

STATION HILL – PLOTS E AND F

READING, UK

PEDESTRIAN LEVEL WIND MICROCLIMATE ASSESSMENT

RWDI #1803688 REV F

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SUBMITTED TO

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TABLE OF CONTENTS

VERSION HISTORY	1
1 EXECUTIVE SUMMARY	2
2 INTRODUCTION	4
3 BACKGROUND AND APPROACH	4
2.1 Site Description and Surroundings	5
2.2 The Proposed Development	5
4 METHODOLOGY AND ASSESSMENT CRITERIA	6
3.1 Simulation of Atmospheric Winds	6
3.2 Meteorological Data	8
3.3 Pedestrian Comfort	8
3.4 Strong Winds	9
5 RESULTS	10
4.1 Details of Analysis	10
4.2 Desired Pedestrian Activity around the Proposed Development	10
4.3 Performance against the Lawson Comfort Criteria	11
4.4 Occurrence of Strong Winds	12
6 CONCLUSIONS	13



LIST OF APPENDICES

APPENDIX A: WIND TUNNEL PHOTOS

APPENDIX B: METEOROLOGICAL DATA



VERSION HISTORY

RWDI Project #1803688	Station Hill Reading, UK	
Report	Releases	Dated
Reports	Rev A	24 th January 2019
	Rev B	31 st January 2019
	Rev C	15 th February 2019
	Rev D	29 th September 2020
	Rev E	2 nd October 2020
	Rev F	8 th October 2020
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1 EXECUTIVE SUMMARY

The objective of this study is to determine the wind environment within and around the proposed Plots E and F of the Station Hill development in Reading, UK.

This report presents a description of the methodology used and the results of four configurations tested, namely:

- Configuration 1: Existing Baseline comprising the Site, as existing in 2019 prior to the recent demolition works, with existing surrounding buildings;
- Configuration 2: Proposed Development with no Landscaping, comprising reserved matters details for Plots E and F with the remaining Station Hill Development as per the 2019 Consented Scheme (as maximum parameters) and existing surrounding buildings;
- Configuration 3: Proposed Development with Landscaping, comprising reserved matters details for Plots E and F with the remaining Station Hill Development as per the 2019 Consented Scheme (as maximum parameters) and existing surrounding buildings; and
- Configuration 4: Proposed Development with Landscaping comprising reserved matters details for Plots E and F with the Station Hill Phase 2 and Phase 3 Development in accordance with the 2019 Hybrid Application in place (as maximum parameters for Plots A, B, C and D and in accordance with the detailed application for Plot G) with cumulative surrounding buildings.

Meteorological data for the Site indicate prevailing winds from the south-west quadrant throughout the year with secondary winds from the north-east direction which are more prevalent during the spring months.

All locations in and around the Existing Site (Configuration 1) have wind conditions generally suitable for the intended use.

With the introduction of the Proposed Development devoid of any landscaping (Configuration 2), wind conditions would generally be suitable for the intended usages. Wind conditions exceeding the pedestrian comfort criteria occur at thoroughfare locations 54 and 80 situated in the North Site. All entrances, and amenity spaces at podia, terraces and balconies would have suitable conditions.

There would be three locations with strong winds exceeding the threshold, at thoroughfare locations 54, 80 and 81 situated within the North Site.

With the landscaping scheme in place (Configuration 3), wind conditions would largely remain similar to those in Configuration 2.

Wind mitigation measures would therefore be required at thoroughfare locations 54, 80 and 81 to improve conditions and reduce the occurrence of strong winds. As these occur on the North Site, mitigation measures should be developed when its detailed design comes forward.

With the introduction of nearby cumulative schemes and maximum parameters for Plots A, B, C and D, and in accordance with the detailed application for Plot G (Configuration 4), wind conditions would largely remain similar to those at Configurations 2 and 3 at the Proposed Development. Wind conditions exceeding the pedestrian comfort criteria would, however, occur at thoroughfare location 52 situated within the North Site. All entrances and amenity spaces at podia, terraces and balconies would have suitable conditions.



In Configuration 4 there would be five locations with strong winds, at thoroughfare locations 43, 51, 52, 59 and podium location 208, all situated in the North Site.

Wind mitigation measures would therefore be required at thoroughfare locations 43, 51, 52, 59 and podium location 208 to improve conditions and reduce the occurrence of strong winds. As these occur at the North Site, mitigation measures including the use of landscaping, sculptural elements and elevated porous screens developed using wind tunnel testing should be incorporated as the detailed design comes forward.

Overall, wind conditions around the Site would generally be suitable for their intended uses. However, there would still be highlighted locations which would be windier than suitable, requiring further mitigation to be developed at a later stage when the North Site undergoes detailed design.

2 INTRODUCTION

RWDI was retained by CallisonRTKL to conduct a pedestrian level wind microclimate assessment using wind tunnel testing for the proposed Plots E and F of the Station Hill development in Reading, UK. This report presents the background, objectives, results and conclusion from RWDI's assessment.

3 BACKGROUND AND APPROACH

Wind tunnel tests were conducted on a 1:300 scale model of the Proposed Development. The investigation quantifies the wind conditions within and around the Site, by comparing the measured wind speed and frequency of occurrence with the Lawson Comfort Criteria. Meteorological data for Reading has been analysed from the London Heathrow meteorological station and adjusted to the Site conditions by modelling the effect of terrain roughness on the wind speeds approaching the Site.

Measurements were taken at up to 218 locations for 36 wind directions, in 10° increments. The measurements covered ground level locations along the building façades and at corners, near main entrances, on pedestrian routes within and around the Site, and on balconies, terraces and podia on the Site. Analysis was conducted on a seasonal basis, but the report focuses on the windiest season results (i.e. winter) and those for the summer season, when pedestrian activity generally requires calmer conditions.

This report presents a description of the methodology used and the results of the four configurations tested in the wind tunnel, namely:

- Configuration 1: Existing Baseline comprising the Site, as existing in 2019 prior to the recent demolition works, with existing surrounding buildings;
- Configuration 2: Proposed Development with no Landscaping, comprising reserved matters details for Plots E and F with the remaining Station Hill Development as per the 2019 Consented Scheme (as maximum parameters) and existing surrounding buildings;
- Configuration 3: Proposed Development with Landscaping, comprising reserved matters details for Plots E and F with the remaining Station Hill Development as per the 2019 Consented Scheme (as maximum parameters) and existing surrounding buildings; and
- Configuration 4: Proposed Development with Landscaping comprising reserved matters details for Plots E and F with the Station Hill Phase 2 and Phase 3 Development in accordance with the 2019 Hybrid Application in place (as maximum parameters for Plots A, B, C and D and in accordance with the detailed application for Plot G) with cumulative surrounding buildings.

2.1 Site Description and Surroundings

The Site is located in Reading and the OS Landranger Grid Reference to the Site is SU714737.

The Site is located approximately 100m to the south of Reading Train Station. It is bound by Garrard Street to the north, buildings on Greyfriars Road to the west, Friars Street to the south and buildings to the east.

The surrounding area is generally low- to mid-rise residential. Further afield, the surrounding area is generally low-rise suburban residential, which is typically characterised by lower mean wind speeds and stronger gusts, when compared with open country.

As such, the Site is relatively exposed to oncoming prevailing south westerly winds above ~15m in height, which can proceed unimpeded towards the Site.

2.2 The Proposed Development

The Proposed Development consists of two residential blocks, Block E to the west and Block F to the east of the Site. Block E consists of three towers, ranging from 5 storeys to 11 storeys and linked by large podiums, whilst Block F is a single tower, rising 12 storeys above ground level.

There are amenity spaces on the podiums of Block E and on the roof terraces of both Blocks E and F.

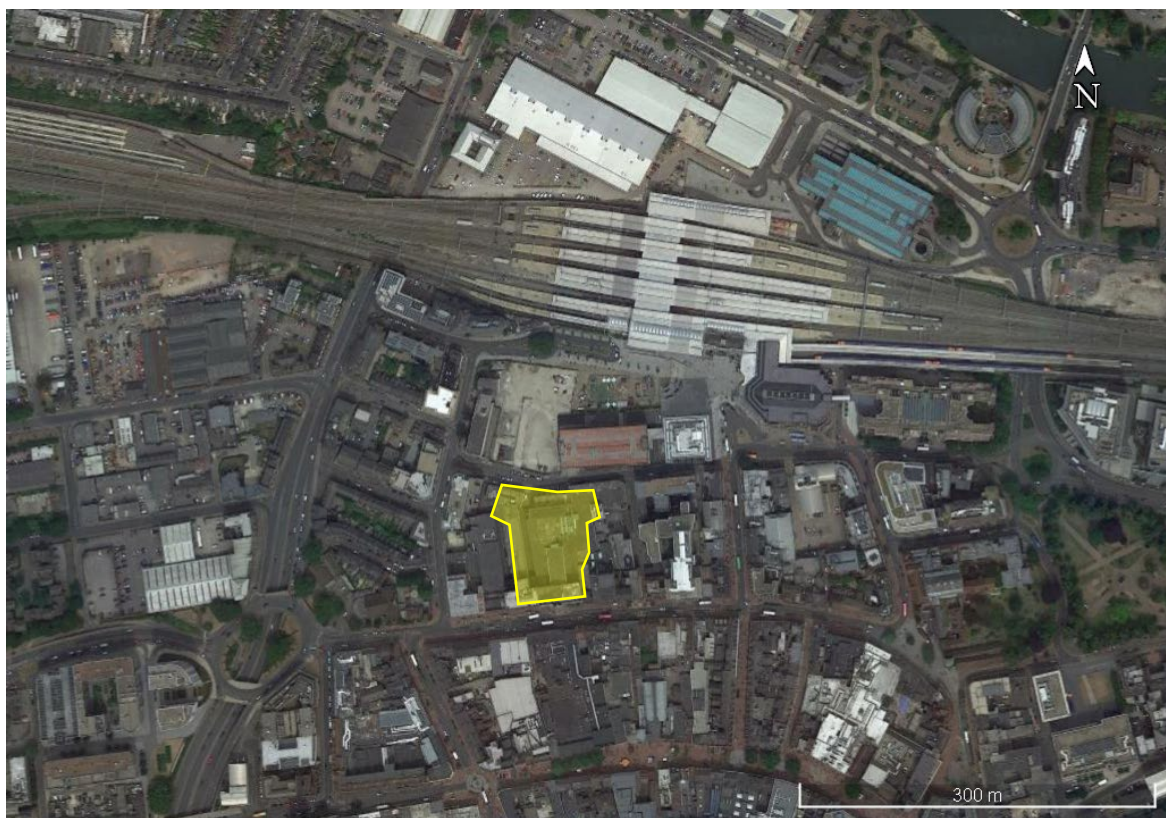


Figure 1: Site location with the approximate Site highlighted in yellow



4 METHODOLOGY AND ASSESSMENT CRITERIA

Wind tunnel testing is the most well-established and robust means of assessing the pedestrian wind microclimate with the Proposed Development in place. It enables the wind conditions at the Site to be quantified and classified in accordance with the Criteria. To produce the results within the tunnel, a 1:300 scale model of the existing buildings at the Site and the surrounding area within a 360 metre (m) radius of the centre of the Site was constructed.

The basic methodology for quantifying the pedestrian level wind environment is outlined below:

1. Measure the wind speeds at pedestrian level in the wind tunnel relative to a reference wind speed;
2. Adjust standard meteorological data to account for conditions at the Site;
3. Combine these to obtain the expected frequency and magnitude of wind speeds at pedestrian level; and
4. Compare the results with the Criteria to 'grade' conditions around the Site.

3.1 Simulation of Atmospheric Winds

The wind is turbulent, or gusty, and this turbulence varies depending upon the Site. It is necessary to reflect these differences in the wind tunnel test. In addition, the atmospheric boundary layer is a shear flow which means that the mean wind speed increases with height. Modelling these effects is achieved by a combination of spires and floor roughness elements to create a naturally grown boundary layer that is representative of urban or open country conditions, as appropriate. The detailed contoured proximity model around the Site is used to fine-tune the flow and create conditions similar to those expected at full scale.

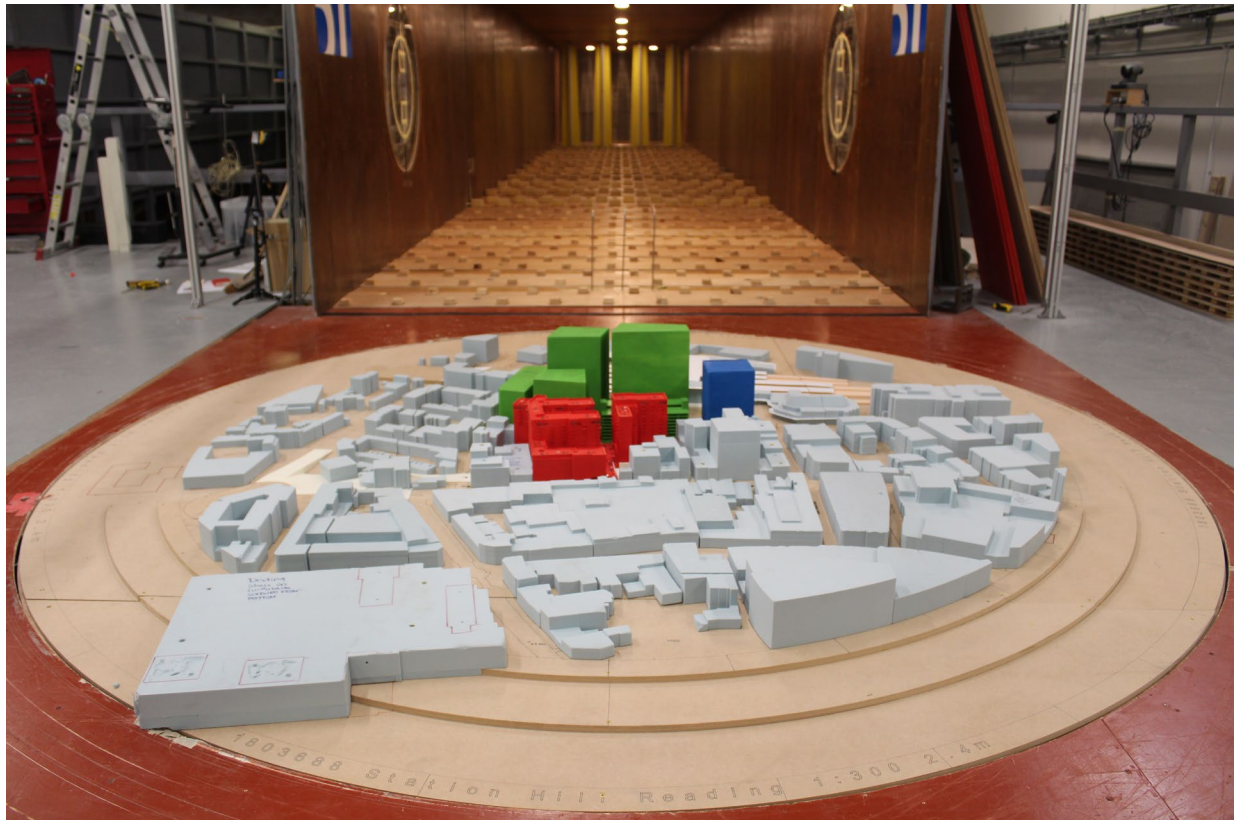


Figure 2: Image of Configuration 2 (View in the wind tunnel from south)

3.2 Meteorological Data

Approximately 30 years of meteorological data for Reading (gathered from the London Heathrow meteorological station) was used in this report and is presented in Appendix B as wind roses by season. The radial axis indicates the directional distribution of winds. The seasons are defined as spring (March, April and May), summer (June, July and August), autumn (September, October and November) and winter (December, January and February). The data has been corrected to standard conditions of 10m above open flat level country terrain, over which pedestrian level wind speeds are greatest.

The combined wind data derived from meteorological station of London airports has been corrected to standard conditions of 10m above open flat level country terrain. The meteorological station data are then adjusted to site conditions by assessing the terrain in all directions around the Development using the methodology implemented in the BREVe3 software package. Pedestrian level wind speeds at open, flat, level country terrain are typically greater than at an inner city environment with low to medium rise buildings, due to the difference in boundary layer thickness for the vertical wind profile. Hence roughness lengths, a parameter for the wind profile equations that specifies the type of terrain, were estimated in all directions for appropriate upwind distances by use of virtual geographical software, and input into calculations for the wind profiles.

The meteorological data indicate that the prevailing wind direction throughout the year is from the south-west, which is consistent feature of met stations within the London area.

The combination of meteorological data and velocity ratios permits the percentage of time that wind speeds are exceeded on the site to be evaluated. The locations can then be assessed using the Criteria, as described below.

3.3 Pedestrian Comfort

The assessment of the wind conditions requires a standard against which the measurements can be compared. This report uses the Lawson Comfort Criteria, which have been established for over thirty years. The Criteria, which seek to define the reaction of an average pedestrian to the wind, are described in Table 1. If the measured wind conditions exceed the threshold for more than 5% of the time, then they are unacceptable for the stated pedestrian activity and the expectation is that there may be complaints of nuisance or people will not use the area for its intended purpose.

The Criteria sets out four pedestrian activities and reflect the fact that less active pursuits require more benign wind conditions. The four categories are sitting, standing, strolling and walking, in ascending order of activity level, with a fifth category for conditions that are uncomfortable for all uses. In other words, the wind conditions in an area for sitting need to be calmer than a location that people merely walk past.

The distinction between strolling and walking is that in the strolling scenario pedestrians are more likely to take on a leisurely pace, with the intention of taking time to move through an area, whereas in the walking scenario pedestrians are intending to move through the area quickly and are therefore expected to be more tolerant of stronger winds.

The Criteria are derived for open air conditions and assume that pedestrians will be suitably dressed for the season. Thermal comfort is discussed with reference to acceptable wind environments but not evaluated as part of the assessment.

The coloured key in Table 1 corresponds to the presentation of wind tunnel test results described in the results section of this report.

Table 1: Lawson Comfort Criteria

Key	Comfort Category	Threshold	Description
	Sitting	0-4 m/s	Light breezes desired for outdoor restaurants and seating areas where one can read a paper or comfortably sit for long periods
	Standing	4-6 m/s	Gentle breezes acceptable for main building entrances, pick-up/drop-off points and bus stops
	Strolling	6-8 m/s	Moderate breezes that would be appropriate for strolling along a city/town street, plaza or park
	Walking	8-10 m/s	Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering
	Uncomfortable	> 10 m/s	Winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended

3.4 Strong Winds

In addition, the criteria stipulate two strong wind threshold limits; when winds exceed 15m/s or 20m/s for more than 0.025% of the time (or 2.2 hours of the year). The lower limit, 15m/s, if exceeded may require remedial measures depending on the sensitivity of the location i.e. is it reasonable to expect an elderly or very young pedestrian to be present at the location? Wind speeds that exceed the 20m/s threshold for more than approximately 2.2 hours per year would represent a safety risk for all members of the population and would therefore require mitigation to provide an appropriate wind environment.

In the UK, strong winds are associated with areas which would be classified as walking or uncomfortable for pedestrian use. In a mixed-use, urban development scheme, walking or uncomfortable conditions would not usually form part of the 'target' wind environment and would usually require mitigation due to pedestrian comfort considerations. Mitigation applied to improve pedestrian comfort would also reduce the frequency of, or even eliminate, any strong winds.

5 RESULTS

4.1 Details of Analysis

To account for the difference in height and terrain roughness between meteorological conditions at the airports and the Site, it is necessary to apply adjustment factors to the wind tunnel velocity ratios. Adjustment factors (mean factors) were computed for wind directions from 0° through to 360°. The reference height in the wind tunnel was at the equivalent full-scale height of 120 metres. Table 2 presents the mean factors for the Site.

5.1.1 Table 2: BREVe3 mean factors at 120m above ground level

Wind Direction	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°
Mean Factor at 120 m	1.41	1.42	1.44	1.43	1.39	1.45	1.46	1.51	1.46	1.41	1.41	1.40

4.2 Desired Pedestrian Activity around the Proposed Development

Generally, for a mixed-use development, the target conditions are:

1. Strolling during the windiest season on pedestrian thoroughfares;
2. Standing conditions at main entrances, drop off areas or taxi ranks, and bus stops throughout the year;
3. Standing conditions at private balconies where seating is not designated during the summer season; and
4. Sitting conditions at outdoor seating during the summer season when these areas are more likely to be frequently used by pedestrians.

The walking and uncomfortable classifications are usually avoided because of their association with occasional strong winds, unless they are on a minor pedestrian route or a route where pedestrian access could be controlled in the event of strong winds.

At back of house entrances, maintenance entrances or fire escapes, strolling wind conditions would be tolerable.

In some circumstances, for a mixed-use amenity space such as an outdoor gym area or play space, a mix of sitting and standing wind conditions would be deemed acceptable; however, if any seating was situated within this space, they would have to be restricted to areas having sitting wind conditions.

For a large terrace space, a mix of standing and sitting wind conditions is acceptable provided that any desired seating areas are situated in areas having sitting wind conditions.

Achieving a sitting classification in the summer usually means that the same location would be acceptable for standing in the windiest season because winds are stronger at this time. This is considered an acceptable occurrence for the majority of external amenity spaces because other factors such as air temperature and precipitation influence people's perceptions about the 'need' to use seating in the middle of winter.

4.3 Performance against the Lawson Comfort Criteria

The wind microclimate within and around the Site has been assessed and classified using the Lawson Comfort Criteria defined in Table 1. The results of the assessment for each configuration are described below and presented graphically in Figures 3 to 16.

4.3.1 Configuration 1 – Existing Baseline comprising the existing Site, as existing in 2019 prior to the recent demolition works, with existing surrounding buildings

The wind microclimate results for Configuration 1 are shown in the following figures:

- Figure 3: Windiest Season - Ground Level; and
- Figure 4: Summer Season - Ground Level.

4.3.2 Configuration 2 – Proposed Development with no Landscaping, comprising reserved matters details for Plots E and F with the remaining Station Hill Development as per the 2019 Consented Scheme (as maximum parameters) and existing surrounding buildings

The wind microclimate results for Configuration 2 are shown in the following figures:

- Figure 5: Windiest Season - Ground Level;
- Figure 6: Summer Season - Ground Level;
- Figure 7: Summer Season – Balconies, Terraces and Roof Levels; and
- Figure 8: Annual Strong Wind Exceedances - Ground Level.

4.3.3 Configuration 3 – Proposed Development with Landscaping comprising reserved matters details for Plots E and F with the remaining Station Hill Development as per the 2019 Consented Scheme (as maximum parameters)) and existing surrounding buildings

The wind microclimate results for Configuration 3 are shown in the following figures:

- Figure 9: Windiest Season - Ground Level;
- Figure 10: Summer Season - Ground Level;
- Figure 11: Summer Season – Balconies, Terraces and Roof Levels; and
- Figure 12: Annual Strong Wind Exceedances - Ground Level.

4.3.4 Configuration 4 – Proposed Development with Landscaping comprising reserved matters details for Plots E and F with the Station Hill Phase 2 and Phase 3 Development in accordance with the 2019 Hybrid Application in place (as maximum parameters for Plots A, B, C and D and in accordance with the detailed application for Plot G) in place with cumulative surrounding buildings

The wind microclimate results for Configuration 4 are shown in the following figures:

- Figure 13: Windiest Season - Ground Level;
- Figure 14: Summer Season - Ground Level;
- Figure 15: Summer Season – Balconies, Terraces and Roof Levels; and
- Figure 16: Annual Strong Wind Exceedances - Ground Level.

4.4 Occurrence of Strong Winds

Strong winds exceeding 15m/s for more than 2.2 hours per year are listed in Table 3 below.

Table 3: Annual exceedance of strong winds

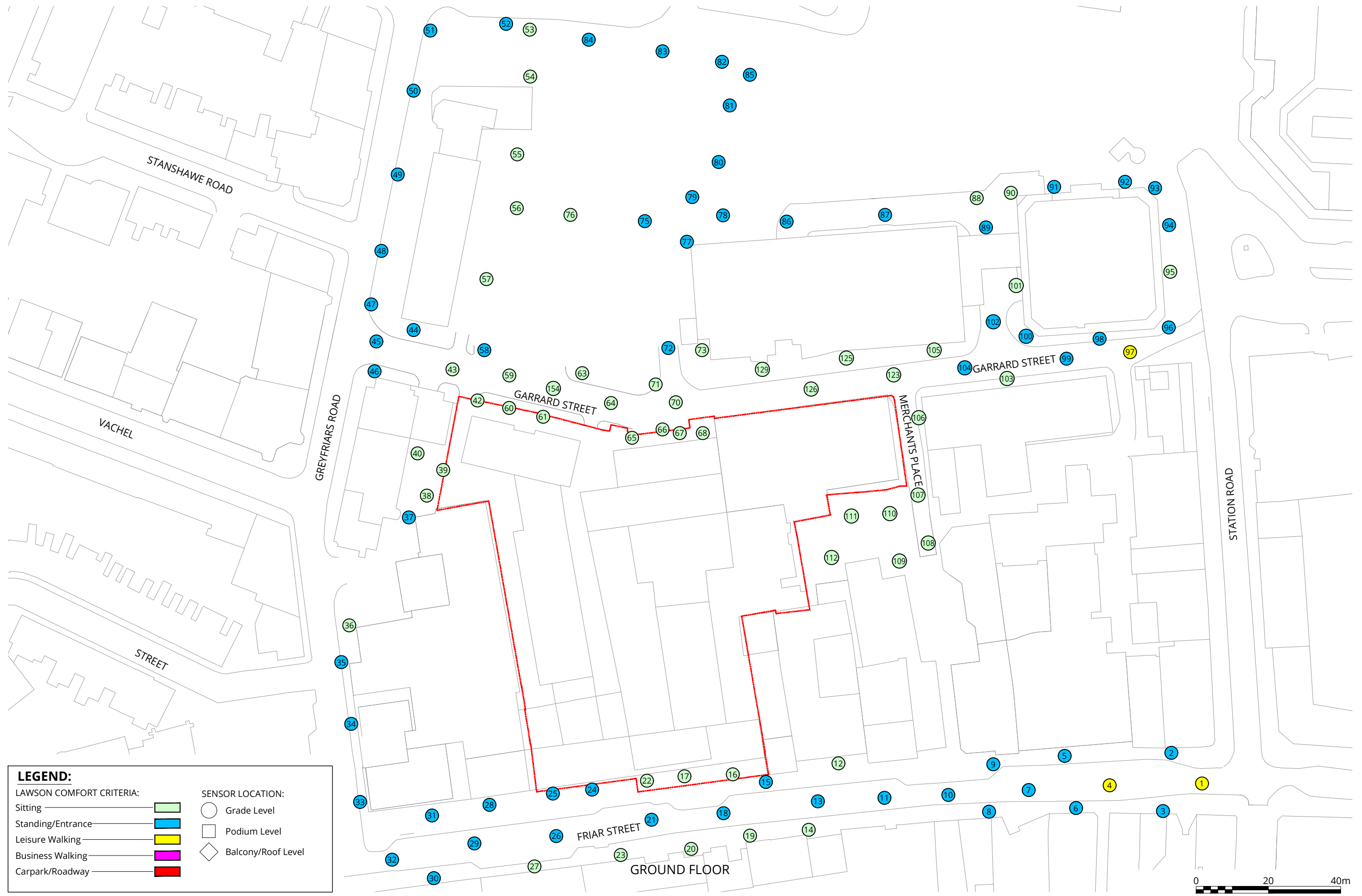
Location	Strong Wind Exceedance	Main Wind Direction	Hours per Annum
Configuration 1: Existing Baseline			
There were no strong winds exceeding 15m/s for more than 2.2 hours in this configuration.			
Configuration 2: Proposed Development			
54	S15	10	8.8
80	S15	170	2.5
81	S15	10	2.2
Configuration 3: Proposed Development with Landscaping			
54	S15	10	9.0
80	S15	170	3.0
81	S15	10	2.4
Configuration 4: Proposed Development with Landscaping and cumulative surrounding buildings			
43	S15	290	3.9
51	S15	270	4.6
52	S15	270	12.2
59	S15	290	3.1
208	S15	60	5.7

6 CONCLUSIONS

1. Meteorological data for the Site indicate prevailing winds from the south-west quadrant throughout the year with secondary winds from the north-east direction which are more prevalent during the spring months.
2. All locations in and around the Existing Site (Configuration 1) have wind conditions generally suitable for the intended use.
3. With the introduction of the Proposed Development devoid of any landscaping (Configuration 2), wind conditions would generally be suitable for the intended usages. Wind conditions exceeding the pedestrian comfort criteria occur at highlighted thoroughfares north of the Proposed Development. All other spaces would have suitable conditions. There would be three locations with strong winds, at thoroughfares situated north of the Proposed Development.
4. With the landscaping scheme in place (Configuration 3), wind conditions would largely remain similar to those in Configuration 2.
5. Wind mitigation measures would therefore be required at the highlighted thoroughfare locations within the North Site to improve conditions and reduce the occurrence of strong winds. As these occur at the North Site, mitigation measures should be developed when its detailed design comes forward.
6. With the introduction of nearby cumulative schemes and the 2019 Hybrid Application on the north Site with cumulative surrounding buildings, wind conditions would largely remain similar to Configurations 2 and 3 at the Proposed Development. Wind conditions exceeding the pedestrian comfort criteria would occur at highlighted thoroughfares within the North Site. All other spaces would have suitable conditions. There would be five locations with strong winds, at thoroughfare and podium spaces, all situated in the North Site of the Proposed Development.
7. Wind mitigation measures would therefore be required at the highlighted thoroughfare and podium locations to improve conditions and reduce the occurrence of strong winds. As these occur on the North Site, mitigation measures should be developed when its detailed design comes forward.
8. Overall, wind conditions around the Site would generally be suitable for their intended uses. However, there would still be highlighted locations which would be windier than suitable, requiring further mitigation to be developed at a later stage when the northern Site undergoes detailed design.

FIGURES





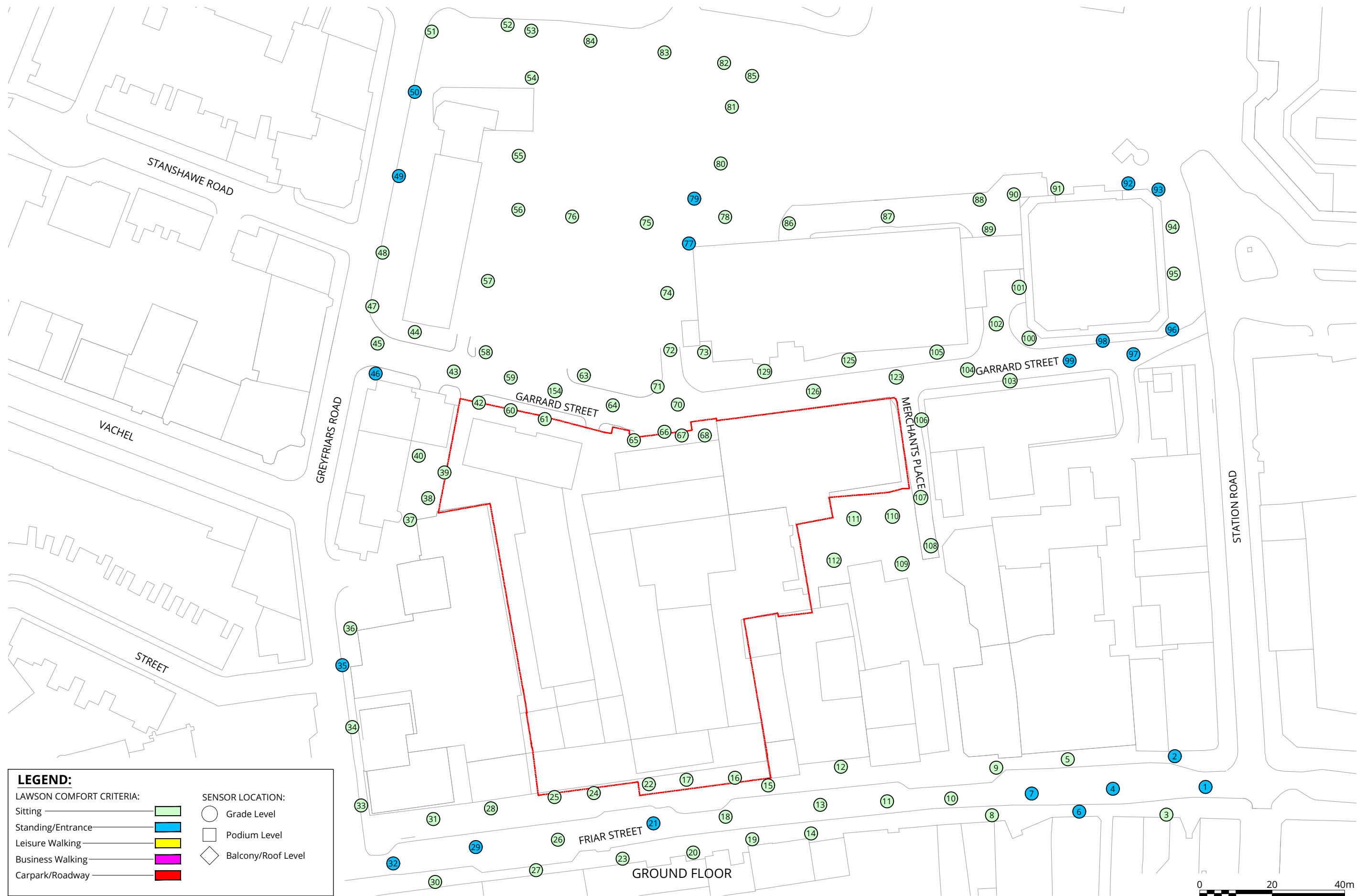
LEGEND:

LAWSON COMFORT CRITERIA:

Sitting	Light Green
Standing/Entrance	Blue
Leisure Walking	Yellow
Business Walking	Pink
Carpark/Roadway	Red

SENSOR LOCATION:

○ Grade Level
□ Podium Level
◇ Balcony/Roof Level



Pedestrian Wind Comfort Conditions - Ground Floor Configuration 1: Existing Baseline Summer Season

Station Hill, Reading



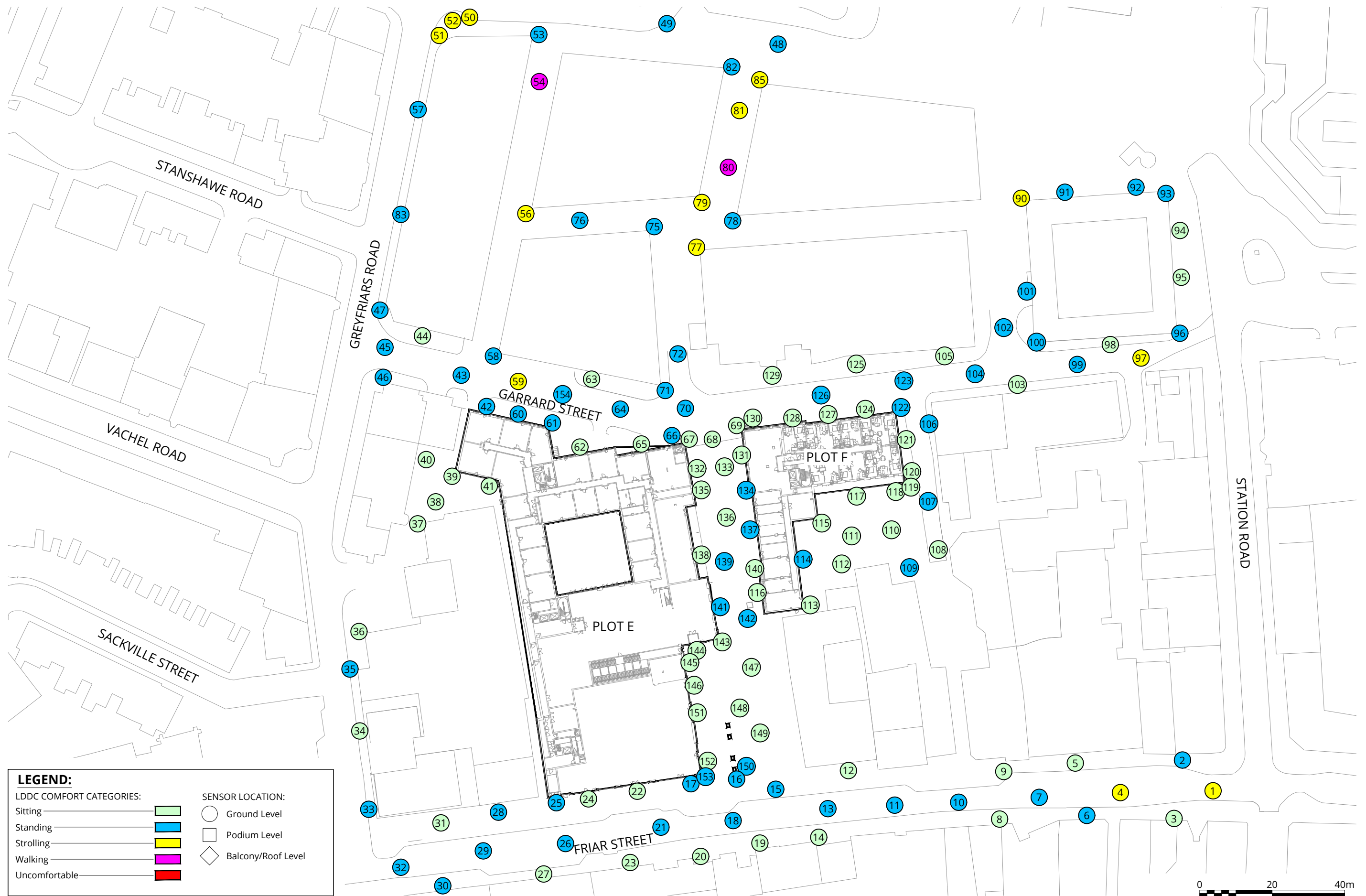
Project #1803688

Drawn by: JLF Figure: 4

Approx. Scale @A3: 1:1000

Date Revised: Jan. 29, 2019





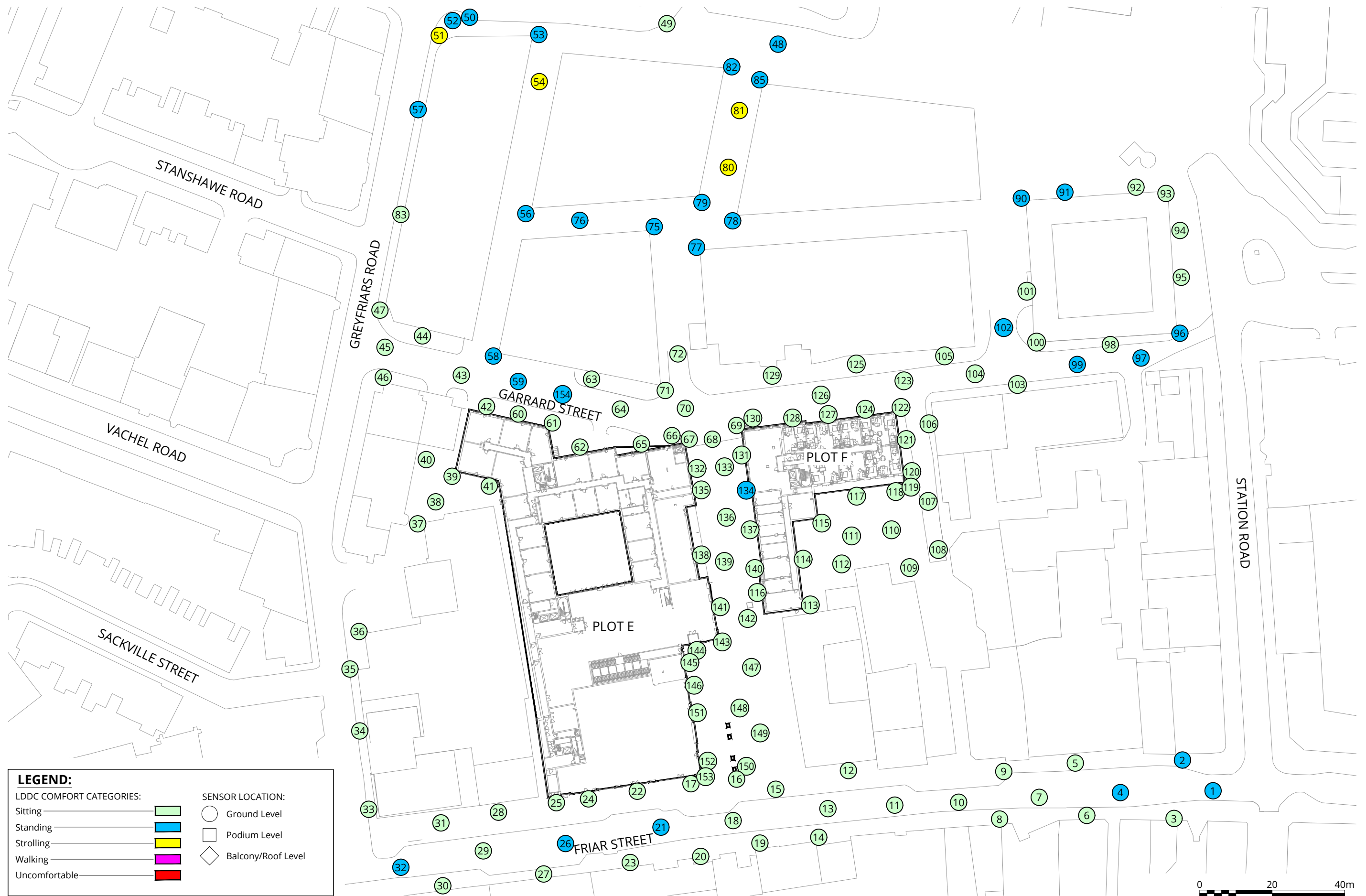
LEGEND:

LDDC COMFORT CATEGORIES:

Sitting	Light Green
Standing	Blue
Strolling	Yellow
Walking	Magenta
Uncomfortable	Red

SENSOR LOCATION:

○ Ground Level
□ Podium Level
◇ Balcony/Roof Level



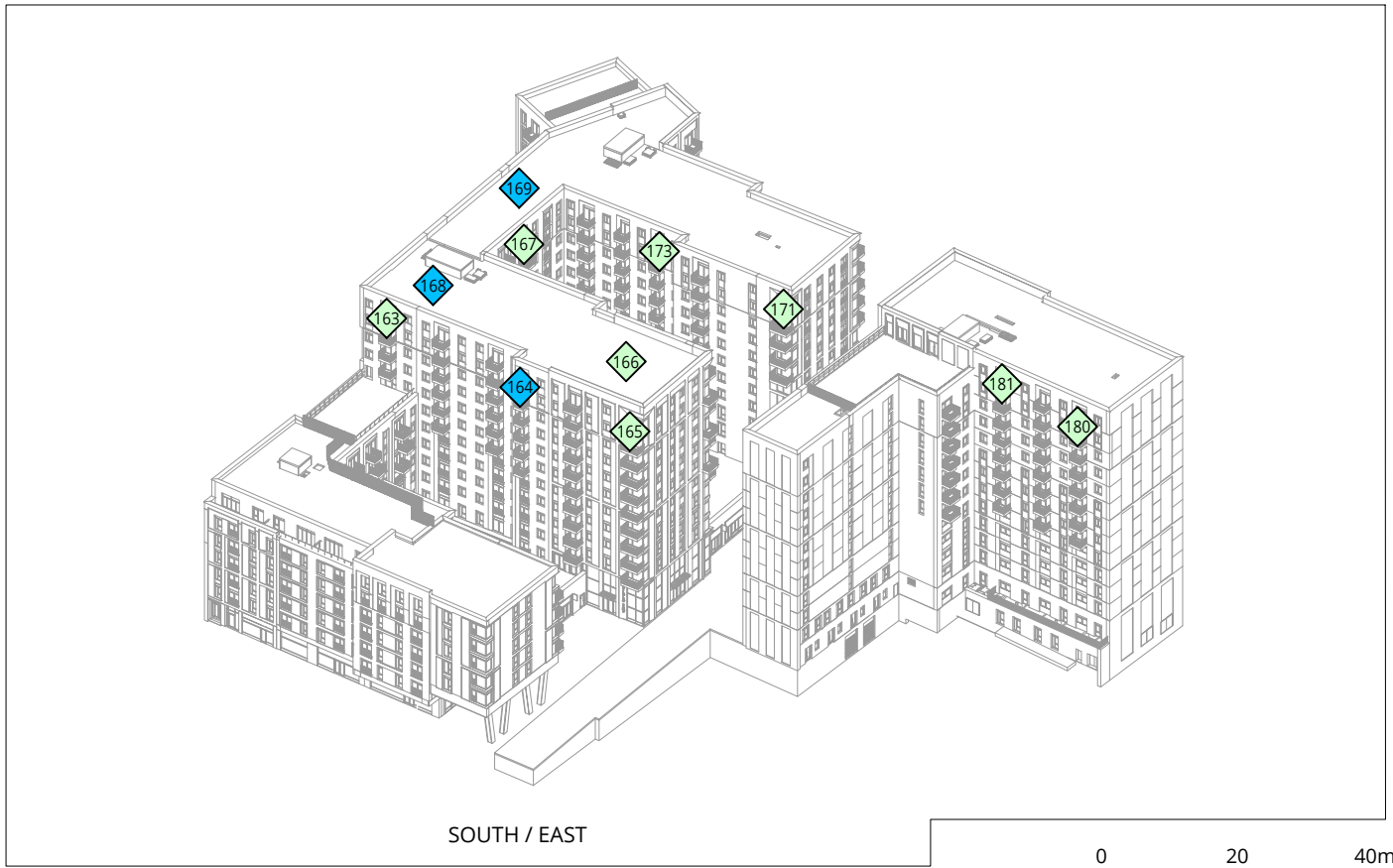
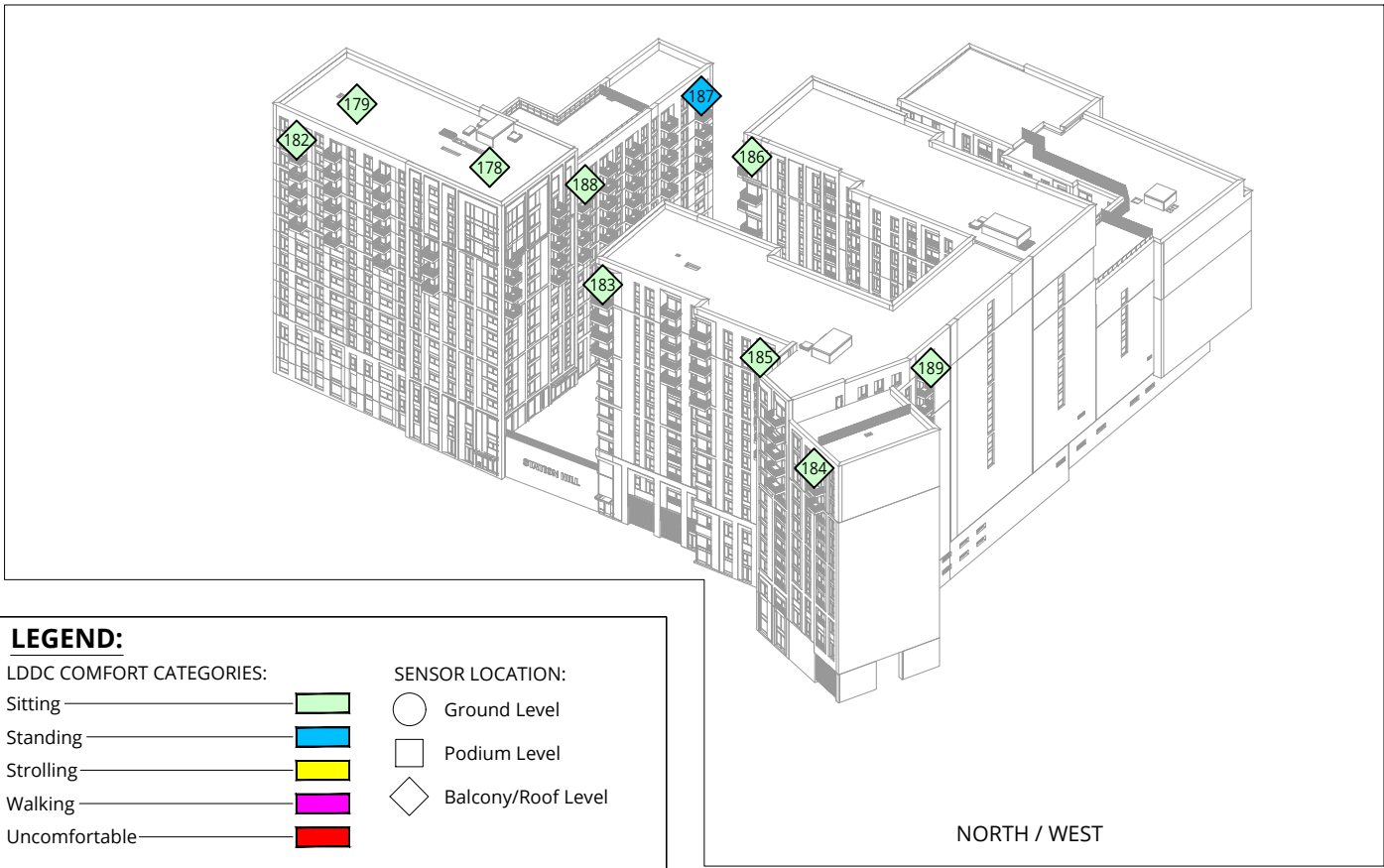
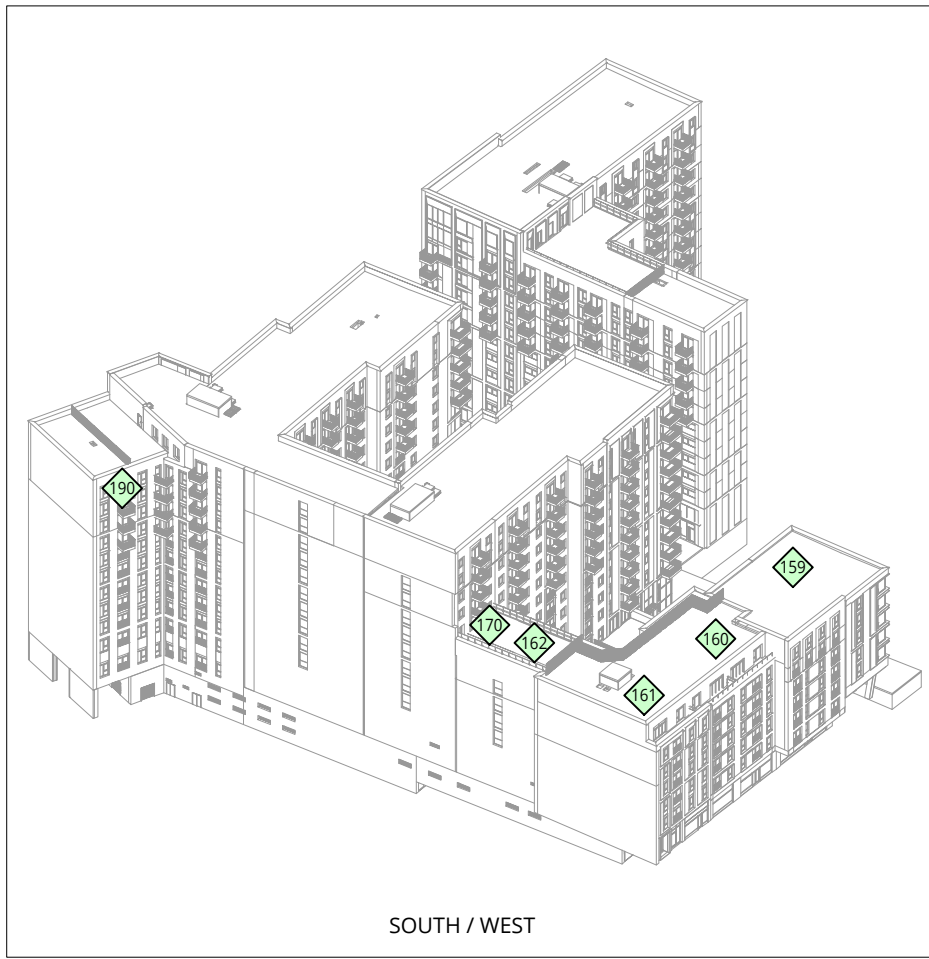
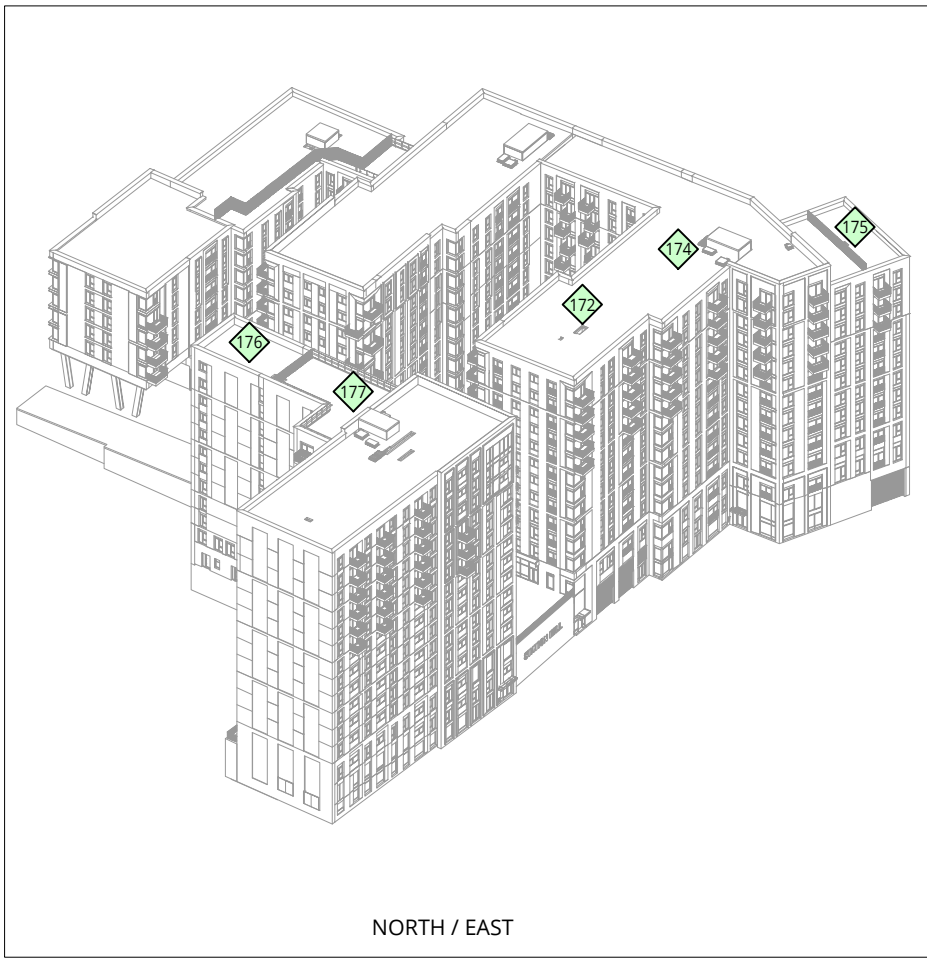
LEGEND:

LDDC COMFORT CATEGORIES:

Sitting	
Standing	
Strolling	
Walking	
Uncomfortable	

SENSOR LOCATION:

	Ground Level
	Podium Level
	Balcony/Roof Level



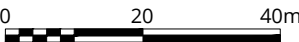
LEGEND:

LDDC COMFORT CATEGORIES:

Sitting	
Standing	
Strolling	
Walking	
Uncomfortable	

SENSOR LOCATION:

	Ground Level
	Podium Level
	Balcony/Roof Level



Pedestrian Wind Comfort Conditions - Balconies, Terraces and Roof Level
 Configuration 2: Proposed Development
 Summer Season

Station Hill - Reading, UK

Project #1803688

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Approx. Scale @A3: 1:1100	
Date Revised: Sept. 22, 2020	





LEGEND:

SAFETY CATEGORIES:

Pass ————

S15 Exceeded ————

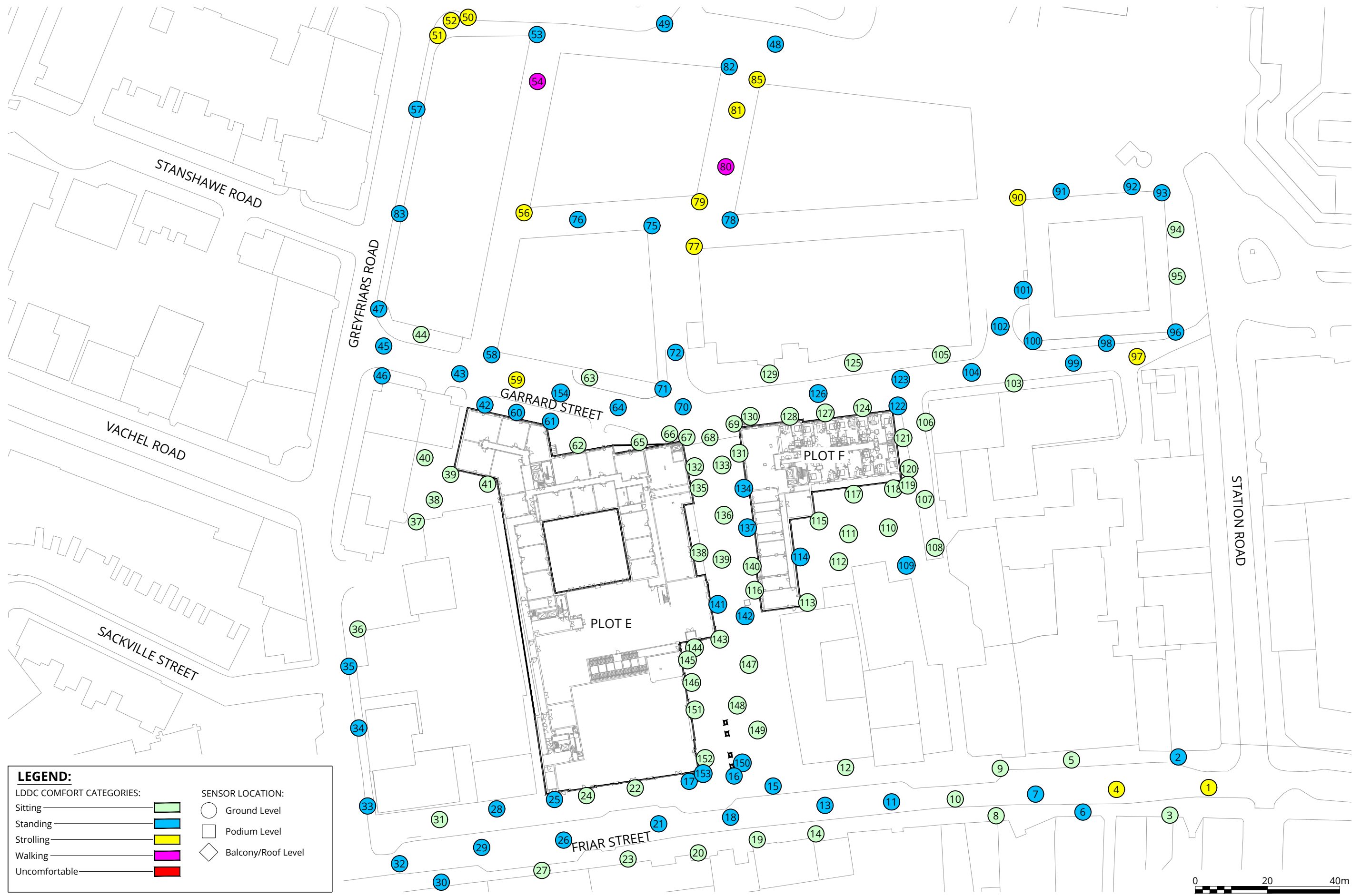
S20 Exceeded ————

SENSOR LOCATION:

○ Ground Level

□ Podium Level

◇ Roof Level



LEGEND:

LDDC COMFORT CATEGORIES:

Sitting	Light Green
Standing	Blue
Strolling	Yellow
Walking	Magenta
Uncomfortable	Red

SENSOR LOCATION:

○ Ground Level
□ Podium Level
◇ Balcony/Roof Level

Pedestrian Wind Comfort Conditions - Ground Level
Configuration 3: Proposed Development with Landscaping
Windiest Season

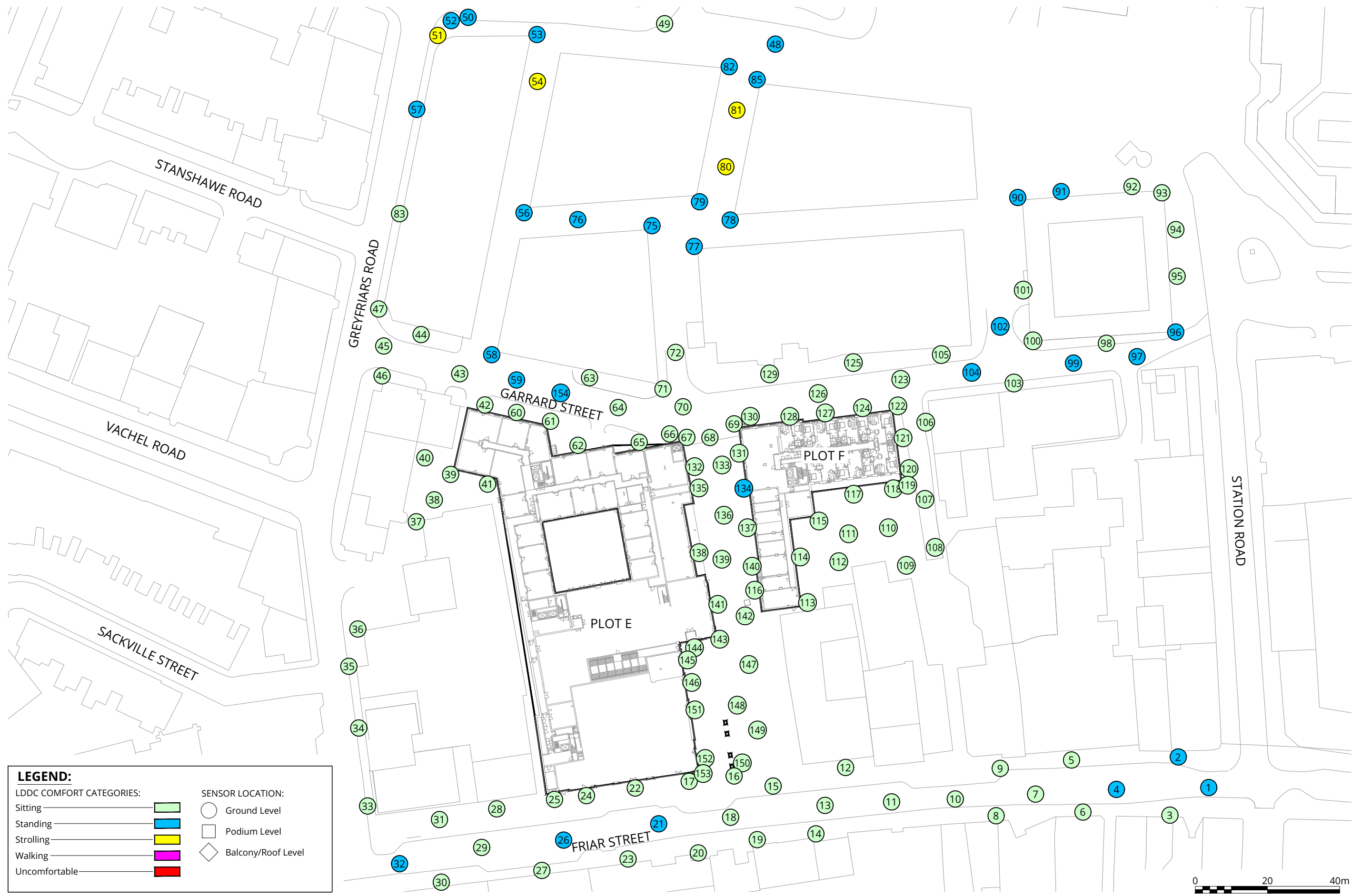
Station Hill - Reading, UK



Project #1803688

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Date Revised: Sept. 22, 2020	





LEGEND:

LDDC COMFORT CATEGORIES:

Sitting	Green
Standing	Blue
Strolling	Yellow
Walking	Magenta
Uncomfortable	Red

SENSOR LOCATION:

Ground Level	Circle
Podium Level	Square
Balcony/Roof Level	Diamond

Pedestrian Wind Comfort Conditions - Ground Level
Configuration 3: Proposed Development with Landscaping
Summer Season

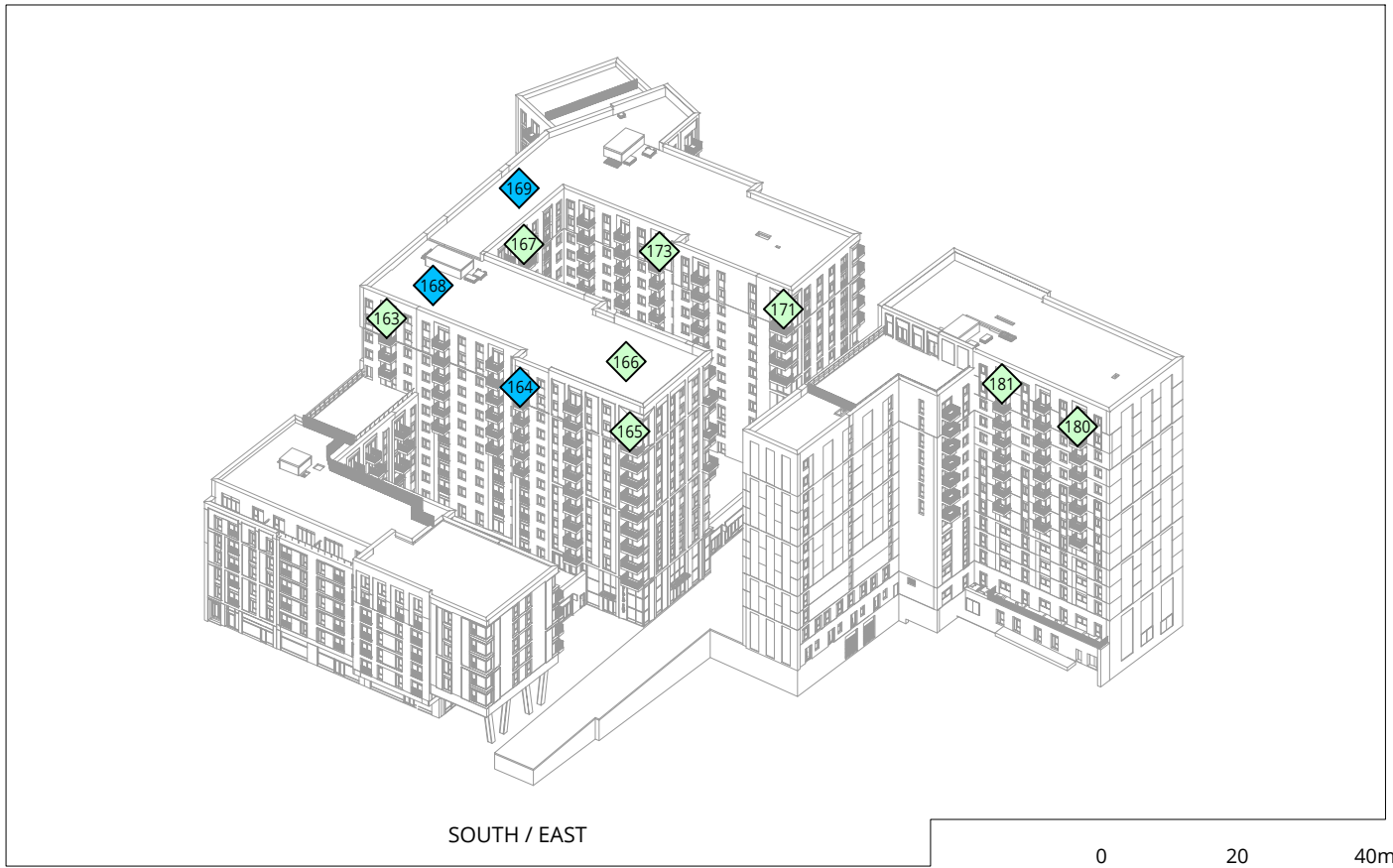
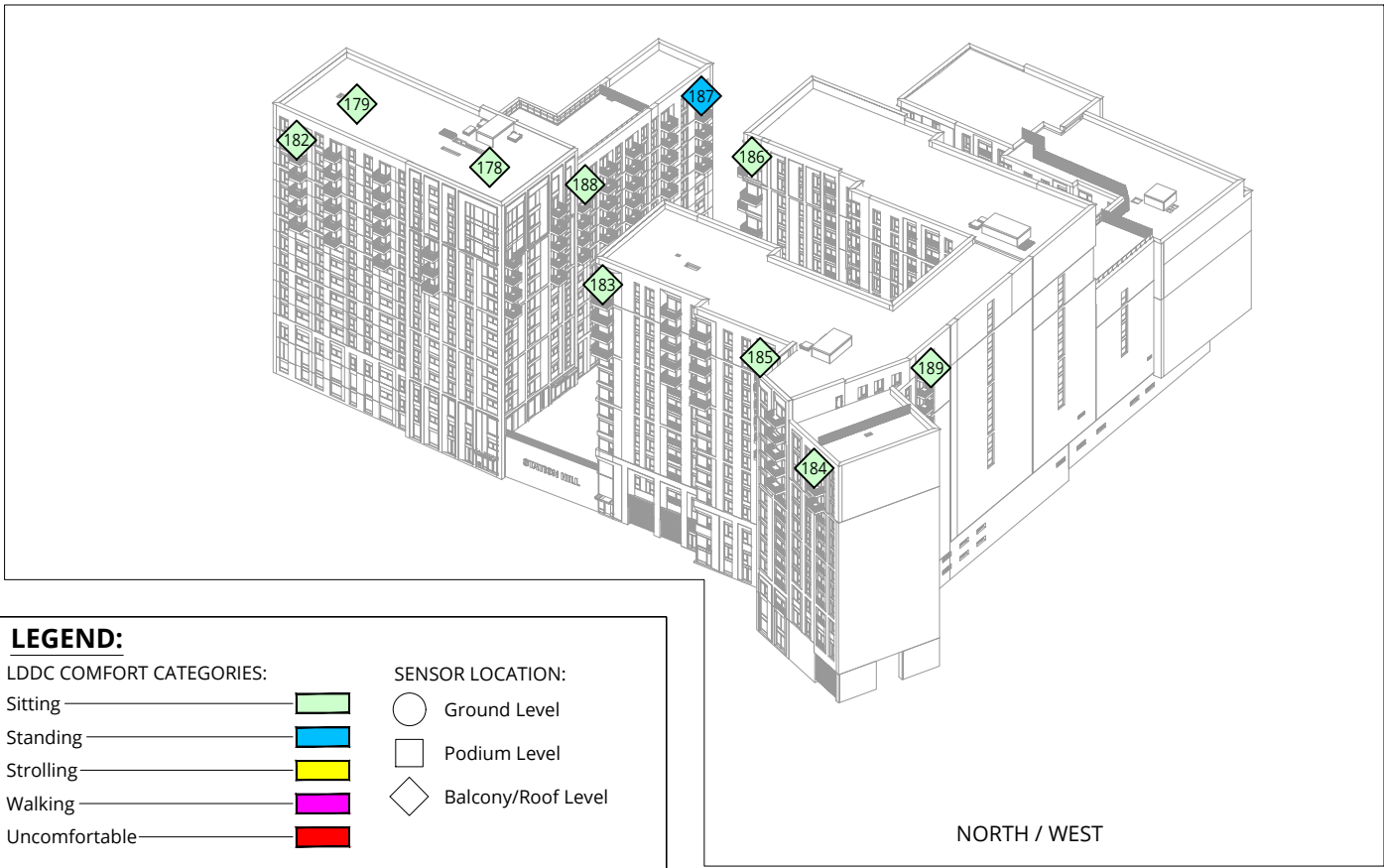
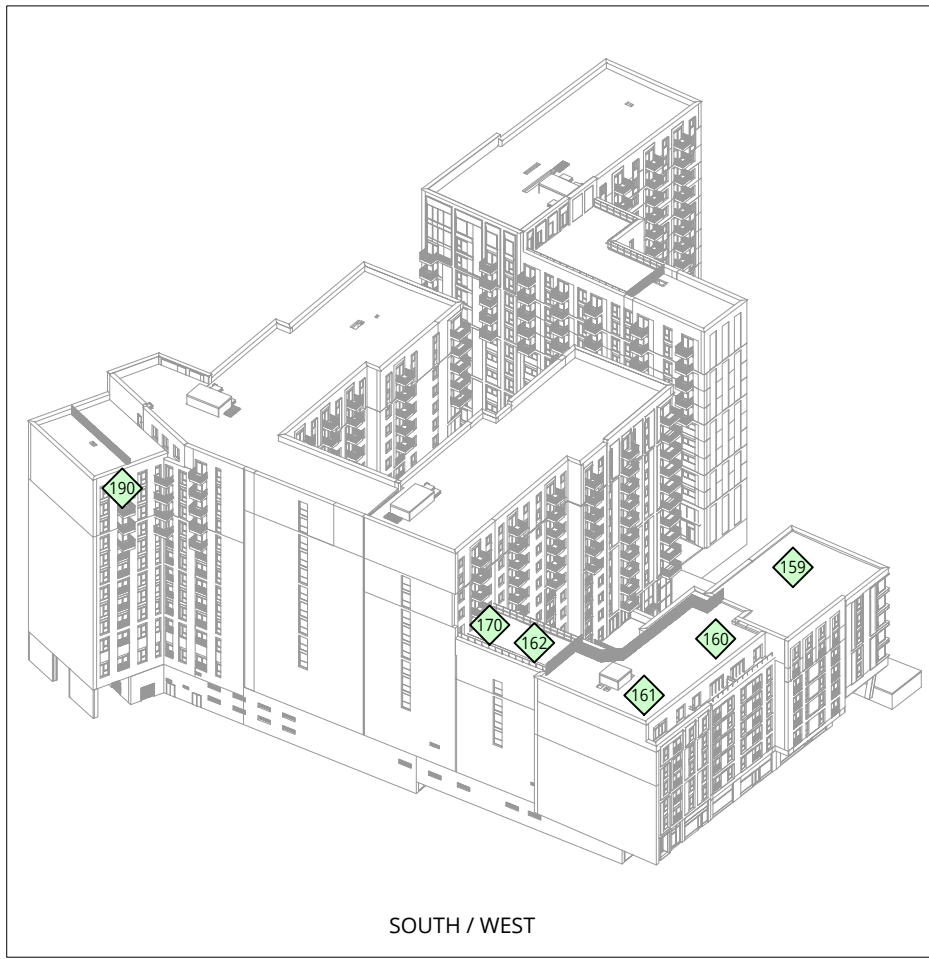
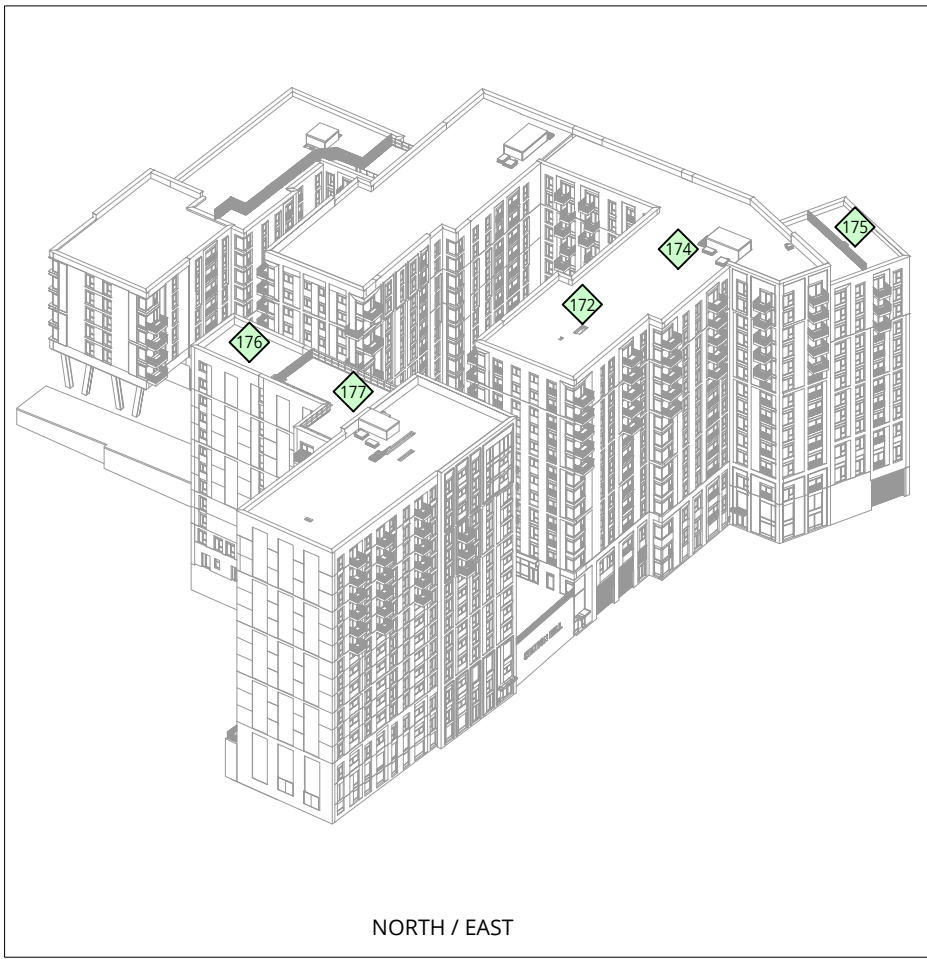
Station Hill - Reading, UK



Project #1803688

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Date Revised: Sept. 22, 2020	





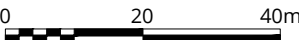
LEGEND:

LDDC COMFORT CATEGORIES:

Sitting	
Standing	
Strolling	
Walking	
Uncomfortable	

SENSOR LOCATION:

	Ground Level
	Podium Level
	Balcony/Roof Level



Pedestrian Wind Comfort Conditions - Balconies, Terraces and Roof Level
 Configuration 3: Proposed Development with Landscaping
 Summer Season

Station Hill - Reading, UK

Project #1803688

Drawn by: EN	Figure: 11
Approx. Scale @A3: 1:1100	
Date Revised: Sept. 22, 2020	





LEGEND:

SAFETY CATEGORIES:

Pass — [white box]

S15 Exceeded — [light grey box]

S20 Exceeded — [dark grey box]

SENSOR LOCATION:

○ Ground Level

□ Podium Level

◇ Roof Level



Pedestrian Wind Comfort Conditions - Ground Level
 Configuration 4: Proposed Development with Landscaping and Cumulative Surrounding Buildings
 Windiest Season

Station Hill - Reading, UK



Project #1803688

Drawn by: JLF	Figure: 13
Approx. Scale @A3: 1:1000	
Date Revised: Sept. 22, 2020	





LEGEND:

LDDC COMFORT CATEGORIES:

Sitting	Light Green
Standing	Blue
Strolling	Yellow
Walking	Magenta
Uncomfortable	Red

SENSOR LOCATION:

Ground Level	Circle
Podium Level	Square
Balcony/Roof Level	Diamond

Pedestrian Wind Comfort Conditions - Ground Level
Configuration 4: Proposed Development with Landscaping and Maximum Cumulative Surrounding Buildings
Summer Season

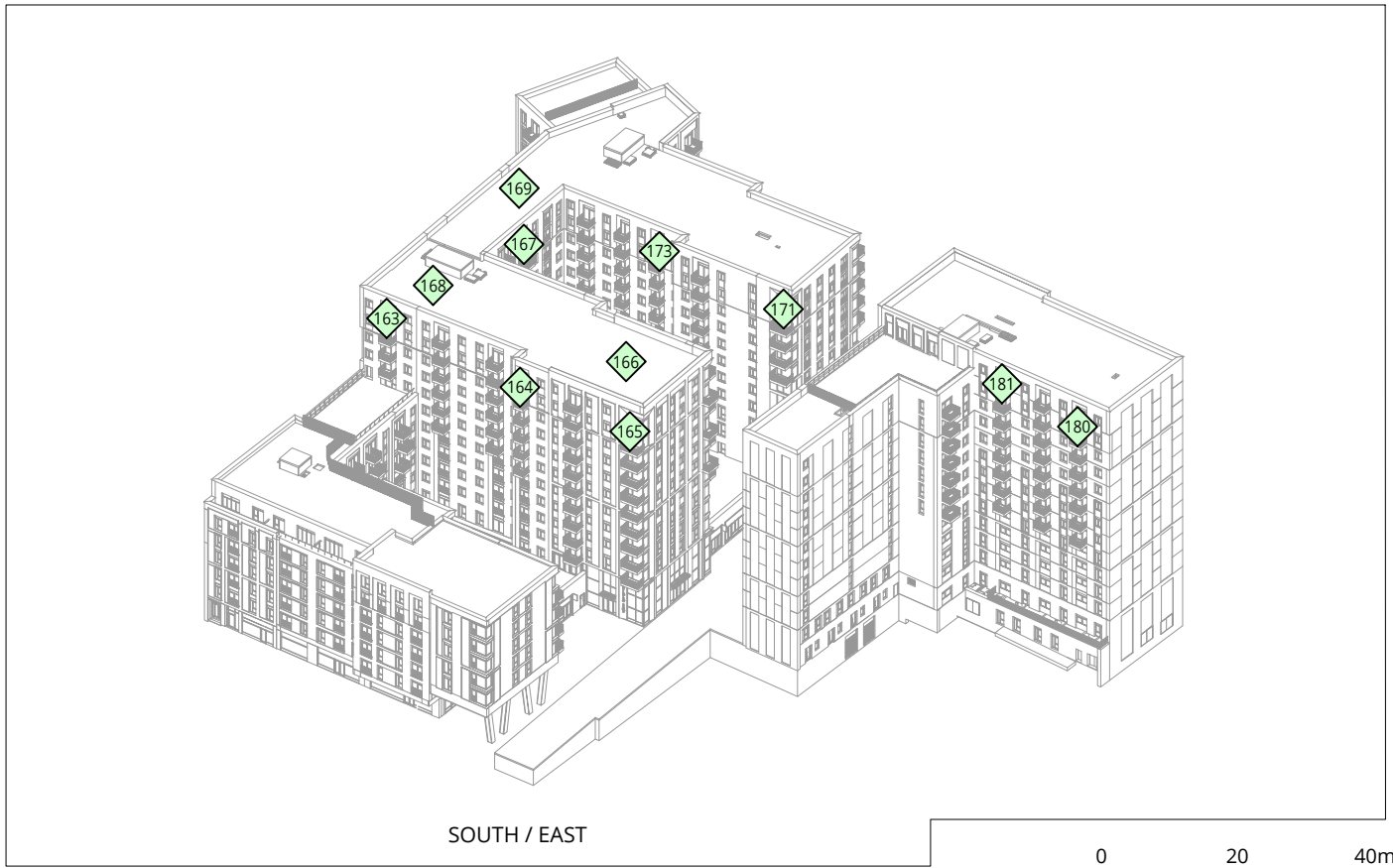
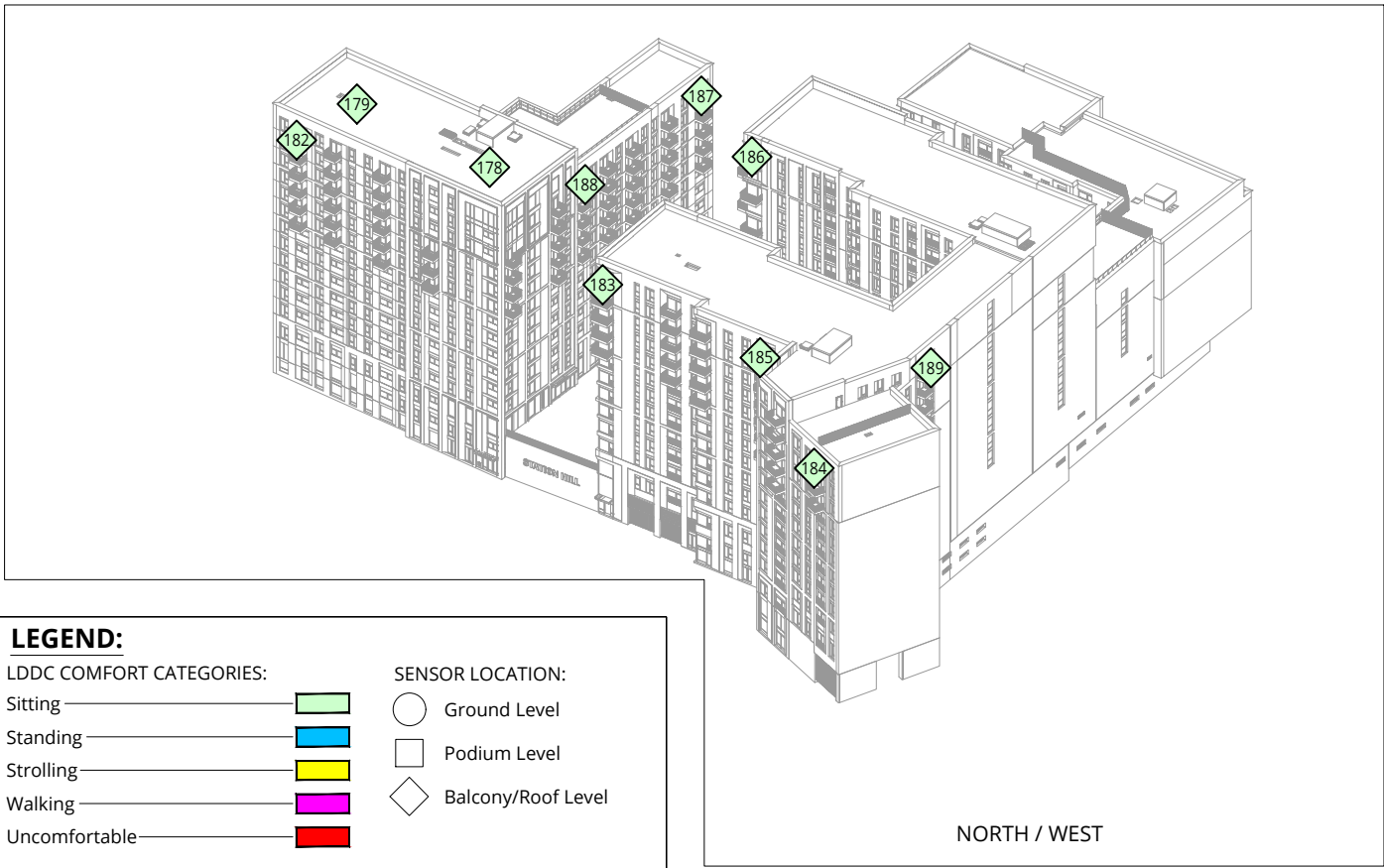
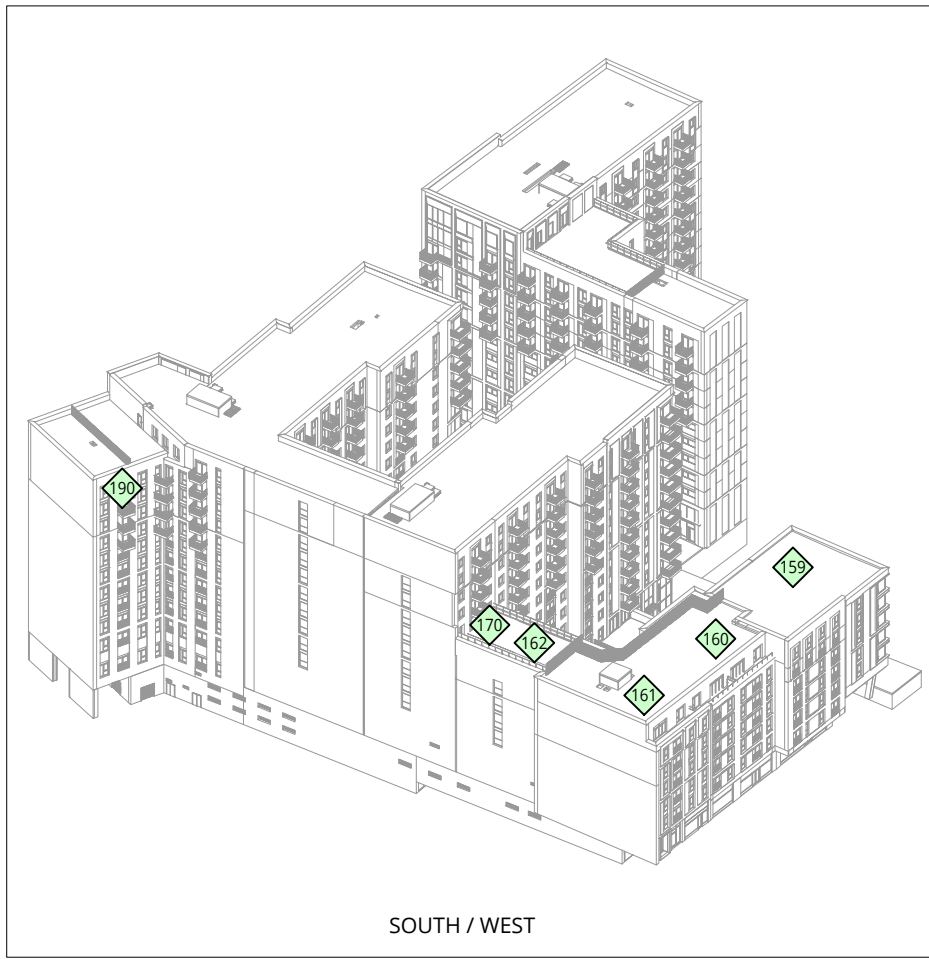
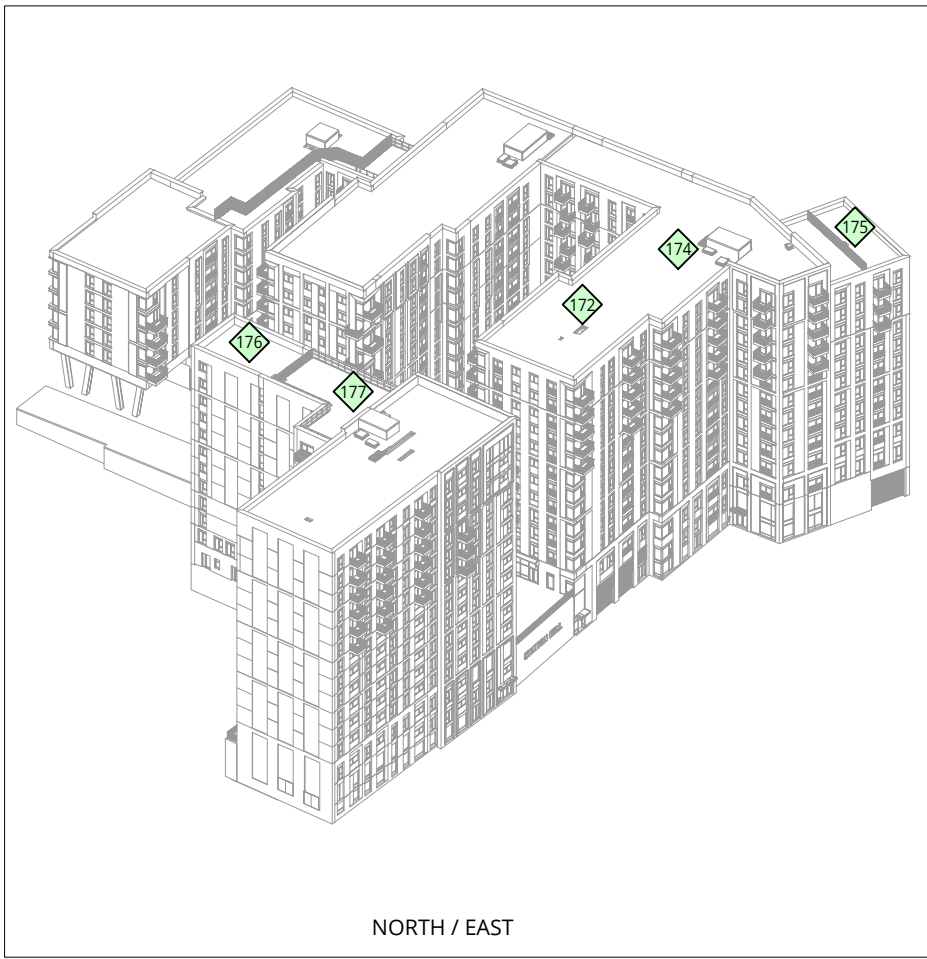
Station Hill - Reading, UK



Project #1803688

Drawn by: JLF	Figure: 14
Approx. Scale @A3: 1:1000	
Date Revised: Sept. 22, 2020	





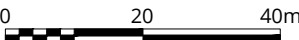
LEGEND:

LDDC COMFORT CATEGORIES:

Sitting	
Standing	
Strolling	
Walking	
Uncomfortable	

SENSOR LOCATION:

	Ground Level
	Podium Level
	Balcony/Roof Level



Pedestrian Wind Comfort Conditions - Balconies, Terraces and Roof Level
 Configuration 4: Proposed Development with Landscaping and Cumulative Surrounding Buildings
 Summer Season

Station Hill - Reading, UK

Project #1803688

Drawn by: EN	Figure: 15
Approx. Scale @A3: 1:1100	
Date Revised: Sept. 22, 2020	





LEGEND:

SAFETY CATEGORIES:

Pass

S15 Exceeded

S20 Exceeded

SENSOR LOCATION:

Ground Level

Podium Level

Roof Level

APPENDICES



APPENDIX A: WIND TUNNEL PHOTOS



Figure 17: Existing Baseline; (Configuration 1) - View of the Model (from the south)

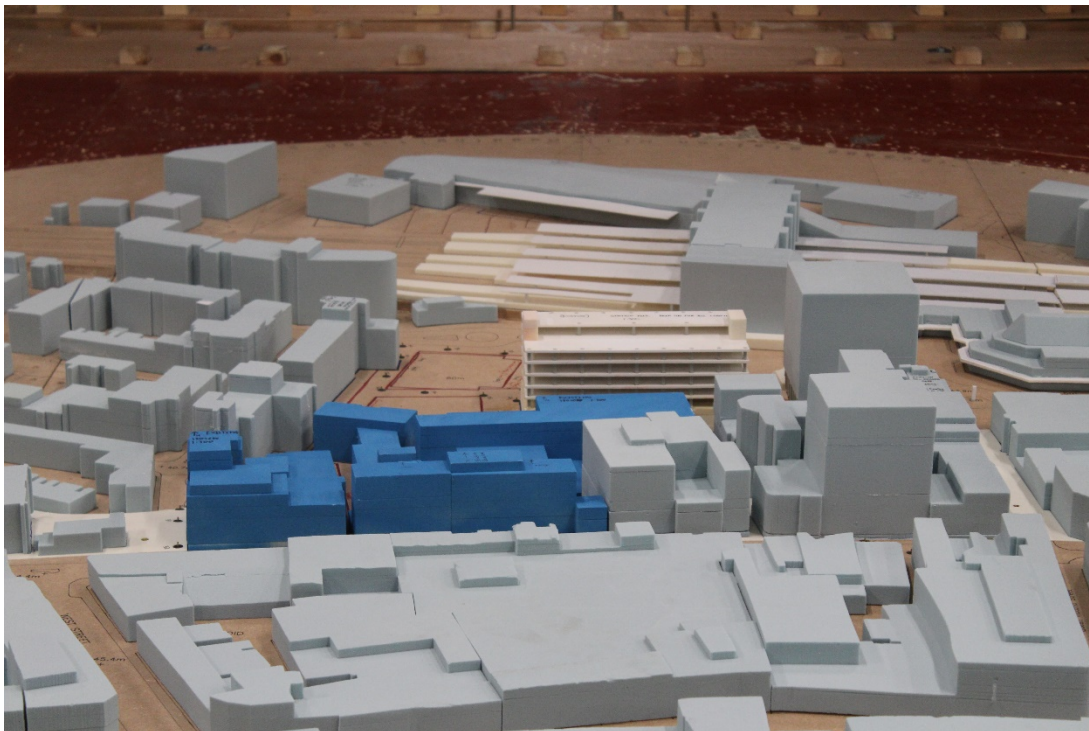


Figure 18: Existing Baseline; (Configuration 1) - View of the Model (from the south)

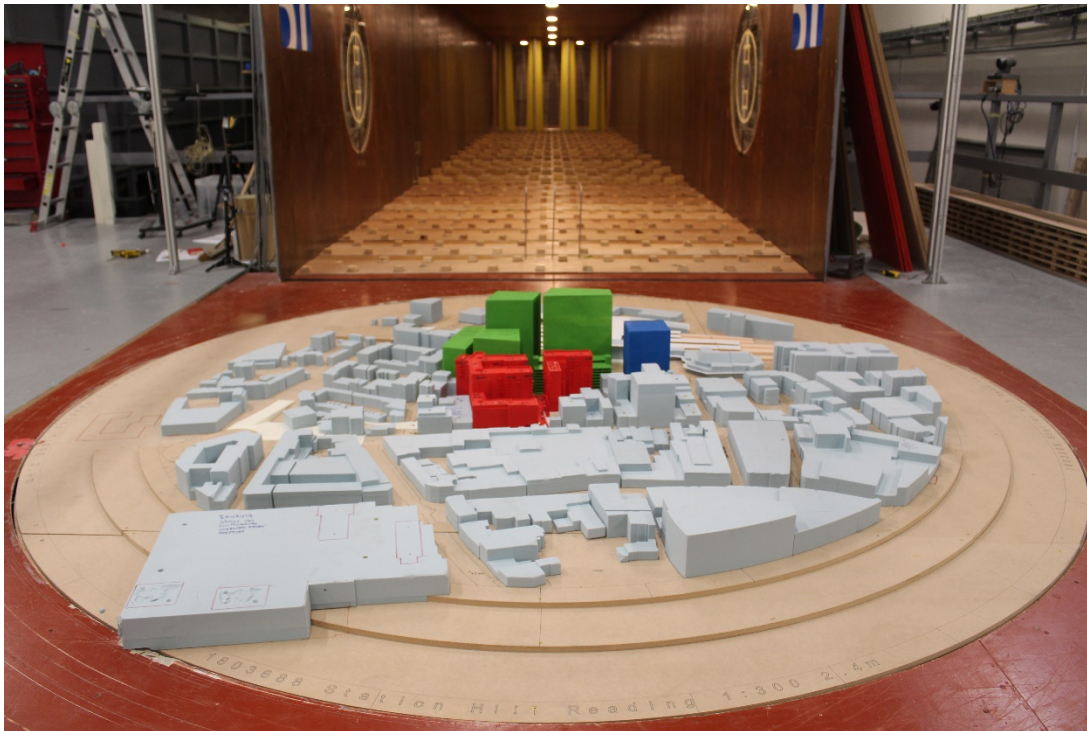


Figure 19: Proposed Development (Configuration 2) - View of the Model (from the south)

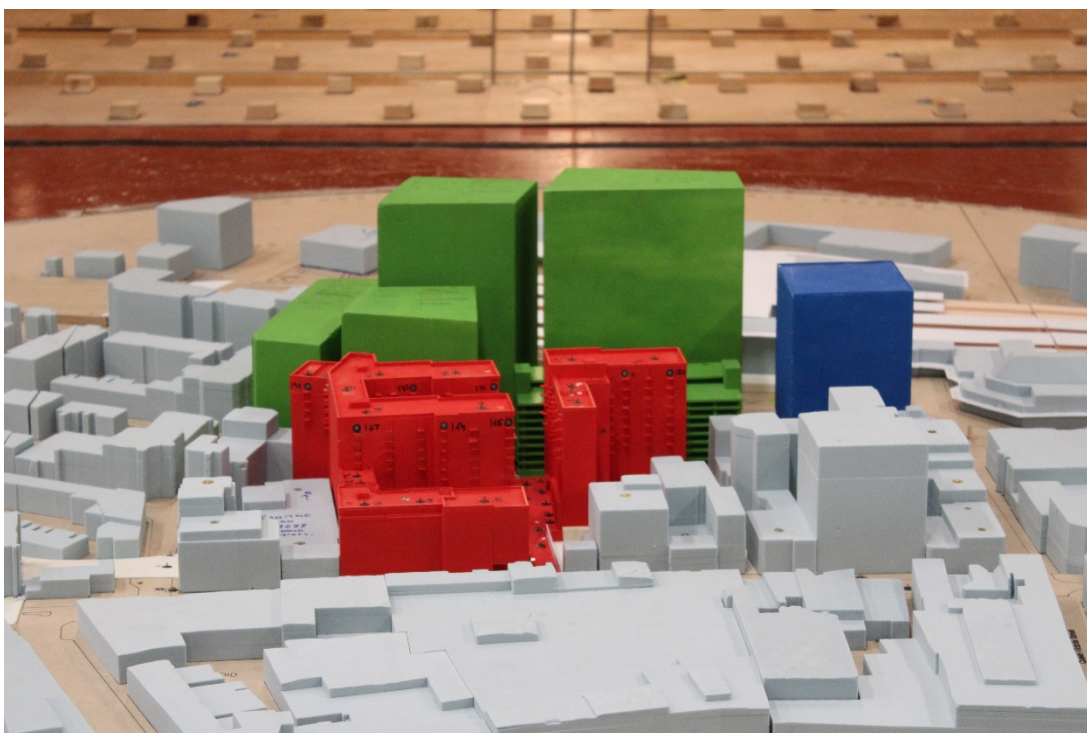


Figure 20: Proposed Development (Configuration 2) - View of the Model (from the south)

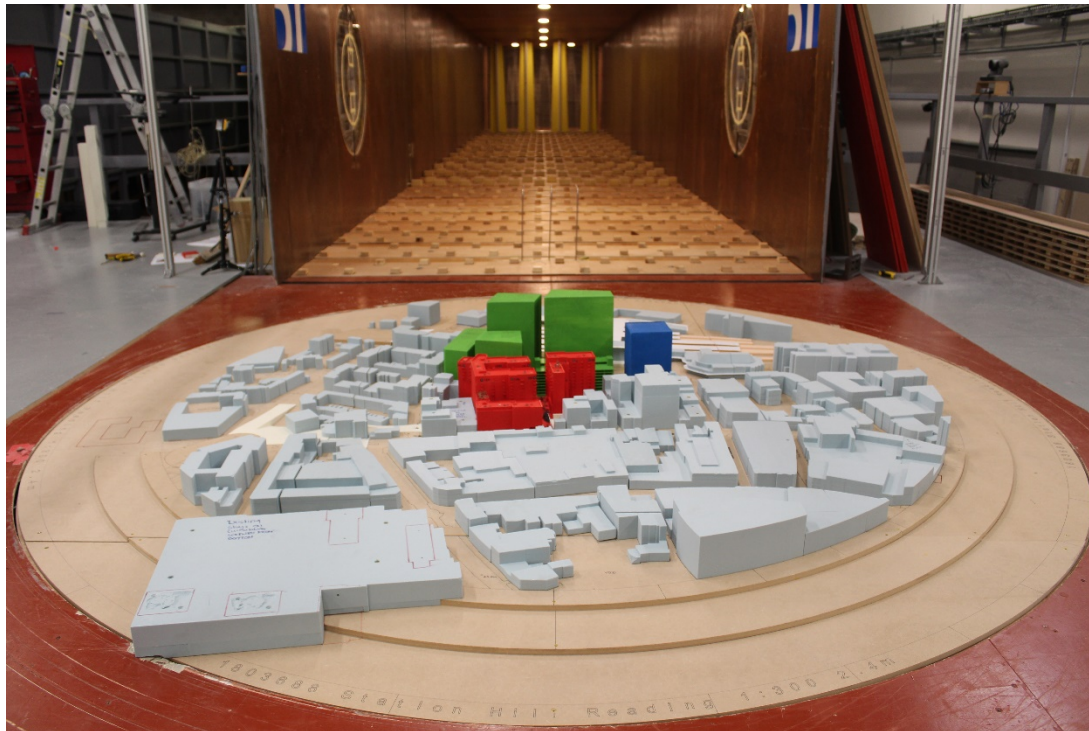


Figure 21: Proposed Development with Landscaping (Configuration 3) – View of the Model (from the south)

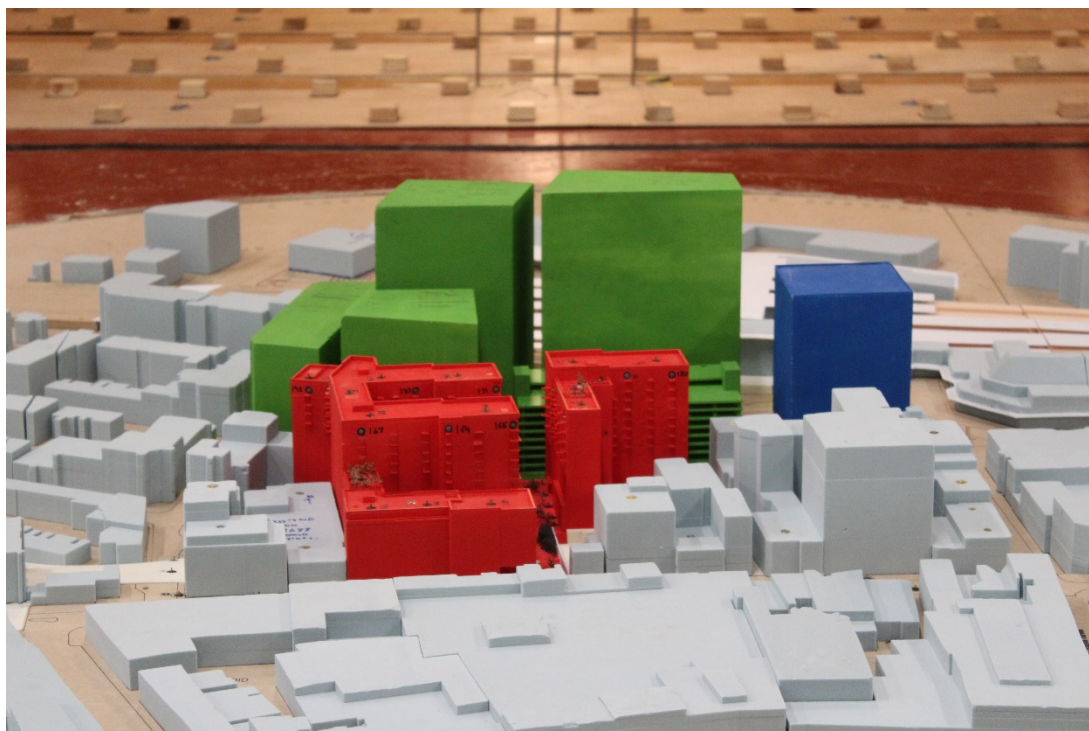


Figure 22: Proposed Development with Landscaping (Configuration 3) – View of the Model (from the south)



**Figure 23: Proposed Development with Landscaping and cumulative surrounding buildings
(Configuration 4) – View of the Model (from the south)**



**Figure 24: Proposed Development with Landscaping and cumulative surrounding buildings.
(Configuration 4) – View of the Model (from the south)**

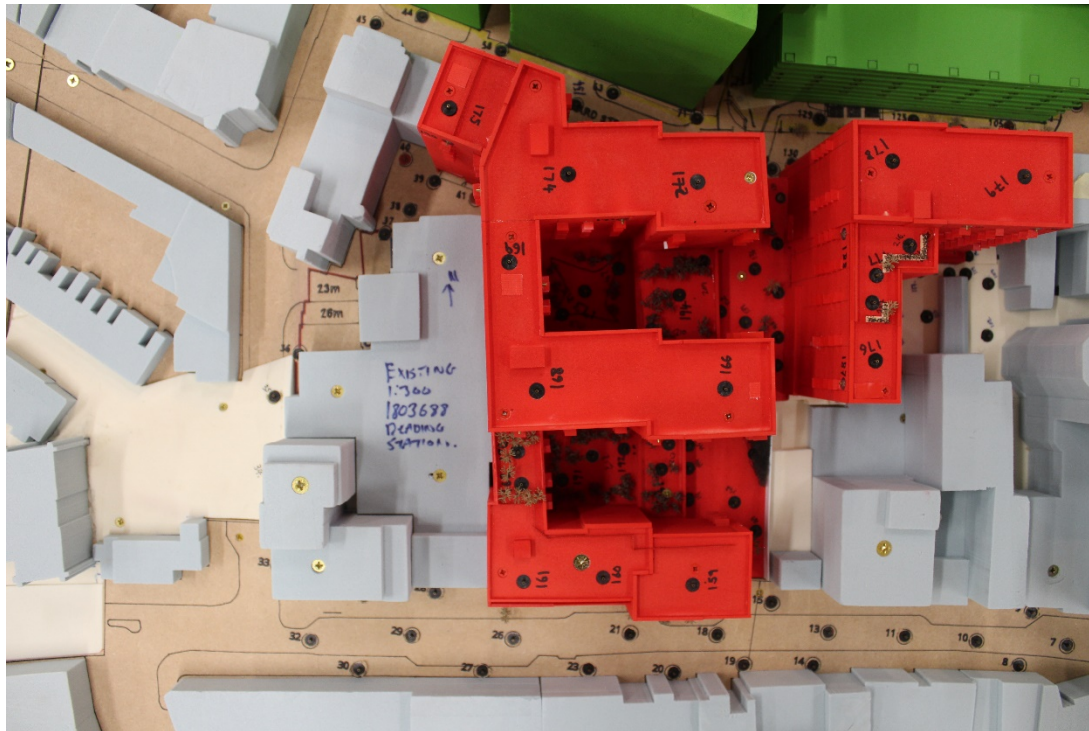


Figure 25: View of landscaping on the terraces and podia (from the south, above)

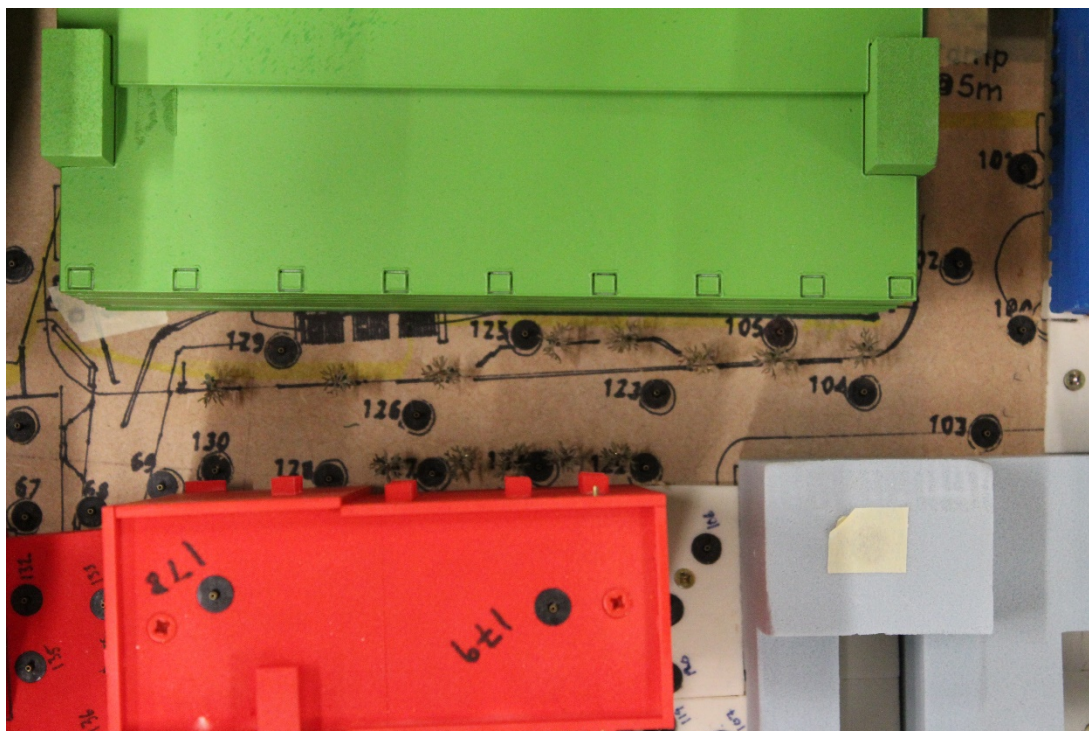


Figure 26: View of landscaping at ground level (from the south, above)

APPENDIX B: METEOROLOGICAL DATA

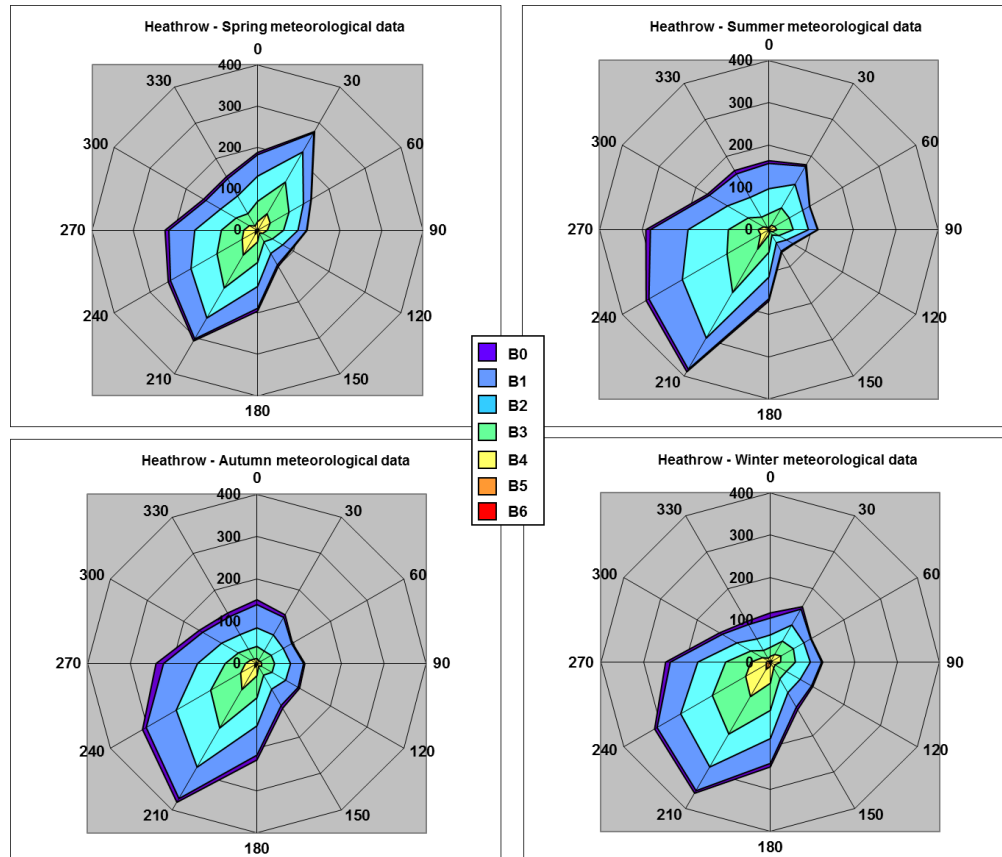


Figure 27: Seasonal wind roses from London Heathrow Airport (in Beaufort Force) - (Radial axis indicates the hours for which the stated Beaufort Range is exceeded)