

ACOUSTIC TECHNICAL NOTE



Reference:	11695.ATN03.ADO.0
Revision:	0
From:	Helen Sheldon
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Project:	389 Manor Road, Richmond
Subject:	Overheating and Acoustics

1.0 INTRODUCTION

A new residential-led, mixed-use development is proposed at the site of the existing Homebase store located at 389 Manor Road, Richmond. The development consists of 4 residential blocks ranging from 3 to 10 storeys high. Several of these blocks will contain retail/office/community spaces at ground floor.

The site is bordered to the north-west by the District and Overground North London lines, which runs between Kew Gardens and Richmond. Meanwhile, the southern site boundary is bordered by the South Western Railway Waterloo to Reading line. The eastern site boundary is bordered by Manor Road.

This note looks at the issues associated with overheating specifically in relation to the acoustic design.

Background

Planning Condition 55, issued by the London Borough of Richmond-upon-Thames in Planning Application No.19/0510/FUL, refers to overheating. It states that mitigation measures outlined in Section 8.2 of Hoare Lee's *Energy Strategy - Revised* (July 2020) should be implemented and retained for the life of the development. These overheating mitigation measures include the use of boosted MVHR units and the opening of windows.

An assessment has previously been carried out with regard to Acoustics Ventilation and Overheating Guide (AVO), which was detailed in Acoustic Technical Note 11695.ATN01.AVO.11042022.DEF. It was noted at that time that Approved Document O (ADO) was to be implemented imminently, although at that time it was not expected that this site would be required to comply with the requirements of ADO.

Since that time, due to changes in programme, it is understood that the site will be required to comply with the requirements of ADO, and this note summarises the AVO assessment previously carried out, expanded to also cover the requirements of ADO.

2.0 NOISE SURVEY AND NOISE MODELLING

RBA Acoustics have undertaken an unattended noise survey around the site to determine the existing noise climate arising from nearby noise sources. These sources are chiefly the District and Overground Railway Lines to the north-west of site, the Waterloo Railway to the south, and road traffic noise from Manor Road to the east.

In order to predict the noise levels at the different façades with varying heights, an acoustic model of the proposed site, including all proposed buildings and existing surrounding buildings was generated using the CadnaA platform.

The model allows the various sound sources, which are the main surrounding roads and the railway lines, to be calibrated according to on-site measurements. The proposed buildings were subsequently built into the model and calculations using the methodology outlined in ISO9613 were undertaken to predict façade incident noise levels at all floor heights and to produce noise contours for the site and surrounding area.

3.0 ACOUSTICS, VENTILATION AND OVERHEATING

As part of our acoustic assessment of the proposed development, RBA Acoustics have been commissioned to undertake an assessment regarding the risk of overheating.

Many buildings require closed windows to provide good internal acoustic conditions, however, opening a window is the normal way to keep a building cool during the warmer summer months. These opposing requirements have become a major issue in the design of buildings, in particular for housing, especially given the general desire to avoid the widespread use of mechanical cooling.

The Acoustics, Ventilation & Overheating (AVO) guide by the Association of Noise Consultants (ANC) attempts to address this need for an integrated approach to consider noise, ventilation, and overheating. The guide involves a two-level approach to address issues of overheating with respect to noise.

3.1 AVO Level 1 Criteria

In order to assess the possibility of overheating within the development it is necessary to predict internal ambient noise levels and compare these with the criteria set by BS 8233:2014 *Guidance on Sound insulation and noise reduction for buildings*. In line with the guidance provided by BS8233:2014 it is appropriate to increase these values by 5dB to account for the natural increase in internal ambient noise levels from opening a window.

Additionally, it is reasonable to assume that a partially open windows provides a reduction in sound of approximately 13 dBA. Therefore, in order to achieve internal noise levels in line with BS8233:2014, external noise levels incident on the facade should fall within the levels presented in Table 1 below.

Table 1 – Maximum External Noise Levels to Allow Openable Windows

Room	Daytime (07:00 to 23:00 hours)	Night-time (23:00 to 07:00 hours)
Living Rooms	53 dB $L_{Aeq,16hour}$	--
Dining Room/area	58 dB $L_{Aeq,16hour}$	--
Bedrooms	53dB $L_{Aeq,16hour}$	48 dB $L_{Aeq,8hour}$

Based on the external levels detailed above in Table 1, the AVO guide seeks to determine the level of risk associated with overheating within a new development based on the developments surrounding noise climate. The AVO risk categories and their associated noise levels are detailed below in Table 2:

Table 2 – AVO Level 1 Risk Assessment Guide

Daytime Noise Level ($L_{Aeq, 07:00-23:00}$)	Night-time Noise Level ($L_{Aeq, 23:00-07:00}$)	Risk Category	Mitigation
≤ 53 dB	≤ 48 dB	Negligible Risk	None required – openable windows suitable for ventilation
54 – 62 dB	49 – 54 dB	Low/Medium Risk	Level 2 assessment optional in order to give more confidence regarding the suitability of internal noise conditions
≥ 63 dB	≥ 55 dB	High Risk	Level 2 assessment recommended. Windows which are unopenable on grounds of noise will inevitably create issues for the overheating strategy.

3.2 AVO Level 1 Assessment Results and Discussion

As previously discussed, a noise map of the local area has been created using the modelling software CadnaA. An assessment has been undertaken on the basis of this model with regards to the criteria listed above in Table 2. From this Model, RBA Acoustics have determined which areas of the development fall into the various negligible, low/medium and high-risk areas. Screenshots of the model indicating the Night-time L_{Aeq} levels are provided in the attached Figures 2-6.

Following on from the results of our model, we have the following observations to make. Typically, night-time noise levels result in a more “worst-case” result, in line with best practices from the ANC guidance, as such the night-time period is typically what we are referring to in our discussion.

High Risk Areas

From our initial analyses, the areas which have been deemed “high risk” are those which overlook the railways towards the north-west or south of site, and Manor Road to the east. These areas are as follows:

- Block A – the east and west facades of this building, and some of the northern facade
- Block B – the western facades of this building, up to Floor 7
- Block C – the west and south facades
- Block D – the east and south facades

Low/Medium Risk Areas

Generally, areas which are set further back from, and do not directly overlook, the railway lines and roads, fall into the “low/medium risk” category.

Negligible Risk Areas

“Negligible risk” areas include those located within the inner section of the development, which are screened from the major noise sources. These areas include:

- Block A – Inner elevations and sections of the southern facade
- Block B – sections of the eastern facade
- Block D – northern facade

4.0 APPROVED DOCUMENT 0

4.1 ADO Criteria

ADO states that where internal noise levels exceed the following levels within bedrooms at night, the overheating assessment should take into account the fact that window are likely to remain closed:

- $L_{Aeq,8hour}$ 40 dB
- L_{AFmax} 55 dB not to be exceeded more than 10 times per night.

Based on the typical reduction provided by a wide-open window, the following 'risk levels' are considered appropriate.

Table 3 – ADO Risk Levels

Night-time Noise Level ($L_{Aeq, 23:00-07:00}$)	Risk Category	Mitigation
≤ 48 dB	Negligible Risk	None required – openable windows likely to be suitable for ventilation.
49 – 54 dB	Low/Medium Risk	Open windows may not be suitable – suitability will depend on open area and opening angle.
≥ 55 dB	High Risk	Window should not be opened in bedrooms at night.

In addition to this, consideration has been given to the L_{AFmax} levels, and this is discussed in the assessment detailed below.

4.2 ADO Results and Discussion

High Risk Areas

The areas which are highlighted as being high risk from an AVO perspective are also considered high risk from an ADO perspective, and it is considered that in order to comply with the requirements of ADO windows in bedrooms will be required to be closed at night.

Low/Medium Risk Areas

Again, the low to medium risk areas are the same as those which are highlighted in the AVO assessment. In these cases, it is considered that with bedroom windows open during the night, noise levels will exceed the internal noise levels quoted in ADO.

There are some limited medium risk areas which directly overlook the railways or Manor Road. Due to the L_{AFmax} levels measured from the railways and main road, these areas should be treated as per the “high risk” areas discussed above. On elevations which are shielded from the railway and Manor Road, L_{AFmax} levels expected to reduce significantly.

In these more shielded areas, the exceedances (both in terms of L_{Aeq} and L_{AFmax}) are likely to be relatively small, depending on the area of the proposed windows and the required opening angles.

As such, limited area open windows to bedrooms may be considered acceptable at night for short periods in these zones. This would be subject to more detailed assessment and potentially discussion with the building control body.

Negligible Risk Areas

In the low/negligible risk areas, it is considered that it is likely to be possible to open bedroom windows at night whilst still achieving appropriate internal noise levels.

5.0 CONCLUSION

RBA Acoustics have undertaken an environmental noise survey at 389 Manor Road, Richmond in order to understand the noise climate around the proposed residential-led development. The results of these measurements have been used to produce a noise model of the area using acoustic modelling software CadnaA.

The results of this model indicate that while some areas fall into the “negligible risk” category, large areas either fall into the “high risk” or “low/medium risk” category.

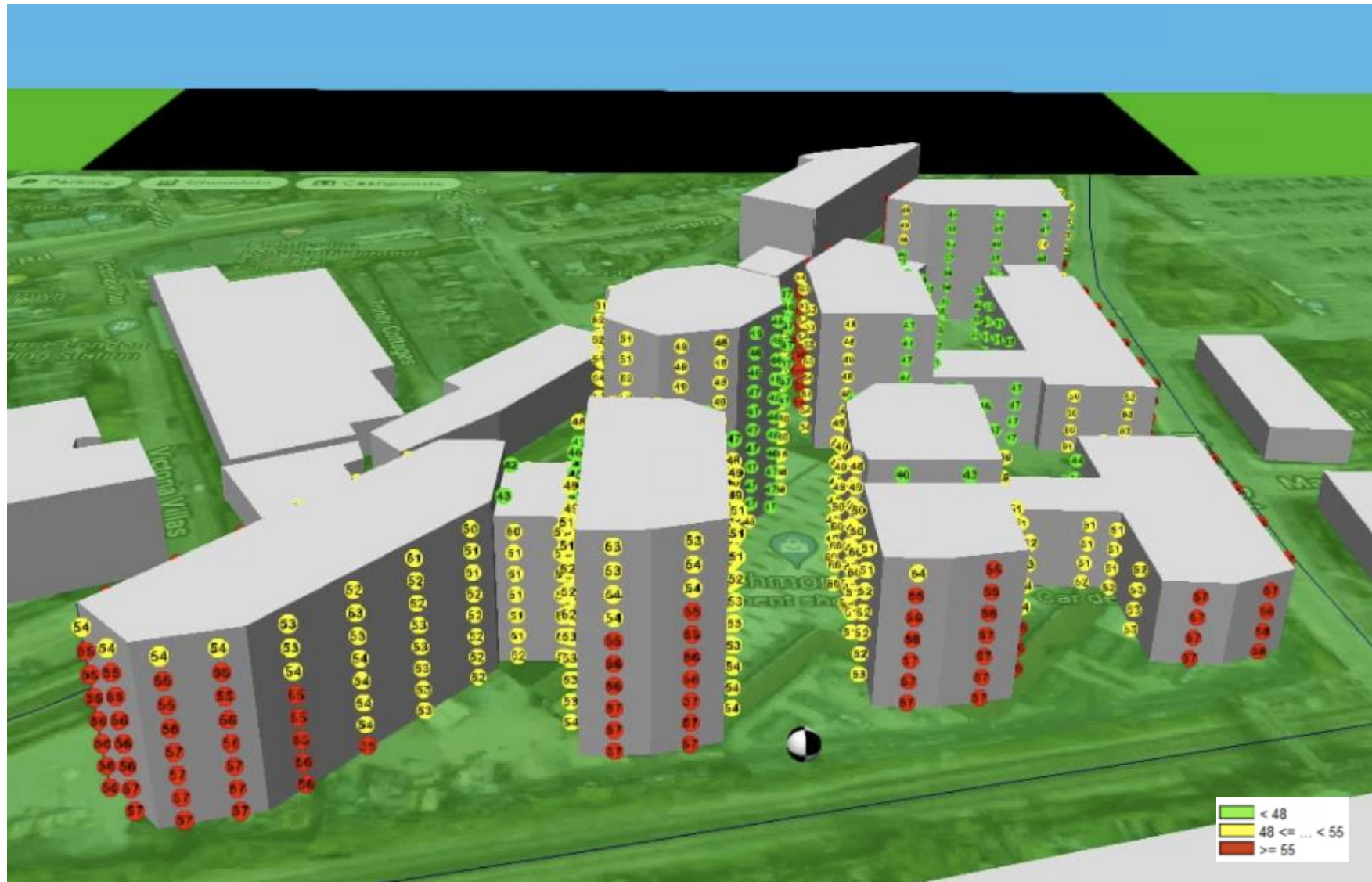
From an ADO perspective, it is considered that the “high risk” areas will require bedroom windows to be closed at night. In the “negligible risk” areas, it is considered that opening windows in bedrooms at night would be acceptable, as internal noise levels will be in line with the levels detailed in ADO.

In those areas which are identified as “low/medium risk”, it is likely that noise levels inside bedrooms would exceed the levels detailed in ADO. However, these exceedances are likely to be relatively minor, depending on the opening area of the window. Therefore, having limited area windows open for limited periods of time may be considered acceptable in these areas, subject to discussion with the Building Control Body.



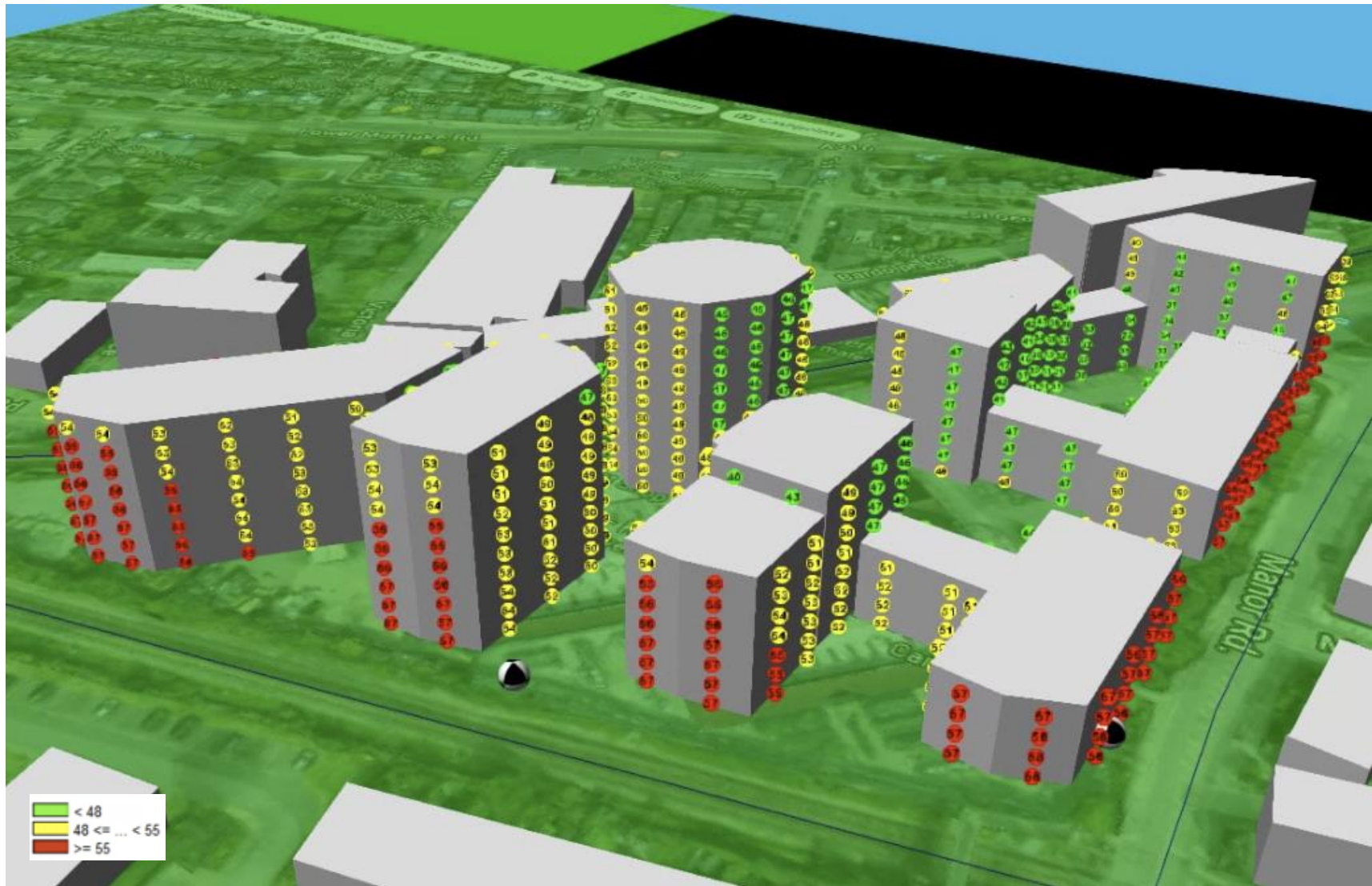
389 Manor Road, Richmond
Site Layout Plan
Project 11695

Figure 1
10 February 2023
Not to Scale



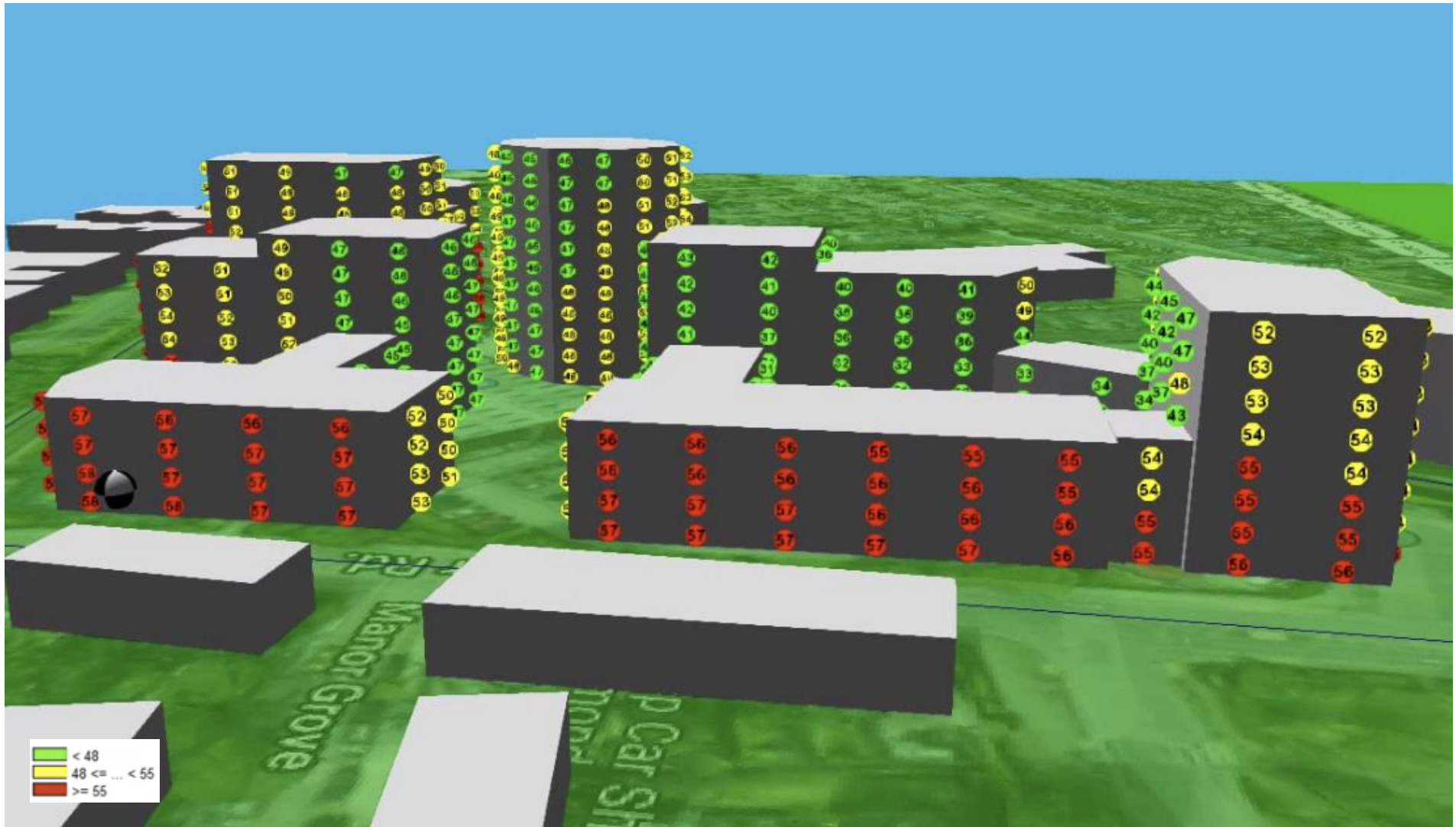
389 Manor Road, Richmond
 Facades Overlooking Waterloo Railway - Night-time Levels and Criteria
 Project 11695

Figure 2
 10 February 2023
 Not to Scale



389 Manor Road, Richmond
 Facades Overlooking Waterloo Railway and Manor Road - Night-time Levels and Criteria
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Figure 3
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389 Manor Road, Richmond
 Facades Overlooking Manor Road - Night-time Levels and Criteria
 Project 11695

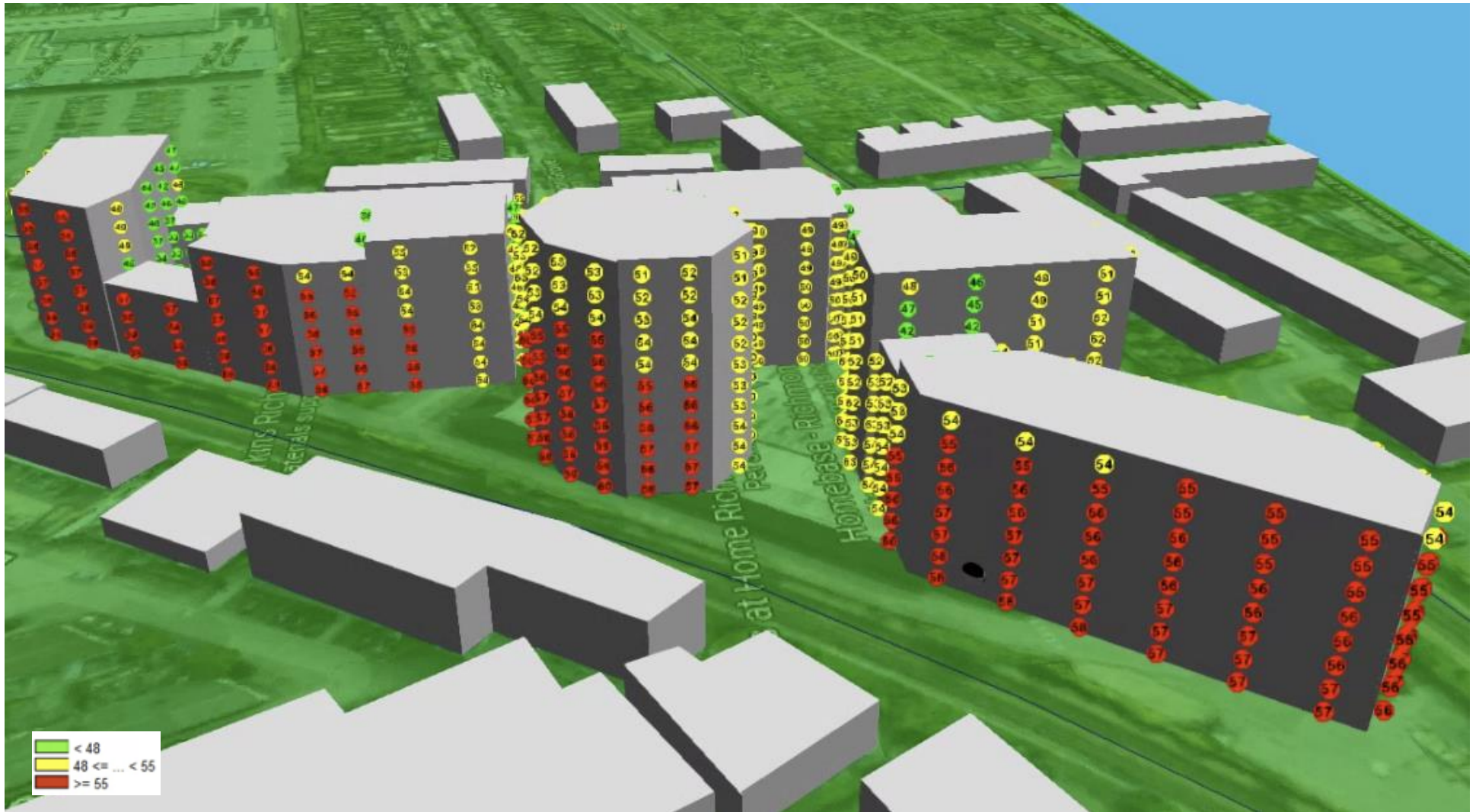
Figure 4
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389 Manor Road, Richmond
 Facades Overlooking Manor Road - Night-time Levels and Criteria
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Figure 5
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389 Manor Road, Richmond
 Facades Overlooking District and Overground Lines - Night-time Levels and Criteria
 Project 11695

Figure 6
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