

Figure 5h: Mitigation Measures Tested – (CONFIGURATION 4) Completed Proposed Development with Existing Surrounds and Proposed Landscaping – 3D West Aspect

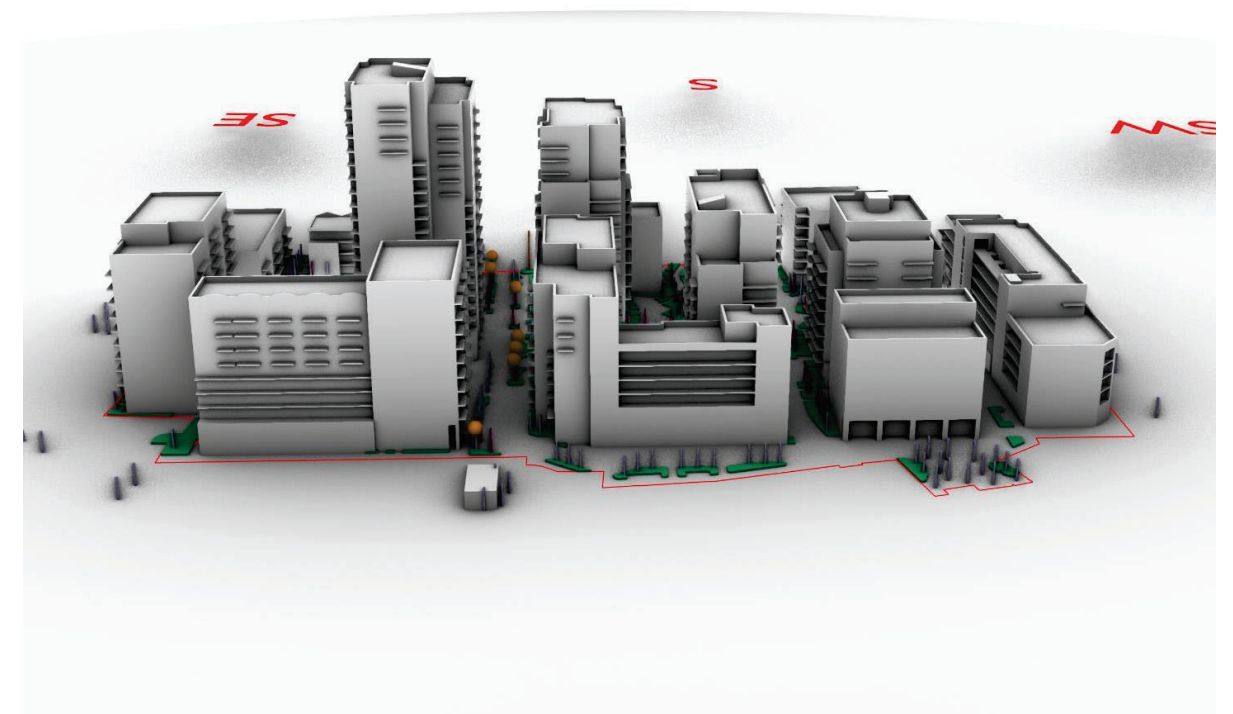
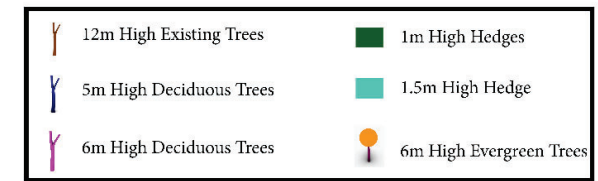


Figure 5i: Mitigation Measures Tested – (CONFIGURATION 4) Completed Proposed Development with Existing Surrounds and Proposed Landscaping – 3D North Aspect

As detailed in Section 2 of this report, the following nine configuration were tested in the wind tunnel:

- CONFIGURATION 1: The Existing Site with Existing Surrounds (the Baseline Conditions)
- CONFIGURATION 2: Interim Phase of the Proposed Development with Existing Surrounds
- CONFIGURATION 3: Completed Proposed Development with Existing Surrounds
- CONFIGURATION 4: Completed Proposed Development with Existing Surrounds and Proposed Landscaping

The results of the wind tunnel study are presented in the form of velocity coefficient directional plots in Appendix D for all study point locations and also shown on marked-up plans in Figures 6. The determination of whether the relevant criteria for pedestrian comfort or safety are also met is presented in Appendix D for each study point location.

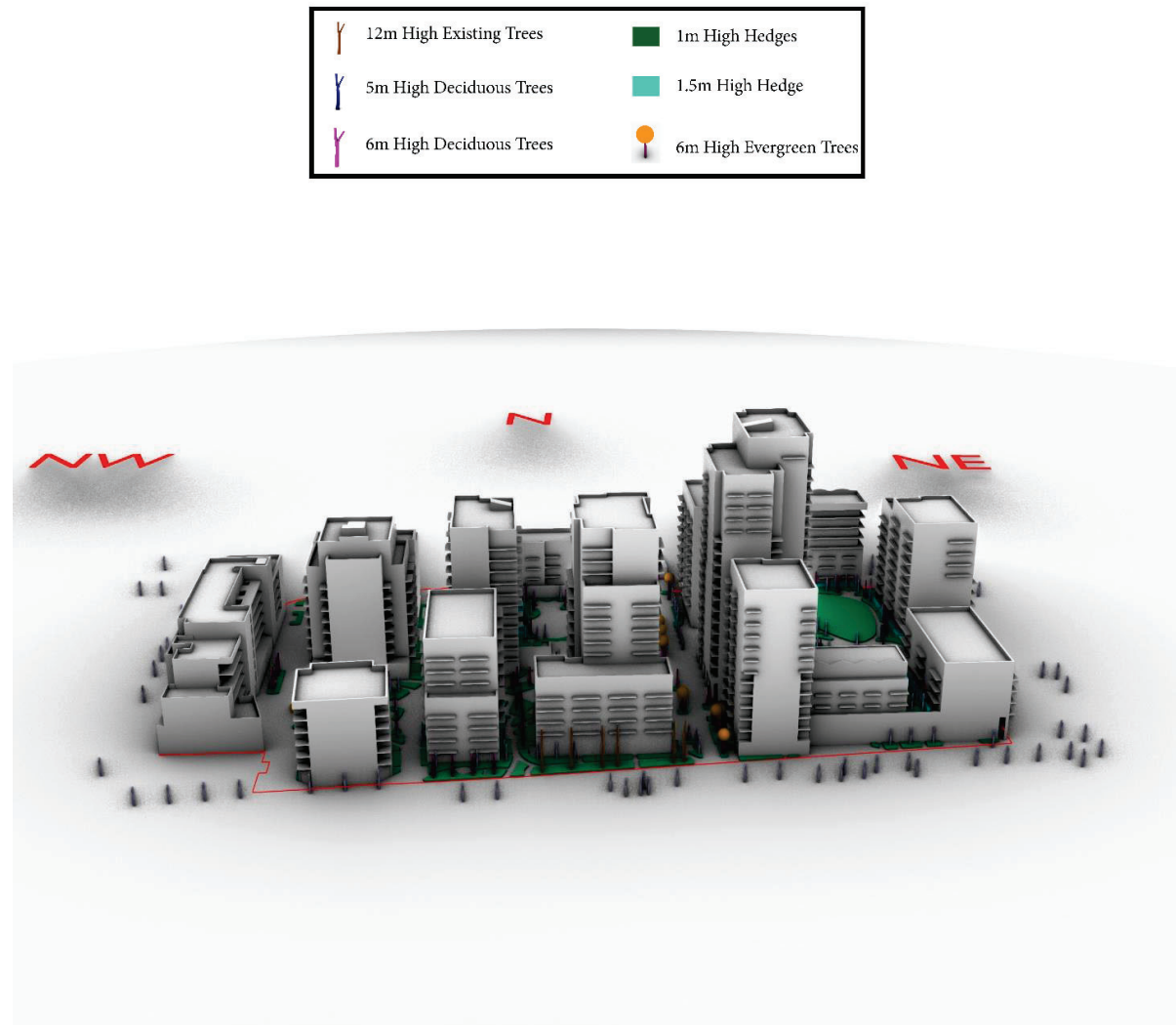


Figure 5j: Mitigation Measures Tested – (CONFIGURATION 4) Completed Proposed Development with Existing Surrounds and Proposed Landscaping – 3D South Aspect

6.1 Configuration 1: The Existing Site with Existing Surrounds

The results for the existing surrounds indicate that the wind conditions at ground level do not exceed the safety criterion within the site and surrounds. The wind conditions are rated as safe for pedestrians and cyclist use throughout the year.

The wind conditions are suitable for a combination of occasional sitting, standing, and walking during the worst season (winter). The wind conditions are suitable for the intended pedestrian activities.

6.2 Configuration 2: Interim Phase of the Proposed Development with Existing Surrounds

The results for the interim phase of the proposed development with the existing surrounds indicate that the wind conditions at two elevated levels do exceed the safety criterion (**Points P91 and 147**). The wind conditions in all other areas on and off-site are rated as safe for pedestrians and cyclist use throughout the year.

6.2.1 Thoroughfares

In the presence of the interim phase of the proposed development, at ground level, the wind conditions are suitable for strolling/walking during the worst season (winter). Hence, the wind conditions at all the thoroughfares at the site within the surrounds are suitable for pedestrian and cyclist use throughout the year.

6.2.2 Entrances

The wind microclimate outside all the entrances of the proposed development is suitable for ingress/egress throughout the year.

However, in the surrounds, the wind conditions outside the entrance of the neighbouring building (**Point 28**) exceed the comfort criterion for ingress/egress use during the worst season (winter). Point 28 represents the entrance to a neighbouring building that does present worse than existing conditions, but the entrance is raised and surrounded by existing trees and landscaping. Therefore, this will provide additional shelter and is not expected to be of concern in terms of wind comfort. As such no mitigation is recommended.

6.2.3 Seating areas/ Outdoor amenity spaces/ Play areas

The summer seasonal results show that the wind conditions are suitable for occasional sitting and standing. Hence, the wind conditions at all the seating/ Outdoor amenity and play areas at the site within the surrounds are suitable for the intended use during the summer season.

6.2.4 Roads

The wind conditions along the roads are also suitable for the intended pedestrian and cyclist use (i.e., walking) throughout the year.

6.2.5 Pedestrian Crossings

The wind conditions at the major Pedestrian Crossings tested at the site within the surrounds are suitable for pedestrian use (i.e., standing and walking) throughout the year.

6.2.6 Bus Stops

The wind conditions at all the bus stops at the site within the surrounds are suitable for pedestrian use (i.e., standing) throughout the year.

6.2.7 Podium and Terraces

With regards to pedestrian comfort, the podium and terraces are expected to be used frequently by the occupants or visitors of the development, particularly during the summer season. Hence the pedestrian activity of occasional or frequent sitting is considered as an appropriate target activity on the podium and terraces of the proposed development during the summer season.

The wind microclimate conditions on the Podium/Terrace (**Points 20, 87, 88, 89, 90, 91, 92, 93, 98 and 117**) exceed the comfort criterion for intended occupant use during the summer season.

For these areas, additional mitigation measures (e.g. balustrades and/or soft landscaping) are recommended to provide further shelter for the intended occupant use.

6.2.8 Private balconies

The pedestrian activity of occasional sitting is considered as an appropriate target activity on the private balconies of the proposed development during the summer season.

The wind microclimate conditions on balcony location **Point 145** is suitable for intended occupant use during the summer season.

The wind microclimate conditions on the balcony locations (**Points 95, 96, 97, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 110, 111, 112, 114, 146, 147, 148, 149 and 150**) exceed the comfort criterion for intended occupant use during the summer season.

For these areas, additional mitigation measures (e.g. balustrades and/or side screening) are recommended to provide further shelter for the intended occupant use.

As a general note, the use of loose glass-tops and light-weight sheets or covers (including loose BBQ lids) is not appropriate on high-rise outdoor terraces, balconies, and podiums. Furthermore, lightweight furniture is not recommended unless it is securely attached to the balcony or terrace floor slab.

6.3 Configuration 3: Completed Proposed Development with Existing Surrounds

The results for the completed proposed development with the existing surrounds indicate that the wind conditions at three elevated levels do exceed the safety criterion (**Points P20, 102 and P143**). The wind conditions in all other areas on and off-site are rated as safe for pedestrians and cyclist use throughout the year.

6.3.1 Thoroughfares

In the presence of the completed proposed development with the existing surrounds, at ground level, the wind conditions are suitable for strolling/walking during the worst season (winter). Hence, the wind conditions at all the thoroughfares at the site within the surrounds are suitable for pedestrian and cyclist use throughout the year.

6.3.2 Entrances

The wind microclimate outside all entrances except 1 location within the proposed development is suitable for ingress/egress throughout the year. **Point 11** represents a very marginal exceedance and with the inclusion of the existing trees and landscaping within this area it is anticipated this will be of no concern. Therefore, no mitigation is recommended.

Moreover, in the surrounds, the wind conditions outside the entrance of the neighbouring building (**Point 28**) improve and no longer exceed the comfort criterion for ingress/egress use during the worst season (winter). Therefore, during the completed stage of the development this area is of no concern.

6.3.3 Seating areas/ Outdoor amenity spaces/ Play areas

The summer seasonal results show that the wind conditions are suitable for frequent sitting, occasional sitting and standing during the summer season.

For most areas, the wind conditions are suitable for intended usage. However, there are outdoor café and seating areas where the wind conditions exceed the appropriate target activity of frequent sitting and occasional sitting (**Points 48, 49, 57, 58, 66, 67 and 69**).

However, all would be suitable for standing comfort criteria activities during the summer season given the use of these spaces for commercial spill-out café with no play/seating area. Additional mitigation measures (including soft-landscaping and/or screens) could be introduced to provide additional shelter to these areas. A suitable alternative to the inclusion of additional mitigation measures would be to remove the seating and change the intended use.

6.3.4 Roads

The wind conditions along the roads are also suitable for the intended pedestrian and cyclist use (i.e., walking) throughout the year.

6.3.5 Pedestrian Crossings

The wind conditions at the major Pedestrian Crossings tested at the site within the surrounds are suitable for pedestrian use (i.e., standing and walking) throughout the year.

6.3.6 Bus Stops

The wind conditions at all the bus stops at the site within the surrounds are suitable for pedestrian use (i.e., standing) throughout the year.

6.3.7 Podium and Terraces

With regards to pedestrian comfort, the podium and terraces are expected to be used frequently by the occupants or visitors of the development, particularly during the summer season. Hence the pedestrian activity of occasional or frequent sitting is considered as an appropriate target activity on the podium and terraces of the proposed development during the summer season.

The wind microclimate conditions on the Podium/Terrace (**Points 4, 5, 20, 84, 86, 87, 88, 89, 90, 91, 92, 93, 98, 117 and 128**) exceed the comfort criterion for intended occupant use during the summer season.

For these areas, additional mitigation measures (e.g. balustrades and/or soft landscaping) are recommended to provide further shelter for the intended occupant use.

6.3.8 Private balconies

The pedestrian activity of occasional sitting is considered as an appropriate target activity on the private balconies of the proposed development during the summer season.

The wind microclimate conditions on the balcony locations (**Points 121,124,125,126,133, 136, 140, 142, 144 and 145**), is suitable for intended occupant use during the summer season.

The wind microclimate conditions on the balcony locations (**Points 94, 95, 96, 97, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 110, 111, 112, 113, 114, 115, 116, 119, 120, 122, 123, 127, 128, 129, 130, 131, 132, 134, 135, 137, 138, 139, 141, 143, 146, 147, 148, 149, 150**) exceed the comfort criterion for intended occupant use during the summer season.

For these areas, additional mitigation measures (e.g. balustrades and/or side screening) are recommended to provide further shelter for the intended occupant use.

As a general note, the use of loose glass-tops and light-weight sheets or covers (including loose BBQ lids) is not appropriate on high-rise outdoor terraces, balconies, and podiums. Furthermore, lightweight furniture is not recommended unless it is securely attached to the balcony or terrace floor slab.

6.4 Configuration 4: Completed Proposed Development with Existing Surrounds and Proposed Landscaping

The results for the completed proposed development with the existing surrounds and Proposed Landscaping indicate that the wind conditions at Two elevated levels do exceed the safety criterion (**Points P102 and 143**). The wind conditions in all other areas on and off-site are rated as safe for pedestrians and cyclist use throughout the year.

6.4.1 Thoroughfares

In the presence of the completed proposed development with the existing surrounds, at ground level, the wind conditions are suitable for strolling/walking during the worst season (winter). Hence, the wind conditions at all the thoroughfares at the site within the surrounds are suitable for pedestrian and cyclist use throughout the year.

6.4.2 Entrances

The wind microclimate outside all entrances except 2 locations within the proposed development is suitable for ingress/egress throughout the year. **Points 38 and 53** represent a marginal exceedance and with the inclusion of further local landscaping within this area, it is anticipated this will be of no concern.

6.4.3 Seating areas/ Outdoor amenity spaces/ Play areas

The summer seasonal results show that the wind conditions are suitable for frequent sitting, occasional sitting and standing during the summer season.

For most areas, the wind conditions are suitable for intended usage. However, there are outdoor café and seating areas where the wind conditions exceed the appropriate target activity of frequent sitting and occasional sitting **(Points 48, 49, 57, 58, 66 and 69)**.

However, all would be suitable for standing comfort criteria activities during the summer season given the use of these spaces for commercial spill-out café with no play/seating area. Additional mitigation measures (including soft-landscaping and/or screens) could be introduced to provide additional shelter to these areas. A suitable alternative to the inclusion of additional mitigation measures would be to remove the seating and change the intended use.

6.4.4 Roads

The wind conditions along the roads are also suitable for the intended pedestrian and cyclist use (i.e., walking) throughout the year.

6.4.5 Pedestrian Crossings

The wind conditions at the major Pedestrian Crossings tested at the site within the surrounds are suitable for pedestrian use (i.e., standing and walking) throughout the year.

6.4.6 Bus Stops

The wind conditions at all the bus stops at the site within the surrounds are suitable for pedestrian use (i.e., standing) throughout the year.

6.4.7 Podium and Terraces

With regards to pedestrian comfort, the podium and terraces are expected to be used frequently by the occupants or visitors of the development, particularly during the summer season. Hence the pedestrian activity of occasional or frequent sitting is considered as an appropriate target activity on the podium and terraces of the proposed development during the summer season.

The wind microclimate conditions on the Podium/Terrace **(Points 4, 5, 20, 84, 86, 87, 89, 90, 91, 98, 117 and 128)** exceed the comfort criterion for intended occupant use during the summer season.

For these areas, additional mitigation measures (e.g. balustrades and/or soft landscaping) are recommended to provide further shelter for the intended occupant use.

6.4.8 Private balconies

The pedestrian activity of occasional sitting is considered as an appropriate target activity on the private balconies of the proposed development during the summer season.

The wind microclimate conditions on the balcony locations **(Points 111, 114, 121,124, 126,128, 133, 136, 140, 142, 144, 145 and 147)**, is suitable for intended occupant use during the summer season.

The wind microclimate conditions on the balcony locations **(Points 94, 95, 96, 97, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 110, 112, 113, 115, 116, 119, 120, 122, 123, 125, 127, 129, 130, 131, 132, 134, 135, 137, 138, 139, 141, 143, 146, 148, 149, 150)** exceed the comfort criterion for intended occupant use during the summer season.

For these areas, additional mitigation measures (e.g. balustrades and/or side screening) are recommended to provide further shelter for the intended occupant use.

As a general note, the use of loose glass-tops and light-weight sheets or covers (including loose BBQ lids) is not appropriate on high-rise outdoor terraces, balconies, and podiums. Furthermore, lightweight furniture is not recommended unless it is securely attached to the balcony or terrace floor slab.

6.5 Wind Tunnel Results – Annual Safety



Figure 6a: Wind Tunnel Results – The Existing Site with Existing Surrounds, Safety Results, Annual, Ground



Figure 6b: Wind Tunnel Results – Interim Phase of the Proposed Development with Existing Surrounds, Safety Results, Annual, Ground



Figure 6c: Wind Tunnel Results – Interim Phase of the Proposed Development with Existing Surrounds, Safety Results, Annual, Elevated Amenity



Figure 6d: Wind Tunnel Results – Interim Phase of the Proposed Development with Existing Surrounds, Safety Results, Annual, Elevated Balcony Low



Figure 6e: Wind Tunnel Results – Interim Phase of the Proposed Development with Existing Surrounds, Safety Results, Annual, Elevated Balcony Top



Figure 6f: Wind Tunnel Results – Interim Phase of the Proposed Development with Existing Surrounds, Safety Results, Annual, Elevated Terraces Top



Figure 6g: Wind Tunnel Results - Completed Proposed Development with Existing Surrounds, Safety Results, Annual, Ground



Figure 6h: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds, Safety Results, Annual, Elevated Amenity



Figure 6i: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds, Safety Results, Annual, Elevated Balcony Low



Figure 6j: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds, Safety Results, Annual, Elevated Balcony Top



Figure 6k: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds, Safety Results, Annual, Elevated Terraces Top



Figure 6l: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds and Proposed Landscaping, Safety Results, Annual, Ground



Figure 6m: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds and Proposed Landscaping, Safety Results, Annual, Elevated Amenity

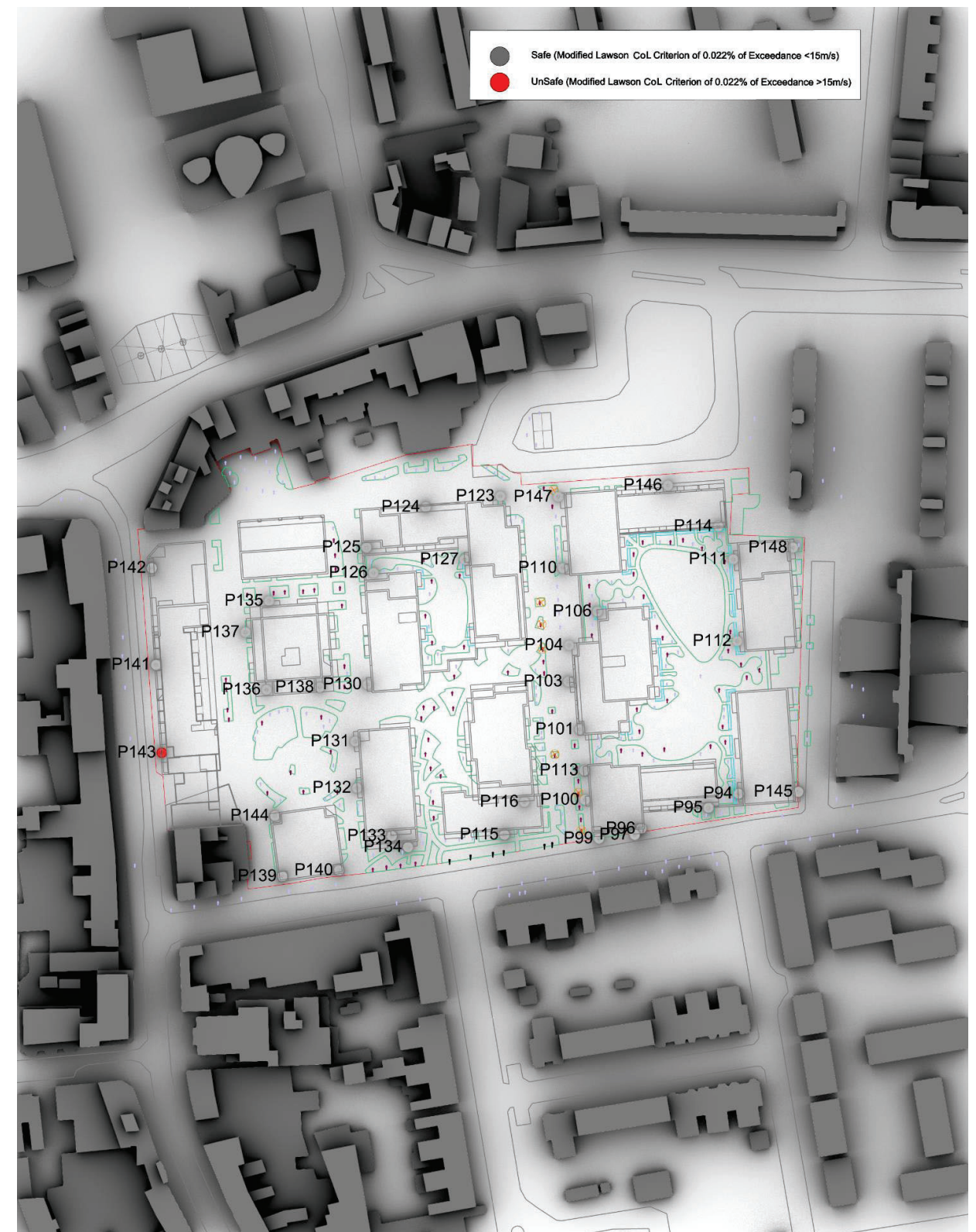


Figure 6n: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds and Proposed Landscaping, Safety Results, Annual, Elevated Balcony Low



Figure 6o: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds and Proposed Landscaping, Safety Results, Annual, Elevated Balcony Top



Figure 6p: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds and Proposed Landscaping, Safety Results, Annual, Elevated Terraces Top

6.6 Wind Tunnel Results – Winter Comfort

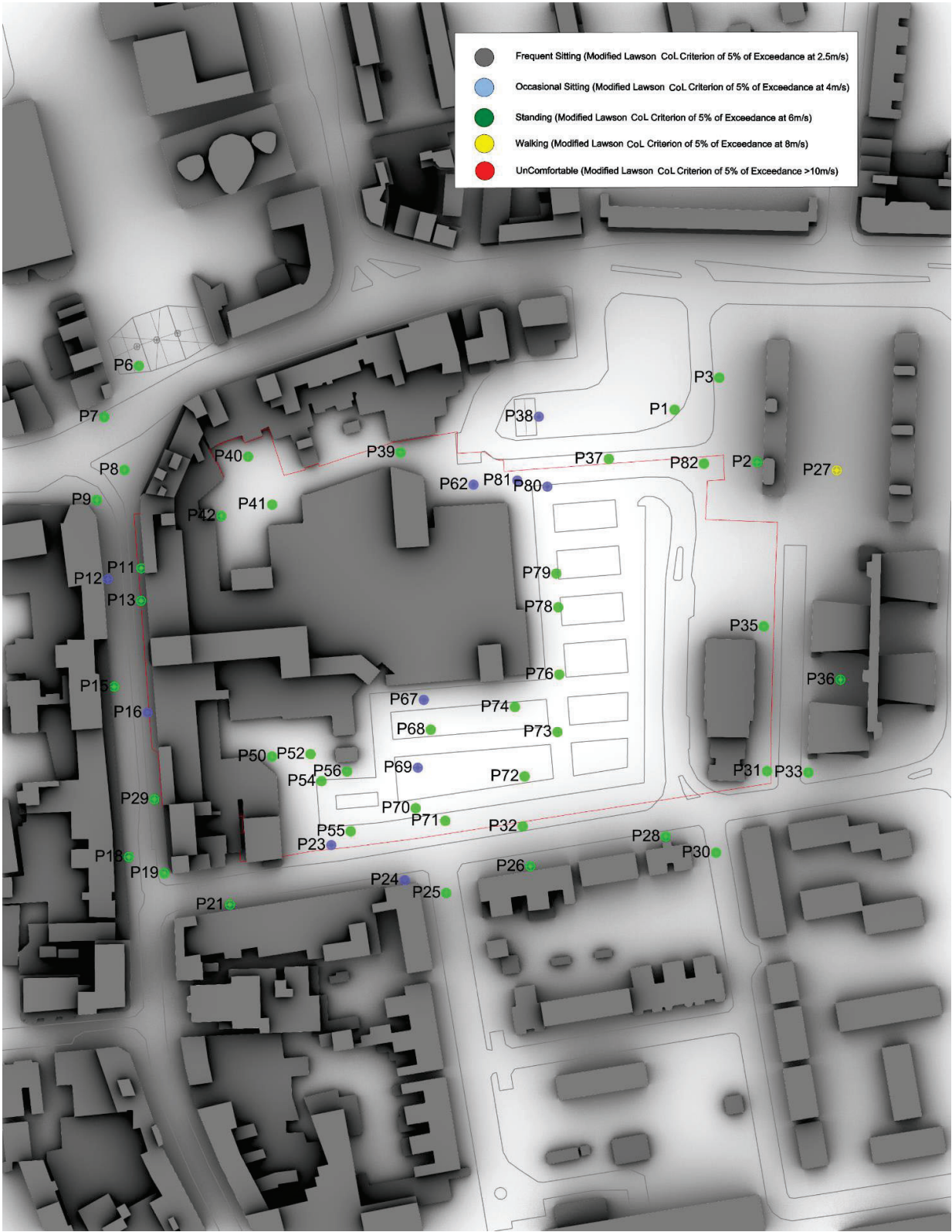


Figure 6q: Wind Tunnel Results – The Existing Site with Existing Surrounds, Comfort Results, Winter Season. Ground

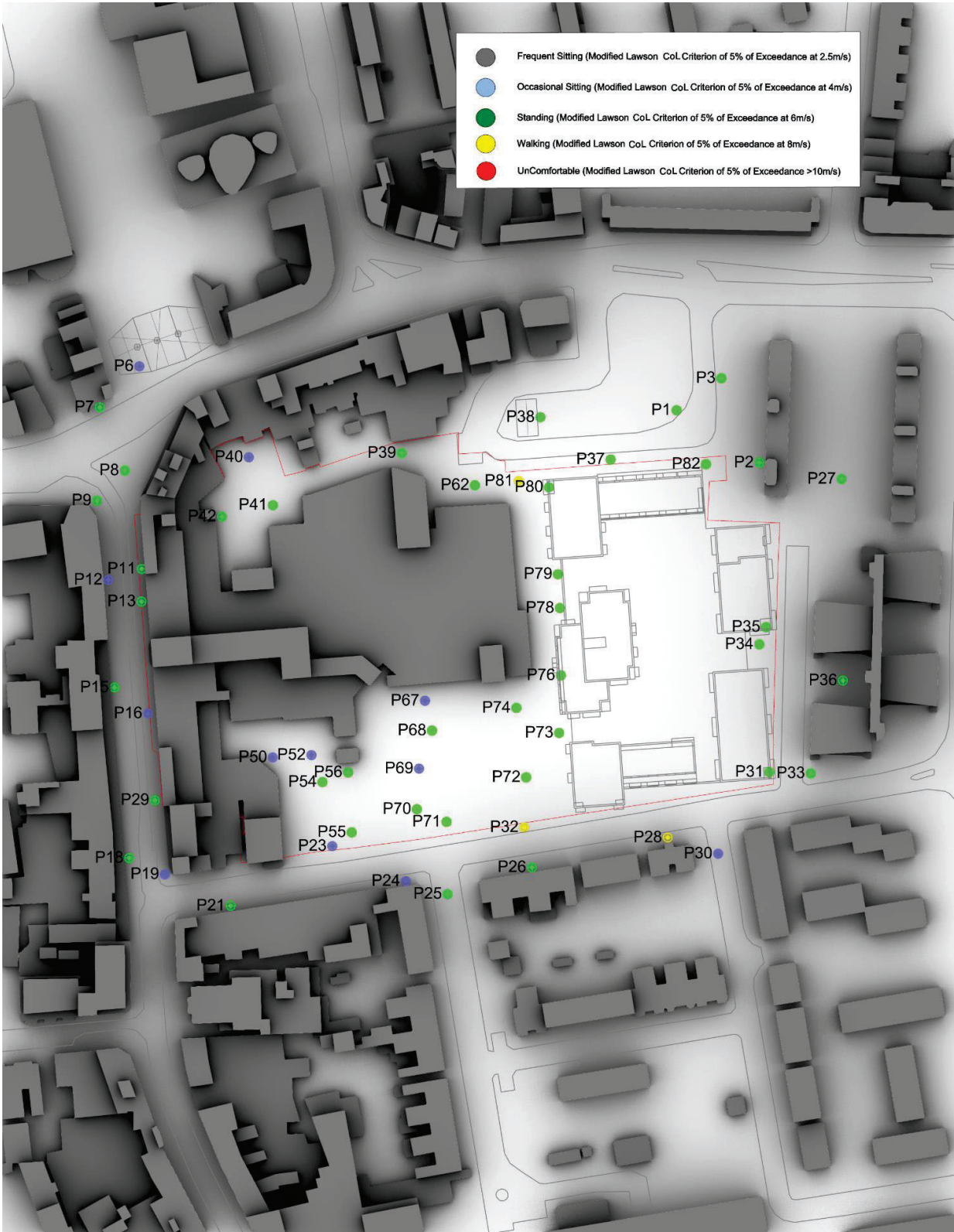


Figure 6r: Wind Tunnel Results – Interim Phase of the Proposed Development with Existing Surrounds, Comfort Results, Winter Season, Ground

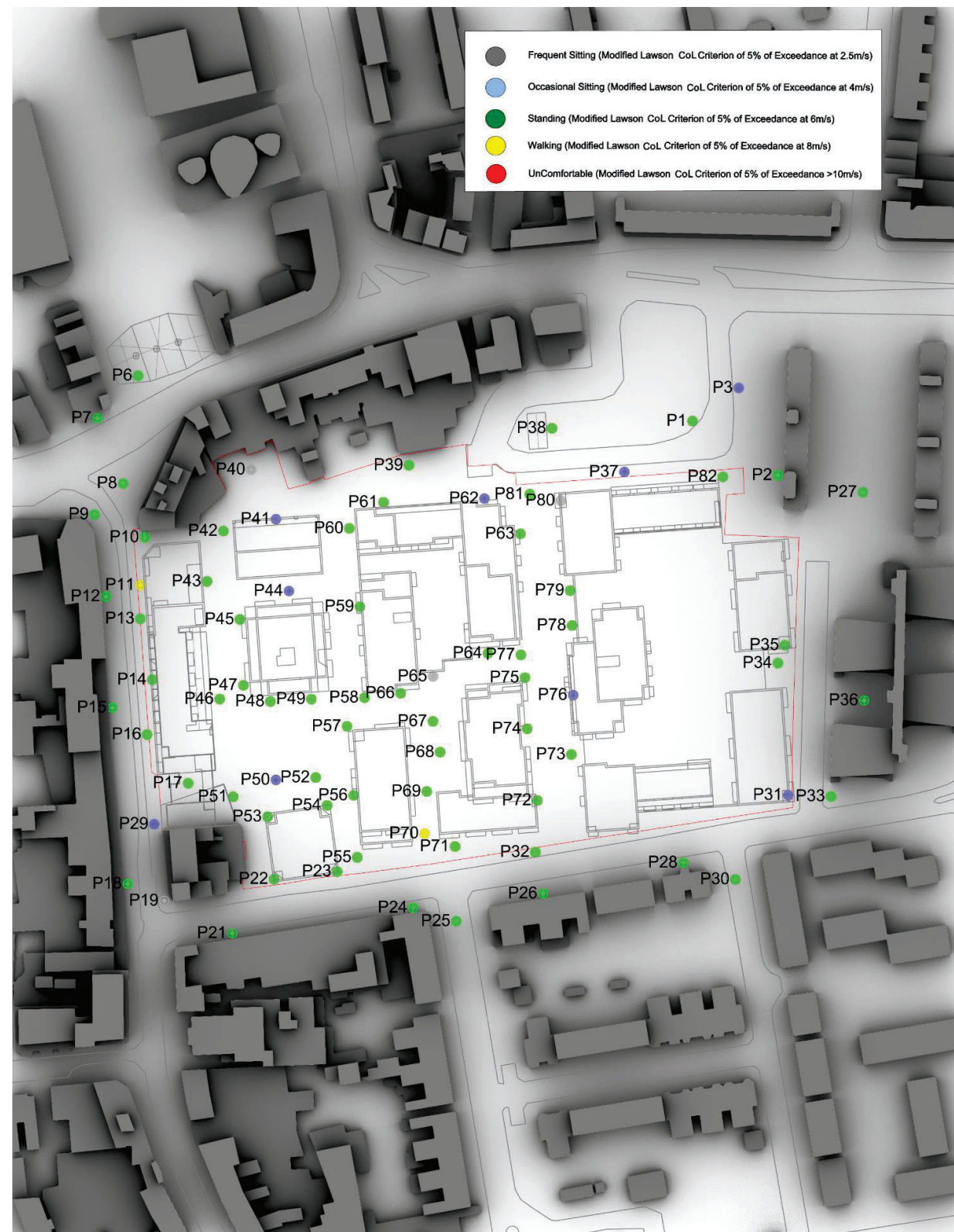


Figure 6s: Wind Tunnel Results - Completed Proposed Development with Existing Surrounds, Comfort Results, Winter Season, Ground

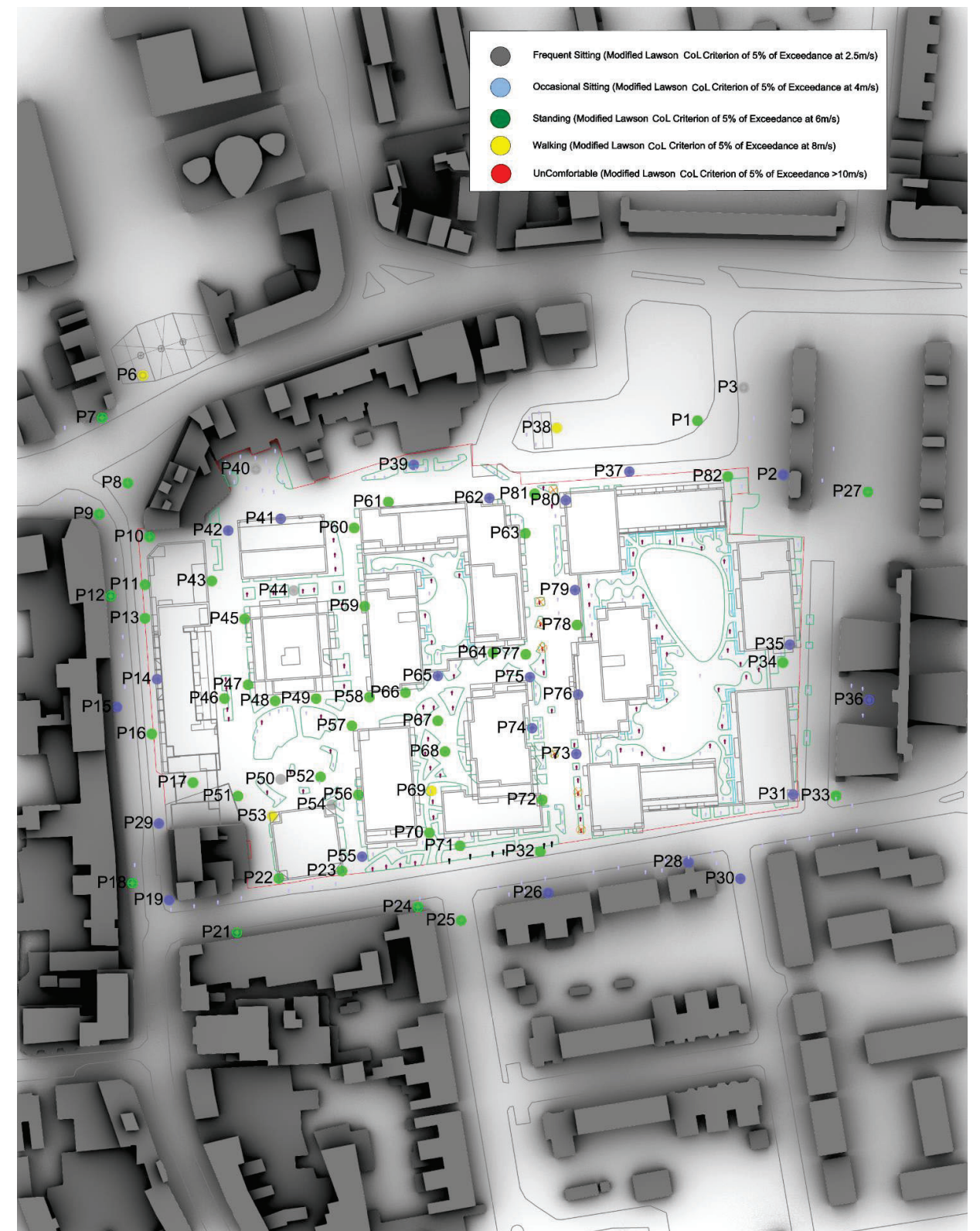


Figure 6t: Wind Tunnel Results – Completed Proposed Development with Existing Surrounds and Proposed Landscaping, Comfort Results, Winter Season, Ground

6.7 Wind Tunnel Results – Summer Comfort

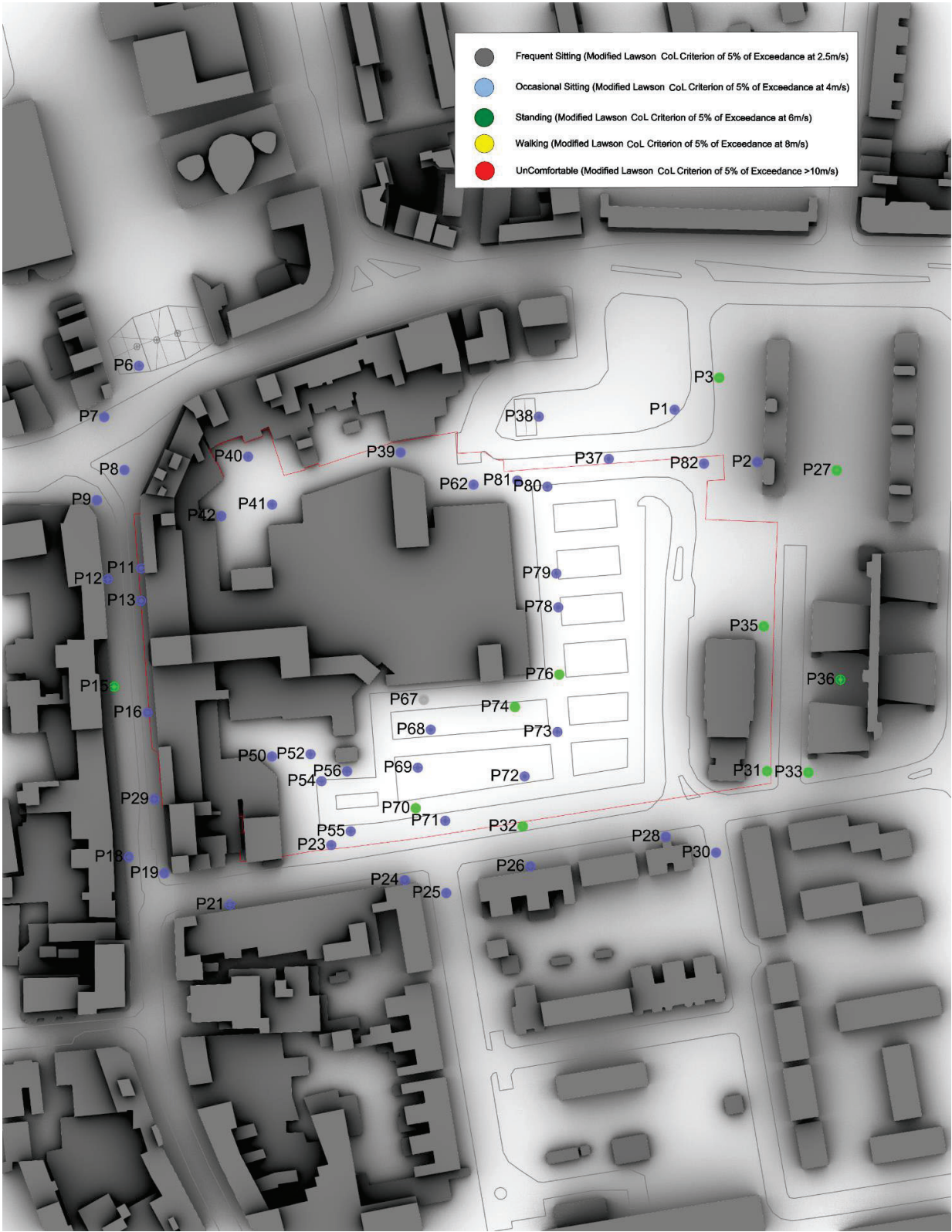


Figure 6u: Wind Tunnel Results – The Existing Site with Existing Surrounds, Comfort Results, Summer Season, Ground

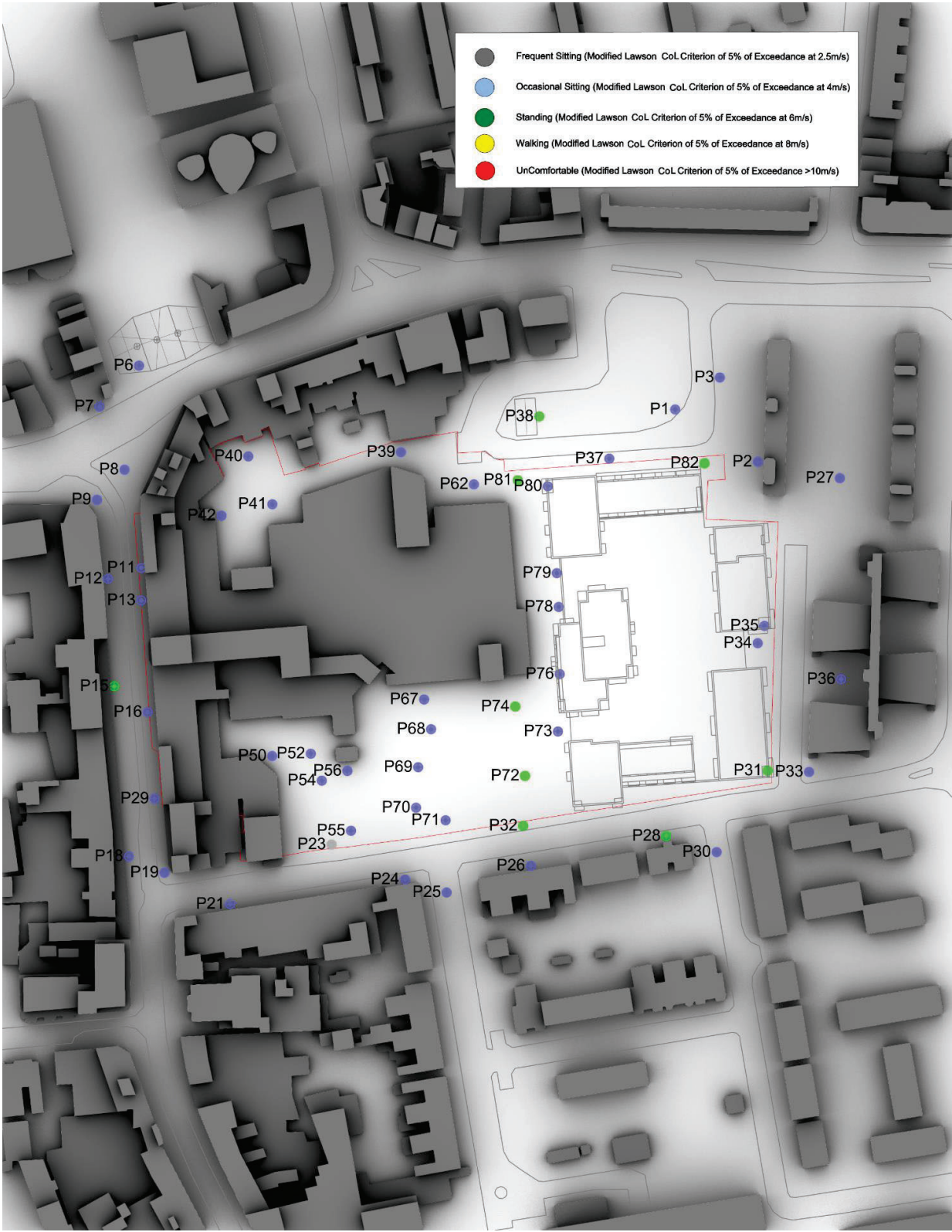


Figure 6v: Wind Tunnel Results – Interim Phase of the Proposed Development with Existing Surrounds, Comfort Results, Summer Season, Ground

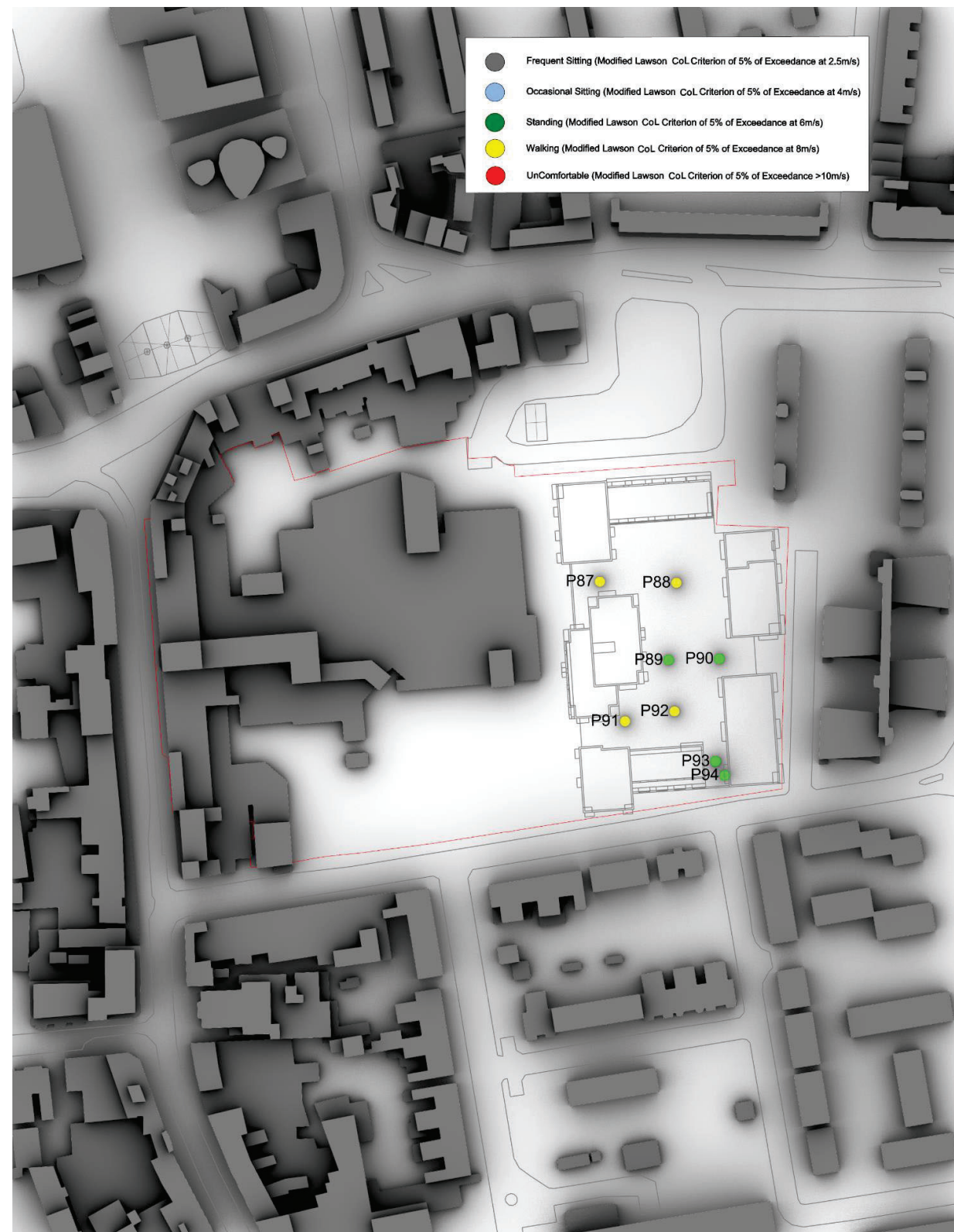


Figure 6w: Wind Tunnel Results – Interim Phase of the Proposed Development with Existing Surrounds, Comfort Results, Summer Season, Elevated Amenity

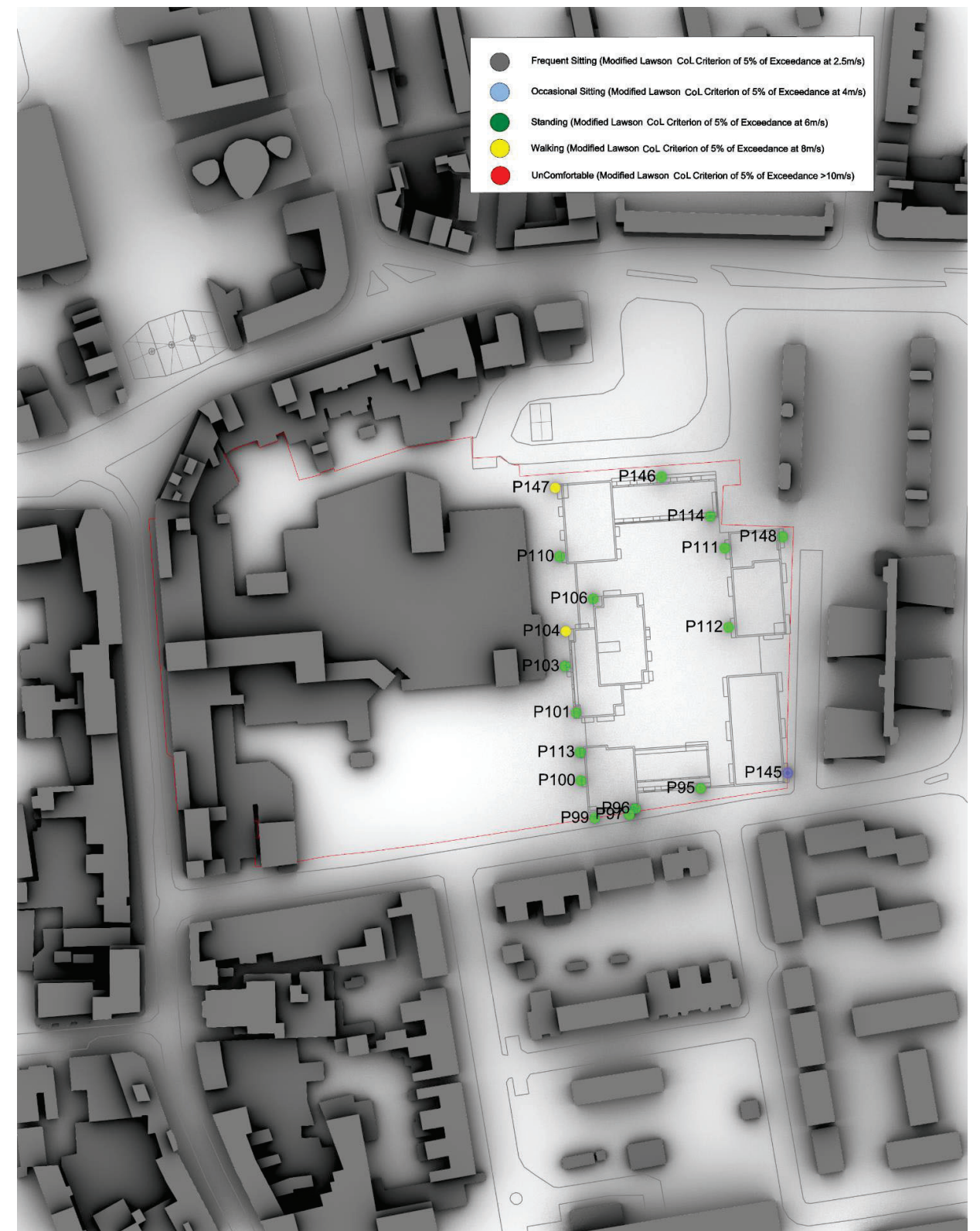


Figure 6x: Wind Tunnel Results – Interim Phase of the Proposed Development with Existing Surrounds, Comfort Results, Summer Season, Elevated Balcony Low

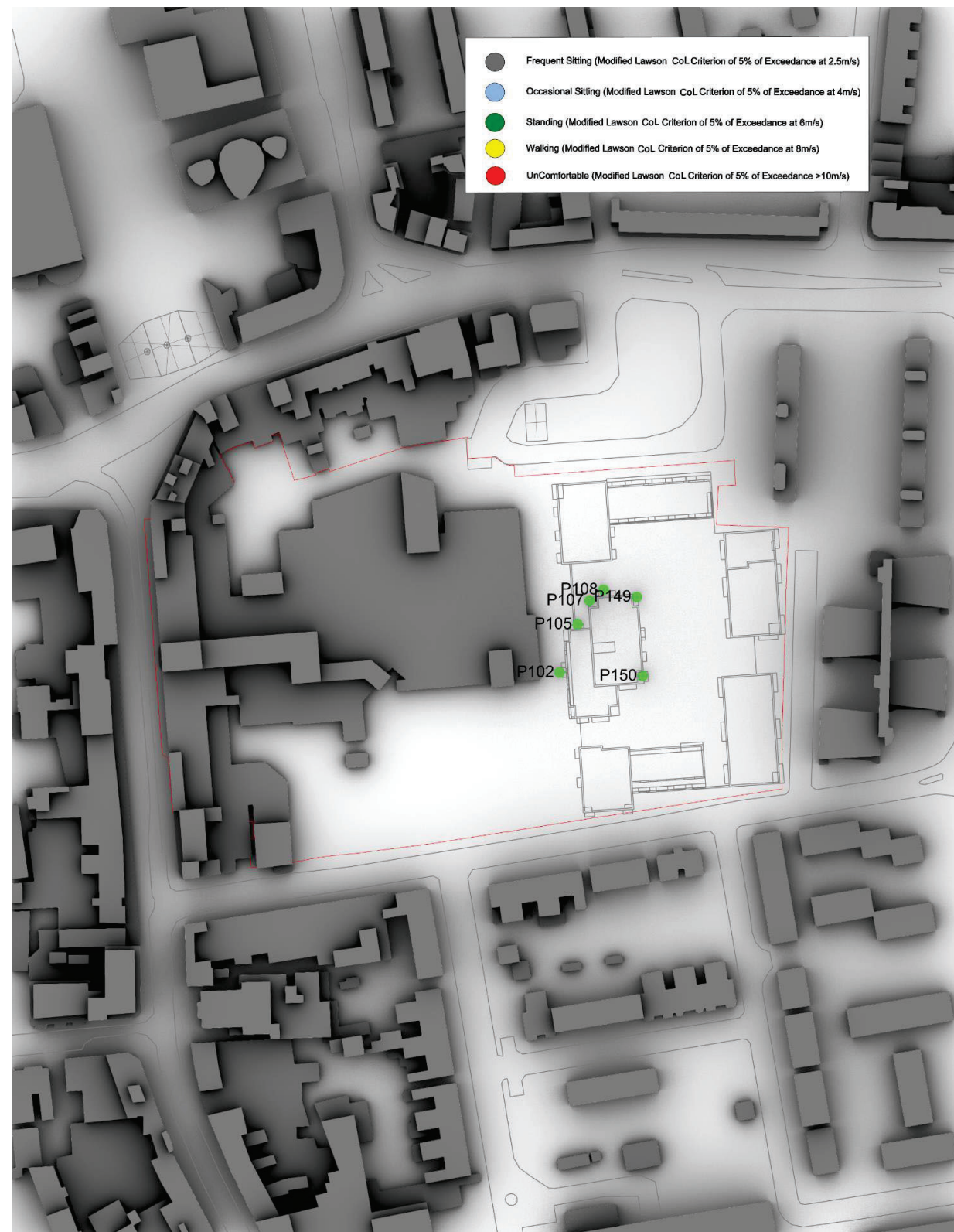


Figure 6y: Wind Tunnel Results – Interim Phase of the Proposed Development with Existing Surrounds, Comfort Results, Summer Season, Elevated Balcony Top

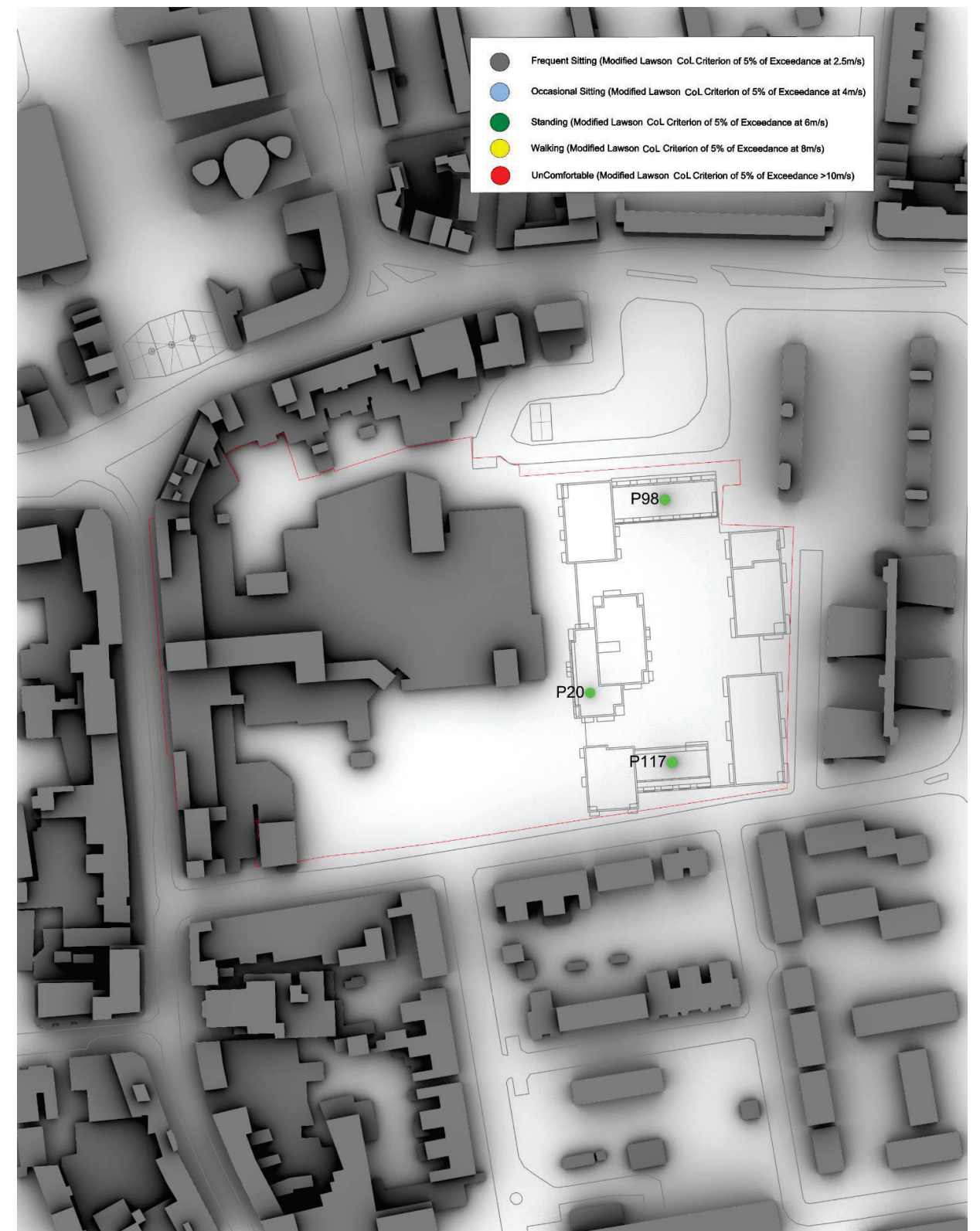


Figure 6z: Wind Tunnel Results – Interim Phase of the Proposed Development with Existing Surrounds, Comfort Results, Summer Season, Elevated Terraces Top