REPORT

3115 HURONTARIO STREET

MISSISSAUGA, ON

PEDESTRIAN WIND STUDY
RWDI # 2200840
July 6, 2022

SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI was retained to conduct a pedestrian wind assessment for the proposed development at 3115 Hurontario Street in Mississauga, ON (Image 1). The assessment was based on the wind tunnel testing conducted for the proposed development site under the Existing and Proposed configurations of the site and surroundings. The results were analysed using the regional wind climate records and evaluated against the Mississauga Pedestrian Wind Criteria for pedestrian comfort (pertaining to common wind speeds conducive to different levels of human activity) and pedestrian safety (pertaining to infrequent but strong gusts that could affect a person's footing). The predicted wind conditions are presented in Figures 1A through 3B, and Table 1, and are summarized as follows:

- The existing wind conditions on and around the project site are comfortable for the intended use throughout the year.

- With the addition of the proposed building, wind speeds increase on and around the site, with conditions remaining appropriate for the intended use at most areas in the summer, including the building main entrances. Higher-than-desired wind speeds are predicted in the outdoor space of the Dam Charity Center, and uncomfortable wind conditions occur at several locations on the northeast site and near the west corner of the building.

- In the winter, wind speeds increase from those in the summer months due to seasonally stronger winds. Therefore, increased wind speeds and uncomfortable conditions are predicted at numerous grade level locations, including the outdoor space and entrance of the Dam Charity Center, as well as near the residential lobby entrance.

- Wind speeds on the above-grade outdoor amenity spaces are expected to be generally appropriate for the intended use in the summer, with the exception of localized areas near the exposed corners on Levels 3 and 7. Higher wind activity and uncomfortable wind conditions are predicted in the winter.

- The criterion used to assess the pedestrian wind safety is expected to be met at all locations for the Existing configuration. In the Proposed configuration, this criterion is expected to be exceeded at multiple locations around the building, and on Levels 3 and 7 outdoor amenity spaces.

- Satisfactory wind speeds around the proposed building, and in the outdoor amenity spaces can be achieved with various wind control measures. Additional wind tunnel testing is recommended to develop wind control solutions.

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1 INTRODUCTION

RWDI was retained to conduct a pedestrian wind assessment for the proposed development at 3115 Hurontario Street in Mississauga, ON. This report presents the project objectives, background and approach, and discusses of the results from RWDI's assessment and provides conceptual wind control measures, where necessary. Our Statement of Limitations as it pertains to this study can be found in Section 4 of this report.

1.1 Project Description

The project (site shown in Image 1) is located east of Hurontario street and south of Kirwin Ave. It is a mixed-use development, consisting of 36 storeys and 3 levels of underground parking. The proposed building will have outdoor amenities on Levels 2, 3 and 7.

1.2 Objectives

The objective of the study was to assess the effect of the proposed development on local conditions in pedestrian areas on and around the study site and provide recommendations for minimizing adverse effects, if needed. This quantitative assessment was based on wind speed measurements on a scale model of the project and its surroundings in one of RWDI's boundary-layer wind tunnels. These measurements were combined with the local wind records and compared to the Mississauga criteria for gauging wind comfort and safety in pedestrian areas. The assessment focused on critical pedestrian areas, including building entrances, public sidewalks/walkways, and the above-grade outdoor amenity areas.

Image 1: Aerial View of the Existing Site and Surroundings (Photo Courtesy of Google™ Earth)

2 BACKGROUND AND APPROACH

2.1 Wind Tunnel Study Model

To assess the wind environment around the proposed project, a 1:300 scale model of the project site and surroundings was constructed for the wind tunnel tests of the following configurations:

A - Existing: Existing site with existing surroundings (Image 2A), and,

B - Proposed: Proposed project with existing surroundings (Image 2B).

The wind tunnel model included all relevant surrounding buildings and topography within an approximately 360 m radius around the study site. The wind and turbulence profiles in the atmospheric boundary layer beyond the modelled area were also simulated in RWDI's wind tunnel. The wind tunnel model was instrumented with 88 specially designed wind speed sensors to measure mean and gust speeds at a full-scale height of approximately 1.5 m above local grade in pedestrian areas throughout the study site. Wind speeds were measured for 36 directions in 10-degree increment. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the mean wind speed at a reference height above the model. The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site, and was reviewed by the design team.

Image 2A: Wind Tunnel Study Model – Existing Configuration

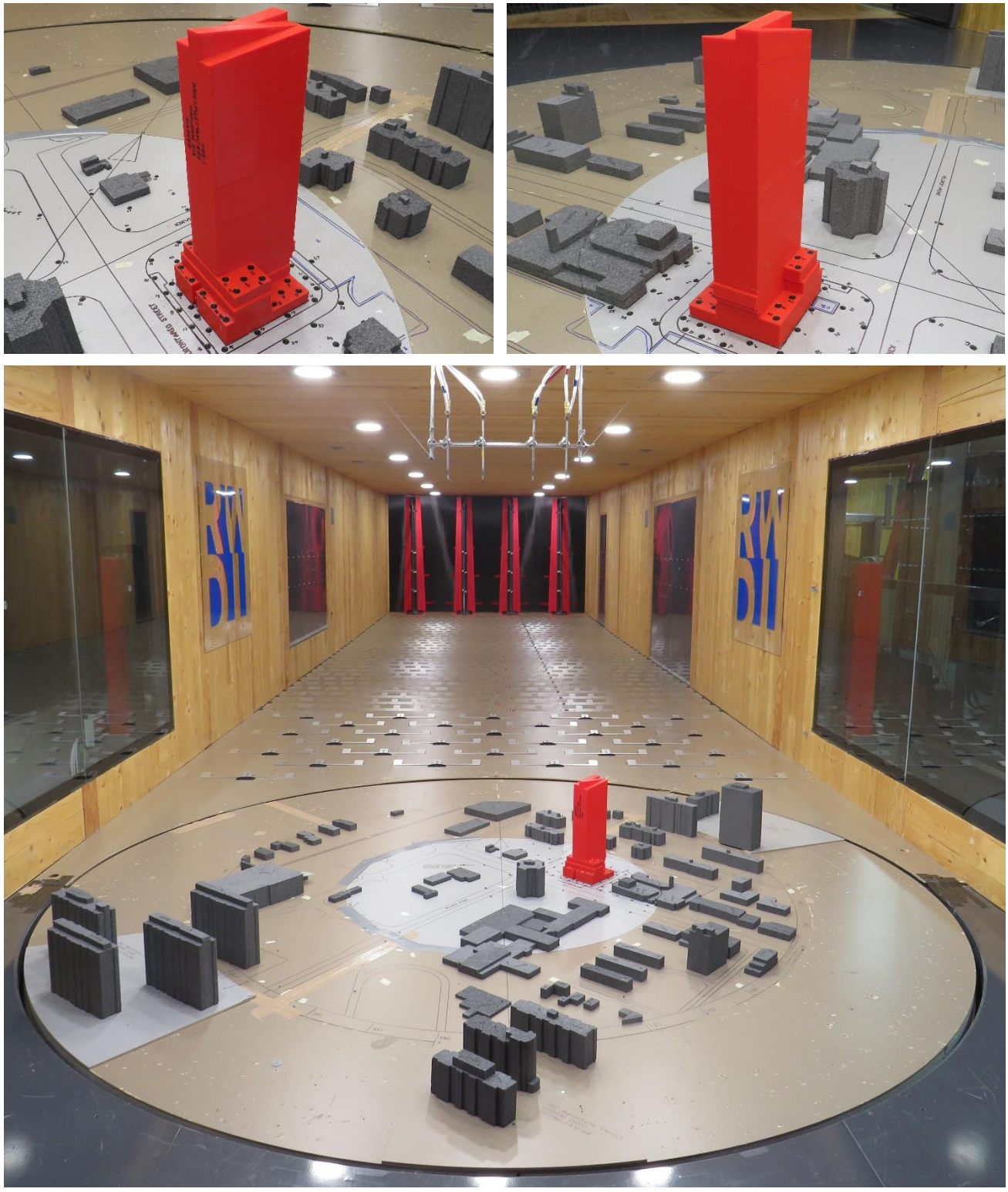
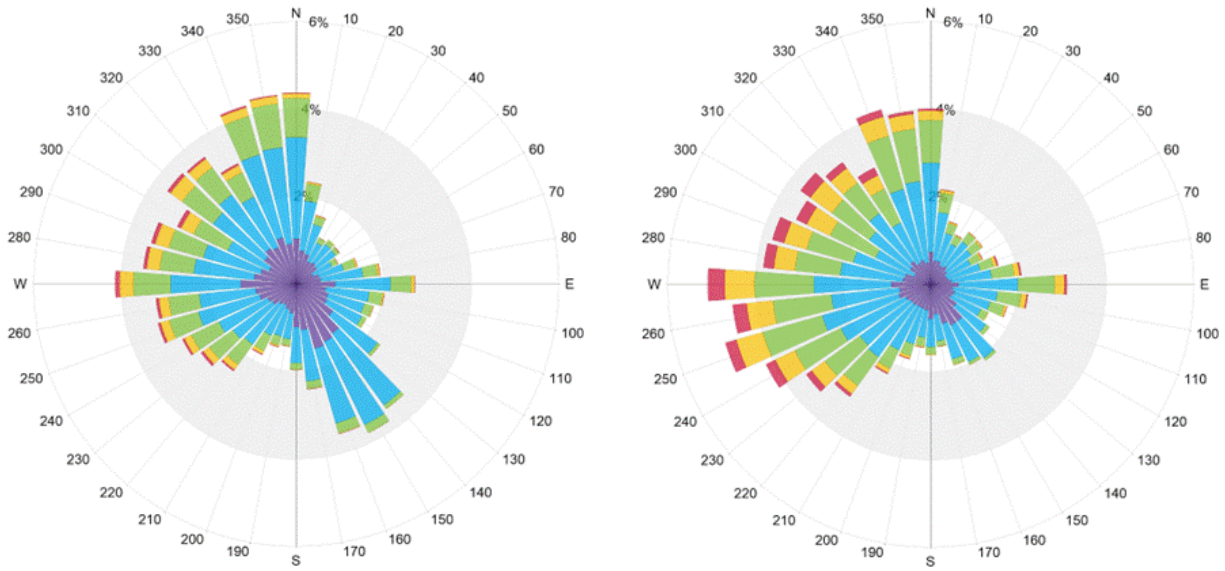


Image 2B: Wind Tunnel Study Model – Proposed Configuration

2.2 Meteorological Data

Wind statistics recorded at Toronto Pearson International Airport between 1990 and 2020, inclusive, were analyzed for the Summer (May through October) and Winter (November through April) seasons. Image 3 graphically depicts the directional distributions of wind frequencies and speeds for these two seasons. Winds from the southwest, west and northwest directions are predominant during both summer and winter. During the winter season, the prevailing winds from the east direction are also frequent, as indicated by the wind roses. The southeast winds are frequent in the summer, but typically of low wind speeds. Strong winds of a mean speed greater than 30 km/h measured at the airport (at an anemometer height of 10 m) occur for 4.8% and 11.4% of the time during the summer and winter seasons, respectively.

Wind statistics were combined with the wind tunnel data to predict the frequency of occurrence of full-scale wind speeds. The full-scale wind predictions were then compared with the wind criteria for pedestrian comfort and safety.



Summer (May – October) Winter (November – April)

Wind Speed (km/h)	Probability (%) Summer	Winter
Calm	5.3	3.7
1-10	30.7	22.5
11-20	42.9	39.9
21-30	16.2	22.6
31-40	3.9	8.1
>40	0.9	3.3

Image 3: Directional Distribution of Winds Approaching Toronto Pearson International Airport between 1990 and 2020

2.3 Mississauga Pedestrian Wind Criteria

The Mississauga pedestrian wind criteria, developed in June 2014, are specified in the Urban Design Terms of Reference, "Pedestrian Wind Comfort and Safety Studies". The following defines the criterion in detail.

Comfort Category	GEM Speed (km/h)	Description
Sitting	≤ 10	Calm or light breezes desired for outdoor restaurants and seating areas where one can read a paper without having it blown away
Standing	≤ 15	Gentle breezes suitable for main building entrances and bus stops
Walking	≤ 20	Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering
Uncomfortable	> 20	Strong winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended

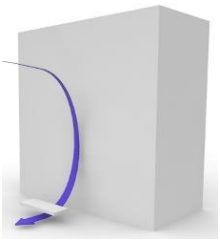
Notes:
(1) GEM Speed = max (Mean Speed, Gust Speed/1.85) and Gust Speed = Mean Speed + 3*RMS Speed;
(2) GEM speeds listed above are based on a seasonal exceedance of 20% of the time between 6:00 and 23:00.

Safety Criterion	Gust Speed (km/h)	Description
Exceeded	> 90	Excessive gust speeds that can adversely affect a pedestrian's balance and footing. Wind mitigation is typically required.

Notes:
(1) Based on an annual exceedance of 9 hours or 0.1% of the time for 24 hours a day.

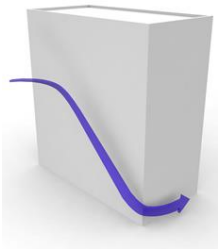
2.4 Generalized Wind Flows

In our discussion of wind conditions, reference may be made to the following generalized wind flows (Image 4):



DOWNWASHING

Tall buildings tend to intercept the stronger winds at higher elevations and redirect them to the ground level. This is often the main cause for wind accelerations around large buildings at the pedestrian level.



CORNER ACCELERATION

When winds approach at an oblique angle to a tall façade and are deflected down, a localized increase in the wind activity or corner acceleration can be expected around the exposed building corners at pedestrian level.

Image 4: Generalized Wind Flows

If these building/wind combinations occur for prevailing winds, there is a greater potential for increased wind activity. Design details such as setting back a tall tower from the edges of a podium, deep canopies close to ground level, etc. can help reduce wind speeds. The use of wind screens and landscaping at grade can also help reduce wind speeds locally (Image 5). The choice and effectiveness of these measures would depend on the exposure and orientation of the site with respect to the prevailing wind directions and the size and massing of the proposed buildings.

Podium/tower setback and canopy (left to right)

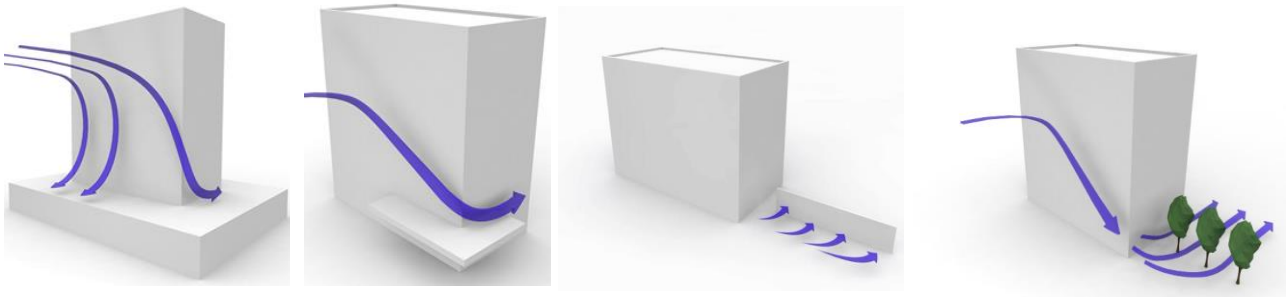


Image 5: Common Wind Control Measures

3 RESULTS AND DISCUSSION

The predicted wind conditions are shown on a site plan in Figures 1A through 3B located in the "Figures" section of this report. These conditions and the associated wind speeds are also represented in Table 1, located in the "Tables" section of this report. The following is a detailed discussion of the suitability of the predicted wind conditions for the anticipated pedestrian use of each area of interest.

3.1 Grade Level (Locations 1 through 67)

Wind conditions comfortable for walking or strolling are appropriate for sidewalks and walkways as pedestrians will be active and less likely to remain in one area for prolonged periods of time. Lower wind speeds, conducive to sitting or standing, are preferred at main entrances where pedestrians are apt to linger.

3.1.1 Existing Configuration

The existing wind conditions are comfortable for sitting or standing in the summer (Figure 1A) and walking or better in the winter (Figure 2A). These conditions are typical for this area of Mississauga and are suitable for the intended pedestrian use.

The pedestrian wind safety criterion is met at all areas assessed in the Existing configuration (Figure 3A).

3.1.2 Proposed Configuration

The addition of the proposed building to the project site is predicted to cause higher wind speeds, compared to the Existing configuration, which is primarily due to the height of the proposed building and the low surroundings in the predominant wind directions. Downwashing of the prevailing winds off the tall building's façades will redirect them to the ground level. These redirected winds can be relatively strong and turbulent, especially around exposed building corners (Image 4).

With the proposed building in place, wind speeds at most areas on and around the site are predicted to be comfortable for walking or better in the summer (Figure 1B). These conditions are appropriate for the intended pedestrian usage of most areas. The main entrances are situated along the southwest façade (Locations 1, 2 and 4). Wind speeds near the entrances are comfortable for standing, which is suitable for the intended use. However, uncomfortable wind conditions occur on the northeast side (Locations 8, 10, 29, 30, 66 and 67), and near the west corner (Locations 5 and 19) of the building. The uncomfortable wind conditions stem from prevailing winds downwashing from the northwest and southwest façades of the building and accelerating around the exposed corners at grade (Image 4). Wind speeds comfortable for walking are also predicted at the outdoor space of the Dam Charity Center (Locations 11, 12, 31 and 32). These wind speeds are higher-than-desired for passive use such as seating, dining, etc.

During the winter months, the seasonally stronger winds are predicted to cause increased wind speeds near the Dam Charity Center and residential lobby entrances (Locations 1 and 2), as well as uncomfortable wind conditions throughout the site (Figure 2B), including the outdoor space of the Dam Charity Center (Locations 11, 12, 31 and

32). It may be noted that although the wind conditions at the bus stop (Location 20) are predicted to be uncomfortable during the winter months due the addition of the proposed building, the wind tunnel test did not include the bus stop shelter, and thus, wind conditions at Location 20 are expected to be appropriate for the intended use throughout the year.

Wind speeds that exceed the pedestrian wind safety criterion are predicted at several locations on the northeast (Locations 8, 29, 30, 31, 33 and 67; Figure 3B), southeast (Locations 36, 37, 39 and 41; Figure 3B), and southwest (Locations 15, 16 and 19; Figure 3B) sides of the building.

We understand that areas along the northeast façade including the outdoor space of the Dam Charity Center may be landscaped with trees and/or large shrubs (as shown in Image 6). Such large plantings will have a localized impact and reduce wind speeds around them. While landscaping will help in reducing the wind speeds during the summer, it will not offer a lot of protection in the winter, unless the landscape plan contains a good mix of coniferous and deciduous trees that are able to retain their foliage year-round.

To help mitigate the wind impact of the proposed building, wide canopies along the exposed façades and wrapped around the corners can help deflect downwashing winds and moderate the wind impact of the tall building. Additionally, extensive use of wind screens and evergreen/marcescent landscaping elements near the building corners and around the building is recommended to diffuse the energy of accelerating winds. To create a sheltered doorway area, it is recommended to recess the Dam Charity Center and residential lobby entrances behind their respective façades. Alternatively, screens/landscaping should be placed on both sides of the entrances. Examples of the proposed wind control solutions are shown in Image 7. Additional wind tunnel testing is recommended to evaluate the efficacy of the suggested wind mitigation measures.

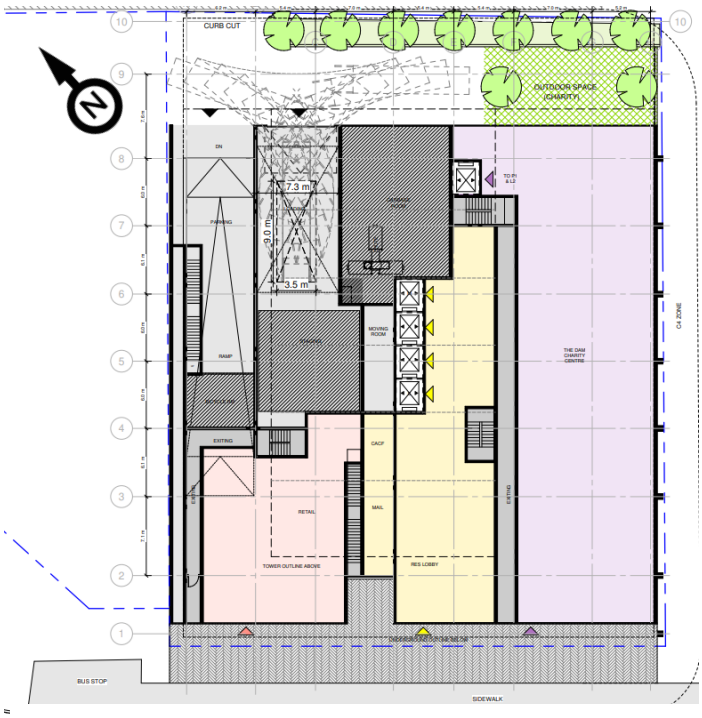


Image 6: Landscaping Plan for the northeast side of the Project Site (Received May 20, 2022)

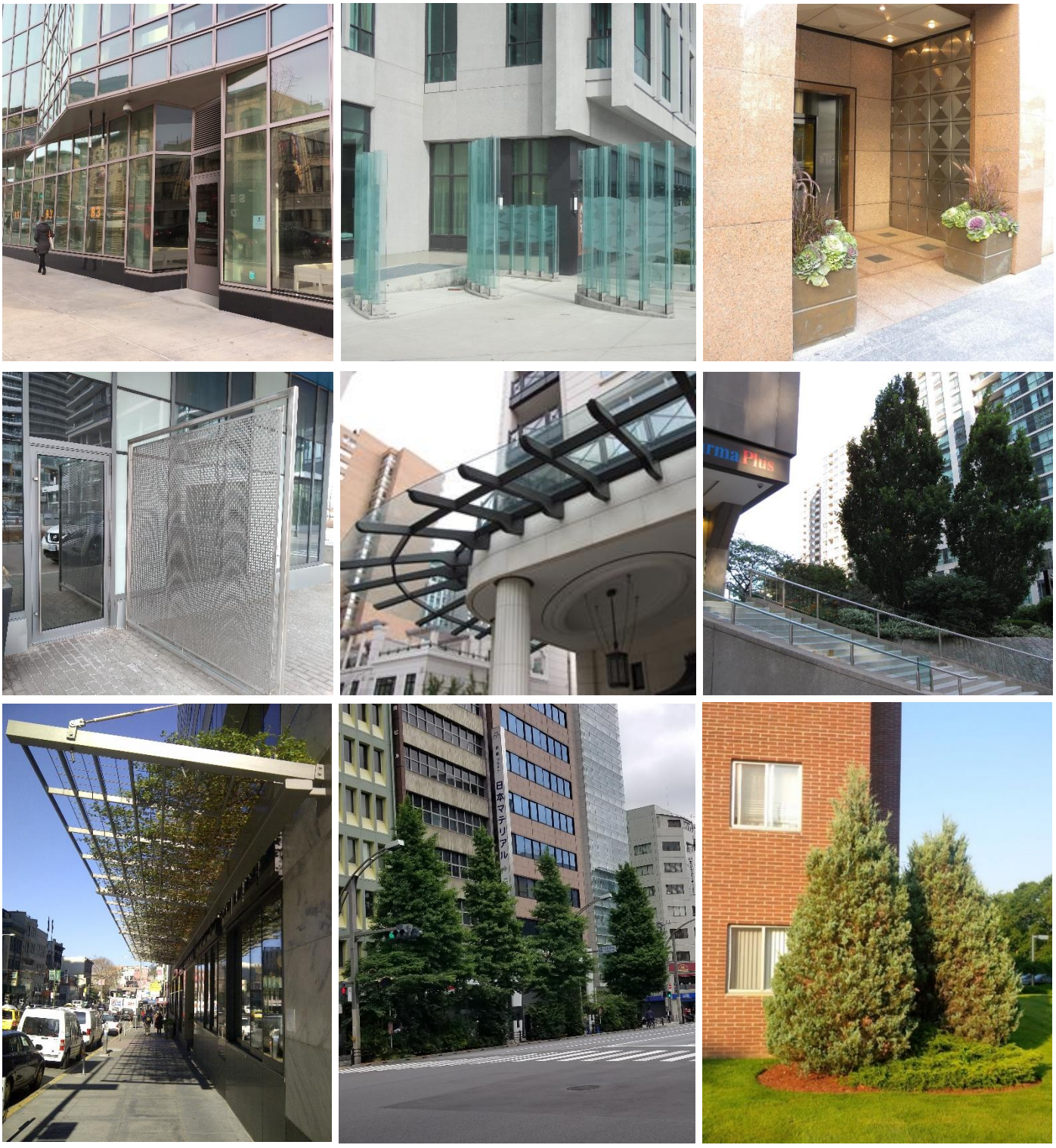


Image 7: Examples of Wind Control Options Applicable for Grade Level

3.2 Above-Grade Outdoor Amenity Levels (Locations 68 through 88)

It is generally desirable for wind conditions on terraces intended for passive activities to be comfortable for sitting or standing more than 80% of the time in the summer. During the winter, the area would not be used frequently and increased wind activity would be considered appropriate.

In the summer, wind conditions comfortable for sitting or standing are predicted in most areas on above-grade outdoor amenity spaces (Figure 1B), which is generally suitable for the intended use. However, higher wind speeds and uncomfortable wind conditions occur at localized areas near the exposed corners of Levels 3 and 7 outdoor amenity spaces.

In the winter, elevated wind speeds and uncomfortable wind conditions are predicted throughout the outdoor amenity areas (Figure 2B), but this may not be of concern as these areas are not planned for frequent use during the colder months.

The pedestrian wind safety criterion is expected to be met at all above-grade areas, except for Location 73 on Level 3, and Locations 83 through 86 on the Level 7 outdoor amenity space (Figure 3B).

Depending on the intended programming of outdoor amenity spaces, if desired, lower wind speeds in summer can be achieved by incorporating tall guardrails along the amenity perimeter. Landscaping/hardscaping features in the form of planters, screens, and trellises or pergolas are recommended around the designated seating areas. These features should be at least 2 m tall and no more than 30% porous. The trellises or pergolas can be fixed or free-standing depending on the intended programming of the space. Examples are shown in Image 8 for reference.

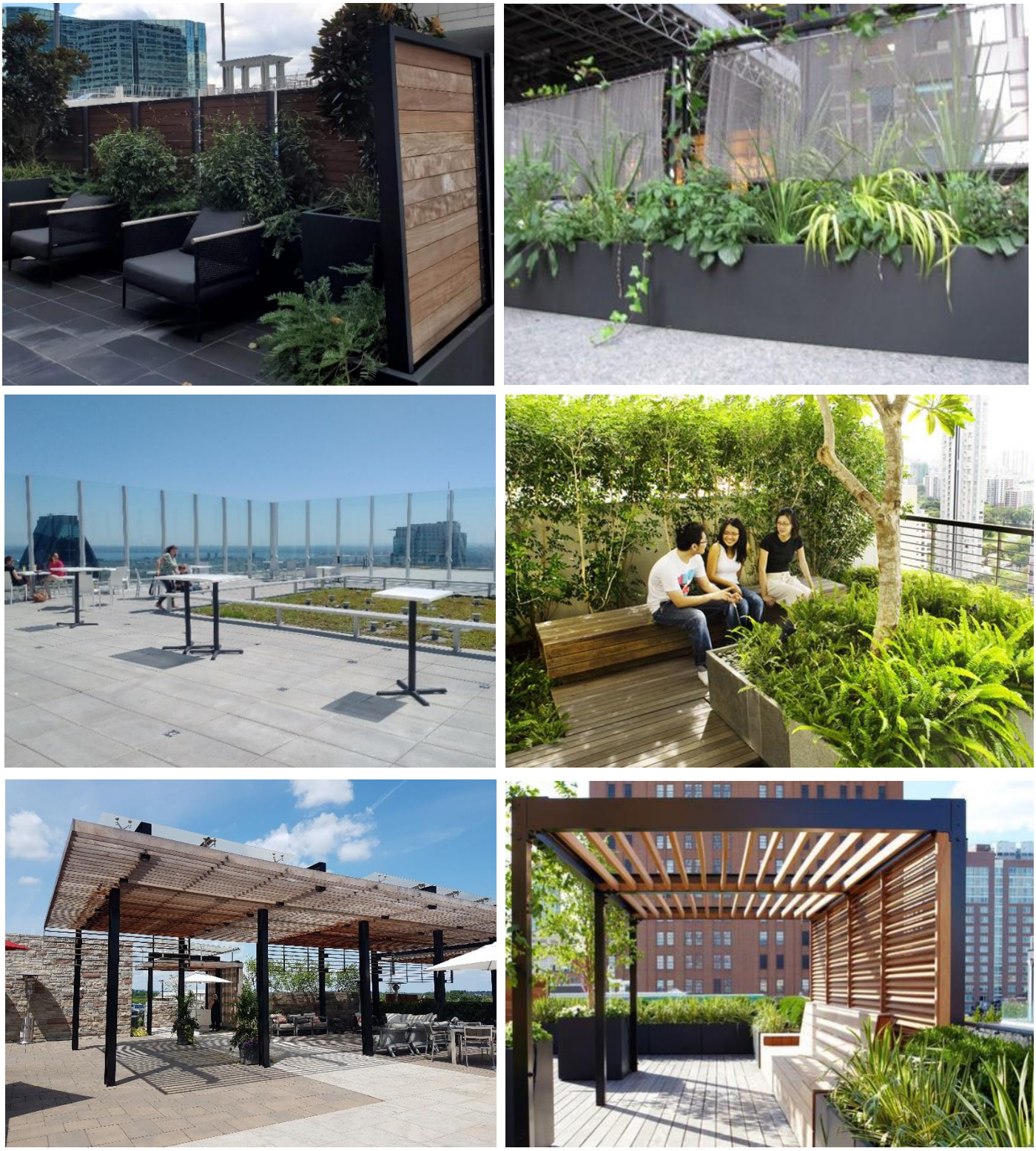


Image 8: Examples of Wind Control Options Applicable to the Outdoor Amenity Spaces

4 STATEMENT OF LIMITATIONS

Limitations

This report entitled 3115 Hurontario Street, July 6, 2022, was prepared by Rowan Williams Davies & Irwin, Inc. ("RWDI") for Sweeny & Co. Architects Inc. ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

Design Assumptions

RWDI confirms that the pedestrian wind assessment (the "**Assessment**") discussed herein was performed by RWDI in accordance with generally accepted professional standards at the time when the Assessment was performed and in the location of the Project. No other representations, warranties, or guarantees are made with respect to the accuracy or completeness of the information, findings, recommendations, or conclusions contained in this Report. This report is not a legal opinion regarding compliance with applicable laws.

The findings and recommendations set out in this report are based on the following information disclosed to RWDI. Drawings and information listed below were received from Sweeny & Co. Architects Inc. and used to construct the scale model of the proposed 3115 Hurontario Street **("Project Data**")

File Name	File Type	Date Received (dd/mm/yyyy)
2106_3115 Hurontario_Coordination Set_220513_F	PDF	18/05/2022
2106_3115 Hurontario_Massing20220519	DWG	20/05/2022

The recommendations and conclusions are based on the assumption that the Project Data and Climate Data are accurate and complete. RWDI assumes no responsibility for any inaccuracy or deficiency in information it has received from others. In addition, the recommendations and conclusions in this report are partially based on

historical data and can be affected by a number of external factors, including but not limited to Project design, quality of materials and construction, site conditions, meteorological events, and climate change. As such, the conclusions and recommendations contained in this report do not list every possible outcome.

The opinions in this report can only be relied up on to the extent that the Project Data and Project Specific Conditions have not changed. Any change in the Project Data or Project Specific Conditions not reflected in this report can impact and/or alter the recommendations and conclusions in this report. Therefore, it is incumbent upon the Client and/or any other third party reviewing the recommendations and conclusions in this report to contact RWDI in the event of any change in the Project Data and Project Specific Conditions in order to determine whether any such change(s) may impact the assumptions upon which the recommendations and conclusions were made.

5 REFERENCES

1. ASCE Task Committee on Outdoor Human Comfort (2004). *Outdoor Human Comfort and Its Assessment*, 68 pages, American Society of Civil Engineers, Reston, Virginia, USA.

2. Williams, C.J., Hunter, M.A. and Waechter, W.F. (1990). "Criteria for Assessing the Pedestrian Wind Environment," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.36, pp.811-815.

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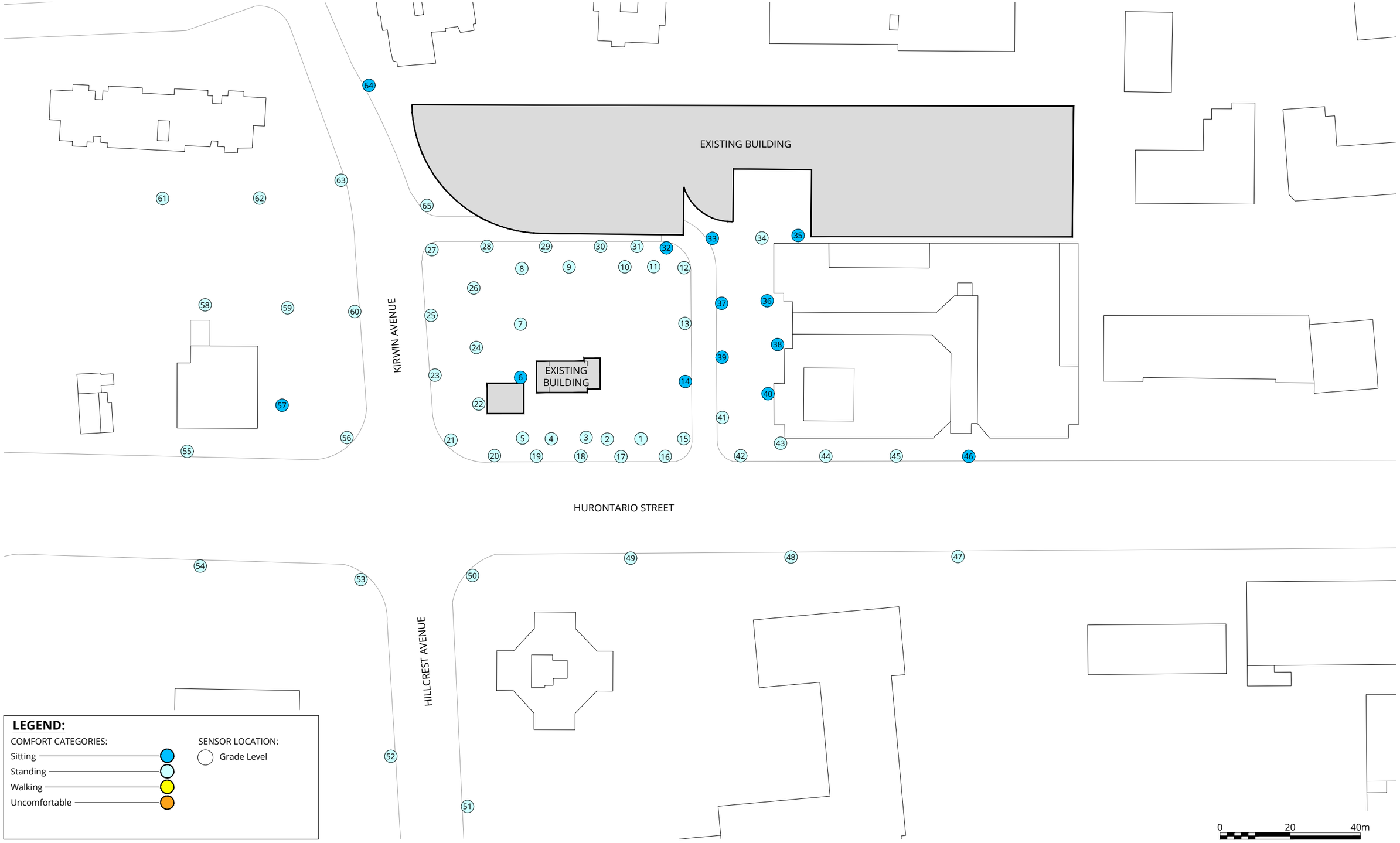
FIGURES



Pedestrian Wind Comfort Conditions
Existing Configuration
Summer (May to October, 6:00 to 23:00)

3115 Hurontario Street - Mississauga, ON

True North

Project #2200840

Drawn by: ALJM	Figure: 1A		
Approx. Scale:	1:1000		
Date Revised:	Jul. 4, 2022		

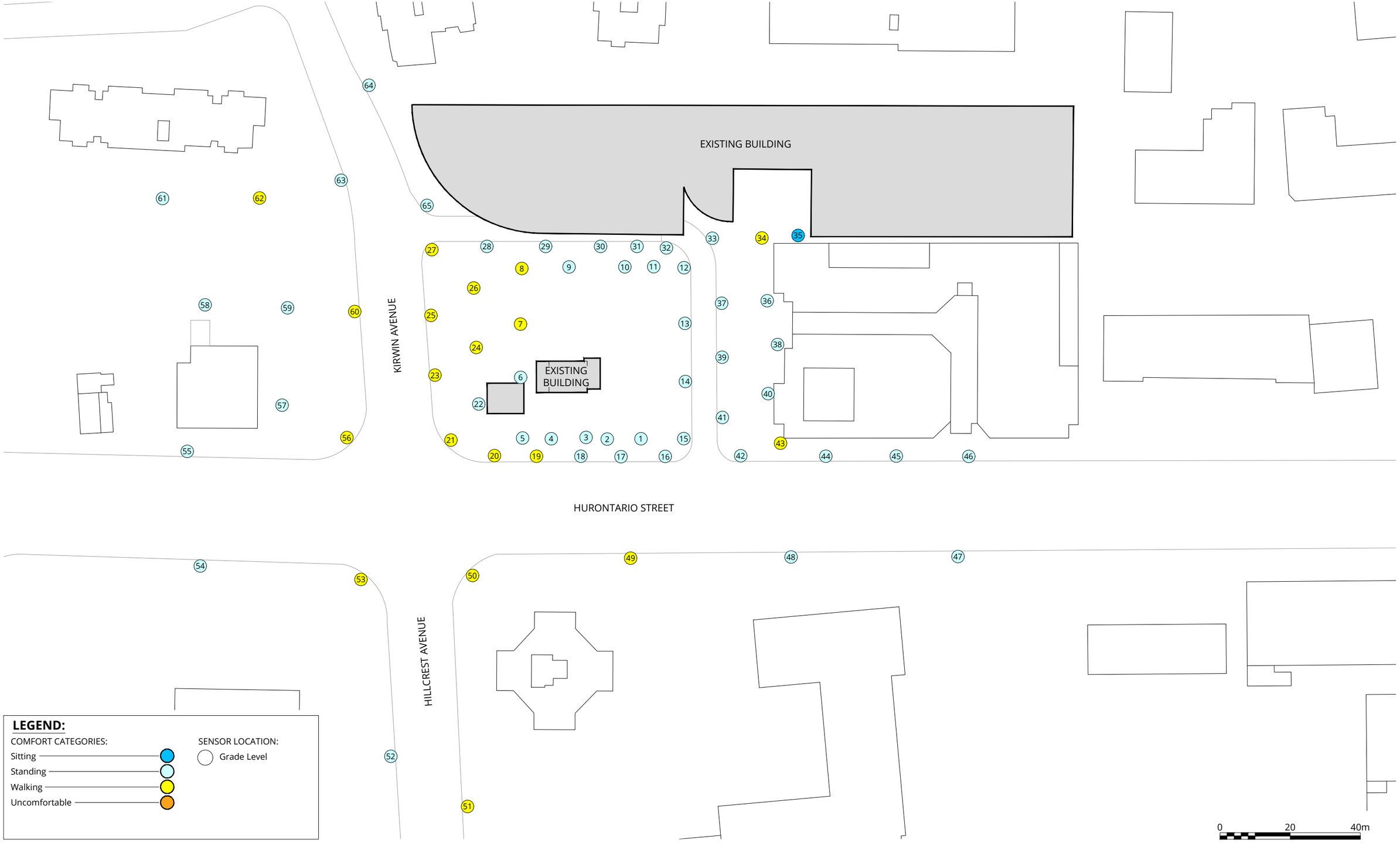
Pedestrian Wind Comfort Conditions
Proposed Configuration
Summer (May to October, 6:00 to 23:00)

3115 Hurontario Street - Mississauga, ON

True North

Project #2200840

Drawn by: ALJM	Figure:	1B
Approx. Scale:	1:1000	
Date Revised:	Jul. 4, 2022	



Pedestrian Wind Comfort Conditions
Existing Configuration
Winter (November to April, 6:00 to 23:00)

3115 Hurontario Street - Mississauga, ON

True North

Project #2200840

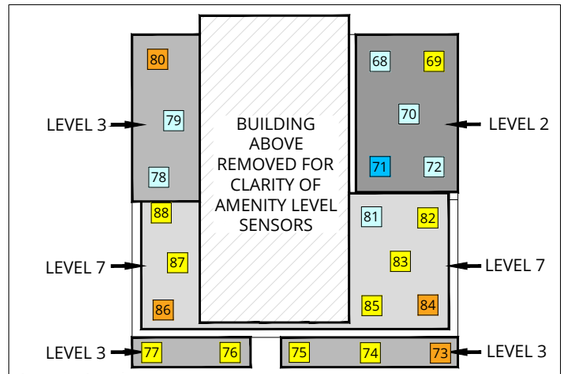
Drawn by: ALJM	Figure: 2A
Approx. Scale:	1:1000
Date Revised:	Jul. 4, 2022

KIRWIN AVENUE

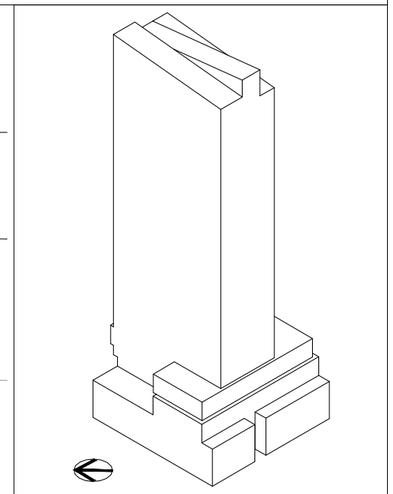
HURONTARIO STREET

HILLCREST AVENUE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS



Amenity Level
Approx. Scale: 1:800



Isometric View of Building

LEGEND:

COMFORT CATEGORIES:
- Sitting
- Standing
- Walking
- Uncomfortable

SENSOR LOCATION:
- Grade Level
- Amenity Levels
- Main Entrance Location

0 20 40m

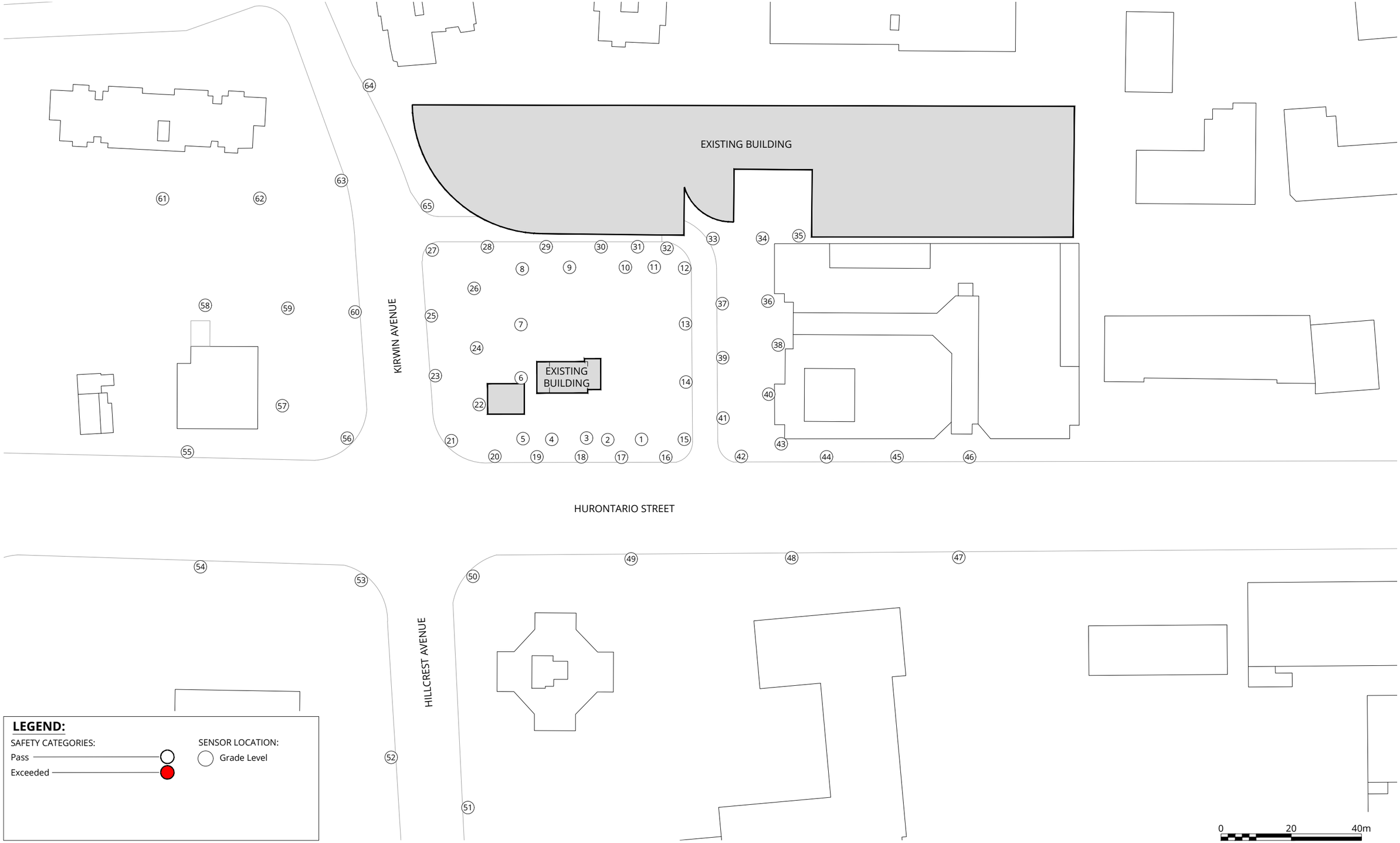
Pedestrian Wind Comfort Conditions
Proposed Configuration
Winter (November to April, 6:00 to 23:00)

3115 Hurontario Street - Mississauga, ON

True North

Project #2200840

Drawn by: ALJM	Figure: 2B
Approx. Scale:	1:1000
Date Revised:	Jul. 4, 2022



Pedestrian Wind Safety Conditions
Existing Configuration
Annual (January to December, 0:00 to 23:00)

3115 Hurontario Street - Mississauga, ON

True North

Project #2200840

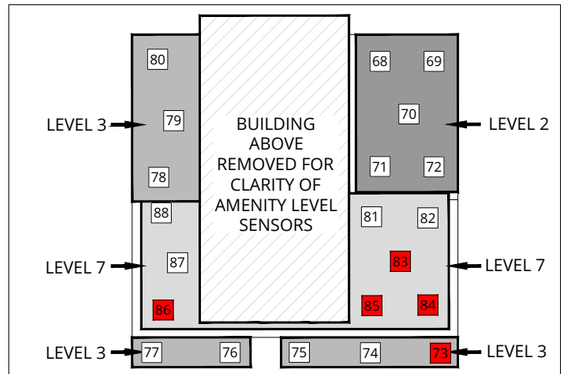
Drawn by: ALJM	Figure: 3A		
Approx. Scale:	1:1000		
Date Revised:	Jul. 4, 2022		

KIRWIN AVENUE

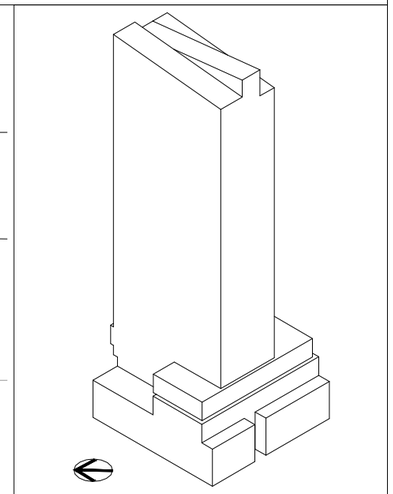
HURONTARIO STREET

HILLCREST AVENUE

BUILDING ABOVE REMOVED FOR CLARITY OF GRADE LEVEL SENSORS



Amenity Level
Approx. Scale: 1:800



Isometric View of Building

LEGEND:

SAFETY CATEGORIES:
- Pass
- Exceeded

SENSOR LOCATION:
- Grade Level
- Amenity Levels
- Main Entrance Location

0 20 40m

Pedestrian Wind Safety Conditions
Proposed Configuration
Annual (January to December, 0:00 to 23:00)

3115 Hurontario Street - Mississauga, ON

True North

Project #2200840

Drawn by: ALJM	Figure: 3B
Approx. Scale:	1:1000
Date Revised:	Jul. 4, 2022

TABLES

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (km/h)	Rating	Speed (km/h)	Rating	Speed (km/h)	Rating
1	Existing	12	Standing	14	Standing	56	Pass
	Proposed	15	Standing	18	Walking	78	Pass
2	Existing	12	Standing	15	Standing	60	Pass
	Proposed	13	Standing	16	Walking	65	Pass
3	Existing	12	Standing	14	Standing	60	Pass
	Proposed	13	Standing	15	Standing	60	Pass
4	Existing	12	Standing	15	Standing	59	Pass
	Proposed	14	Standing	15	Standing	62	Pass
5	Existing	12	Standing	15	Standing	58	Pass
	Proposed	21	Uncomfortable	23	Uncomfortable	89	Pass
6	Existing	10	Sitting	11	Standing	45	Pass
	Proposed	12	Standing	14	Standing	64	Pass
7	Existing	13	Standing	16	Walking	61	Pass
	Proposed	12	Standing	14	Standing	73	Pass
8	Existing	14	Standing	16	Walking	63	Pass
	Proposed	22	Uncomfortable	27	Uncomfortable	96	Exceeded
9	Existing	13	Standing	15	Standing	59	Pass
	Proposed	17	Walking	19	Walking	85	Pass
10	Existing	12	Standing	14	Standing	55	Pass
	Proposed	21	Uncomfortable	23	Uncomfortable	90	Pass
11	Existing	12	Standing	14	Standing	56	Pass
	Proposed	19	Walking	21	Uncomfortable	86	Pass
12	Existing	11	Standing	14	Standing	56	Pass
	Proposed	19	Walking	22	Uncomfortable	88	Pass
13	Existing	11	Standing	14	Standing	55	Pass
	Proposed	14	Standing	16	Walking	71	Pass
14	Existing	10	Sitting	13	Standing	52	Pass
	Proposed	13	Standing	16	Walking	73	Pass
15	Existing	12	Standing	14	Standing	55	Pass
	Proposed	20	Walking	25	Uncomfortable	93	Exceeded
16	Existing	13	Standing	15	Standing	59	Pass
	Proposed	19	Walking	24	Uncomfortable	92	Exceeded

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (km/h)	Rating	Speed (km/h)	Rating	Speed (km/h)	Rating
17	Existing	13	Standing	15	Standing	60	Pass
	Proposed	17	Walking	20	Walking	83	Pass
18	Existing	13	Standing	15	Standing	62	Pass
	Proposed	16	Walking	19	Walking	78	Pass
19	Existing	13	Standing	16	Walking	62	Pass
	Proposed	21	Uncomfortable	24	Uncomfortable	94	Exceeded
20	Existing	14	Standing	17	Walking	62	Pass
	Proposed	19	Walking	21	Uncomfortable	81	Pass
21	Existing	13	Standing	16	Walking	62	Pass
	Proposed	16	Walking	18	Walking	72	Pass
22	Existing	11	Standing	13	Standing	60	Pass
	Proposed	16	Walking	19	Walking	78	Pass
23	Existing	13	Standing	16	Walking	64	Pass
	Proposed	14	Standing	16	Walking	71	Pass
24	Existing	14	Standing	17	Walking	63	Pass
	Proposed	15	Standing	18	Walking	72	Pass
25	Existing	14	Standing	17	Walking	63	Pass
	Proposed	14	Standing	17	Walking	79	Pass
26	Existing	14	Standing	17	Walking	64	Pass
	Proposed	17	Walking	21	Uncomfortable	84	Pass
27	Existing	14	Standing	16	Walking	63	Pass
	Proposed	16	Walking	18	Walking	72	Pass
28	Existing	13	Standing	15	Standing	59	Pass
	Proposed	19	Walking	23	Uncomfortable	82	Pass
29	Existing	12	Standing	14	Standing	56	Pass
	Proposed	21	Uncomfortable	24	Uncomfortable	94	Exceeded
30	Existing	11	Standing	14	Standing	54	Pass
	Proposed	21	Uncomfortable	25	Uncomfortable	108	Exceeded
31	Existing	11	Standing	14	Standing	55	Pass
	Proposed	19	Walking	22	Uncomfortable	96	Exceeded
32	Existing	10	Sitting	13	Standing	53	Pass
	Proposed	18	Walking	21	Uncomfortable	89	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (km/h)	Rating	Speed (km/h)	Rating	Speed (km/h)	Rating
33	Existing	10	Sitting	12	Standing	52	Pass
	Proposed	18	Walking	22	Uncomfortable	94	Exceeded
34	Existing	13	Standing	16	Walking	64	Pass
	Proposed	14	Standing	17	Walking	73	Pass
35	Existing	8	Sitting	9	Sitting	44	Pass
	Proposed	12	Standing	14	Standing	71	Pass
36	Existing	10	Sitting	12	Standing	49	Pass
	Proposed	19	Walking	23	Uncomfortable	99	Exceeded
37	Existing	9	Sitting	11	Standing	47	Pass
	Proposed	17	Walking	21	Uncomfortable	94	Exceeded
38	Existing	9	Sitting	11	Standing	51	Pass
	Proposed	16	Walking	20	Walking	89	Pass
39	Existing	10	Sitting	12	Standing	51	Pass
	Proposed	17	Walking	21	Uncomfortable	91	Exceeded
40	Existing	9	Sitting	11	Standing	45	Pass
	Proposed	17	Walking	20	Walking	82	Pass
41	Existing	11	Standing	13	Standing	53	Pass
	Proposed	19	Walking	23	Uncomfortable	91	Exceeded
42	Existing	13	Standing	14	Standing	56	Pass
	Proposed	18	Walking	22	Uncomfortable	88	Pass
43	Existing	14	Standing	16	Walking	63	Pass
	Proposed	15	Standing	19	Walking	88	Pass
44	Existing	12	Standing	13	Standing	54	Pass
	Proposed	13	Standing	16	Walking	74	Pass
45	Existing	11	Standing	13	Standing	54	Pass
	Proposed	12	Standing	15	Standing	70	Pass
46	Existing	10	Sitting	12	Standing	52	Pass
	Proposed	10	Sitting	13	Standing	61	Pass
47	Existing	13	Standing	15	Standing	60	Pass
	Proposed	13	Standing	16	Walking	68	Pass
48	Existing	12	Standing	14	Standing	59	Pass
	Proposed	14	Standing	17	Walking	81	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (km/h)	Rating	Speed (km/h)	Rating	Speed (km/h)	Rating
49	Existing	15	Standing	17	Walking	75	Pass
	Proposed	18	Walking	22	Uncomfortable	85	Pass
50	Existing	15	Standing	18	Walking	74	Pass
	Proposed	15	Standing	18	Walking	84	Pass
51	Existing	14	Standing	16	Walking	59	Pass
	Proposed	15	Standing	17	Walking	61	Pass
52	Existing	13	Standing	15	Standing	59	Pass
	Proposed	13	Standing	15	Standing	58	Pass
53	Existing	14	Standing	17	Walking	65	Pass
	Proposed	14	Standing	17	Walking	72	Pass
54	Existing	13	Standing	15	Standing	57	Pass
	Proposed	13	Standing	15	Standing	63	Pass
55	Existing	12	Standing	14	Standing	60	Pass
	Proposed	11	Standing	13	Standing	54	Pass
56	Existing	13	Standing	16	Walking	64	Pass
	Proposed	14	Standing	16	Walking	67	Pass
57	Existing	9	Sitting	11	Standing	58	Pass
	Proposed	11	Standing	13	Standing	65	Pass
58	Existing	13	Standing	15	Standing	60	Pass
	Proposed	12	Standing	15	Standing	62	Pass
59	Existing	13	Standing	15	Standing	58	Pass
	Proposed	13	Standing	15	Standing	64	Pass
60	Existing	14	Standing	16	Walking	62	Pass
	Proposed	14	Standing	16	Walking	74	Pass
61	Existing	13	Standing	15	Standing	61	Pass
	Proposed	12	Standing	14	Standing	62	Pass
62	Existing	14	Standing	17	Walking	66	Pass
	Proposed	14	Standing	16	Walking	65	Pass
63	Existing	13	Standing	15	Standing	61	Pass
	Proposed	14	Standing	17	Walking	66	Pass
64	Existing	10	Sitting	12	Standing	45	Pass
	Proposed	10	Sitting	12	Standing	46	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (km/h)	Rating	Speed (km/h)	Rating	Speed (km/h)	Rating
65	Existing	11	Standing	13	Standing	51	Pass
	Proposed	16	Walking	18	Walking	72	Pass
66	Existing	-	-	-	-	-	-
	Proposed	21	Uncomfortable	25	Uncomfortable	85	Pass
67	Existing	-	-	-	-	-	-
	Proposed	22	Uncomfortable	26	Uncomfortable	104	Exceeded
68	Existing	-	-	-	-	-	-
	Proposed	10	Sitting	11	Standing	51	Pass
69	Existing	-	-	-	-	-	-
	Proposed	15	Standing	17	Walking	76	Pass
70	Existing	-	-	-	-	-	-
	Proposed	10	Sitting	12	Standing	56	Pass
71	Existing	-	-	-	-	-	-
	Proposed	6	Sitting	7	Sitting	36	Pass
72	Existing	-	-	-	-	-	-
	Proposed	10	Sitting	11	Standing	49	Pass
73	Existing	-	-	-	-	-	-
	Proposed	18	Walking	22	Uncomfortable	94	Exceeded
74	Existing	-	-	-	-	-	-
	Proposed	15	Standing	18	Walking	82	Pass
75	Existing	-	-	-	-	-	-
	Proposed	15	Standing	17	Walking	74	Pass
76	Existing	-	-	-	-	-	-
	Proposed	14	Standing	16	Walking	71	Pass
77	Existing	-	-	-	-	-	-
	Proposed	17	Walking	18	Walking	88	Pass
78	Existing	-	-	-	-	-	-
	Proposed	9	Sitting	11	Standing	44	Pass
79	Existing	-	-	-	-	-	-
	Proposed	9	Sitting	11	Standing	52	Pass
80	Existing	-	-	-	-	-	-
	Proposed	16	Walking	21	Uncomfortable	84	Pass

Table 1: Pedestrian Wind Comfort and Safety Conditions

Location	Configuration	Wind Comfort				Wind Safety	
		Summer		Winter		Annual	
		Speed (km/h)	Rating	Speed (km/h)	Rating	Speed (km/h)	Rating
81	Existing	-	-	-	-	-	-
	Proposed	11	Standing	13	Standing	76	Pass
82	Existing	-	-	-	-	-	-
	Proposed	13	Standing	17	Walking	85	Pass
83	Existing	-	-	-	-	-	-
	Proposed	14	Standing	17	Walking	93	Exceeded
84	Existing	-	-	-	-	-	-
	Proposed	19	Walking	24	Uncomfortable	114	Exceeded
85	Existing	-	-	-	-	-	-
	Proposed	15	Standing	19	Walking	106	Exceeded
86	Existing	-	-	-	-	-	-
	Proposed	21	Uncomfortable	24	Uncomfortable	95	Exceeded
87	Existing	-	-	-	-	-	-
	Proposed	15	Standing	18	Walking	84	Pass
88	Existing	-	-	-	-	-	-
	Proposed	15	Standing	18	Walking	89	Pass

Season	Months	Hours
Summer	May - October	6:00 - 23:00 for comfort
Winter	November - April	6:00 - 23:00 for comfort
Annual	January - December	0:00 - 23:00 for safety
Configurations		
Existing	Existing site and surroundings	
Proposed	Project with existing surroundings	

Comfort Speed (km/h)	
(20% Seasonal Exceedance)	
≤ 10	Sitting
11 - 15	Standing
16 - 20	Walking
> 20	Uncomfortable

Safety Speed (km/h)	
(0.1% Annual Exceedance)	
≤ 90	Pass
> 90	Exceeded