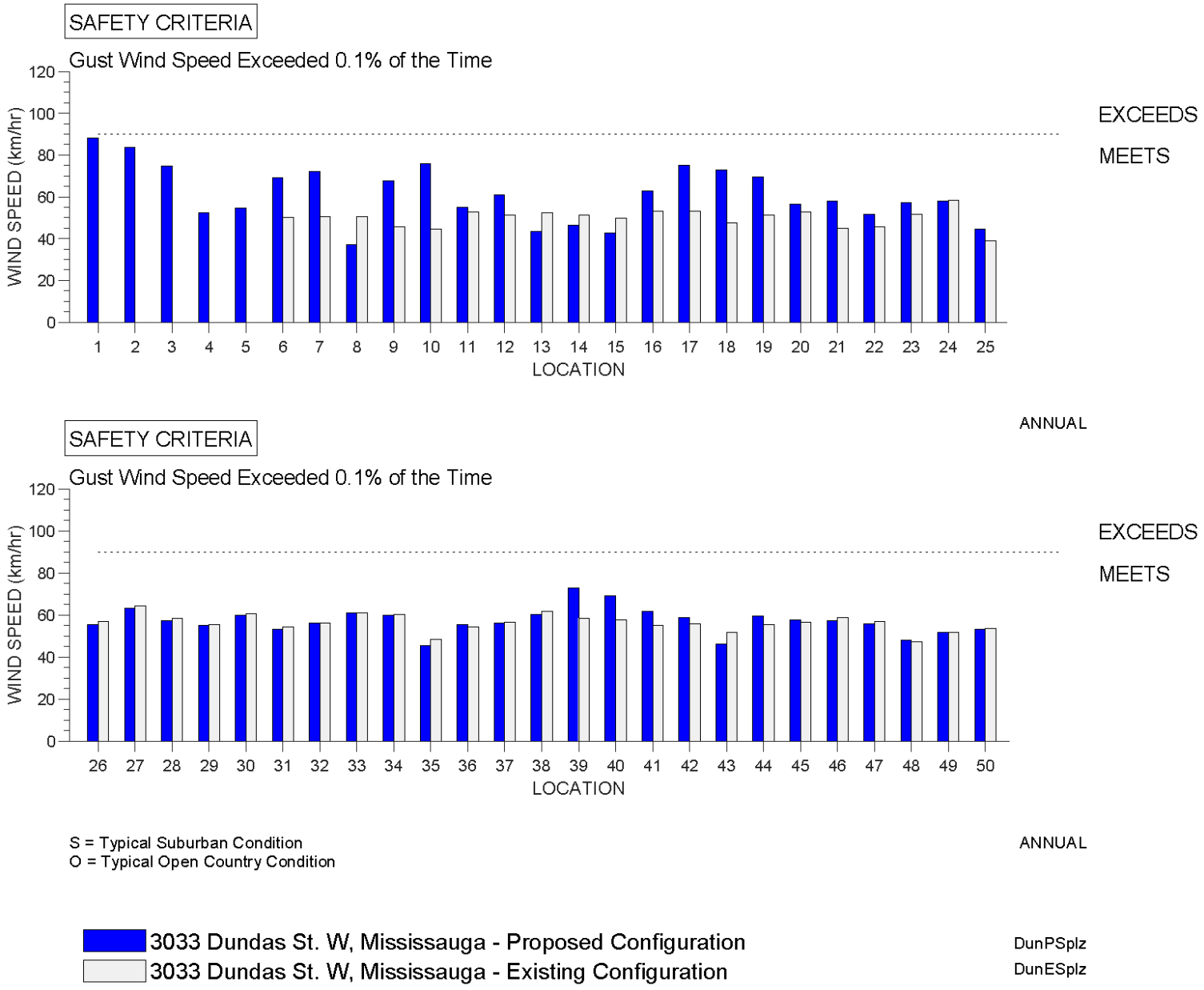


FIGURE 11a PREDICTED WIND SPEEDS COMPARED WITH CRITERIA FOR PEDESTRIAN SAFETY

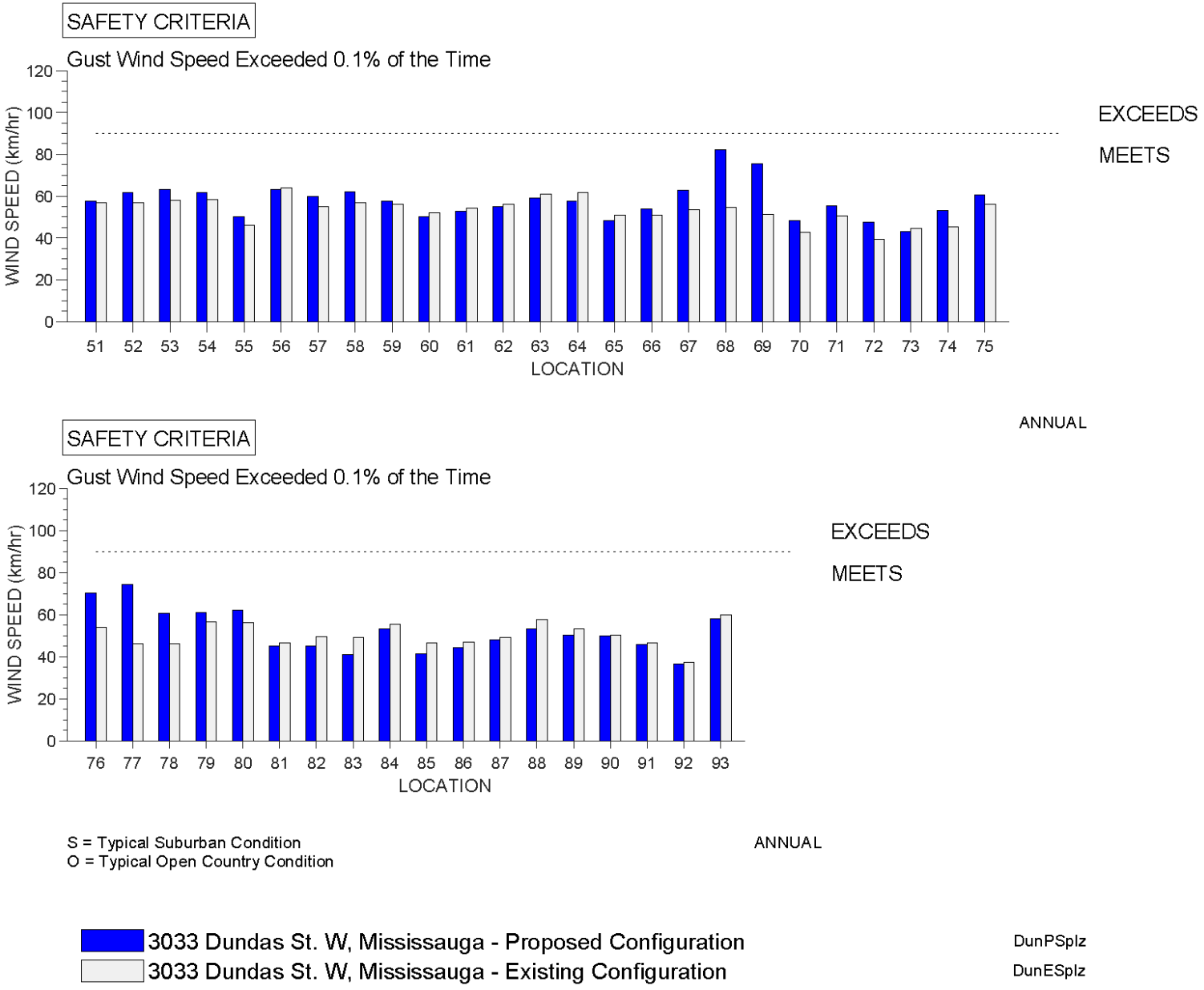


FIGURE 11b PREDICTED WIND SPEEDS COMPARED WITH CRITERIA FOR PEDESTRIAN SAFETY

FIGURE 12a PREDICTED WIND SPEEDS COMPARED WITH CRITERIA FOR PEDESTRIAN COMFORT – SUMMER

FIGURE 12b PREDICTED WIND SPEEDS COMPARED WITH CRITERIA FOR PEDESTRIAN COMFORT – SUMMER

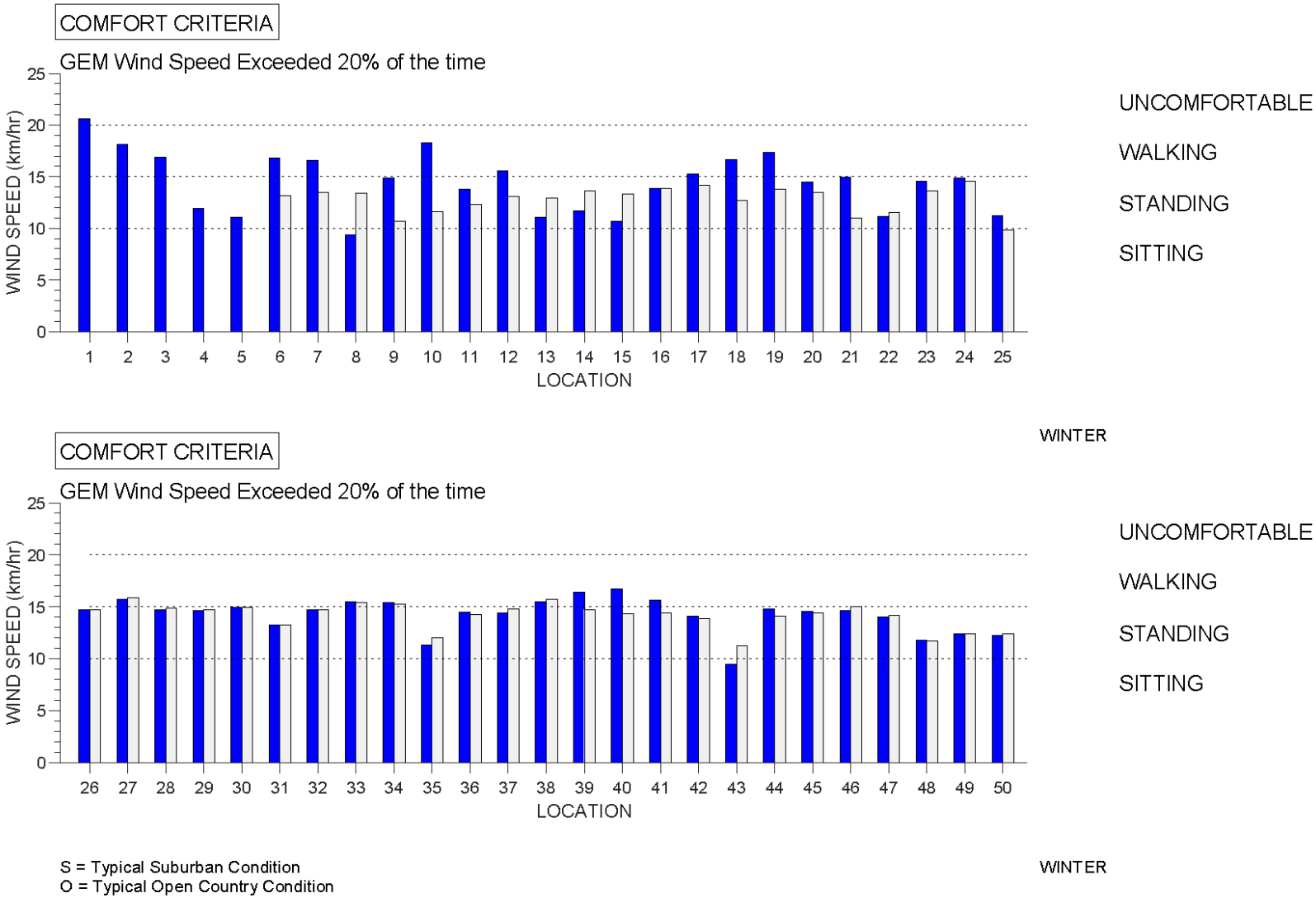


FIGURE 13a PREDICTED WIND SPEEDS COMPARED WITH CRITERIA FOR PEDESTRIAN COMFORT – WINTER

FIGURE 13b PREDICTED WIND SPEEDS COMPARED WITH CRITERIA FOR PEDESTRIAN COMFORT – WINTER

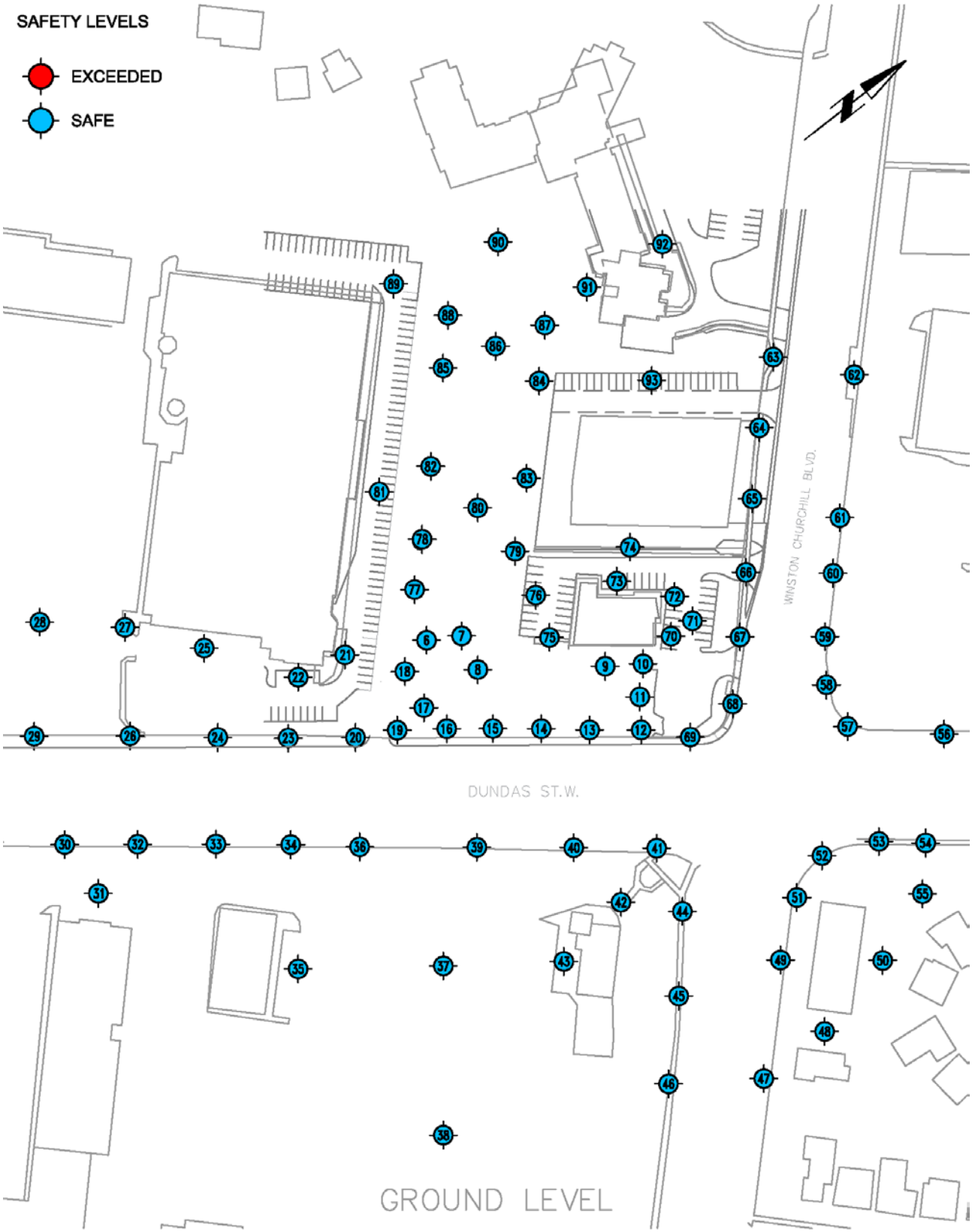


FIGURE 14 SUMMARY OF PREDICTED SAFETY LEVELS FOR PEDESTRIAN-LEVEL WIND SPEEDS – EXISTING SITE

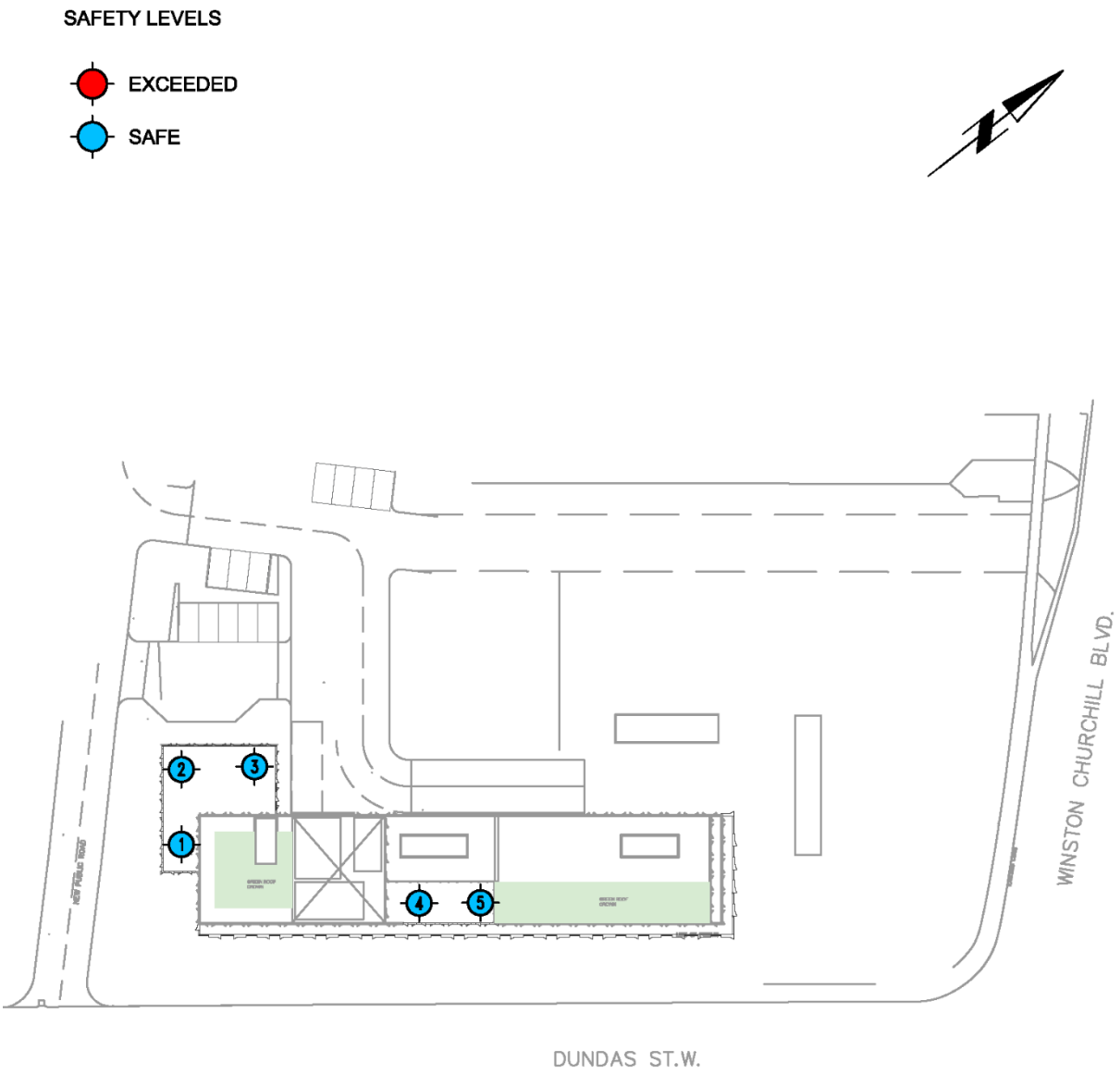


FIGURE 15a SUMMARY OF PREDICTED SAFETY LEVELS FOR PEDESTRIAN-LEVEL WIND SPEEDS – PROPOSED DEVELOPMENT

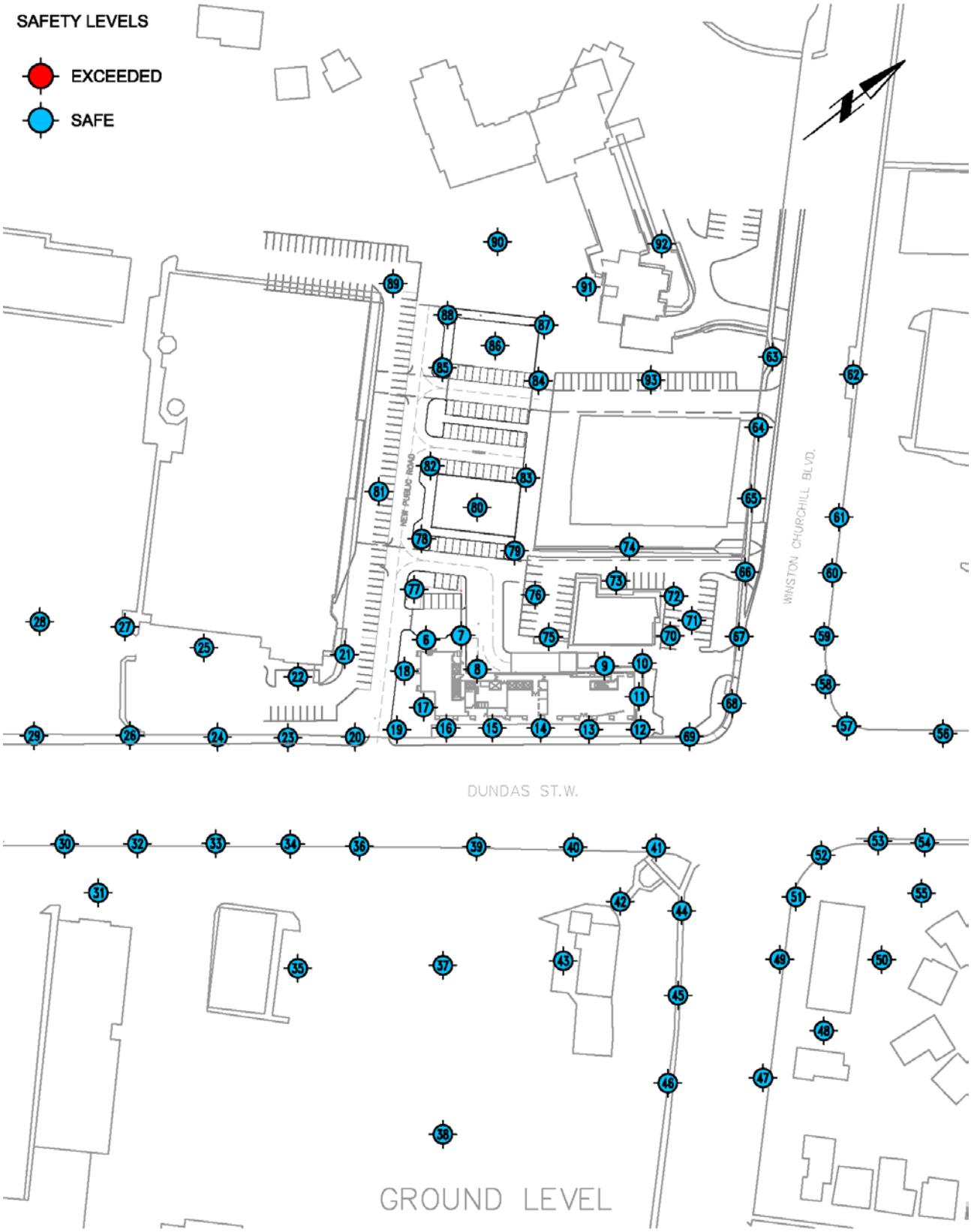


FIGURE 15b SUMMARY OF PREDICTED SAFETY LEVELS FOR PEDESTRIAN-LEVEL WIND SPEEDS – PROPOSED DEVELOPMENT

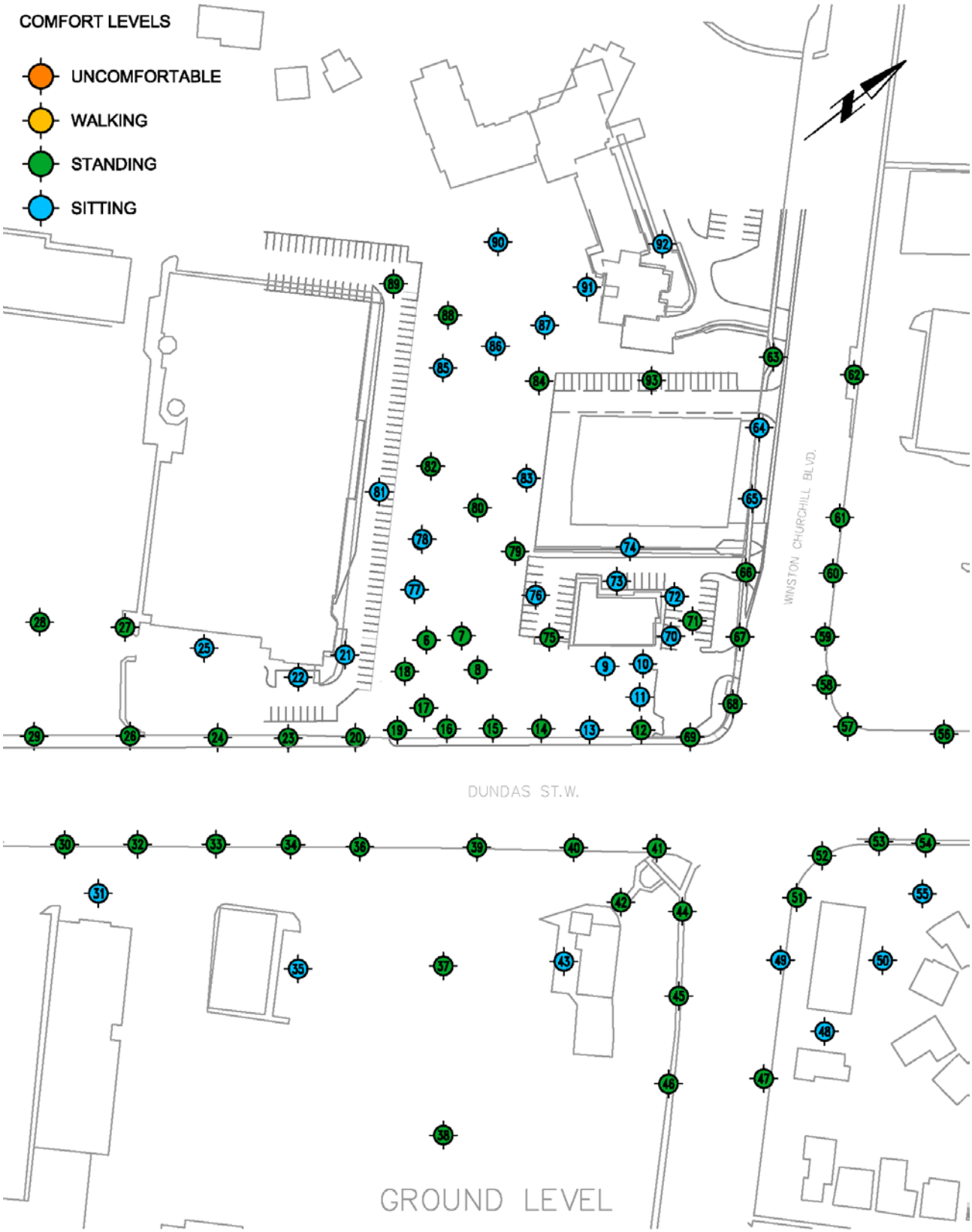


FIGURE 16 SUMMARY OF PREDICTED COMFORT LEVELS FOR PEDESTRIAN-LEVEL WIND SPEEDS – EXISTING SITE - SUMMER

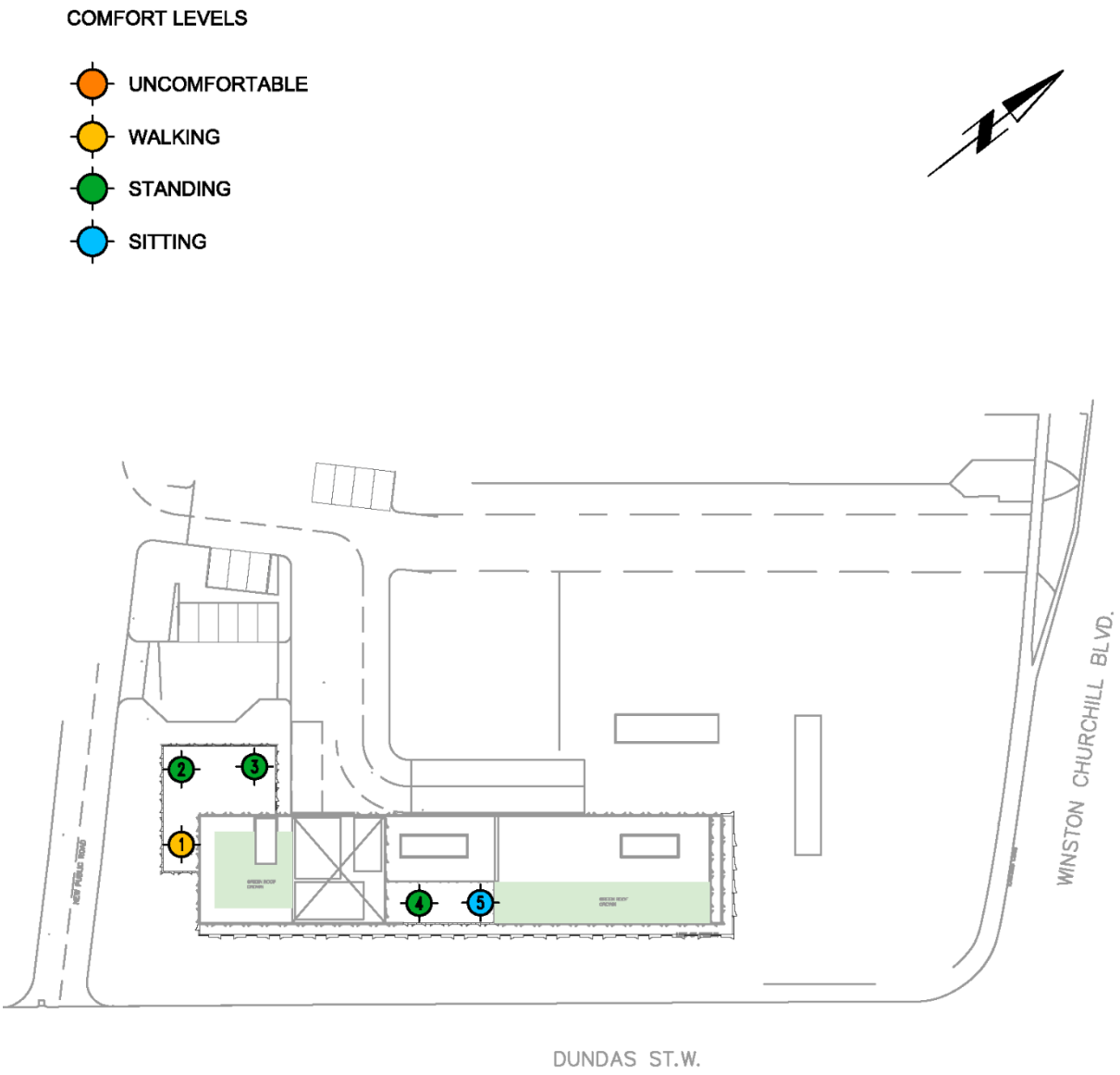


FIGURE 17a SUMMARY OF PREDICTED COMFORT LEVELS FOR PEDESTRIAN-LEVEL WIND SPEEDS – PROPOSED DEVELOPMENT - SUMMER

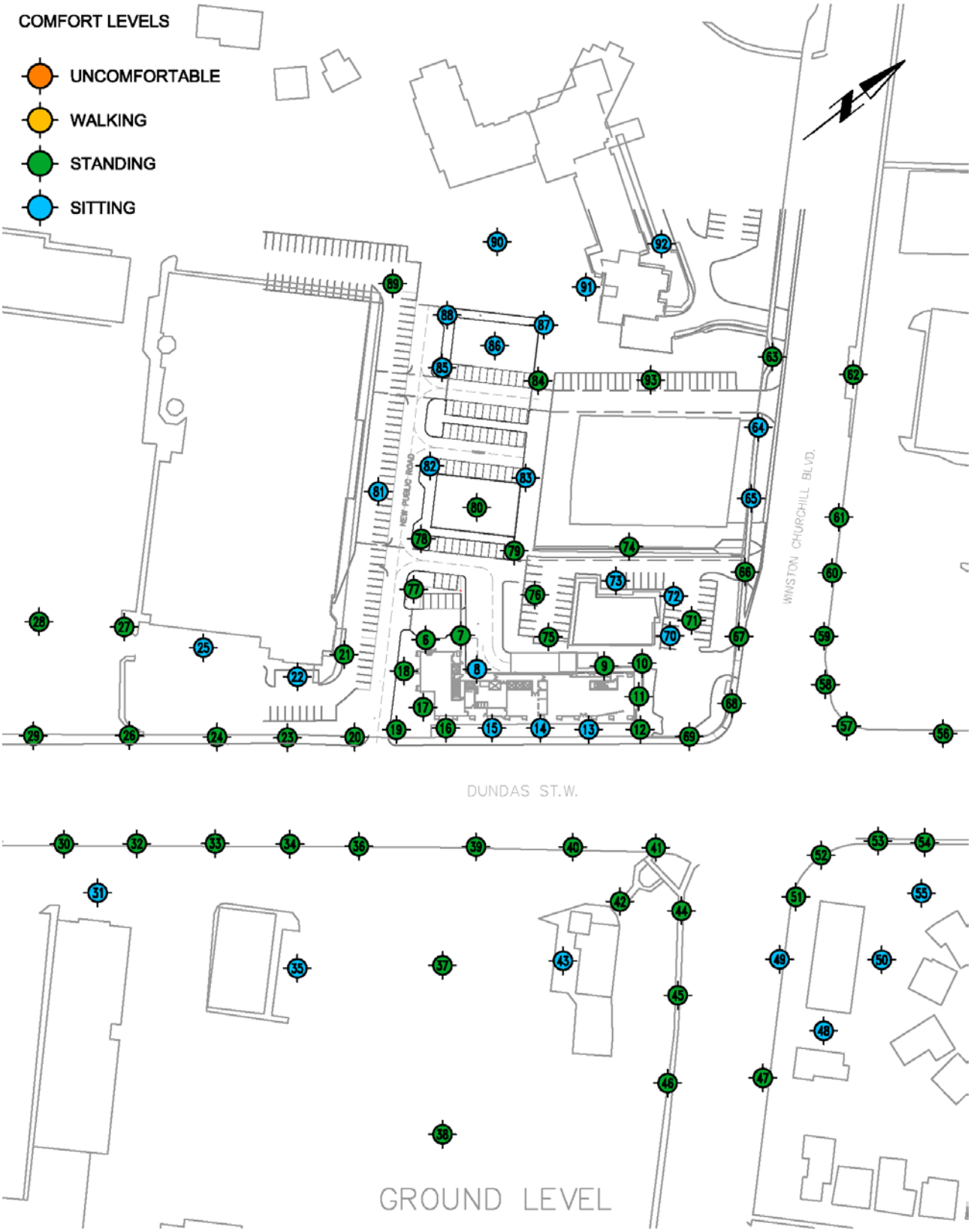


FIGURE 17b SUMMARY OF PREDICTED COMFORT LEVELS FOR PEDESTRIAN-LEVEL WIND SPEEDS – PROPOSED DEVELOPMENT - SUMMER

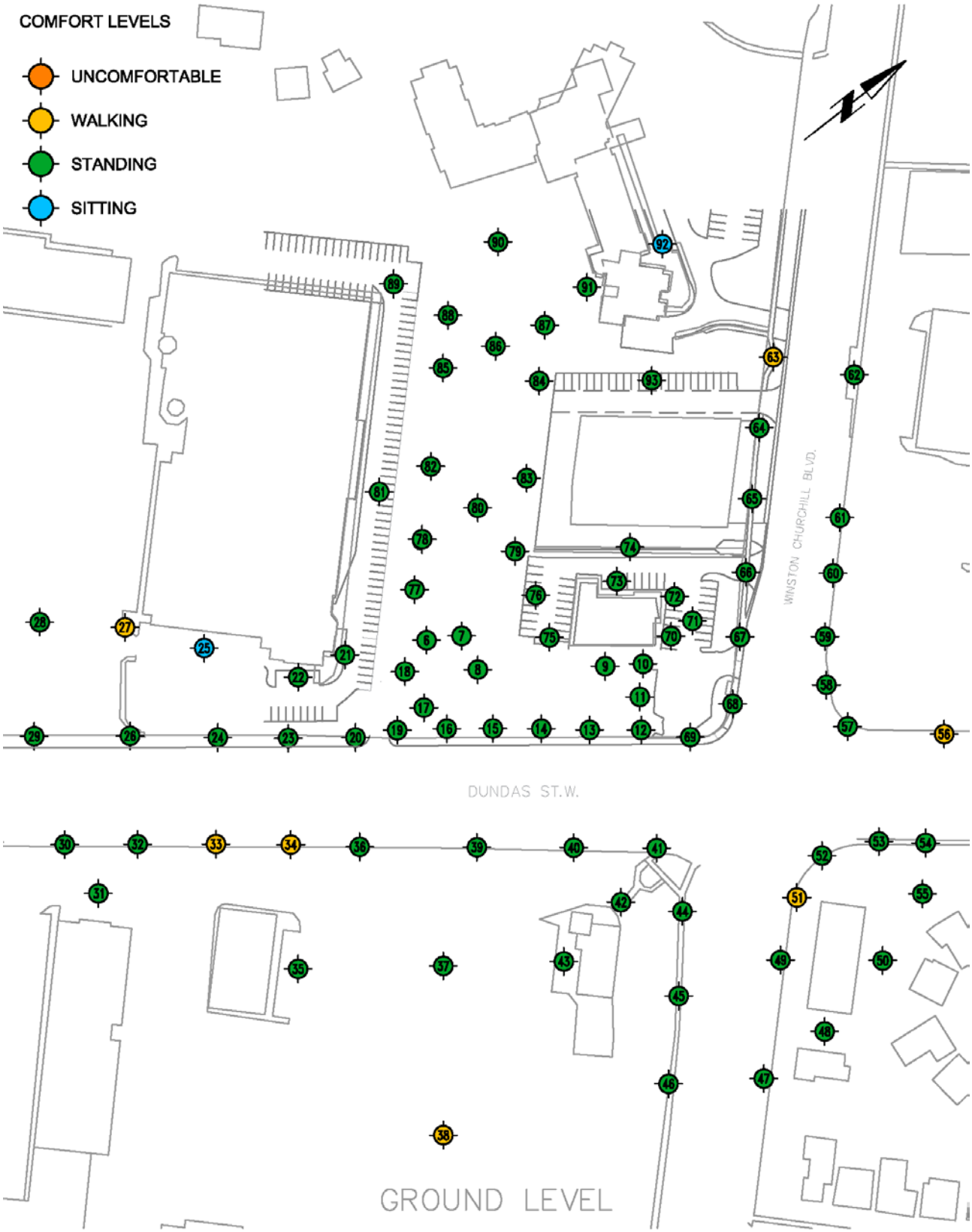


FIGURE 18 SUMMARY OF PREDICTED COMFORT LEVELS FOR PEDESTRIAN-LEVEL WIND SPEEDS – EXISTING SITE - WINTER

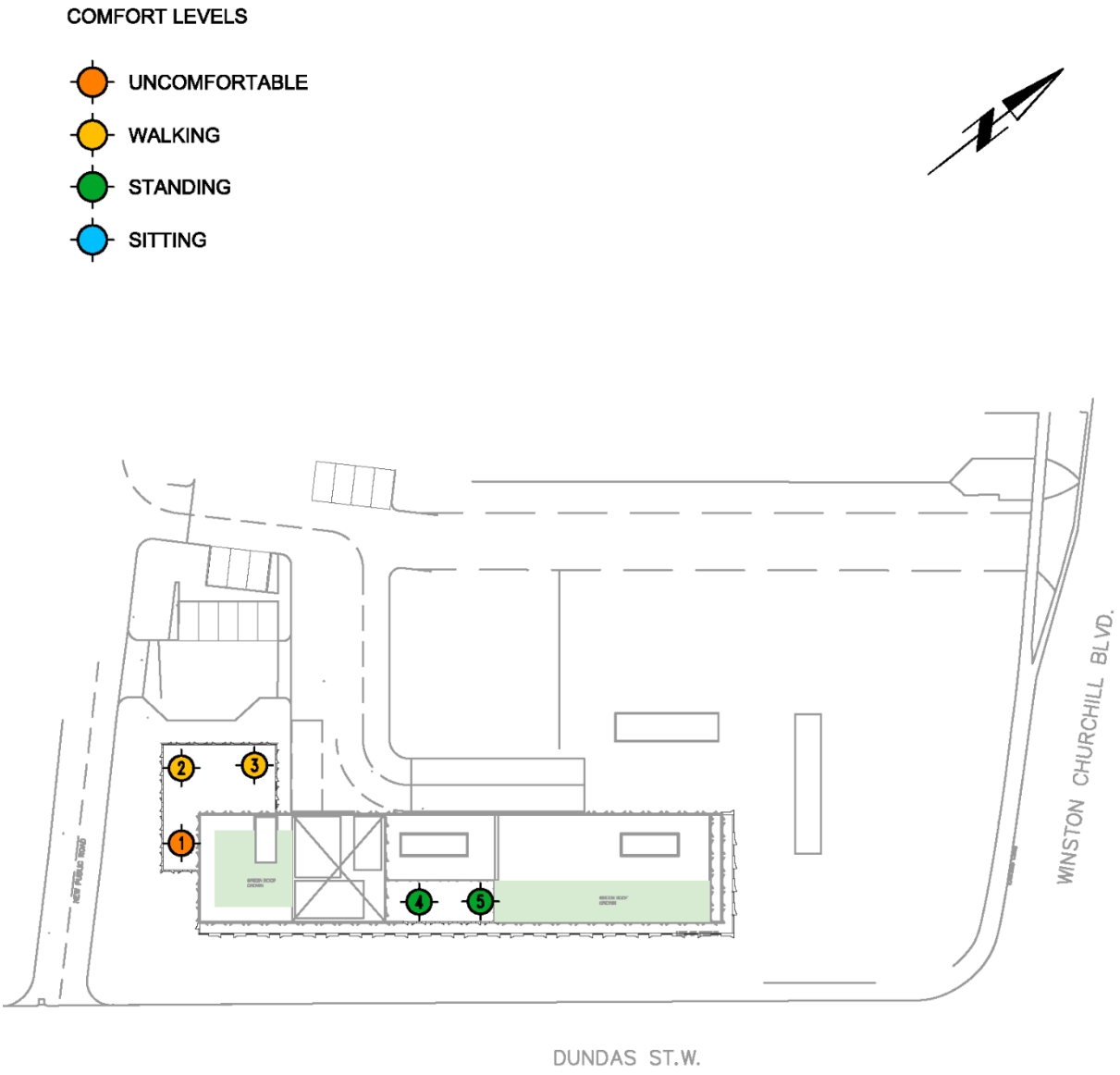


FIGURE 19a SUMMARY OF PREDICTED <u>COMFORT</u> LEVELS FOR PEDESTRIAN-LEVEL WIND SPEEDS – PROPOSED DEVELOPMENT - WINTER

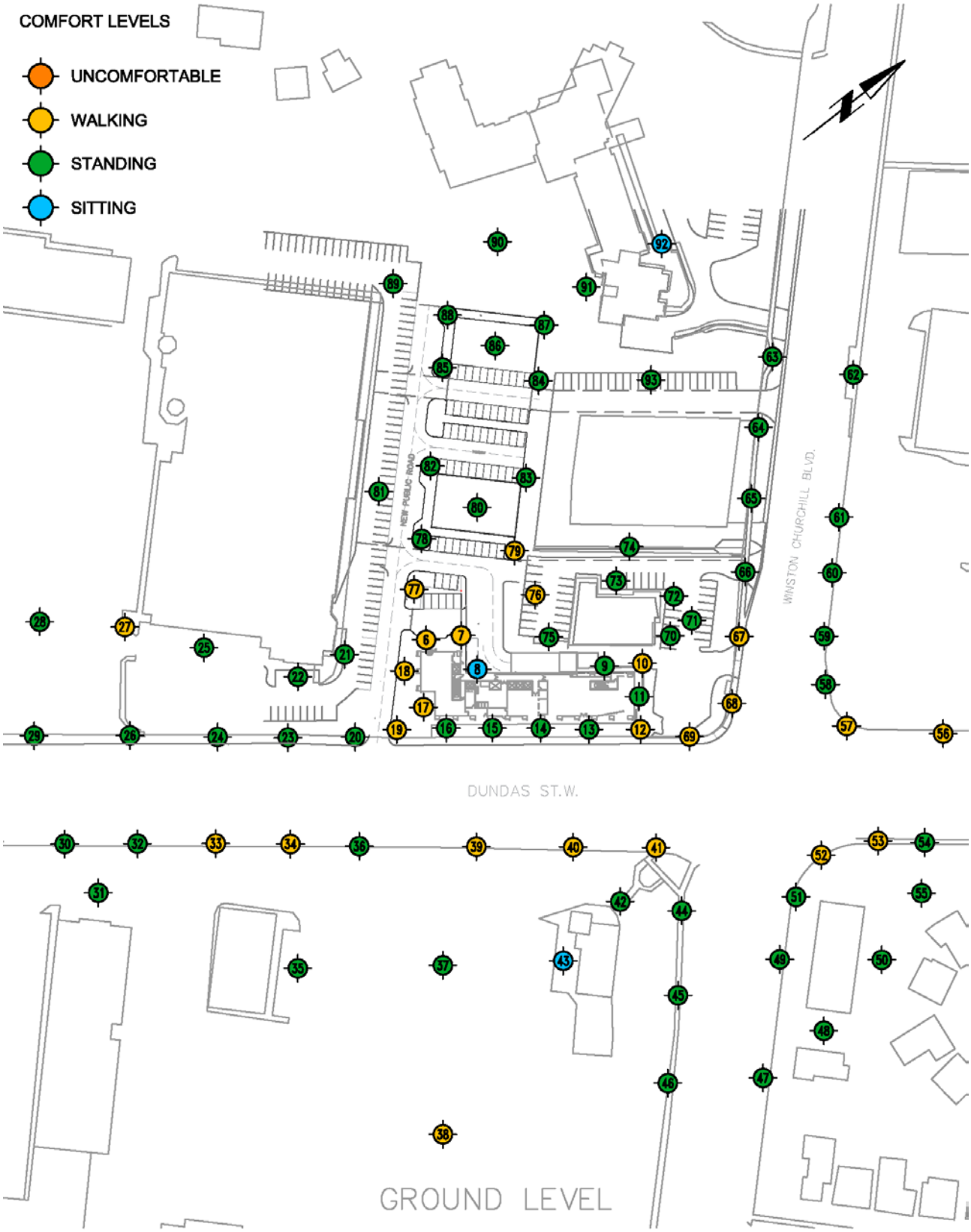


FIGURE 19b SUMMARY OF PREDICTED COMFORT LEVELS FOR PEDESTRIAN-LEVEL WIND SPEEDS – PROPOSED DEVELOPMENT - WINTER

FIGURE 20 EXAMPLES OF VARIOUS MITIGATION OPTIONS FOR THE OUTDOOR AMENITY AREAS

APPENDIX A

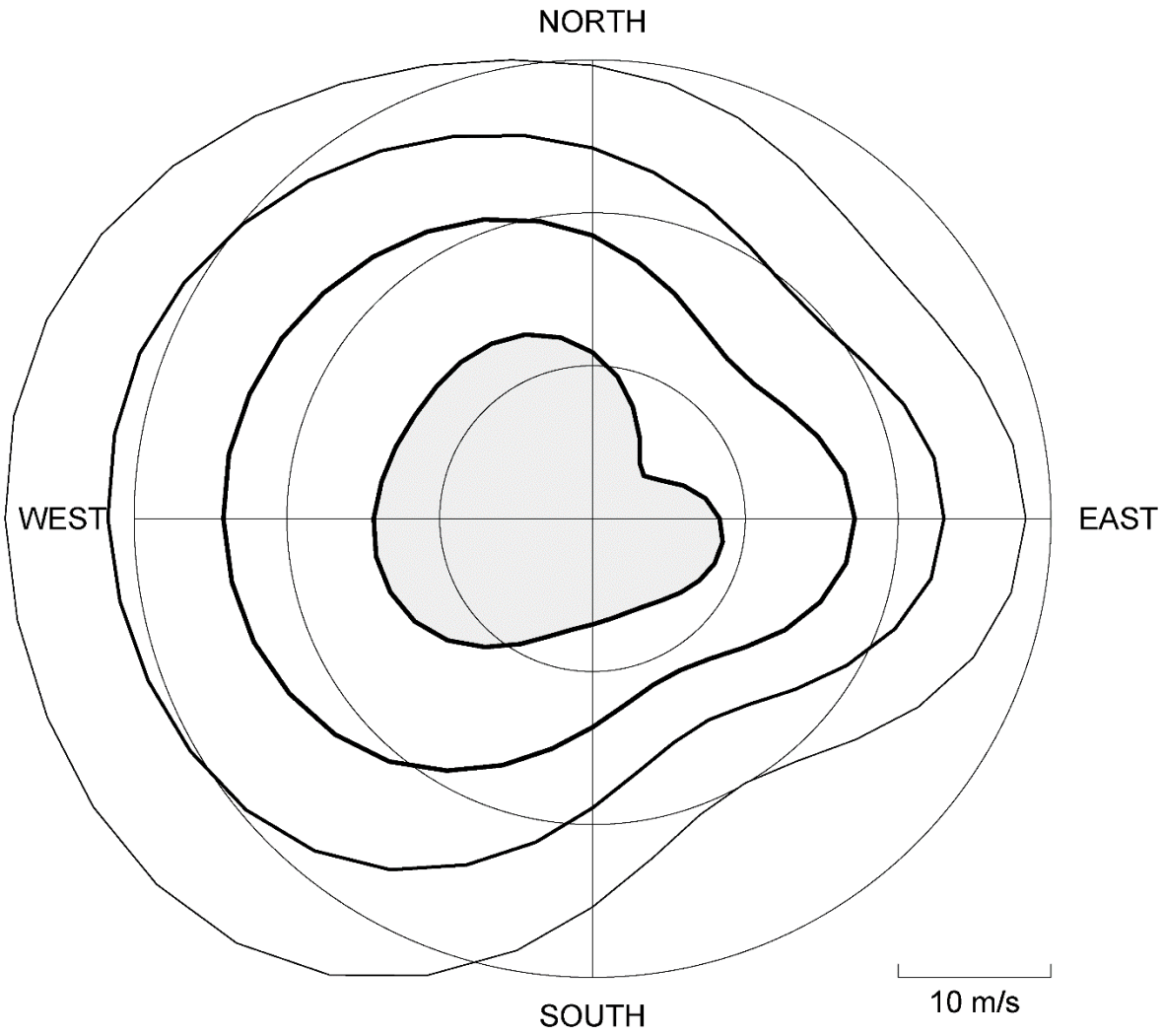
PROBABILITY DISTRIBUTIONS OF WIND SPEED AND DIRECTION

In the plots, the radial distance represents the wind speed at a reference height of 500 m in standard open country exposure. Contours are plotted for four probability levels: the innermost contour is for a probability level of 0.01 or 1% of the time. The other contours represent 0.1%, 0.01% and 0.001% of the time. Thus, the more-common winds are represented by the inner contours and the more-rare winds by the outer contours.

These plots have been derived using data at 16 compass directions, which were interpolated to every 10°. Thus, a point on the innermost contour would represent the wind speed that is exceeded 1% of the time within a 10° sector centred on that wind direction.

To determine the probability of exceeding a particular wind speed at a particular direction, interpolate between the contour levels. For example, to determine the probability of exceeding 20 m/s from the west, find the point on the plot corresponding to this speed and direction. In this case (for 20 m/s at 270°), the probability of exceeding 20 m/s from the west falls between the 1% and 0.1% contours and is approximately 0.35%.

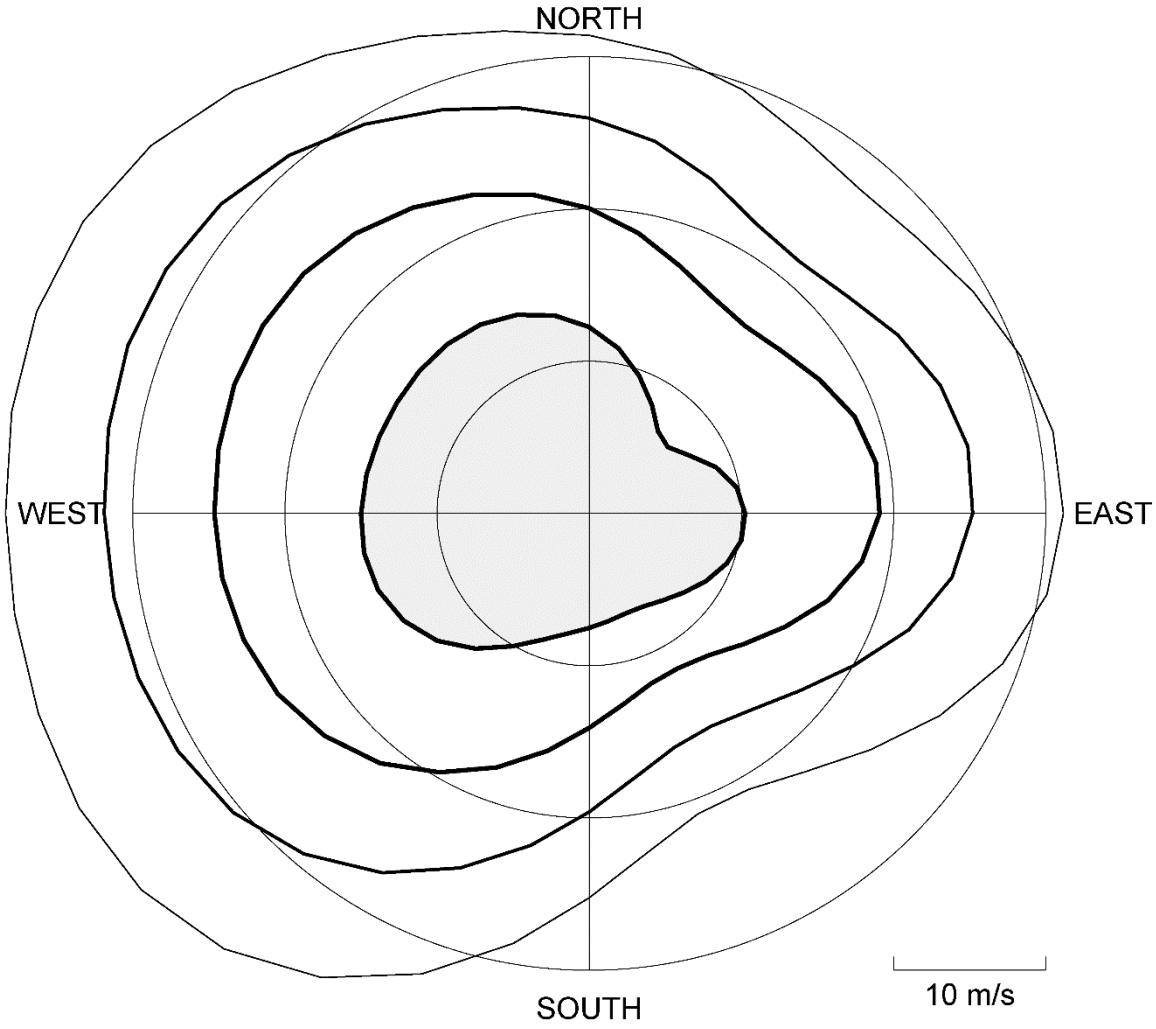
The probability of a particular wind speed being exceeded regardless of direction can be obtained by summing the probabilities of exceeding that wind speed at every 10° over the full 360° azimuth range.



ANNUAL

A point on the innermost contour represents the wind speed exceeded
1% of the time within a 10 degree sector centred on that direction.
Other contours represent probability levels of:
0.1%, 0.01% and 0.001% respectively.

Mississauga, ON (Pearson) - Pedestrian Safety



ANNUAL

A point on the innermost contour represents the wind speed exceeded
1% of the time within a 10 degree sector centred on that direction.
Other contours represent probability levels of:
0.1%, 0.01% and 0.001% respectively.

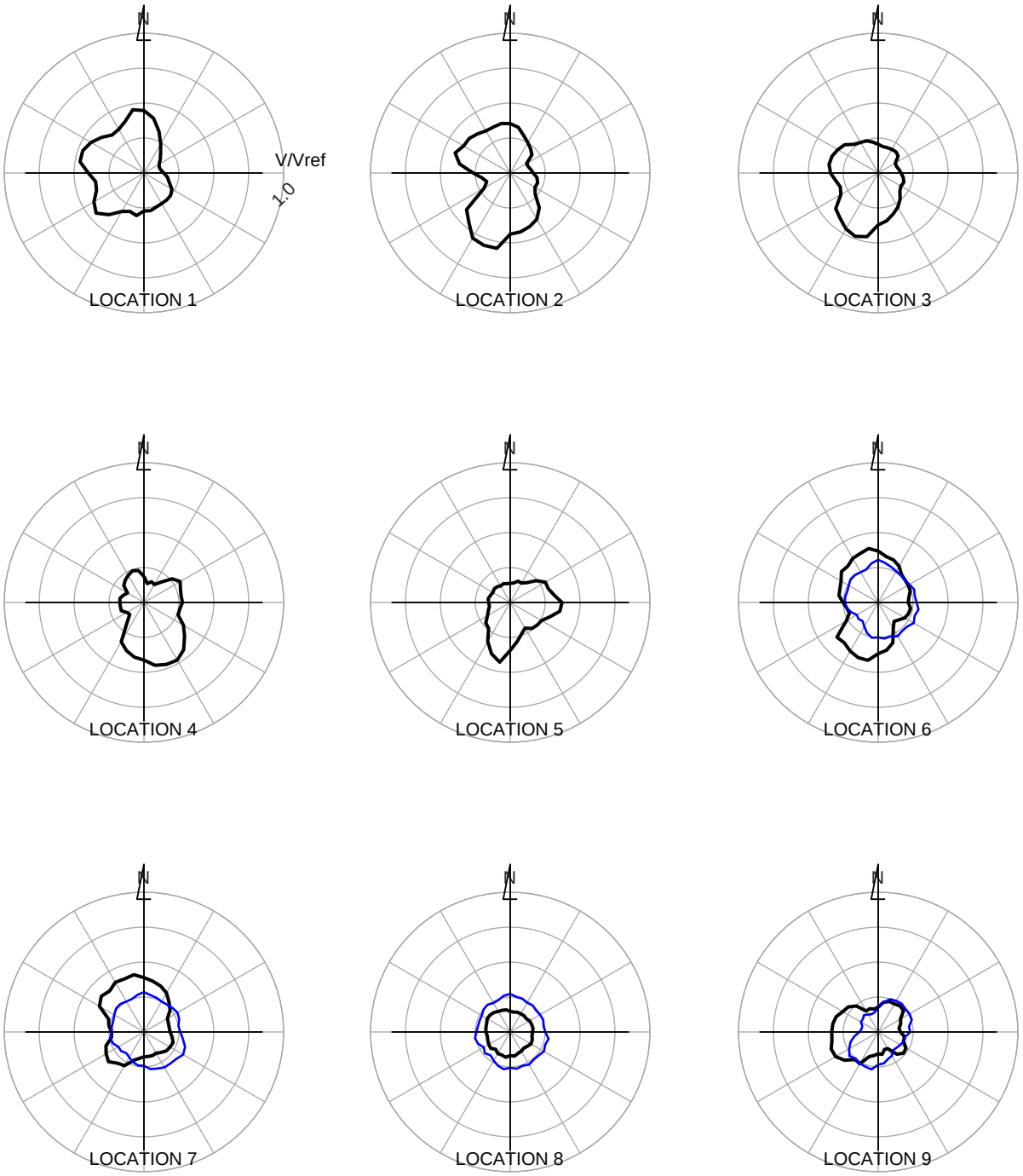
Mississauga, ON (Pearson) - Pedestrian Comfort

APPENDIX B

POLAR PLOTS OF SPEED COEFFICIENTS

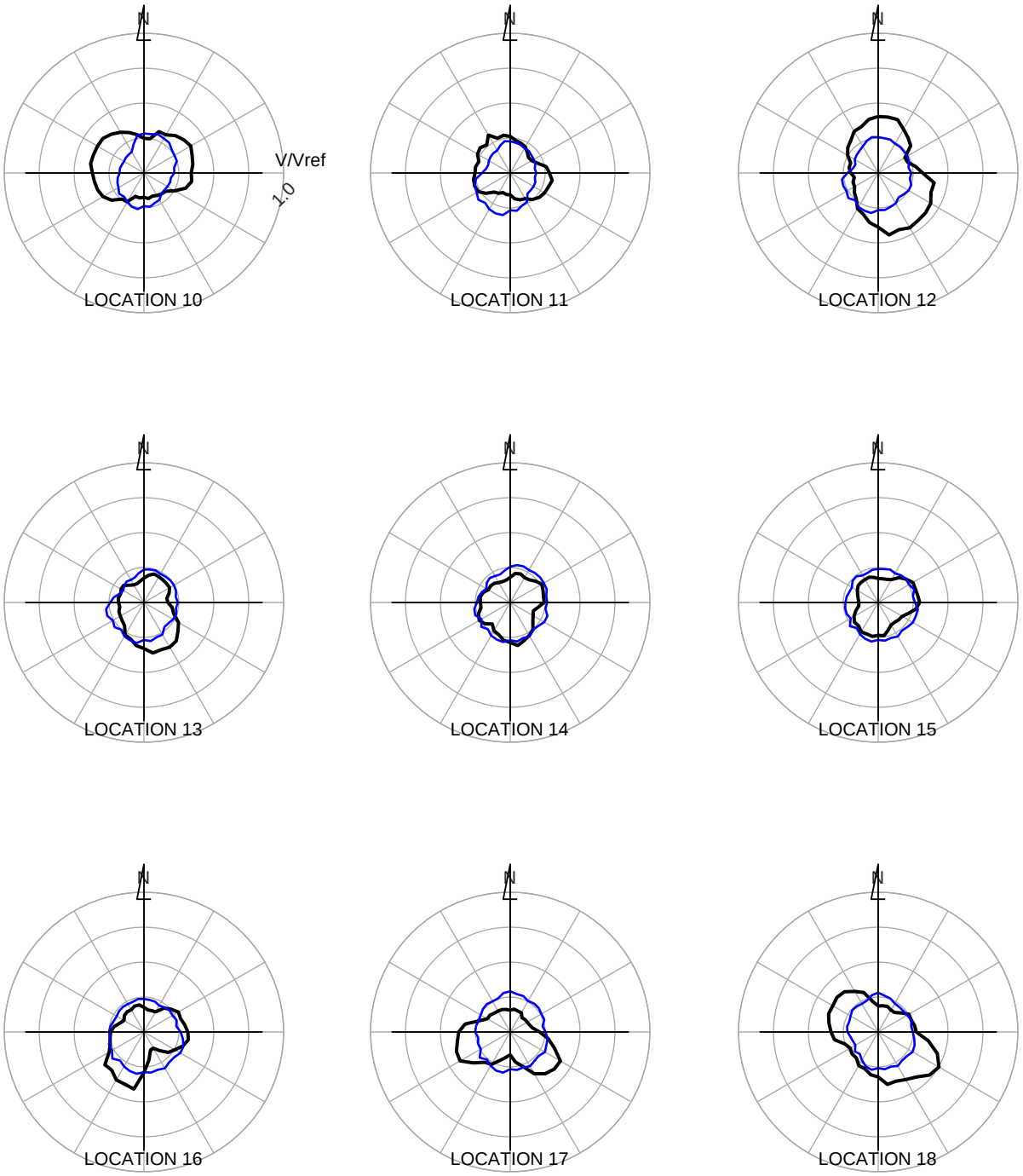
Speed ratios are the speed at the probe height divided by the speed at reference height (see Figure 3).

The azimuth indicated refers to the direction of the oncoming reference-height wind flow, measured from true North. Surface wind directions may vary considerably from these.



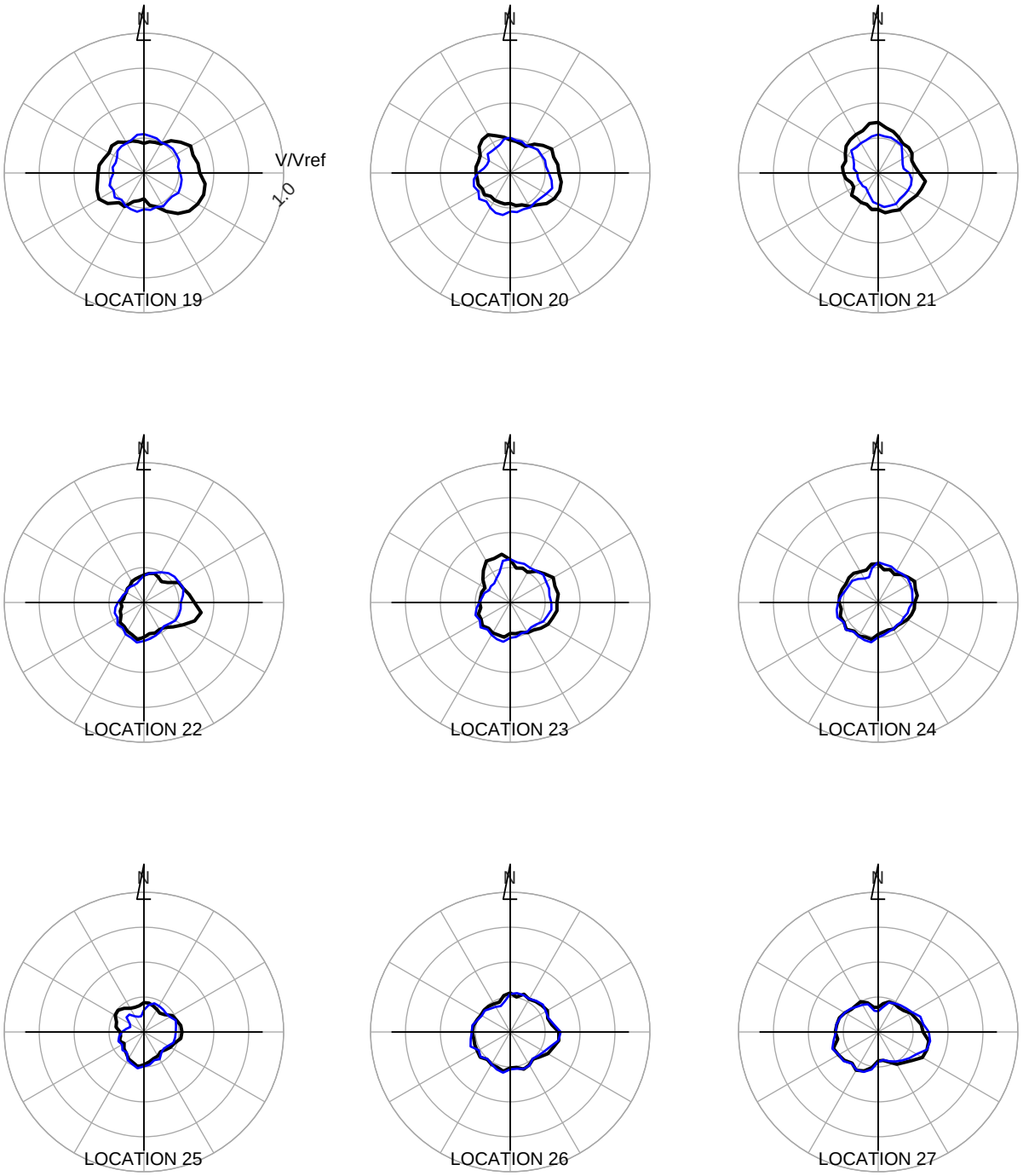
3033 Dundas St. W, Mississauga - Proposed Configuration DunPCplz/GEMean

3033 Dundas St. W, Mississauga - Existing Configuration DunECplz/GEMean



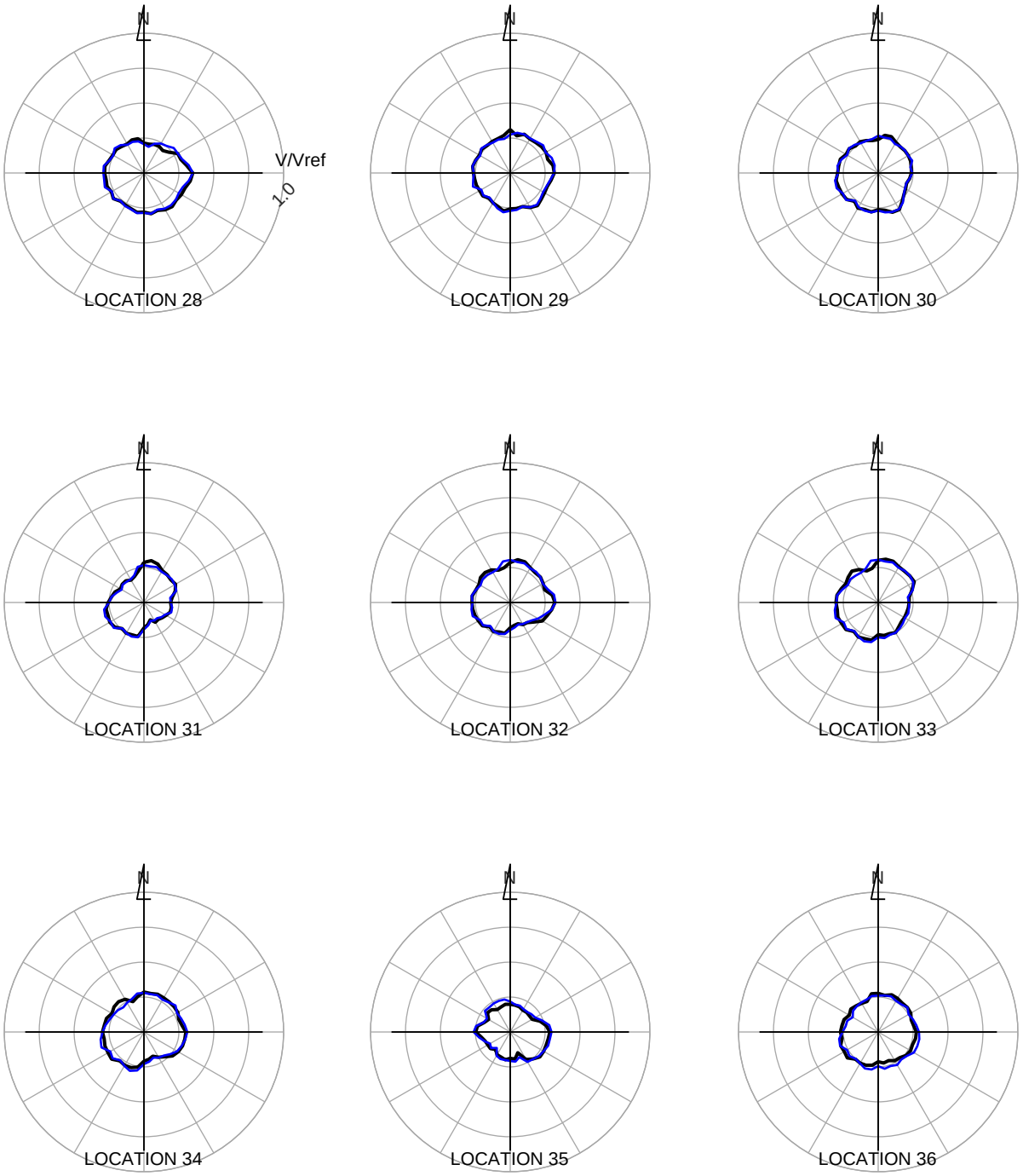
3033 Dundas St. W, Mississauga - Proposed Configuration DunPCplz/GEMean

3033 Dundas St. W, Mississauga - Existing Configuration DunECplz/GEMean



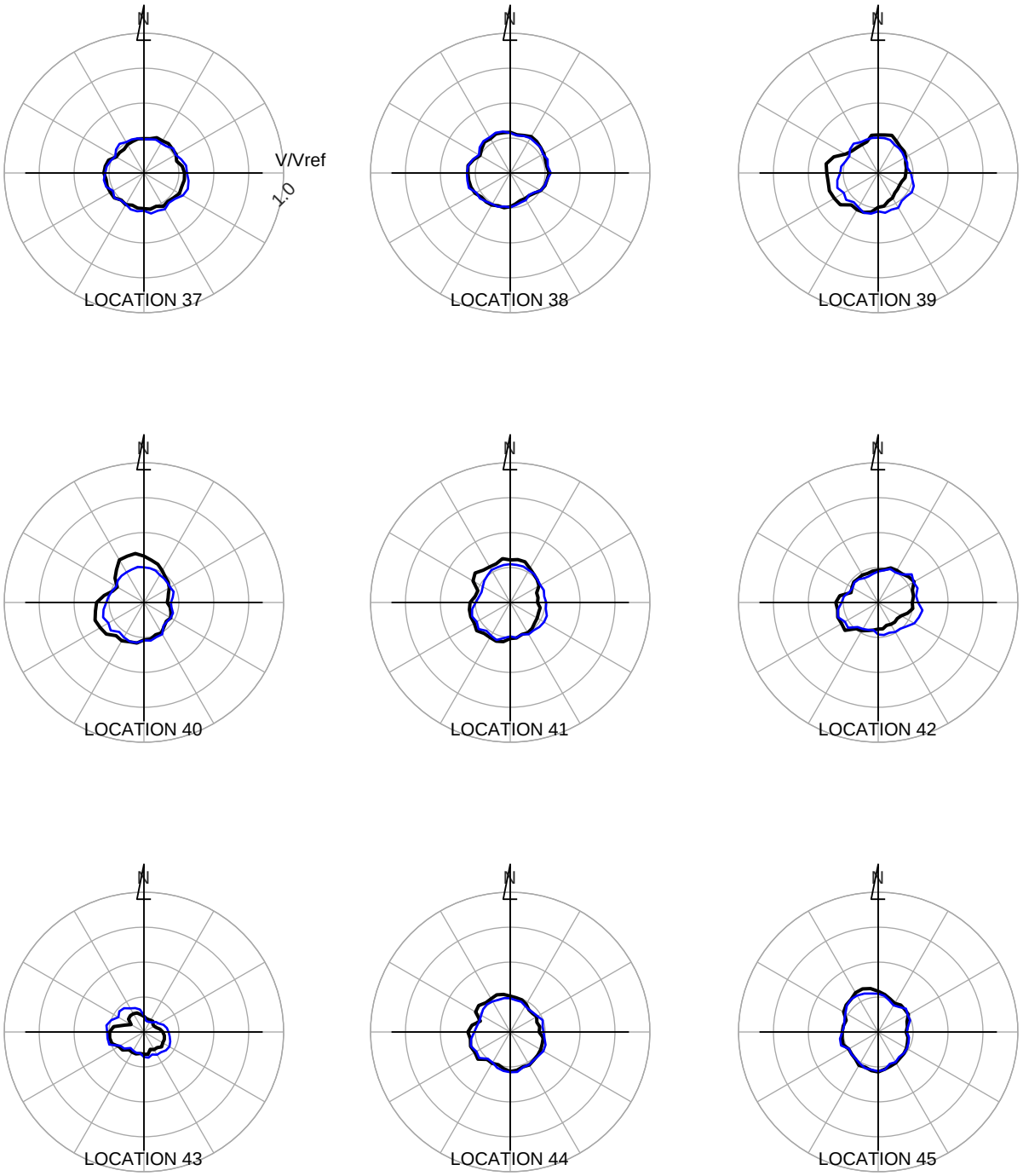
3033 Dundas St. W, Mississauga - Proposed Configuration DunPCplz/GEMean

3033 Dundas St. W, Mississauga - Existing Configuration DunECplz/GEMean



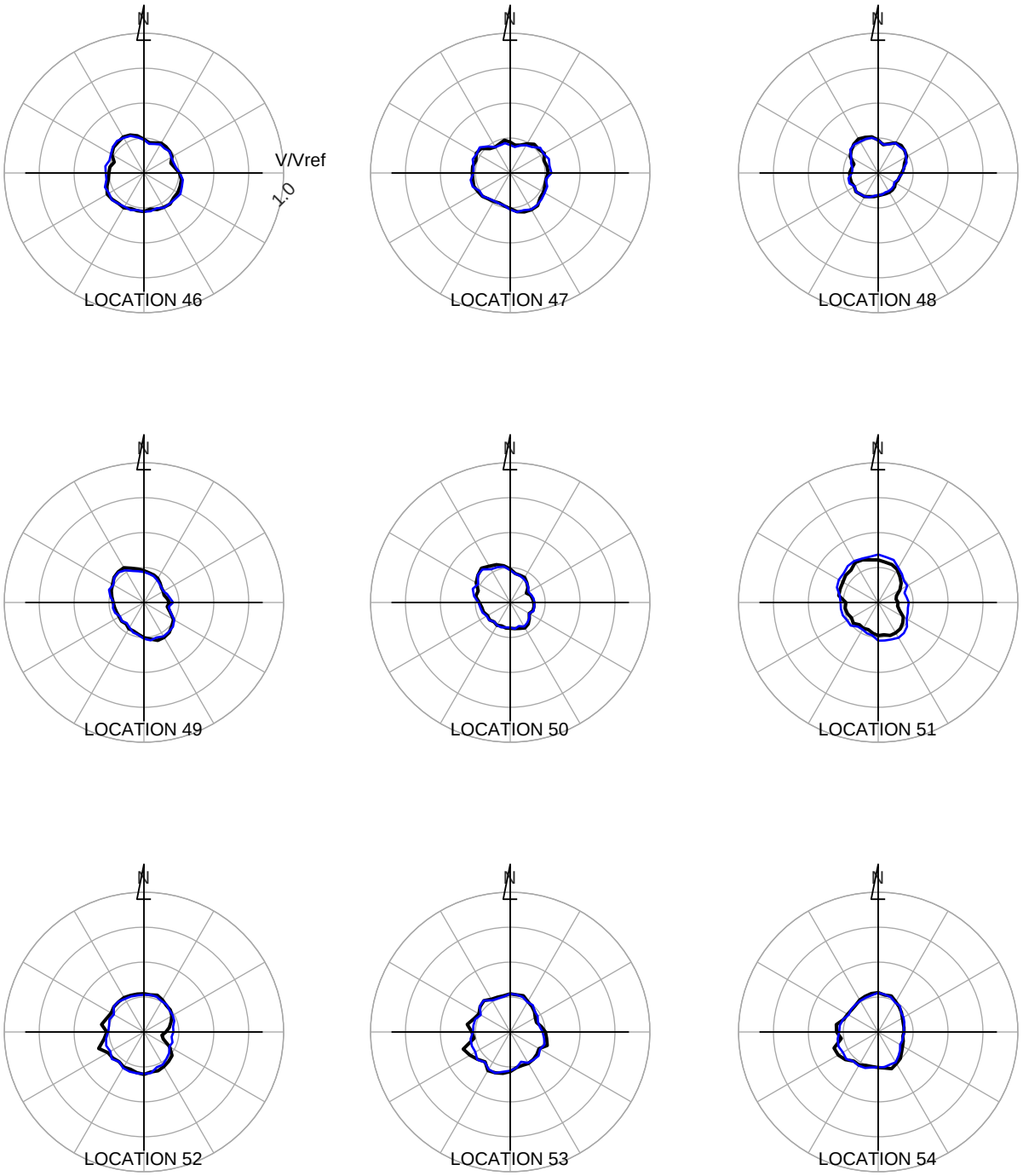
3033 Dundas St. W, Mississauga - Proposed Configuration DunPCplz/GEMean

3033 Dundas St. W, Mississauga - Existing Configuration DunECplz/GEMean



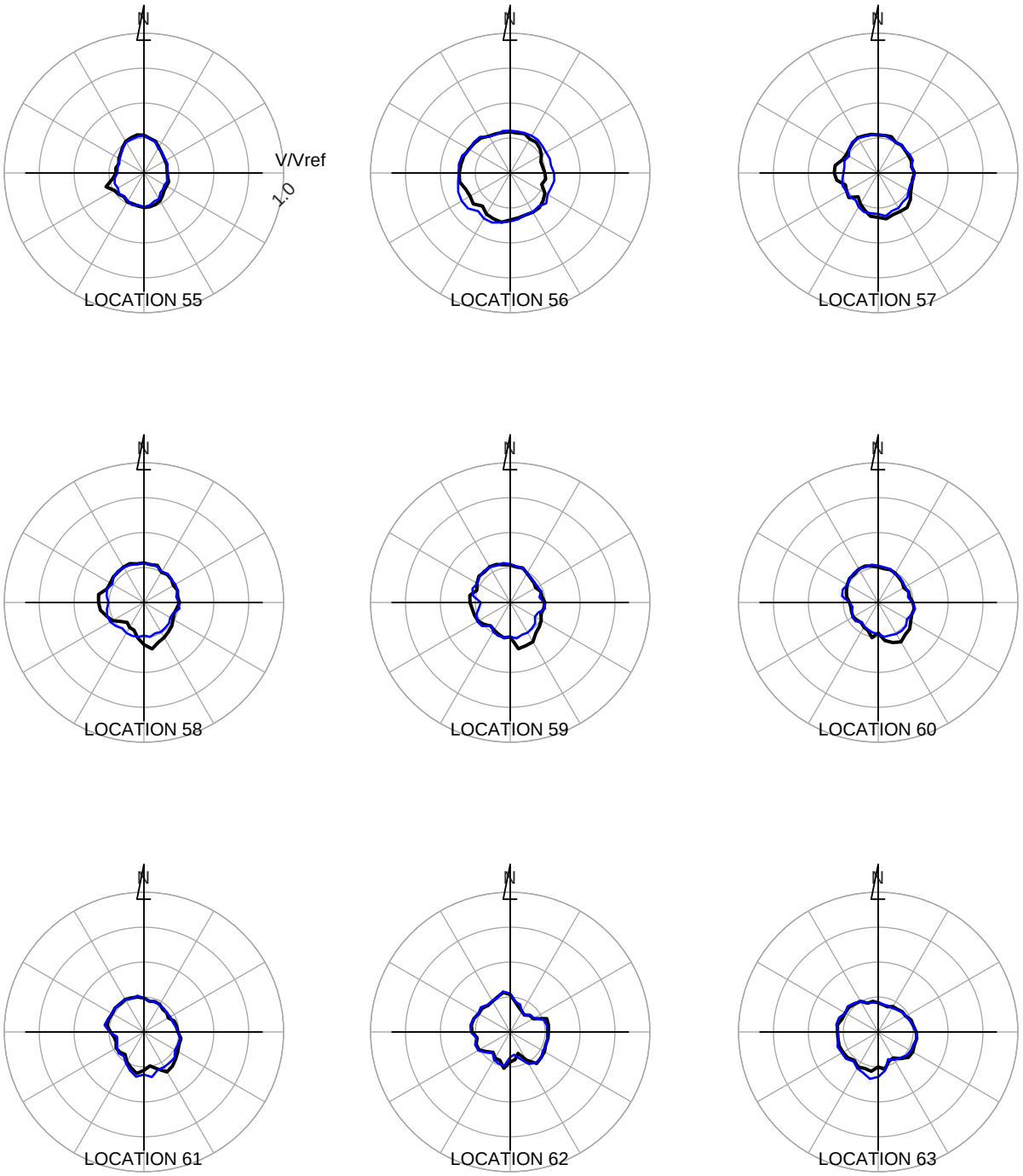
3033 Dundas St. W, Mississauga - Proposed Configuration DunPCplz/GEMean

3033 Dundas St. W, Mississauga - Existing Configuration DunECplz/GEMean



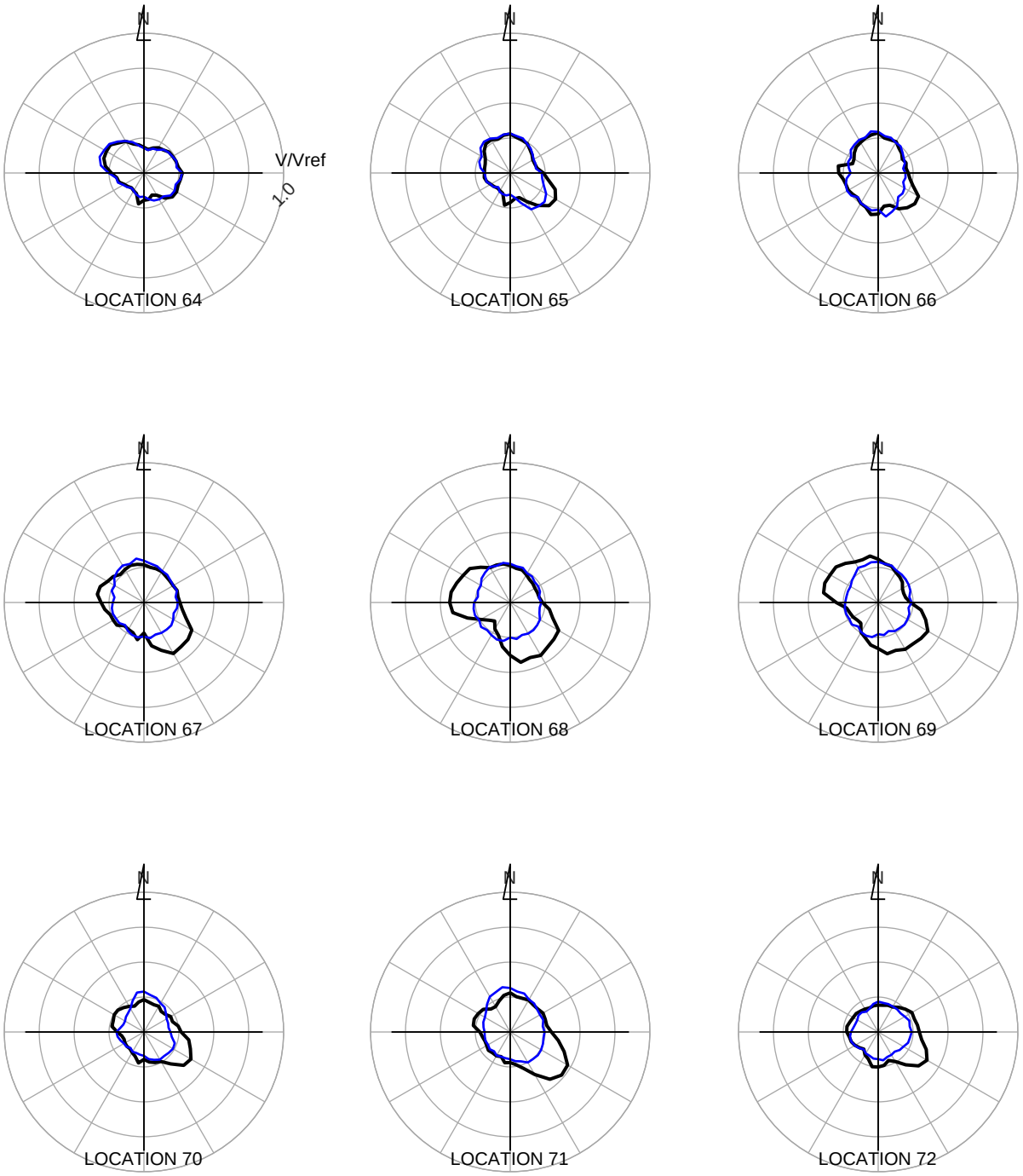
3033 Dundas St. W, Mississauga - Proposed Configuration DunPCplz/GEMean

3033 Dundas St. W, Mississauga - Existing Configuration DunECplz/GEMean



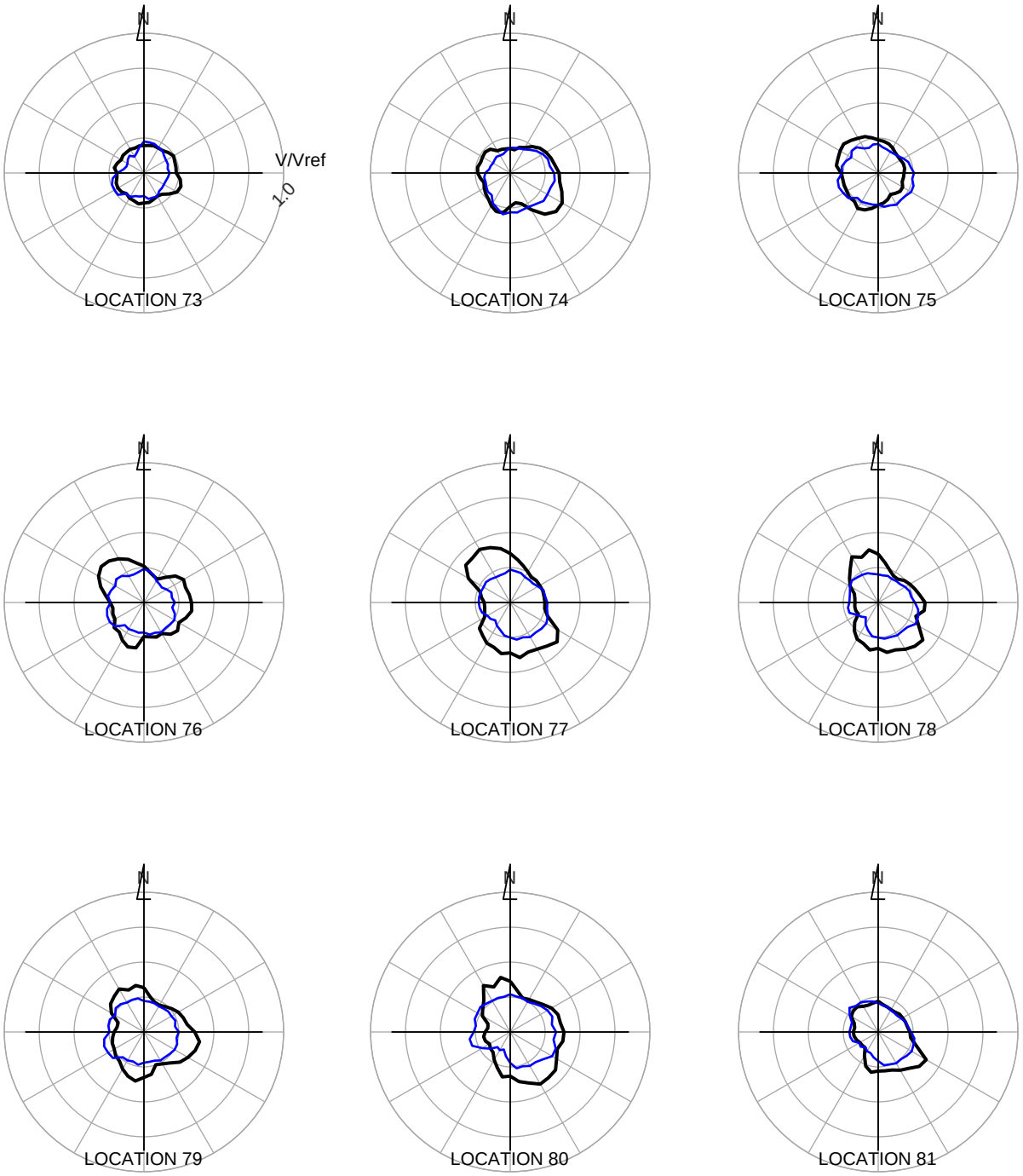
3033 Dundas St. W, Mississauga - Proposed Configuration DunPCplz/GEMean

3033 Dundas St. W, Mississauga - Existing Configuration DunECplz/GEMean



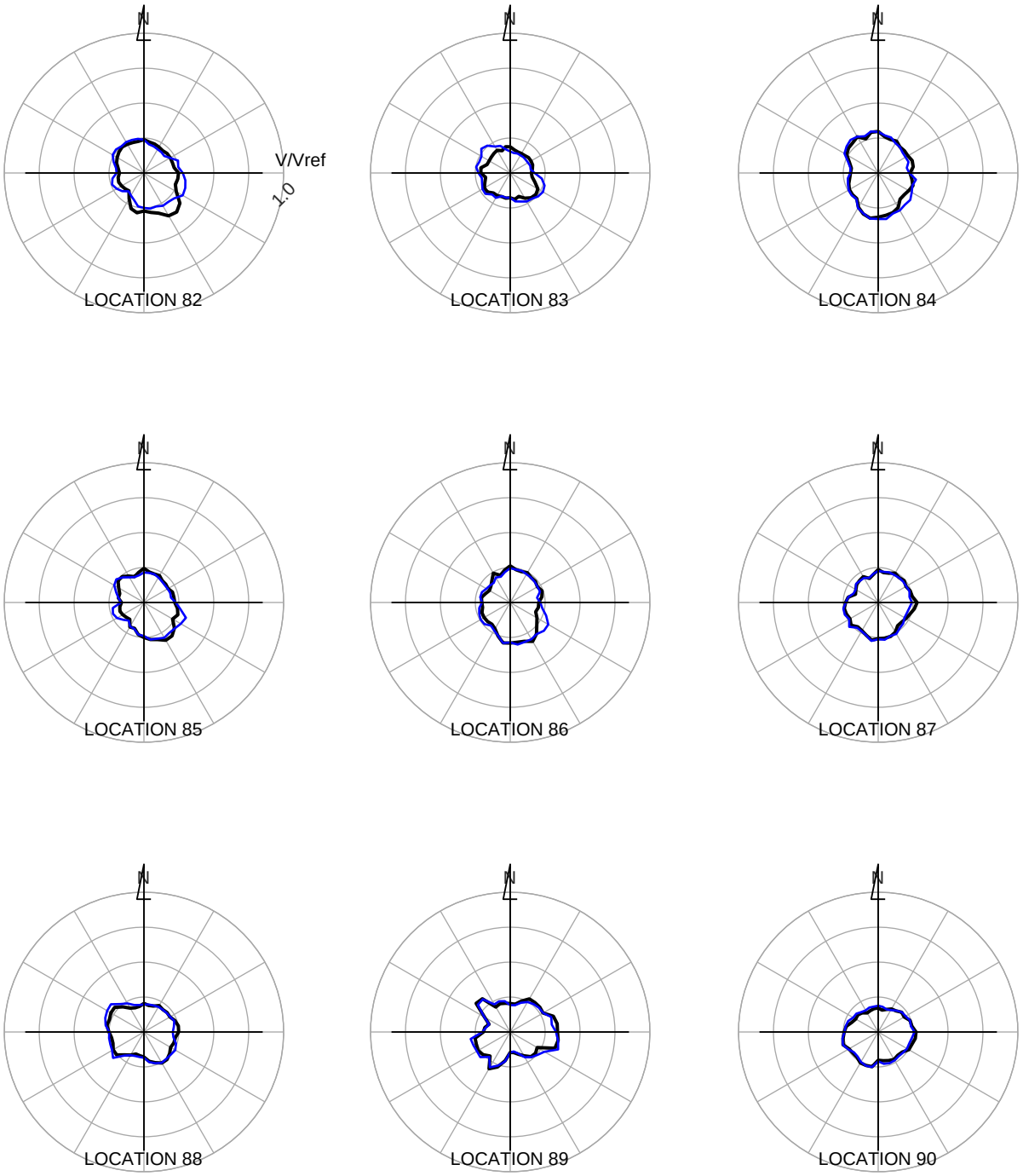
3033 Dundas St. W, Mississauga - Proposed Configuration DunPCplz/GEMean

3033 Dundas St. W, Mississauga - Existing Configuration DunECplz/GEMean



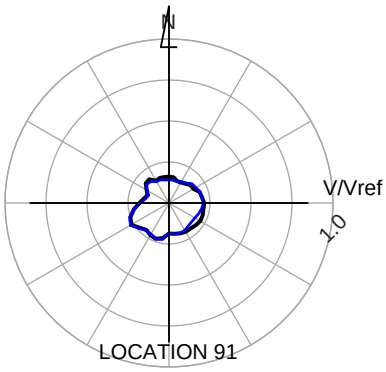
3033 Dundas St. W, Mississauga - Proposed Configuration DunPCplz/GEMean

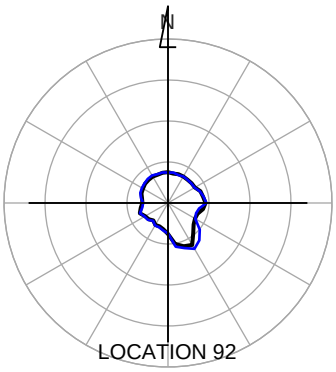
3033 Dundas St. W, Mississauga - Existing Configuration DunECplz/GEMean

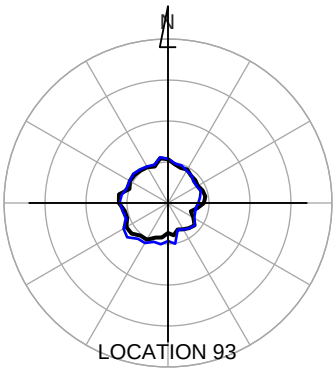


3033 Dundas St. W, Mississauga - Proposed Configuration DunPCplz/GEMean

3033 Dundas St. W, Mississauga - Existing Configuration DunECplz/GEMean







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3033 Dundas St. W, Mississauga - Existing Configuration DunECplz/GEMean