Overheating Assessment

Battersea Park Road

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Contents

Executive Summary

This Approved Document Part O and CIBSE TM59 overheating analysis has been prepared to support the detailed planning application for the Battersea Park Road development and encompasses the overheating strategy and assessment results for Plot 1, Plot 2 & Plot 3. The results demonstrate that a strategy for overheating mitigation, in line with Approved Document Part O and CIBSE TM59, is to limit solar gains, utilise thermal mass (in the form of exposed concrete ceilings) and mechanically night purge via a separate purge fan (alongside the MVHR) to cool the structure. This has allowed us to omit cooling from all residential apartments, studios, cluster bedrooms and cluster living/kitchen areas (active cooling is only present in the commercial units and student amenity spaces as demonstrated in the accompanying Energy Strategy Report).

Dynamic thermal modelling has been completed in accordance with the requirements of Policy LP 10 (Responding to the Climate Crisis) of the Wandsworth Local Plan 2023 - 2038 (2023), Policy SI 4 (Managing Heat Risk) for the London Plan 2021 and the GLA Energy Assessment Guidance 2022. The thermal modelling has applied the cooling hierarchy process outlined within Policy SI 4 of minimising internal heat gains, apply passive measures and implement increased mechanical ventilation rates to avoid active cooling. The thermal modelling has been completed in accordance with CIBSE TM59 (Design Methodology for the Assessment of Overheating Risk in Homes), Approved Document Part O and the modelling software IESVE user manuals for completing thermal analysis assessments.

The results from the thermal modelling confirm that under the mandatory London climate change weather file (DSY1), all bedrooms, studios and kitchen/living spaces achieve compliance. Where spaces have not passed the DSY2, DSY3 and future climate change weather files, future mitigation measures have been outlined.

The cooling hierarchy has been applied as far as practically possible. Due to acoustic constraints, natural ventilation will not be relied upon for overheating mitigation in sleeping areas, but natural ventilation openings will be provided throughout for use at the occupants' discretion. Deep window reveals and overhangs have been provided, along with low g-values and reduced glazing percentages to minimise solar gains. A large proportion of the ceiling in bedrooms, studios and kitchen/living spaces will be exposed concrete and all plasterboard layers will be 30mm thick to maximise the amount of exposed thermal mass for night cooling.

The overall ventilation strategy is to provide MVHR for general ventilation, with the addition of purge fans to provide night-time cooling of the structure. Natural ventilation openings are provided throughout but are not relied on for overheating mitigation in the bedrooms and studios (due to Part O acoustic constraints) but are used for overheating mitigation in the living/kitchen areas. Typical flowrates for the studios are 21l/s and in some areas be able to boost to 55l/s. Typical flowrates for the bedrooms are 8l/s and able to boost to 15l/s. Typical flowrates for the kitchen/living rooms are 13l/s and can be boosted to 35l/s. A single purge fan is present in all bedrooms, studios and Plot 1 kitchen/living areas. Two purge fans are added to each of the Plot 3 cluster kitchen/living spaces along with natural ventilation louvres. The purge fans supply 100l/s and can achieve 120l/s where required.

The commercial spaces will be served by VRF, with some indicative cooling capacities contained in the results, assessed against the CIBSE TM52 criteria (The Limits of Thermal Comfort: Avoiding Overheating in European Buildings). All areas have also been assessed against the DSY 2 and DSY 3 weather files (including adjustment for climate change and heat island effect) given in CIBSE TM49: design summer years for London. The results confirm that with the proposed strategies, all areas comply against these climatic conditions.

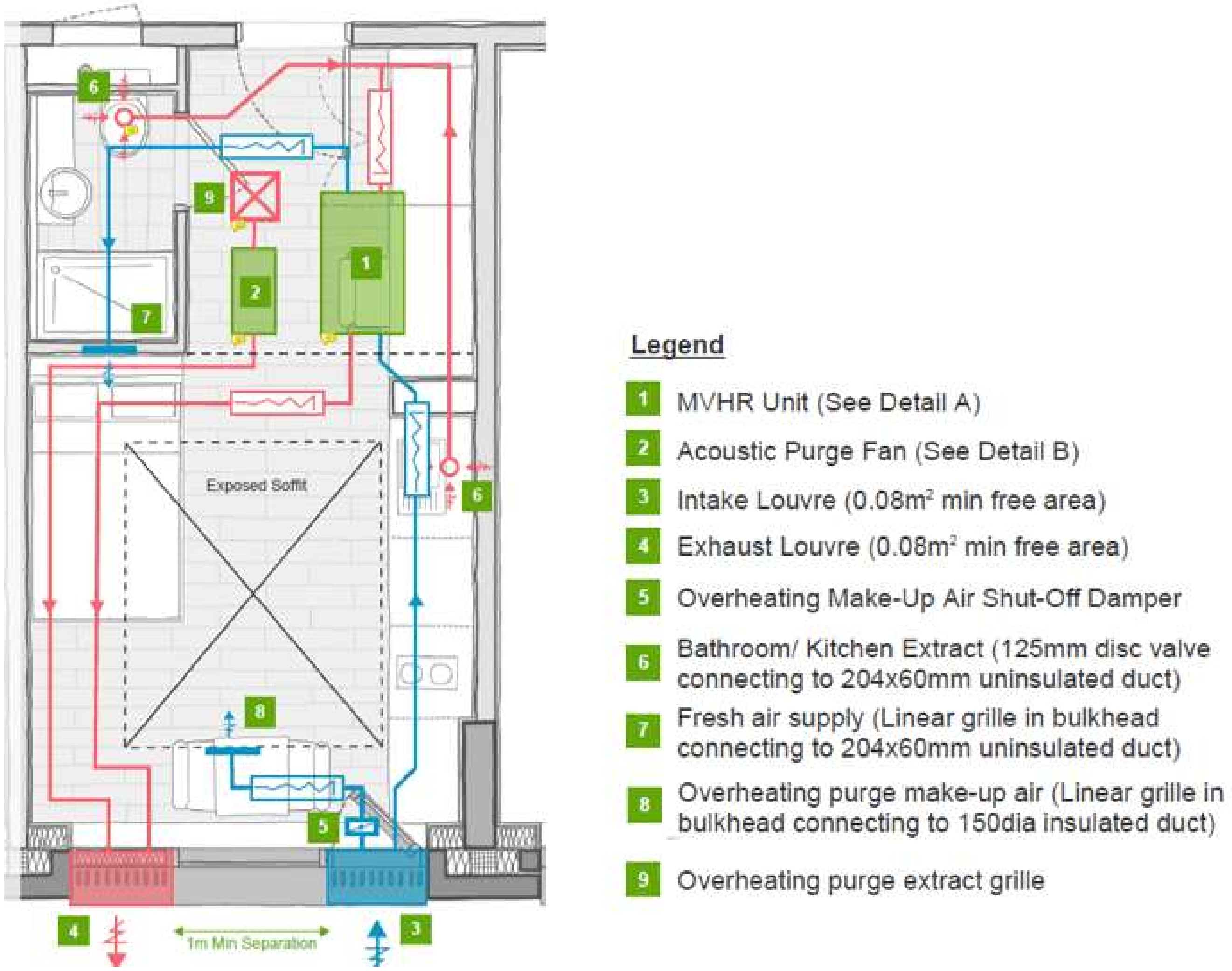


Figure 0.1 Example layout of a studio showing the MVHR, additional purge fan and area of exposed concrete soffit

1 Introduction

Thermal comfort in the body is provided through homeothermy, which is the balance of heat gains and losses to maintain the bodies core temperature of 36-38°C. There are several measurable factors that contribute to occupant thermal comfort including air speed, dry bulb temperature, radiant temperature, humidity, metabolic rate and clothing. In addition, there are also subjective physiological parameters such as individual expectations that also affect thermal comfort. This means that not everyone will be comfortable under the same conditions, which makes quantifying a thermally comfortable environment a challenging performance characteristic to assesses.

With buildings becoming more thermally efficient to reduce carbon emissions and the impact on global climate change, increased thermal insulation and airtight buildings can lead to an overheating risk, often requiring comfort cooling to be installed. By introducing cooling into buildings, this results in increased energy consumptions and carbon emissions which contribute further to global warming and more locally to the urban heat island effect, as heat is rejected into the atmosphere via the cooling equipment.

It is for these reasons why Policy LP 10 of the Wandsworth Local Plan 2023 - 2038 requires new developments to; through its layout, design, construction, materials, landscaping, and operation, minimise the effects of overheating, mitigate the urban heat island effect, and minimise energy consumption in accordance with the cooling hierarchy set out in the Policy SI4 of the London Plan.

Policy SI 4 (Managing Heat Risk) of the London Plan 2021 requires major developments to assess the risk of summer overheating by applying the following cooling hierarchy:

1. Reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and walls.
2. Minimise internal heat generation through energy efficient design.
3. Manage the heat within the building through exposed internal thermal mass and high ceilings.
4. Application of passive ventilation.
5. Subsequent application of mechanical ventilation
6. Application of active cooling systems (ensuring they are the lowest carbon options)

Part L1A and Part L2A (Conservation of Fuel and Power in New Buildings) of the Building Regulations of England and Wales includes a check on limiting excessive solar gains through windows (known as Criterion 3). The aim of this solar gain check is to limit the solar heat gain into a building/ room to reduce the need for air conditioning and/ or reduce the installed capacity of any air-conditioning system installed. It does not provide an overheating risk assessment in terms of occupant thermal comfort.

To assess and quantify overheating risk, the Chartered Institute of Building Services Engineers (CIBSE) have published Technical Memorandum 59 (TM59) which provides methods and assessment criteria to quantify overheating risk in UK dwellings. CIBSE TM59 has been adopted by Greater London Authority (GLA) as the methodology to assess overheating risk in buildings throughout the London Boroughs, as detailed within the GLA Guidance on Preparing Energy Assessments.

The CIBSE TM59 methodology has therefore been applied to assess the risk of overheating to the bedrooms, living spaces and studios in the Battersea Park Road development, as well as a check of the temperatures reached in the communal corridors.

Summary of Changes

Energy Statement

The latest revision of the energy statement "6892 Battersea Park Road Energy Statement 2024.11.12 RevS2G" encompasses the responses to the GLA Energy Memo received 28/5/2024. Changes to the report and further appendices include:

1. Updated SAP and BRUKL figures in line with comments
2. External wall buildup
3. SAP y-value changed from 0.04 to 0.08
4. SAP window U-value changed from 1.4 to 1.2
5. Distribution losses increased from 90/95% to 85/90% respectively
6. Further quality assurance mechanisms
7. Commitment to provide the trenches and pipework to connect all blocks to a future DHN via a single connection point
8. Further DHN correspondence
9. Further justification of high glazing percentages to amenity and retail
10. Retail and amenity glazing g-value reduced to 0.21
11. Updated report format

Overheating Assessment

The latest revision of the overheating assessment " 6892 Battersea Park Road Overheating Assessment 2024.11.12 RevS2E" encompasses the responses to the GLA Energy Memo received 21/8/2024. Changes to the report and further appendices include:

1. U-value update to Plot 1 glazing (1.4 to 1.2)
2. Further work on the natural ventilation only scenario to achieve 100% compliance
3. Inclusion of full cooling hierarchy iterations (provided in accompanying supporting documents)

2 Thermal Modelling

Thermal modelling is a useful tool to assess and quantify internal air temperatures and the predicted thermal comfort of occupants in buildings. Through dynamic simulation thermal modelling, the complex interaction of heat gains/losses, and the building space conditioning systems, allow the internal air temperatures, and resulting thermal comfort to be evaluated over an entire year period. This section of the report outlines the methodology and parameters applied within the CIBSE TM59 thermal analysis for the assessed spaces.

2.1 CIBSE TM59 Methodology

CIBSE TM59 provides the industry standard of assessing overheating risk in homes. Two assessment criteria are presented: one for buildings that are predominantly naturally ventilated, and one for buildings that are predominantly mechanically ventilated.

2.1.1 Predominantly Naturally Ventilated Buildings

In naturally ventilated buildings, occupants can take action to restore their own thermal comfort through the opening of windows. This autonomy confers a psychological benefit, increasing an individual's tolerance for thermal discomfort. This permits the use of an adaptive thermal comfort model to assess overheating risk by assessing comfort temperature against its relationship with the outdoor temperature.

Table 2.1 Occupancy profiles applied in the space according to the requirements of TM59.

TM59 Assessed Room	Occupancy (75W/person sensible, 55W/person latent)	Equipment Load (In addition to 2W/m2 lighting between 18:00-23:00)
Double Bedroom	2 people @ 70% (11pm – 8am) 2 people @ 100% (8am – 9am, 10pm – 11pm) 1 person @ 100% (9am – 10pm)	Peak Load of 80W (8am – 11pm) Base Load = 10W (11pm – 8am)
1 Bed Living/Kitchen	1 people (9am – 10pm)	Peak Load of 450W (6pm – 8pm) 200W (8pm – 10pm) 110W (9am – 6pm, 10pm – 12pm) Base Load = 85W
2 Bed Living/Kitchen	2 people (9am – 10pm)	Peak Load of 450W (6pm – 8pm) 200W (8pm – 10pm) 110W (9am – 6pm, 10pm – 12pm) Base Load = 85W
3 Bed Living/Kitchen	3 people (9am – 10pm)	Peak Load of 450W (6pm – 8pm) 200W (8pm – 10pm) 110W (9am – 6pm, 10pm – 12pm) Base Load = 85W
4 Bed Living/Kitchen*	4 people (9am – 10pm)	Peak Load of 450W (6pm – 8pm) 200W (8pm – 10pm) 110W (9am – 6pm, 10pm – 12pm) Base Load = 85W
Studio**	1 person (continuous)	Peak Load of 250W (6pm – 8pm) 110W (8pm – 10pm) 60W (9am – 6pm, 10pm – 12pm) Base Load = 50W
Cluster Living Room***	6 people (9am – 10pm) at 75% gains	Peak Load of 150W (6pm – 10pm) 60W (9am – 6pm, 10pm – 12pm) Base Load = 35W
Cluster Kitchen***	6 people (9am – 10pm) at 25% gains	Peak Load of 600W (6pm-8pm) Base Load = 100W
*TM59 does not provide a template for a 4 bed living/kitchen. Therefore, a reasonable approach was to follow the trend of 1 bed, 2 bed and 3 bed living/kitchens in that the equipment gain is the same and an extra occupant is added		
**The studios apartments will not be provided with a full kitchen, only two small burners for light cooking. To account for reduced cooking equipment, the peak equipment gain for the studios has been reduced from 450W to 250W		
***TM59 does not provide a template for a cluster living/kitchen which is essentially a 6-bed living/kitchen. Therefore, the approach was to double the occupancy of a 3 bed living/kitchen and increase kitchen equipment loads to 600W.		

For residential apartments, rooms and studios that have natural ventilation, the following two criteria must be achieved to reduce the severity, duration and discomfort of overheating.

a) For living rooms, kitchens and bedrooms: the number of hours during which ΔT is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 per cent of occupied hours. (CIBSE TM52 Criterion 1: Hours of exceedance).

b) For bedrooms only: to guarantee comfort during the sleeping hours of the operative temperature in the bedroom from 10pm to 7am shall not exceed 26°C for more than 1% of annual hours. (Note: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 32 hours, so ≥33 hours above 26°C during these hours will be recorded as a fail).

The rooms assessed have substantial openable windows that can be used at the occupants' discretion. Therefore, the overheating criteria for naturally ventilated spaces are applied as the primary method of assessment. However, the overheating strategy cannot rely exclusively on natural ventilation, as acoustic constraints restrict window opening.

2.1.2 Predominantly Mechanically Ventilated Buildings

For homes with restricted window openings, TM59 states that the CIBSE fixed temperature test should be applied. This is consistent with the idea that, without autonomy over their thermal environment, occupants are more sensitive to thermal discomfort. Here, all occupied rooms should not exceed an operative temperature of 26 degrees for more than 3% of annual occupied hours.

This is a serious restriction for buildings in London assessed under the required climate-change and urban heat island-adjusted weather files. For spaces such as bedrooms that are occupied for 24 hours under TM59 methodology, the outdoor air temperature exceeds 26 degrees for 3.2% of annual occupied hours. For spaces such as living rooms and kitchens that are occupied from 0900-2200 under TM59 methodology, the outdoor air temperature exceeds 26 degrees for 5.9% of annual occupied hours. Therefore, mechanically ventilated spaces are required to be significantly cooler than the outdoor environment over the course of the year. Achieving this passively presents a challenge without some form trim cooling to supply temperatures or active cooling. However, the strategy outlined in this report meets the requirements for both the predominately naturally ventilated and the predominately mechanically ventilated building criteria without the use of any cooling.

The results of the overheating analysis when assessed under the mechanically ventilated criteria have been included for the purpose of comparison.

2.2 Thermal Model

A three-dimensional model of the full development was created in the simulation software IESVE 2022.3.0.0. Using the Apache thermal calculation and simulation module within IES, the fabric thermal performances, internal heat gains and occupancy profiles were entered. In addition, a SunCast simulation was included to represent solar heat gains through windows. The thermal modelling was completed in accordance with CIBSE AM 11 Building Performance Modelling.

2.2.1 Fabric Parameters

Table 2.1 below presents the fabric thermal performances which are applied within the thermal model.

Table 2.1 Fabric & infiltration modelled

Modelled Parameter		
Element	U-value (W/m2K)	Other Parameters
External Wall	0.12	30mm plasterboard internal
Internal Partition	N/A	30mm plasterboard internal
Internal Ceiling/Floor*	N/A	Various exposed concrete proportions
Internal Ceiling/Floor	N/A	30mm plasterboard where concrete is not exposed
Glazing (inc. frame)	1.2	g-value of 0.28 to south and west (0.61 visible light transmittance) g-value of 0.35 east and north (0.65 visible light transmittance)
Air Permeability		
Infiltration	0.01 ACH^{-1}	Representing $3m^3/m^2.h$ for worst case
*Bedrooms, studios, kitchen/living rooms, amenity spaces		
**Bathrooms, apartment circulation, communal circulation, commercial spaces		

The exposed thermal mass in the bedrooms and living spaces comprises an exposed concrete soffit in the ceilings. A double layer of plaster board is applied to the internal partitions. The proportion of exposed concrete on the ceiling that is achieved differs depending on the building and the room type, and are summarised below:

- Plot 1
  - Bedrooms: 25% concrete, 75% plasterboard
  - Living/Kitchens: 50% concrete, 50% plasterboard
- Plot 2
  - Studios: 25% concrete, 75% plasterboard
- Plot 3
  - Cluster bedrooms: 25% concrete, 75% plasterboard
  - Cluster Living/Kitchens: 50% concrete, 50% plasterboard

2.2.2 Weather Data & Building Location

The development is located just outside of the CAZ (Central Activity Zone) and therefore the location falls under London Heathrow airport weather data. Lower density urban and suburban areas (DSY1_LHR1989_2020High50pct.epw) has been applied in accordance with CIBSE TM49 (Design Summer Years for London, 2014) and the GLA Guidance. This weather file has been climatically adjusted for climate change and urban heat island effect.

Further testing has been carried out under 2020_DSY2, 2020_DSY3 & 2050_DSY1 weather files.

2.2.3 Occupancy Profiles & Internal Gains

Within the full development, there are a range of different occupied spaces:

- Plot 1
  - Double bedrooms
  - 1 Bed Living/Kitchens
  - 2 Bed Living/Kitchens
  - 3 Bed Living/Kitchens
  - 4 Bed Living/Kitchens
- Plot 2
  - Studios
- Plot 3
  - Cluster bedrooms
  - Cluster Living/Kitchens

Ensuites/bathrooms and cupboards with HIU (heat interface units) have also been included. Communal corridors have also been assessed. The occupancy profiles and internal heat gains that have been applied within the thermal model for the assessed spaces are given in Table 2.3 and Table 2.3. These have been based on CIBSE TM59 (Design Methodology for the Assessment of Overheating Risk in Homes 2017). The profiles of CIBSE TM59 have also been applied. Adjustments to the TM59 profiles are detailed in Table 2.1, and are consistent with theTM59 approach.

Table 2.3 Inputs for adjacent spaces.

Other Modelled Spaces	Inputs
Ensuite	1.75W/m^2 (6pm-11pm)
Communal Corridors*	16W/m^2 on continuously
*Heat gains to corridors based on pipe losses from domestic hot water of 12W/m. Corridors to be on PIR sensors, therefore lighting gain has been switched off	

2.2.4 Deviations from TM59 profiles

The applied profiles for overheating deviate from TM59 in four places:

4. TM59 does not provide a template for a 4 bed living/kitchen. Therefore, this assessment follows the trend of 1 bed, 2 bed and 3 bed living/kitchens in that the equipment gain is the same and an extra occupant is added.
5. The studios apartments will not be provided with a full kitchen, only two small burners for light cooking. To account for reduced cooking equipment, the peak equipment gain for the studios has been reduced from 450W to 250W, with all other equipment gains reduced proportionately.
6. TM59 does not provide a template for a cluster living/kitchen. Therefore, this assessment applies double the occupancy of a 3-bed living/kitchen. Equipment loads are duplicated for the kitchen due to the increased cooking provision, but not for the living room as the number of appliances in this space does not increase with occupancy.
7. As the corridor lighting will be controlled with PIR sensors, the lighting gains to the corridors have been excluded.

2.2.5 Building Orientation & Shading

Adjacent buildings have been incorporated within the thermal model in order to assess the overshading. Reveal depths (typically 300-400mm), vertical fins and overhangs have been incorporated with the thermal model as shading devices in order to assess the solar gain reduction from such devices.

At the present time, as per Part O guidance, interior blinds are not taken into account. External shutters have also not been included but should be considered for future climate change mitigation.

As the blinds would not interfere with the mechanical ventilation strategy, there could be a case to argue with the accordance of the GLA Energy Assessment Guidance to omit blinds.

2.2.6 Ventilation Strategy

The ventilation strategy will be relying on night cooling to cool the thermal mass of the structure to start the next day at a lower temperature, thereby staying below the target temperatures to achieve overheating compliance. Modelling indicates that the levels of ventilation required for bedrooms and studios are typically 100l/s at night (which will be provided via a separate acoustic induct fan to provide purge ventilation). The ceilings of the bedrooms, studios and kitchen/living rooms will have exposed concrete and all plasterboard layers will be 30mm thick (walls and bulkhead); see Section 2.2.1.

Table 2.4 TM59 ventilation rates assigned.

Ventilation Rate	Comment
Bedrooms	
6l/s	Background continuous
15l/s	Boosted MVHR rate
100l/s	Supplied at night or when purge is required in the day
Studios	
21l/s	Background continuous
55/s	Boosted MVHR rate
100l/s	Supplied at night or when purge is required in the day
Living/Kitchen (PLOT 1)	
13l/s	Background continuous
35l/s	Boosted MVHR rate
100l/s	Supplied at night or when purge is required in the day.
Cluster Living/Kitchen (PLOT 3)	
13l/s	Background continuous
35l/s	Boosted MVHR rate
200l/s	Via two purge fans (supplied at night or when purge is required in the day)

MVHR Profiles

Operates 24 hours a day to provide the minimum quantity of fresh air required to satisfy indoor air quality requirements. When the indoor air temperature exceeds 19°C and is greater than the outdoor air temperature, the flow rate through the MVHR is boosted to the higher rate to assist with the purge. When the outdoor temperature exceeds the indoor air temperature, the MVHR operates in heat recovery mode with a heat recovery of 80%, which reduces the temperature gain from hotter outdoor air.

Purge Fan Profiles

The purge fan is in operation when the indoor air temperature exceeds 19°C and is greater than the outdoor air temperature. This ensures effective purging in summer months whenever possible, while minimising unwanted heat gains when the outdoor air temperature exceeds the indoor air temperature.

Corridor Ventilation Profile

Stairs, lobbies, and corridors are supplied with 1 ACH^{-1} of ventilation which will come from the smoke extract. In summer, this operates when the internal temperature exceeds 16 degrees, and the indoor air temperature exceeds the outdoor air temperature. In Plot 3, ventilation in the communal corridor spaces is boosted to 1.5 ACH^{-1} to combat overheating risk from communal hot water pipework. Where possible, natural ventilation is also provided to the stair cores and corridors.

Natural Ventilation Strategy

Natural ventilation is restricted by acoustic issues on the site. However, natural ventilation openings are provided in all buildings for use at the discretion of the occupant. This helps improve the resilience of the scheme for future climate scenarios.

In Plot 1, the glazed openings comprise the natural ventilation elements. These are assumed to remain closed for the overheating analysis but are assumed to be openable to achieve a minimum of 20% free area. In Plots 2 and 3, natural ventilation is provided through the use of separate louvered purge panels. These panels allow the windows to be fully opened and can achieve 70% free area. These purge panels are typically glazed on the North and East facades, and solid on the South and West facades. These purge panels are assumed to be closed for the purpose of the overheating analysis for bedrooms and studios. However, as the Part O noise criteria only apply to night cooling of bedrooms, the purge panels in the cluster living/kitchens in Plot 3 are modelled as openable. These openings follow the Part O opening profiles for overheating with night purge.

The equivalent orifice areas of all window openings present in the model are summarised in Appendix B.

2.2.7 Mechanical cooling

Mechanical cooling has been applied to the commercial units and amenity spaces on all plots. The use of active cooling to these areas is justified in the accompanying Energy Strategy Report, with the cooling loads minimised as far as possible through exposed thermal mass and solar control glazing.

2.2.8 Assessed Spaces

All occupied spaces in across Plot 1, Plot 2 & Plot 3 have been modelled with full results contained in the appendix.

A Cat II thermal comfort category has been applied within the thermal analysis in accordance with CIBSE TM59.

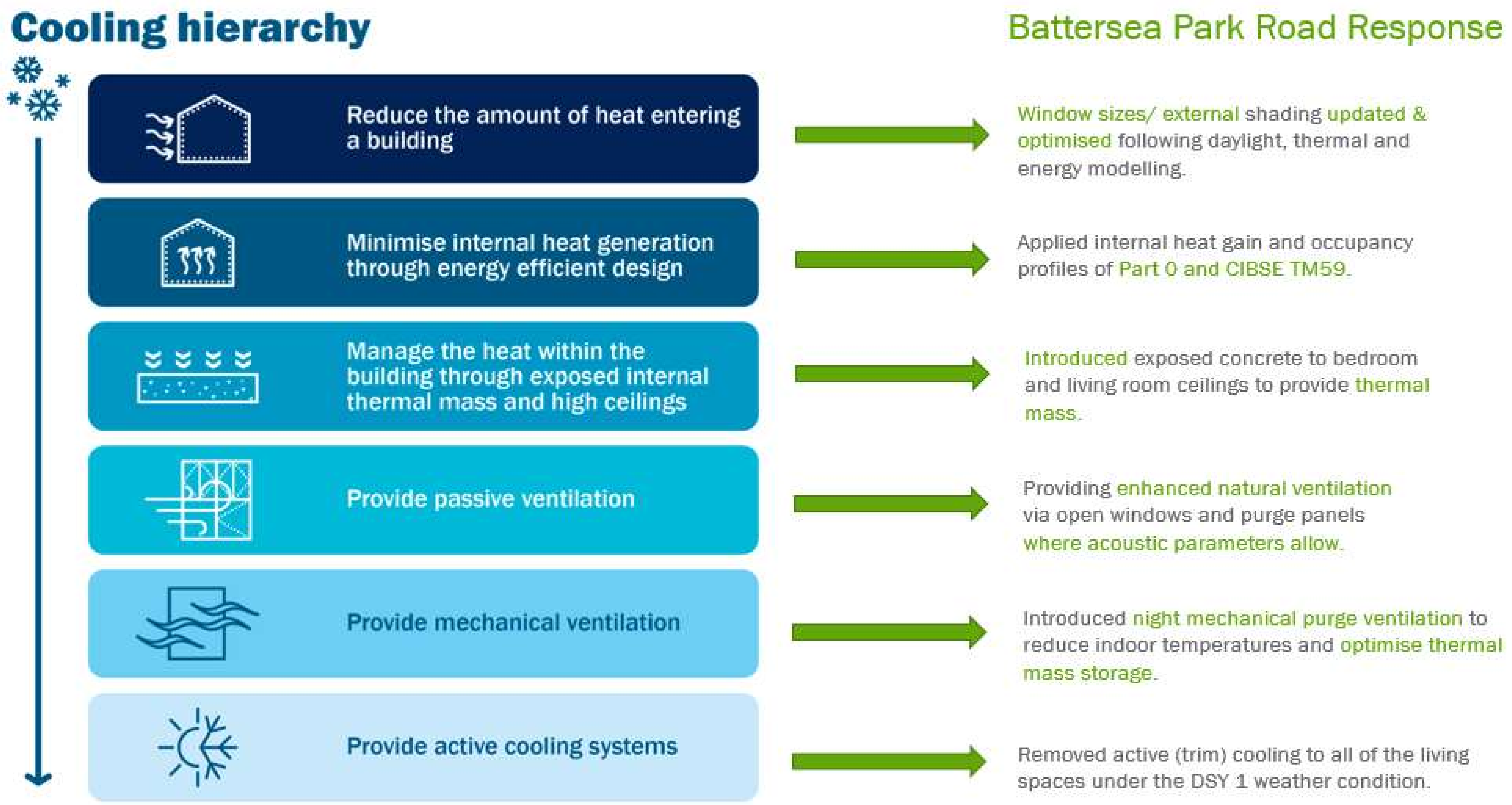
2.3 Cooling Hierarchy

To achieve the overheating results cited in this report, the cooling hierarchy given in Policy SI 4 of the London Plan has been applied. Seven iterations are described here:

1. The baseline design addresses Steps 1 and 2 through the minimisation of glazed areas, minimisation of hot-water pipe lengths, and the use of low energy PIR lighting.
2. The second iteration addresses Step 1 by applying solar shading in the form of a 300mm-400mm reveal and louvre-fins to openable panels to reduce solar gains.
3. The third iteration addresses Step 1 by applying reduced G-values to the windows to further reduce solar gains, from g=0.45 to g=0.35 (N/E) and G=0.28 (S/W).
4. The fourth iteration addresses Step 3 by increasing the exposed thermal mass. Here we have achieved a 25% and 50% exposed concrete ceiling in the bedrooms and living/kitchen spaces respectively, compared to a double-plasterboard finish in the baseline building.
5. The fifth iteration addresses Step 4 through the integration of window openings. These are modelled as openable as if there were no acoustic restrictions on opening hours.
6. The sixth iteration addresses Step 5 using mechanical purge ventilation. Here, acoustic restrictions on natural ventilation openings are applied to improve the resilience of the final scheme.

7. The seventh iteration addresses Step 5 by boosting the ventilation supply from the MVHR to supplement the purge ventilation.

A copy of the GHA early stage overheating tool is given in Appendix C, which shows that the geographical characteristics give the scheme a high overheating risk. However, this dynamic analysis illustrates that the use of mechanical cooling can be eliminated in all residential spaces through the application of the cooling hierarchy.



Cooling hierarchy	Battersea Park Road Response
Reduce the amount of heat entering a building	Window sizes/ external shading updated & optimised following daylight, thermal and energy modelling.
Minimise internal heat generation through energy efficient design	Applied internal heat gain and occupancy profiles of Part O and CIBSE TM59.
Manage the heat within the building through exposed internal thermal mass and high ceilings	Introduced exposed concrete to bedroom and living room ceilings to provide thermal mass.
Provide passive ventilation	Providing enhanced natural ventilation via open windows and purge panels where acoustic parameters allow.
Provide mechanical ventilation	Introduced night mechanical purge ventilation to reduce indoor temperatures and optimise thermal mass storage.
Provide active cooling systems	Removed active (trim) cooling to all of the living spaces under the DSY 1 weather condition.

3 Plot 1 Results

100% of bedrooms and 100% of kitchen/living spaces achieve compliance with the TM59 overheating criteria. No corridors exceed 28°C for more than 3% of the year.

3.1 DSY1 2020

Under the DSY1 2020 weather file, 100% of bedrooms and 100% of kitchen/living spaces pass against the Natural Ventilation overheating criteria. This compares with 99% of bedrooms and 31% of living/kitchen spaces that pass against the more onerous Mechanical Ventilation overheating criteria.

The maximum operative temperature occurring in the bedrooms and living/kitchen spaces under this weather file are 31.9°C and 32.2°C respectively. Notably this is over two degrees cooler than the peak outdoor air temperature of 34.6°C. A full summary of the overheating results for each space is given in Appendix A.1.1.

Overheating risk in corridors has been assessed in accordance with TM59, and finds that no corridors exceed 28°C for more than 3% of the year.

3.2 DSY2 2020

Under the DSY2 2020 weather file, 3% of the bedroom spaces and 96% of the living/kitchen spaces comply when assessed against the natural ventilation criteria. This compares with 96% of bedrooms and 2% of the living/kitchen spaces complying under the mechanically ventilated criteria. All bedrooms comply with criterion A of the natural ventilation criteria. Here it can be seen that, for bedrooms, it is easier to comply under the mechanical ventilation criteria, as there is no requirement for night-time overheating hours. By contrast, it is harder to comply with the mechanical ventilation criteria in the living room spaces due to the reduced number of occupied hours. A full summary of the overheating results for each space is given in Appendix A.1.2.

Compliance under DSY2 is not required by either Part O or GLA criteria.

3.3 DSY3 2020

Under the DSY3 2020 weather file, 0% of the bedroom spaces and 91% of the living/kitchen spaces comply when assessed against the natural ventilation criteria. This compares with 44% of bedrooms and none of the living/kitchen spaces complying under the mechanically ventilated criteria. 100% of bedroom spaces comply with Criteria A of the natural ventilation criteria, which illustrates the impact of high evening temperatures on overheating risk. A full summary of the overheating results for each space Is given in Appendix A.1.3

Compliance under DSY3 is not required by either Part O or GLA criteria.

3.4 DSY1 2050

Under the DSY1 2050 weather file 0% of the bedroom spaces and 95% of living/kitchen spaces comply when assessed against the natural ventilation criteria. This compares with 15% of bedrooms and none of the living/kitchen spaces complying under the mechanically ventilated criteria. In the bedrooms, failure to achieve compliance is governed by the night-time overheating Criterion B: all bedroom spaces achieve compliance with Criterion A under the 2050 weather file. A full summary of the overheating results for each space Is given in Appendix A.1.4.

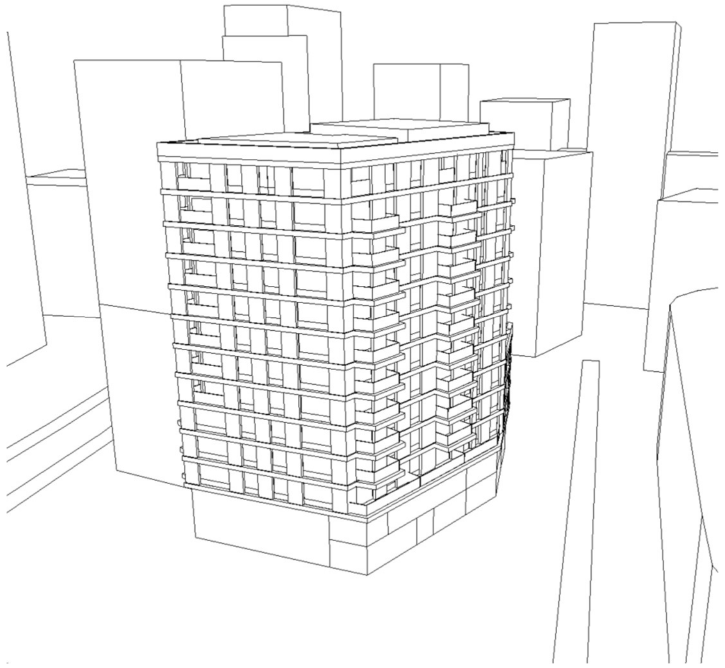


Figure 3.1 Plot 1 model in IES

3.5 Natural Ventilation Assessment

To assess the potential for the building to be cooled by natural ventilation, a simulation was run with the purge-fans turned off, and all windows modelled as openable with no restrictions. Here, windows are modelled as achieving 80% free area when fully open and are treated as openable in the day and night. Mechanical ventilation is used to provide the minimum background ventilation for indoor air quality, supplemented by natural ventilation to mitigate overheating risk.

Under the DSY1 2020 weather file, 100% of bedroom spaces and 100% of living/kitchen spaces comply with the TM59 overheating criteria. This meets the GLA requirement to design buildings that are capable of being cooled with natural ventilation alone, in the absence of restrictions on window opening. Full results are included in the accompanying documents.

3.6 Cooling Hierarchy Results

Table 3.1 presents the results of the application of the cooling hierarchy to Plot 1. This shows that, through the use of the cooling hierarchy, mechanical cooling has been designed out of the residential spaces within the scheme. Full results are included in the accompanying documents. Full results for cooling hierarchy steps that result in 0% compliance have not been included.

Table 3.1 Summary of the results arising from the application of the cooling hierarchy to Plot 1

			Bedrooms		Living rooms	CIBSE TM59 Compliance
Iteration	Policy SI 4 Cooling Hierarchy Element	Description of cooling strategy applied	Criterion A compliance rate	Criterion B compliance rate	Criterion A compliance rate	
1	1/2	Baseline: 0.45 g-value 30mm plasterboard ceiling and walls Minimum MVHR rates No shading No natural ventilation	0%	0%	0%	✗
2	1	0.45 g-value 30mm plasterboard ceiling and walls Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation	0%	0%	0%	✗
3	1	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard ceiling and walls Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation	0%	0%	0%	✗
4	3	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard walls Exposed thermal mass in ceilings (percentage assumed contained within Section 2.2.1 of this document) Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation	0%	0%	0%	✗
5	4	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard walls Exposed thermal mass in ceilings (percentage assumed contained within Section 2.2.1 of this document) Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels Natural ventilation added (shown here with natural ventilation for comparative purposes only – natural ventilation provided but not relied upon)	100%	2%	100%	✗
6	5	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard walls Exposed thermal mass in ceilings (percentage assumed contained within Section 2.2.1 of this document) Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation Purge fans (100l/s) in each bedroom and living/kitchen	100%	96%	100%	✗
7	5	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard walls Exposed thermal mass in ceilings (percentage assumed contained within Section 2.2.1 of this document) Increased flowrates for final spaces to bring the last few spaces into compliance Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation Purge fans (100l/s) in each bedroom and living/kitchen	100%	100%	100%	✓

4 Plot 2 Results

100% of studio apartments achieve compliance with the TM59 overheating criteria. No corridors exceed 28 degrees for more than 3% of the year.

4.1 DSY1 2020

Under the DSY1 2020 weather file, 100% of studio apartments pass against the Natural Ventilation overheating criteria. This compares with 99% of studios that pass against the more onerous Mechanical Ventilation overheating criteria.

The maximum operative temperature occurring in the studio spaces under this weather file is 31.2°C. Notably, this is over three degrees cooler than the peak outdoor air temperature of 34.6°C. A full summary of the overheating results for each space is given in Appendix A.2.1.

Overheating risk in corridors has been assessed in accordance with TM59, and finds that no corridors exceed 28°C for more than 3% of the year.

4.2 DSY2 2020

Under the DSY2 2020 weather file, 0% of the studio spaces comply when assessed against the natural ventilation criteria. This compares with 89% of studio spaces complying under the mechanically ventilated criteria. All bedroom spaces comply with Category A of the natural ventilation overheating criteria. A full summary of the overheating results for each space is given in Appendix A.2.2.

Compliance under DSY2 is not required by either Part O or GLA criteria.

4.3 DSY3 2020

Under the DSY3 2020 weather file, 0% of the studio spaces comply when assessed against the natural ventilation criteria. This compares with 53% of studio spaces complying under the mechanically ventilated criteria. All bedroom spaces comply with Category A of the natural ventilation overheating criteria. A full summary of the overheating results for each space is given in Appendix A.2.3.

Compliance under DSY3 is not required by either Part O or GLA criteria.

4.4 DSY1 2050

Under the DSY1 2050 weather file, 0% of the studio spaces comply when assessed against the natural ventilation criteria. This compares with 5% of studio spaces complying under the mechanically ventilated criteria. All studio spaces comply with Category A of the natural ventilation overheating criteria. A full summary of the overheating results for each space is given in Appendix A.2.4.

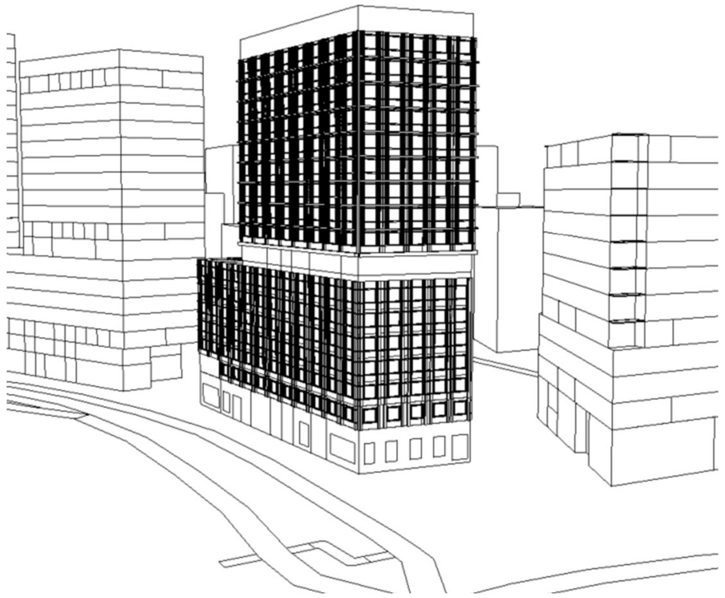


Figure 4.1 Plot 2 model in IES

4.5 Natural Ventilation Assessment

To assess the potential for the building to be cooled by natural ventilation, a simulation was run with the purge-fans turned off, and the purge panels modelled as openable. Here, mechanical ventilation is used to provide the minimum background ventilation for indoor air quality, supplemented by natural ventilation to mitigate overheating risk.

Under the DSY1 2020 weather file, 100% of studios comply with the TM59 overheating criteria. All studio spaces comply with Criterion A of the natural ventilation criteria.

4.6 Cooling Hierarchy Results

Table 4.1 presents the results of the application of the cooling hierarchy to Plot 2. This shows that, through the use of the cooling hierarchy, mechanical cooling has been designed out of the residential spaces within the scheme.

Table 4.1 Summary of the results arising from the application of the cooling hierarchy to Plot 2 studios

Iteration	Policy SI 4 Cooling Hierarchy Element	Description of cooling strategy applied	Criterion A compliance rate	Criterion B compliance rate	CIBSE TM59 Compliance
1	1/2	Baseline: 0.45 g-value 30mm plasterboard ceiling and walls Minimum MVHR rates No shading No natural ventilation	0%	0%	☒
2	1	0.45 g-value 30mm plasterboard ceiling and walls Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation	0%	0%	☒
3	1	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard ceiling and walls Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation	0%	0%	☒
4	3	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard walls Exposed thermal mass in ceilings (percentage assumed contained within Section 2.2.1 of this document) Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation	0%	0%	☒
5	4	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard walls Exposed thermal mass in ceilings (percentage assumed contained within Section 2.2.1 of this document) Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels Natural ventilation added (shown here with natural ventilation for comparative purposes only – natural ventilation provided but not relied upon)	100%	74%	☒
6	5	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard walls Exposed thermal mass in ceilings (percentage assumed contained within Section 2.2.1 of this document) Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation Purge fans (100l/s) in each studio	100%	64%	☒
7	5	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard walls Exposed thermal mass in ceilings (percentage assumed contained within Section 2.2.1 of this document) Increased flowrates for final spaces to bring the last few spaces into compliance Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation Purge fans (100l/s) in each studio	100%	100%	☑

5 Plot 3 Results

100% of bedrooms and 100% of kitchen/living spaces achieve compliance with the TM59 overheating criteria. No corridors exceed 28°C for more than 3% of the year.

5.1 DSY1 2020

Under the DSY1 2020 weather file, 100% of bedrooms and 100% of kitchen/living spaces pass against the Natural Ventilation overheating criteria. This compares with 100% of bedrooms and 0% of living/kitchen spaces that pass against the more onerous Mechanical Ventilation overheating criteria.

The maximum operative temperature occurring in the bedrooms and living/kitchen spaces under this weather file are 30.5°C and 33.7°C respectively. Notably these are both noticeably cooler than the peak outdoor air temperature of 34.6°C. A full summary of the overheating results for each space is given in Appendix A.3.1.

Overheating risk in corridors has been assessed in accordance with TM59, and finds no corridors exceed 28 degrees for more than 3% of the year.

5.2 DSY2 2020

Under the DSY2 2020 weather file, 0% of the bedroom spaces and 4.7% of the living/kitchen spaces comply when assessed against the natural ventilation criteria. This compares with 100% of bedrooms and 0% of the living/kitchen spaces complying under the mechanically ventilated criteria. All bedroom spaces comply with Category A of the natural ventilation overheating criteria. A full summary of the overheating results for each space is given in Appendix A.3.2.

Compliance under DSY2 is not required by either Part O or GLA criteria.

5.3 DSY3 2020

Under the DSY3 2020 weather file, none of the bedroom spaces and none of the living/kitchen spaces comply when assessed against the natural ventilation criteria. This compares with 13% of bedrooms and none of the living/kitchen spaces complying under the mechanically ventilated criteria. All bedroom spaces comply with Category A of the natural ventilation overheating criteria. A full summary of the overheating results for each space is given in Appendix A.3.3.

Compliance under DSY3 is not required by either Part O or GLA criteria.

5.4 DSY1 2050

Under the DSY1 2050 weather file, none of the bedroom spaces or living/kitchen spaces comply when assessed against either the natural ventilation or mechanical ventilation criteria. All bedroom spaces comply with Category A of the natural ventilation overheating criteria. A full summary of the overheating results for each space is given in Appendix A.3.4.

Compliance under DSY1 2050 is not required by either Part O or GLA criteria.

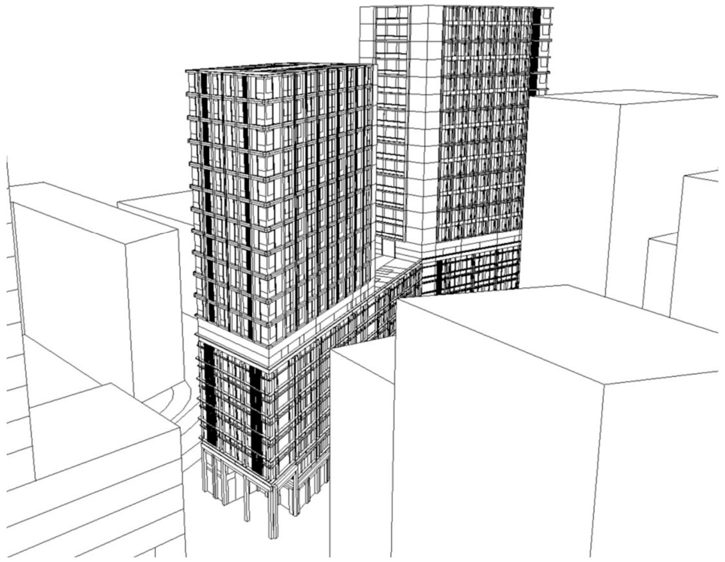


Figure 5.1 Plot 3 model in IES

5.5 Natural Ventilation Assessment

To assess the potential for the building to be cooled by natural ventilation, a simulation was run with the purge-fans turned off, and the purge panels modelled as openable. Here, mechanical ventilation is used to provide the minimum background ventilation for indoor air quality, supplemented by natural ventilation to mitigate overheating risk.

Under the DSY1 2020 weather file, 3% of bedroom spaces and 12% of living/kitchen spaces comply with the TM59 overheating criteria. All bedrooms comply with Criterion A of the natural ventilation criteria. This could be considered an acceptable compliance rate considering the presence of the purge fans and the absence of mechanical cooling.

5.6 Cooling Hierarchy Results

Table 5.1 presents the results of the application of the cooling hierarchy to Plot 3. This shows that, through the use of the cooling hierarchy, mechanical cooling has been designed out of the residential spaces within the scheme.

Table 5.1 Summary of the results arising from the application of the cooling hierarchy to Plot 3

			Bedrooms		Living rooms	CIBSE TM59 Compliance
Iteration	Policy SI 4 Cooling Hierarchy Element	Description of cooling strategy applied	Criterion A compliance rate	Criterion B compliance rate	Criterion A compliance rate	
1	1/2	Baseline: 0.45 g-value 30mm plasterboard ceiling and walls Minimum MVHR rates No shading No natural ventilation	0%	0%	0%	☒
2	1	0.45 g-value 30mm plasterboard ceiling and walls Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation	0%	0%	0%	☒
3	1	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard ceiling and walls Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation	0%	0%	0%	☒
4	3	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard walls Exposed thermal mass in ceilings (percentage assumed contained within Section 2.2.1 of this document) Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels No natural ventilation	0%	0%	0%	☒
5	4	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard walls Exposed thermal mass in ceilings (percentage assumed contained within Section 2.2.1 of this document) Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels Natural ventilation added (shown here with natural ventilation for comparative purposes only – natural ventilation provided but not relied upon for cluster beds)	100%	3%	12%	☒
6	5	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard walls Exposed thermal mass in ceilings (percentage assumed contained within Section 2.2.1 of this document) Minimum MVHR rates Solar shading to windows (300mm reveals) and louvre fins to openable panels Cluster beds = no natural ventilation. Cluster living/kitchens = natural ventilation panels allowed to open Purge fans (100l/s) in each bedroom and 200l/s to cluster living/kitchens	100%	96%	100%	☒
7	5	Reduce G-value to 0.35 (N/E) and 0.28 (S/W) 30mm plasterboard walls Exposed thermal mass in ceilings (percentage assumed contained within Section 2.2.1 of this document) Increased flowrates for final spaces to bring the last few spaces into compliance Solar shading to windows (300mm reveals) and louvre fins to openable panels Cluster beds = no natural ventilation. Cluster living/kitchens = natural ventilation panels allowed to open Purge fans (100l/s) in each bedroom and 200l/s to cluster living/kitchens	100%	100%	100%	☑

6 Discussion of Results

Through the application of the cooling hierarchy, all residential spaces on all plots comply with the TM59 overheating assessment without the use of mechanical cooling.

6.1 Performance Under Current Weather Conditions

All residential spaces on all plots comply with the TM59 overheating assessment without the use of mechanical cooling. The night-vent mechanical purge strategy coupled with the use of exposed thermal mass allows the indoor spaces to be kept significantly cooler than the outdoor environment. On average, the peak indoor temperature achieved in the spaces is about 4 degrees cooler than the peak outdoor temperature.

6.2 Future Weather Files

While 100% compliance with future weather files or current extreme weather files (DSY2/DSY3) has not been achieved, relatively good thermal performance is reported. Without the inclusion of any additional mitigation methods, 100% of bedroom spaces comply with Criteria A across all plots, and for all applied weather files.

6.2.1 Future Mitigation Methods

To manage overheating risk under future weather scenarios, a number of mitigation options are available that have excluded from the overheating assessment in this report:

Natural Ventilation Openings

Natural ventilation openings have been provided throughout the scheme but have not been treated as openable for the purpose of the overheating assessment. These openings are sufficiently sized to provide overheating mitigation and could be used alongside the mechanical purge in future weather scenarios as a significant additional source of ventilation. The presence of these panels also provides resilience in the case of breakdown of the mechanical systems.

Additional Purge

The acoustic in-duct fans specified for the purge ventilation are capable of providing up to 120l/s, but have been restricted to 100l/s for acoustic comfort. In future weather scenarios, this could potentially be boosted to deliver increased fresh air flow rates. While this would come at the cost of increased noise, this might be considered acceptable, particularly if it is only for a small portion of the year.

Blinds and External Shutters

In line with Part O, the use of blinds has not been applied in this analysis. However, there is a potential for blinds to be used to mitigate solar gains. In Plots 2 and 3 we have separated the natural ventilation purge panels from the visual glazing. This allows blinds to be integrated into the fixed glazing without affecting the natural ventilation strategy. There could also be an argument for applying solar gains in Plot 1, where compliance with overheating is not dependent on the use of natural ventilation. Similarly, external shutters could be applied in the future to mitigate unwanted solar gains.

7 Conclusion

Through the application of the cooling hierarchy, all residential spaces on all plots comply with the TM59 overheating assessment under the mandatory DSY1 2020 London Heathrow weather file without the use of mechanical cooling. The proposed scheme enables the building to be kept significantly cooler than the external environment: on average, the peak summertime indoor temperature is about 4°C cooler than the peak outdoor temperature.

The design includes several elements that improve its resilience and adaptability to future weather scenarios. These include natural ventilation purge panels, separate visual glazing to improve potential for use of blinds, and additional capacity for the purge fans. As the current overheating strategy is not reliant on these strategies, integral resilience to future weather scenarios is ensured.

Compliance with the overheating criteria of Policy LP 10 of the Wandsworth Local Plan (2023 - 2038) and Policy SI 4 of the London Plan 2021 is therefore achieved through the application of the cooling hierarchy.

Appendices

Appendix A - Overheating Results

A.1 Plot 1

A.1.1 DSY1 2020 overheating results.

Table A.1 TM59 overheating results for bedroom spaces in Plot 1 under the DSY1 2020 weather file.

		Natural ventilation overheating criteria			Mechanical ventilation overheating criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
L01 4B6P East Double Bedroom No 1	30.2	0.1	19	PASS	2.0%	PASS
L01 4B6P East Single Bedroom No 1	30.4	0.3	22	PASS	2.2%	PASS
L01 4B6P East Double Bedroom No 2	31	0.4	26	PASS	2.5%	PASS
L01 4B6P East Single Bedroom No 2	30.2	0	21	PASS	2.1%	PASS
L01 3B5P East Double Bedroom No 1	28	0	13	PASS	0.7%	PASS
L01 3B5P East Double Bedroom No 2	27.5	0	10	PASS	0.6%	PASS
L01 3B5P East Single Bedroom No 1	28.7	0	14	PASS	0.8%	PASS
L01 1B2P South Double Bedroom No 1	29.7	0	14	PASS	1.2%	PASS
L01 2B4P West Double Bedroom No 1	28.9	0	14	PASS	0.9%	PASS
L01 2B4P West Double Bedroom No 2	28.9	0	15	PASS	0.9%	PASS
L01 3B5P West Double Bedroom No 1	27.7	0	11	PASS	0.6%	PASS
L01 3B5P West Single Bedroom No 1	28.8	0	14	PASS	0.8%	PASS
L01 3B5P West Double Bedroom No 2	28.6	0	13	PASS	0.8%	PASS
L02 4B6P East Double Bedroom No 1	30.3	0.1	24	PASS	1.9%	PASS
L02 4B6P East Single Bedroom No 1	31	0.4	23	PASS	2.3%	PASS
L02 4B6P East Double Bedroom No 2	31.7	0.6	32	PASS	2.9%	PASS
L02 4B6P East Single Bedroom No 2	30.7	0.4	23	PASS	2.4%	PASS
L02 3B5P East Double Bedroom No 1	28.7	0	19	PASS	0.9%	PASS
L02 3B5P East Double Bedroom No 2	28.3	0	13	PASS	0.7%	PASS
L02 3B5P East Single Bedroom No 1	29.4	0	18	PASS	1.1%	PASS
L02 1B2P South Double Bedroom No 1	30.4	0.1	22	PASS	1.8%	PASS
L02 2B4P West Double Bedroom No 1	29.6	0	20	PASS	1.3%	PASS
L02 2B4P West Double Bedroom No 2	29.6	0	19	PASS	1.2%	PASS
L02 3B5P West Double Bedroom No 1	28.6	0	16	PASS	0.9%	PASS
L02 3B5P West Single Bedroom No 1	29.6	0	18	PASS	1.2%	PASS
L02 3B5P West Double Bedroom No 2	29.3	0	19	PASS	1.0%	PASS
L03 4B6P East Double Bedroom No 1	30.5	0.1	27	PASS	2.0%	PASS
L03 4B6P East Single Bedroom No 1	31.2	0.5	24	PASS	2.5%	PASS
L03 4B6P East Double Bedroom No 2	31.9	0.7	32	PASS	3.2%	FAIL
L03 4B6P East Single Bedroom No 2	31.1	0.5	23	PASS	2.8%	PASS
L03 3B5P East Double Bedroom No 1	29.1	0	20	PASS	1.0%	PASS
L03 3B5P East Double Bedroom No 2	28.6	0	16	PASS	0.8%	PASS
L03 3B5P East Single Bedroom No 1	29.8	0	20	PASS	1.5%	PASS
L03 1B2P South Double Bedroom No 1	30.5	0.1	23	PASS	2.0%	PASS
L03 2B4P West Double Bedroom No 1	30	0	22	PASS	1.5%	PASS
L03 2B4P West Double Bedroom No 2	29.8	0	20	PASS	1.3%	PASS
L03 3B5P West Double Bedroom No 1	28.9	0	19	PASS	0.9%	PASS
L03 3B5P West Single Bedroom No 1	29.8	0	19	PASS	1.4%	PASS
L03 3B5P West Double Bedroom No 2	29.6	0	21	PASS	1.2%	PASS
L04 2B3P SE Bedroom No 1	30.5	0.1	25	PASS	2.0%	PASS
L04 2B3P SE Bedroom No 2	30.1	0.1	27	PASS	2.0%	PASS
L04 1B2P S Bedroom No 1	30.5	0.1	23	PASS	2.0%	PASS
L04 2B3P NE Bedroom No 1	29.9	0	24	PASS	1.7%	PASS
L04 2B3P NE Bedroom No 2	28.5	0	16	PASS	0.8%	PASS
L04 2B4P SW Bedroom No 1	29.3	0	21	PASS	1.0%	PASS
L04 2B4P SW Bedroom No 2	30.1	0	22	PASS	1.7%	PASS
L04 3B5P NW Bedroom No 1	29.1	0	20	PASS	0.9%	PASS
L04 3B5P NW Bedroom No 2	28.8	0	19	PASS	0.9%	PASS
L04 3B5P NW Bedroom No 3	29.9	0	22	PASS	1.5%	PASS
L05 2B3P SE Bedroom No 1	30.5	0.1	26	PASS	2.0%	PASS
L05 2B3P SE Bedroom No 2	30.1	0.1	25	PASS	1.8%	PASS
L05 1B2P S Bedroom No 1	30.5	0.1	23	PASS	2.0%	PASS
L05 2B3P NE Bedroom No 1	30	0	23	PASS	1.7%	PASS
L05 2B3P NE Bedroom No 2	28.5	0	16	PASS	0.8%	PASS
L05 2B4P SW Bedroom No 1	29.3	0	20	PASS	1.0%	PASS
L05 2B4P SW Bedroom No 2	30.2	0	23	PASS	1.7%	PASS

		Natural ventilation overheating criteria			Mechanical ventilation overheating criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
L05 3B5P NW Bedroom No 1	29.1	0	19	PASS	0.9%	PASS
L05 3B5P NW Bedroom No 2	28.8	0	20	PASS	0.9%	PASS
L05 3B5P NW Bedroom No 3	30	0	22	PASS	1.5%	PASS
L06 2B3P SE Bedroom No 1	30.5	0.1	26	PASS	2.0%	PASS
L06 2B3P SE Bedroom No 2	30.2	0.1	25	PASS	1.9%	PASS
L06 1B2P S Bedroom No 1	30.5	0.1	23	PASS	2.0%	PASS
L06 2B3P NE Bedroom No 1	30	0	23	PASS	1.7%	PASS
L06 2B3P NE Bedroom No 2	28.6	0	16	PASS	0.8%	PASS
L06 2B4P SW Bedroom No 1	29.3	0	20	PASS	1.0%	PASS
L06 2B4P SW Bedroom No 2	30.2	0	23	PASS	1.7%	PASS
L06 3B5P NW Bedroom No 1	29	0	19	PASS	0.9%	PASS
L06 3B5P NW Bedroom No 2	28.9	0	21	PASS	1.0%	PASS
L06 3B5P NW Bedroom No 3	30	0	22	PASS	1.6%	PASS
L07 2B3P SE Bedroom No 1	30.5	0.1	26	PASS	2.0%	PASS
L07 2B3P SE Bedroom No 2	30.2	0.1	25	PASS	1.9%	PASS
L07 1B2P S Bedroom No 1	30.5	0.1	24	PASS	2.0%	PASS
L07 2B3P NE Bedroom No 1	30	0	24	PASS	1.8%	PASS
L07 2B3P NE Bedroom No 2	28.6	0	18	PASS	0.9%	PASS
L07 2B4P SW Bedroom No 1	29.3	0	20	PASS	1.0%	PASS
L07 2B4P SW Bedroom No 2	30.2	0	23	PASS	1.8%	PASS
L07 3B5P NW Bedroom No 1	29.1	0	19	PASS	0.9%	PASS
L07 3B5P NW Bedroom No 2	28.9	0	21	PASS	1.0%	PASS
L07 3B5P NW Bedroom No 3	30	0	22	PASS	1.7%	PASS
L08 2B3P SE Bedroom No 1	30.5	0.1	28	PASS	2.0%	PASS
L08 2B3P SE Bedroom No 2	30.2	0.1	26	PASS	1.9%	PASS
L08 1B2P S Bedroom No 1	30.6	0.1	25	PASS	2.1%	PASS
L08 2B3P NE Bedroom No 1	30.1	0.1	24	PASS	1.8%	PASS
L08 2B3P NE Bedroom No 2	28.7	0	19	PASS	0.9%	PASS
L08 2B4P SW Bedroom No 1	29.3	0	21	PASS	1.0%	PASS
L08 2B4P SW Bedroom No 2	30.2	0.1	23	PASS	1.8%	PASS

		Natural ventilation overheating criteria			Mechanical ventilation overheating criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
L08 3B5P NW Bedroom No 1	29.1	0	20	PASS	0.9%	PASS
L08 3B5P NW Bedroom No 2	29	0	21	PASS	1.0%	PASS
L08 3B5P NW Bedroom No 3	30	0.1	23	PASS	1.7%	PASS
L09 2B3P SE Bedroom No 1	30.6	0.3	31	PASS	2.2%	PASS
L09 2B3P SE Bedroom No 2	30.3	0.2	27	PASS	2.0%	PASS
L09 1B2P S Bedroom No 1	30.6	0.2	26	PASS	2.1%	PASS
L09 2B3P NE Bedroom No 1	30.1	0.1	25	PASS	1.9%	PASS
L09 2B3P NE Bedroom No 2	28.9	0	20	PASS	1.0%	PASS
L09 2B4P SW Bedroom No 1	29.4	0	21	PASS	1.1%	PASS
L09 2B4P SW Bedroom No 2	30.3	0.1	27	PASS	1.9%	PASS
L09 3B5P NW Bedroom No 1	29.2	0	20	PASS	1.0%	PASS
L09 3B5P NW Bedroom No 2	29.1	0	21	PASS	1.1%	PASS
L09 3B5P NW Bedroom No 3	30.1	0.1	23	PASS	1.8%	PASS
L10 2B3P SE Bedroom No 1	31.1	0.5	32	PASS	2.6%	PASS
L10 2B3P SE Bedroom No 2	30.5	0.4	31	PASS	2.5%	PASS
L10 1B2P S Bedroom No 1	30.8	0.4	32	PASS	2.4%	PASS
L10 2B3P NE Bedroom No 1	30.4	0.3	28	PASS	2.4%	PASS
L10 2B3P NE Bedroom No 2	29.1	0	21	PASS	1.1%	PASS
L10 2B4P SW Bedroom No 1	29.8	0	28	PASS	1.4%	PASS
L10 2B4P SW Bedroom No 2	30.8	0.4	31	PASS	2.4%	PASS
L10 3B5P NW Bedroom No 1	29.5	0	25	PASS	1.3%	PASS
L10 3B5P NW Bedroom No 2	29.1	0	21	PASS	1.1%	PASS
L10 3B5P NW Bedroom No 3	30.1	0.1	23	PASS	1.9%	PASS
L11 1B2P SE Bedroom No 1	30.5	0.2	30	PASS	2.3%	PASS
L11 1B2P S Bedroom No 1	30.8	0.4	28	PASS	2.5%	PASS
L11 1B2P NE Bedroom No 1	28.9	0	21	PASS	1.1%	PASS
L11 2B3P SW Bedroom No 1	30.1	0.1	28	PASS	2.0%	PASS
L11 2B3P SW Bedroom No 2	30.5	0.2	31	PASS	2.2%	PASS
L11 2B4P NW Bedroom No 1	29.5	0	20	PASS	1.1%	PASS
L11 2B4P NW Bedroom No 2	28.6	0	19	PASS	0.9%	PASS

Table A.2 TM59 overheating results for living/kitchen spaces in Plot 1 under the DSY1 2020 weather file.

		Natural ventilation overheating criteria		Mechanical ventilation overheating criteria	
Room Name	Maximum operative temperature (°C)	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
L01 4B6P East Living/Kitchen No 1	29.4	0	PASS	3.0%	PASS
L01 3B5P East Living/Kitchen No 1	28.8	0	PASS	2.0%	PASS
L01 1B2P South Lving/Kitchen No 1	28.9	0	PASS	1.4%	PASS
L01 2B4P West Living/Kitchen No 1	29.4	0	PASS	2.3%	PASS
L01 3B5P West Living Room No 1	28.9	0	PASS	1.9%	PASS
L02 4B6P East Living/Kitchen No 1	30.5	0.3	PASS	4.8%	FAIL
L02 3B5P East Living/Kitchen No 1	29.8	0	PASS	3.1%	FAIL
L02 1B2P South Lving/Kitchen No 1	29.9	0	PASS	2.5%	PASS
L02 2B4P West Living/Kitchen No 1	30.4	0.1	PASS	3.5%	FAIL
L02 3B5P West Living Room No 1	30.1	0	PASS	3.6%	FAIL
L03 4B6P East Living/Kitchen No 1	30.7	0.5	PASS	5.4%	FAIL
L03 3B5P East Living/Kitchen No 1	30.1	0	PASS	4.1%	FAIL
L03 1B2P South Lving/Kitchen No 1	30.1	0.1	PASS	2.8%	PASS
L03 2B4P West Living/Kitchen No 1	30.9	0.4	PASS	4.2%	FAIL
L03 3B5P West Living Room No 1	30.4	0.2	PASS	4.3%	FAIL
L04 2B3P SE Living/Kitchen No 1	31.3	0.9	PASS	5.3%	FAIL
L04 1B2P S Living/Kitchen No 1	29.8	0	PASS	2.5%	PASS
L04 2B3P NE Living/Kitchen No 1	30.1	0.1	PASS	3.4%	FAIL
L04 2B4P SW Living/Kitchen No 1	30.8	0.4	PASS	3.8%	FAIL
L04 3B5P NW Living/Kitchen No 1	30.2	0.2	PASS	3.8%	FAIL
L05 2B3P SE Living/Kitchen No 1	31.6	1	PASS	5.8%	FAIL
L05 1B2P S Living/Kitchen No 1	29.8	0	PASS	2.4%	PASS
L05 2B3P NE Living/Kitchen No 1	30.1	0.1	PASS	3.5%	FAIL
L05 2B4P SW Living/Kitchen No 1	30.8	0.4	PASS	3.8%	FAIL
L05 3B5P NW Living/Kitchen No 1	30.2	0.2	PASS	3.8%	FAIL
L06 2B3P SE Living/Kitchen No 1	31.6	1.1	PASS	5.9%	FAIL
L06 1B2P S Living/Kitchen No 1	29.8	0	PASS	2.4%	PASS
L06 2B3P NE Living/Kitchen No 1	30.2	0.1	PASS	3.7%	FAIL
L06 2B4P SW Living/Kitchen No 1	30.8	0.4	PASS	3.9%	FAIL
L06 3B5P NW Living/Kitchen No 1	30.2	0.2	PASS	3.9%	FAIL
L07 2B3P SE Living/Kitchen No 1	31.6	1.1	PASS	5.9%	FAIL
L07 1B2P S Living/Kitchen No 1	29.8	0	PASS	2.5%	PASS
L07 2B3P NE Living/Kitchen No 1	30.2	0.2	PASS	3.8%	FAIL
L07 2B4P SW Living/Kitchen No 1	30.8	0.4	PASS	3.9%	FAIL
L07 3B5P NW Living/Kitchen No 1	30.2	0.2	PASS	4.0%	FAIL
L08 2B3P SE Living/Kitchen No 1	31.7	1.2	PASS	6.0%	FAIL
L08 1B2P S Living/Kitchen No 1	29.8	0	PASS	2.5%	PASS
L08 2B3P NE Living/Kitchen No 1	30.3	0.3	PASS	4.1%	FAIL
L08 2B4P SW Living/Kitchen No 1	30.9	0.5	PASS	3.9%	FAIL
L08 3B5P NW Living/Kitchen No 1	30.3	0.2	PASS	4.2%	FAIL
L09 2B3P SE Living/Kitchen No 1	32	1.3	PASS	6.5%	FAIL
L09 1B2P S Living/Kitchen No 1	30	0.1	PASS	2.8%	PASS
L09 2B3P NE Living/Kitchen No 1	30.4	0.4	PASS	4.4%	FAIL
L09 2B4P SW Living/Kitchen No 1	31	0.6	PASS	4.2%	FAIL
L09 3B5P NW Living/Kitchen No 1	30.4	0.4	PASS	4.5%	FAIL
L10 2B3P SE Living/Kitchen No 1	32.2	1.8	PASS	7.9%	FAIL
L10 1B2P S Living/Kitchen No 1	31.3	0.8	PASS	5.1%	FAIL
L10 2B3P NE Living/Kitchen No 1	30.9	0.8	PASS	6.1%	FAIL
L10 2B4P SW Living/Kitchen No 1	32.1	1.4	PASS	6.3%	FAIL
L10 3B5P NW Living/Kitchen No 1	30.6	0.4	PASS	5.0%	FAIL
L11 1B2P SE Kitchen/Living No 1	30.2	0.1	PASS	3.8%	FAIL
L11 1B2P S Kitchen/Living No 1	31	0.6	PASS	4.6%	FAIL
L11 1B2P NE Living/Kitchen No 1	29.8	0	PASS	3.2%	FAIL
L11 2B3P SW Kitchen/Living No 1	31.7	1	PASS	6.1%	FAIL
L11 2B4P NW kitchen/living No 1	30.2	0.1	PASS	4.5%	FAIL

A.1.2 DSY2 2020 overheating results

Table A.3 TM59 overheating results for bedroom spaces in Plot 1 under the DSY2 2020 weather file.

	Natural ventilation overheating criteria			Mechanical ventilation overheating criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
L01 4B6P East Double Bedroom No 1	0.3	44	FAIL	2.5%	PASS
L01 4B6P East Single Bedroom No 1	0.6	43	FAIL	2.5%	PASS
L01 4B6P East Double Bedroom No 2	0.8	47	FAIL	2.8%	PASS
L01 4B6P East Single Bedroom No 2	0.7	42	FAIL	2.5%	PASS
L01 3B5P East Double Bedroom No 1	0	36	FAIL	1.5%	PASS
L01 3B5P East Double Bedroom No 2	0	29	PASS	1.2%	PASS
L01 3B5P East Single Bedroom No 1	0	31	PASS	1.6%	PASS
L01 1B2P South Double Bedroom No 1	0.1	40	FAIL	2.1%	PASS
L01 2B4P West Double Bedroom No 1	0	40	FAIL	1.8%	PASS
L01 2B4P West Double Bedroom No 2	0	35	FAIL	1.7%	PASS
L01 3B5P West Double Bedroom No 1	0	31	PASS	1.3%	PASS
L01 3B5P West Single Bedroom No 1	0	31	PASS	1.6%	PASS
L01 3B5P West Double Bedroom No 2	0	36	FAIL	1.5%	PASS
L02 4B6P East Double Bedroom No 1	0.7	52	FAIL	2.5%	PASS
L02 4B6P East Single Bedroom No 1	1	46	FAIL	2.7%	PASS
L02 4B6P East Double Bedroom No 2	1.3	58	FAIL	3.2%	FAIL
L02 4B6P East Single Bedroom No 2	1.1	46	FAIL	2.7%	PASS
L02 3B5P East Double Bedroom No 1	0	49	FAIL	1.8%	PASS
L02 3B5P East Double Bedroom No 2	0	37	FAIL	1.5%	PASS
L02 3B5P East Single Bedroom No 1	0.2	39	FAIL	1.9%	PASS
L02 1B2P South Double Bedroom No 1	0.6	53	FAIL	2.5%	PASS
L02 2B4P West Double Bedroom No 1	0.4	53	FAIL	2.2%	PASS
L02 2B4P West Double Bedroom No 2	0.2	44	FAIL	2.0%	PASS
L02 3B5P West Double Bedroom No 1	0	40	FAIL	1.7%	PASS
L02 3B5P West Single Bedroom No 1	0.2	40	FAIL	2.0%	PASS
L02 3B5P West Double Bedroom No 2	0	43	FAIL	1.8%	PASS
L03 4B6P East Double Bedroom No 1	0.9	55	FAIL	2.6%	PASS
L03 4B6P East Single Bedroom No 1	1.2	50	FAIL	2.8%	PASS
L03 4B6P East Double Bedroom No 2	1.7	59	FAIL	3.4%	FAIL
L03 4B6P East Single Bedroom No 2	1.4	47	FAIL	3.0%	FAIL
L03 3B5P East Double Bedroom No 1	0.1	52	FAIL	2.0%	PASS
L03 3B5P East Double Bedroom No 2	0	40	FAIL	1.6%	PASS
L03 3B5P East Single Bedroom No 1	0.4	42	FAIL	2.2%	PASS
L03 1B2P South Double Bedroom No 1	0.8	56	FAIL	2.7%	PASS
L03 2B4P West Double Bedroom No 1	0.7	55	FAIL	2.4%	PASS
L03 2B4P West Double Bedroom No 2	0.2	45	FAIL	2.1%	PASS
L03 3B5P West Double Bedroom No 1	0	43	FAIL	1.8%	PASS
L03 3B5P West Single Bedroom No 1	0.3	41	FAIL	2.1%	PASS
L03 3B5P West Double Bedroom No 2	0	46	FAIL	1.9%	PASS
L04 2B3P SE Bedroom No 1	0.9	58	FAIL	2.7%	PASS
L04 2B3P SE Bedroom No 2	0.9	53	FAIL	2.6%	PASS
L04 1B2P S Bedroom No 1	0.7	57	FAIL	2.7%	PASS
L04 2B3P NE Bedroom No 1	0.8	50	FAIL	2.5%	PASS
L04 2B3P NE Bedroom No 2	0	42	FAIL	1.7%	PASS
L04 2B4P SW Bedroom No 1	0	49	FAIL	1.8%	PASS
L04 2B4P SW Bedroom No 2	0.7	56	FAIL	2.5%	PASS
L04 3B5P NW Bedroom No 1	0	46	FAIL	1.7%	PASS
L04 3B5P NW Bedroom No 2	0	43	FAIL	1.7%	PASS
L04 3B5P NW Bedroom No 3	0.4	44	FAIL	2.2%	PASS
L05 2B3P SE Bedroom No 1	0.9	58	FAIL	2.7%	PASS
L05 2B3P SE Bedroom No 2	0.9	53	FAIL	2.5%	PASS
L05 1B2P S Bedroom No 1	0.7	57	FAIL	2.7%	PASS
L05 2B3P NE Bedroom No 1	0.8	51	FAIL	2.5%	PASS
L05 2B3P NE Bedroom No 2	0	42	FAIL	1.7%	PASS
L05 2B4P SW Bedroom No 1	0	46	FAIL	1.8%	PASS
L05 2B4P SW Bedroom No 2	0.7	56	FAIL	2.5%	PASS
L05 3B5P NW Bedroom No 1	0	45	FAIL	1.7%	PASS
L05 3B5P NW Bedroom No 2	0	43	FAIL	1.8%	PASS

	Natural ventilation overheating criteria			Mechanical ventilation overheating criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
L05 3B5P NW Bedroom No 3	0.5	44	FAIL	2.2%	PASS
L06 2B3P SE Bedroom No 1	0.9	58	FAIL	2.7%	PASS
L06 2B3P SE Bedroom No 2	0.9	54	FAIL	2.6%	PASS
L06 1B2P S Bedroom No 1	0.7	57	FAIL	2.7%	PASS
L06 2B3P NE Bedroom No 1	0.8	52	FAIL	2.5%	PASS
L06 2B3P NE Bedroom No 2	0	42	FAIL	1.7%	PASS
L06 2B4P SW Bedroom No 1	0	47	FAIL	1.8%	PASS
L06 2B4P SW Bedroom No 2	0.7	56	FAIL	2.5%	PASS
L06 3B5P NW Bedroom No 1	0	45	FAIL	1.7%	PASS
L06 3B5P NW Bedroom No 2	0	43	FAIL	1.8%	PASS
L06 3B5P NW Bedroom No 3	0.5	45	FAIL	2.3%	PASS
L07 2B3P SE Bedroom No 1	0.9	58	FAIL	2.7%	PASS
L07 2B3P SE Bedroom No 2	0.9	54	FAIL	2.6%	PASS
L07 1B2P S Bedroom No 1	0.8	57	FAIL	2.7%	PASS
L07 2B3P NE Bedroom No 1	0.8	52	FAIL	2.5%	PASS
L07 2B3P NE Bedroom No 2	0	43	FAIL	1.8%	PASS
L07 2B4P SW Bedroom No 1	0.1	49	FAIL	1.8%	PASS
L07 2B4P SW Bedroom No 2	0.7	56	FAIL	2.5%	PASS
L07 3B5P NW Bedroom No 1	0	46	FAIL	1.7%	PASS
L07 3B5P NW Bedroom No 2	0	44	FAIL	1.8%	PASS
L07 3B5P NW Bedroom No 3	0.5	47	FAIL	2.4%	PASS
L08 2B3P SE Bedroom No 1	1	58	FAIL	2.7%	PASS
L08 2B3P SE Bedroom No 2	1	54	FAIL	2.6%	PASS
L08 1B2P S Bedroom No 1	0.8	58	FAIL	2.7%	PASS
L08 2B3P NE Bedroom No 1	0.9	52	FAIL	2.5%	PASS
L08 2B3P NE Bedroom No 2	0	44	FAIL	1.8%	PASS
L08 2B4P SW Bedroom No 1	0.1	50	FAIL	1.9%	PASS
L08 2B4P SW Bedroom No 2	0.7	57	FAIL	2.6%	PASS
L08 3B5P NW Bedroom No 1	0	47	FAIL	1.7%	PASS
L08 3B5P NW Bedroom No 2	0	45	FAIL	1.9%	PASS
L08 3B5P NW Bedroom No 3	0.5	48	FAIL	2.4%	PASS
L09 2B3P SE Bedroom No 1	1	60	FAIL	2.8%	PASS
L09 2B3P SE Bedroom No 2	1	56	FAIL	2.7%	PASS
L09 1B2P S Bedroom No 1	0.8	58	FAIL	2.8%	PASS
L09 2B3P NE Bedroom No 1	0.9	53	FAIL	2.6%	PASS
L09 2B3P NE Bedroom No 2	0	45	FAIL	1.8%	PASS
L09 2B4P SW Bedroom No 1	0.1	52	FAIL	1.9%	PASS
L09 2B4P SW Bedroom No 2	0.8	57	FAIL	2.6%	PASS
L09 3B5P NW Bedroom No 1	0	49	FAIL	1.8%	PASS
L09 3B5P NW Bedroom No 2	0	45	FAIL	1.9%	PASS
L09 3B5P NW Bedroom No 3	0.6	48	FAIL	2.5%	PASS
L10 2B3P SE Bedroom No 1	1.1	62	FAIL	3.1%	FAIL
L10 2B3P SE Bedroom No 2	1.1	57	FAIL	3.0%	PASS
L10 1B2P S Bedroom No 1	0.9	59	FAIL	3.0%	PASS
L10 2B3P NE Bedroom No 1	1.1	56	FAIL	2.9%	PASS
L10 2B3P NE Bedroom No 2	0	46	FAIL	2.0%	PASS
L10 2B4P SW Bedroom No 1	0.2	56	FAIL	2.2%	PASS
L10 2B4P SW Bedroom No 2	1	59	FAIL	3.0%	PASS
L10 3B5P NW Bedroom No 1	0	52	FAIL	2.0%	PASS
L10 3B5P NW Bedroom No 2	0	45	FAIL	1.9%	PASS
L10 3B5P NW Bedroom No 3	0.5	48	FAIL	2.5%	PASS
L11 1B2P SE Bedroom No 1	0.7	58	FAIL	2.8%	PASS
L11 1B2P S Bedroom No 1	0.9	58	FAIL	3.0%	FAIL
L11 1B2P NE Bedroom No 1	0	46	FAIL	1.9%	PASS
L11 2B3P SW Bedroom No 1	0.3	49	FAIL	2.4%	PASS
L11 2B3P SW Bedroom No 2	0.7	58	FAIL	2.7%	PASS
L11 2B4P NW Bedroom No 1	0	41	FAIL	1.8%	PASS
L11 2B4P NW Bedroom No 2	0	40	FAIL	1.6%	PASS

Table A.4 TM59 overheating results for living/kitchen spaces in Plot 1 under the DSY2 2020 weather file.

	Natural ventilation overheating criteria		Mechanical ventilation overheating criteria	
Room Name	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
L01 4B6P East Living/Kitchen No 1	0.1	PASS	5.1%	FAIL
L01 3B5P East Living/Kitchen No 1	0	PASS	4.0%	FAIL
L01 1B2P South Lving/Kitchen No 1	0	PASS	3.0%	PASS
L01 2B4P West Living/Kitchen No 1	0.3	PASS	4.2%	FAIL
L01 3B5P West Living Room No 1	0	PASS	3.6%	FAIL
L02 4B6P East Living/Kitchen No 1	1.6	PASS	6.8%	FAIL
L02 3B5P East Living/Kitchen No 1	0.5	PASS	5.2%	FAIL
L02 1B2P South Lving/Kitchen No 1	0.6	PASS	4.4%	FAIL
L02 2B4P West Living/Kitchen No 1	1.4	PASS	5.5%	FAIL
L02 3B5P West Living Room No 1	0.5	PASS	5.3%	FAIL
L03 4B6P East Living/Kitchen No 1	2	PASS	7.1%	FAIL
L03 3B5P East Living/Kitchen No 1	1.1	PASS	5.8%	FAIL
L03 1B2P South Lving/Kitchen No 1	0.9	PASS	4.7%	FAIL
L03 2B4P West Living/Kitchen No 1	1.4	PASS	6.0%	FAIL
L03 3B5P West Living Room No 1	0.7	PASS	5.9%	FAIL
L04 2B3P SE Living/Kitchen No 1	2.3	PASS	6.8%	FAIL
L04 1B2P S Living/Kitchen No 1	0.6	PASS	4.3%	FAIL
L04 2B3P NE Living/Kitchen No 1	1	PASS	5.2%	FAIL
L04 2B4P SW Living/Kitchen No 1	1.3	PASS	5.6%	FAIL
L04 3B5P NW Living/Kitchen No 1	0.7	PASS	5.4%	FAIL
L05 2B3P SE Living/Kitchen No 1	2.5	PASS	7.3%	FAIL
L05 1B2P S Living/Kitchen No 1	0.6	PASS	4.3%	FAIL
L05 2B3P NE Living/Kitchen No 1	1.1	PASS	5.4%	FAIL
L05 2B4P SW Living/Kitchen No 1	1.3	PASS	5.6%	FAIL
L05 3B5P NW Living/Kitchen No 1	0.7	PASS	5.4%	FAIL
L06 2B3P SE Living/Kitchen No 1	2.5	PASS	7.3%	FAIL
L06 1B2P S Living/Kitchen No 1	0.6	PASS	4.3%	FAIL
L06 2B3P NE Living/Kitchen No 1	1.2	PASS	5.5%	FAIL
L06 2B4P SW Living/Kitchen No 1	1.3	PASS	5.6%	FAIL
L06 3B5P NW Living/Kitchen No 1	0.8	PASS	5.5%	FAIL
L07 2B3P SE Living/Kitchen No 1	2.6	PASS	7.4%	FAIL
L07 1B2P S Living/Kitchen No 1	0.6	PASS	4.3%	FAIL
L07 2B3P NE Living/Kitchen No 1	1.2	PASS	5.6%	FAIL
L07 2B4P SW Living/Kitchen No 1	1.3	PASS	5.6%	FAIL
L07 3B5P NW Living/Kitchen No 1	0.9	PASS	5.6%	FAIL
L08 2B3P SE Living/Kitchen No 1	2.7	PASS	7.5%	FAIL
L08 1B2P S Living/Kitchen No 1	0.7	PASS	4.4%	FAIL
L08 2B3P NE Living/Kitchen No 1	1.2	PASS	5.7%	FAIL
L08 2B4P SW Living/Kitchen No 1	1.3	PASS	5.7%	FAIL
L08 3B5P NW Living/Kitchen No 1	1	PASS	5.6%	FAIL
L09 2B3P SE Living/Kitchen No 1	3.1	FAIL	7.7%	FAIL
L09 1B2P S Living/Kitchen No 1	0.9	PASS	4.6%	FAIL
L09 2B3P NE Living/Kitchen No 1	1.3	PASS	5.9%	FAIL
L09 2B4P SW Living/Kitchen No 1	1.3	PASS	6.0%	FAIL
L09 3B5P NW Living/Kitchen No 1	1	PASS	6.0%	FAIL
L10 2B3P SE Living/Kitchen No 1	3.7	FAIL	9.1%	FAIL
L10 1B2P S Living/Kitchen No 1	1.9	PASS	6.2%	FAIL
L10 2B3P NE Living/Kitchen No 1	2.4	PASS	7.5%	FAIL
L10 2B4P SW Living/Kitchen No 1	2.3	PASS	7.6%	FAIL
L10 3B5P NW Living/Kitchen No 1	1	PASS	6.2%	FAIL
L11 1B2P SE Kitchen/Living No 1	0.9	PASS	5.5%	FAIL
L11 1B2P S Kitchen/Living No 1	1.6	PASS	5.8%	FAIL
L11 1B2P NE Living/Kitchen No 1	0.6	PASS	5.1%	FAIL
L11 2B3P SW Kitchen/Living No 1	1.9	PASS	7.3%	FAIL
L11 2B4P NW kitchen/living No 1	0.2	PASS	5.8%	FAIL

A.1.3 DSY3 2020 overheating results

Table A.5 TM59 overheating results for bedroom spaces in Plot 1 under the DSY3 2020 weather file.

	Natural ventilation overheating criteria			Mechanical ventilation overheating criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
L01 4B6P East Double Bedroom No 1	0.5	63	FAIL	3.6%	FAIL
L01 4B6P East Single Bedroom No 1	0.8	60	FAIL	3.6%	FAIL
L01 4B6P East Double Bedroom No 2	1.1	69	FAIL	4.1%	FAIL
L01 4B6P East Single Bedroom No 2	0.6	57	FAIL	3.5%	FAIL
L01 3B5P East Double Bedroom No 1	0	56	FAIL	2.3%	PASS
L01 3B5P East Double Bedroom No 2	0	43	FAIL	2.0%	PASS
L01 3B5P East Single Bedroom No 1	0	46	FAIL	2.3%	PASS
L01 1B2P South Double Bedroom No 1	0	57	FAIL	2.8%	PASS
L01 2B4P West Double Bedroom No 1	0	54	FAIL	2.5%	PASS
L01 2B4P West Double Bedroom No 2	0	52	FAIL	2.4%	PASS
L01 3B5P West Double Bedroom No 1	0	45	FAIL	2.1%	PASS
L01 3B5P West Single Bedroom No 1	0	48	FAIL	2.3%	PASS
L01 3B5P West Double Bedroom No 2	0	54	FAIL	2.4%	PASS
L02 4B6P East Double Bedroom No 1	0.7	75	FAIL	3.6%	FAIL
L02 4B6P East Single Bedroom No 1	1.2	64	FAIL	3.7%	FAIL
L02 4B6P East Double Bedroom No 2	1.7	79	FAIL	4.5%	FAIL
L02 4B6P East Single Bedroom No 2	1.1	64	FAIL	3.9%	FAIL
L02 3B5P East Double Bedroom No 1	0	70	FAIL	2.6%	PASS
L02 3B5P East Double Bedroom No 2	0	55	FAIL	2.3%	PASS
L02 3B5P East Single Bedroom No 1	0.3	56	FAIL	2.6%	PASS
L02 1B2P South Double Bedroom No 1	0.6	73	FAIL	3.6%	FAIL
L02 2B4P West Double Bedroom No 1	0.2	69	FAIL	3.0%	PASS
L02 2B4P West Double Bedroom No 2	0.4	65	FAIL	2.9%	PASS
L02 3B5P West Double Bedroom No 1	0	65	FAIL	2.6%	PASS
L02 3B5P West Single Bedroom No 1	0.5	59	FAIL	2.8%	PASS
L02 3B5P West Double Bedroom No 2	0.2	67	FAIL	2.7%	PASS
L03 4B6P East Double Bedroom No 1	0.9	77	FAIL	3.8%	FAIL
L03 4B6P East Single Bedroom No 1	1.4	69	FAIL	4.0%	FAIL
L03 4B6P East Double Bedroom No 2	2	83	FAIL	4.8%	FAIL
L03 4B6P East Single Bedroom No 2	1.4	66	FAIL	4.2%	FAIL
L03 3B5P East Double Bedroom No 1	0.2	74	FAIL	2.8%	PASS
L03 3B5P East Double Bedroom No 2	0	63	FAIL	2.5%	PASS
L03 3B5P East Single Bedroom No 1	0.6	58	FAIL	2.9%	PASS
L03 1B2P South Double Bedroom No 1	0.9	79	FAIL	3.8%	FAIL
L03 2B4P West Double Bedroom No 1	0.5	75	FAIL	3.3%	FAIL
L03 2B4P West Double Bedroom No 2	0.6	67	FAIL	2.9%	PASS
L03 3B5P West Double Bedroom No 1	0.1	69	FAIL	2.8%	PASS
L03 3B5P West Single Bedroom No 1	0.6	61	FAIL	2.9%	PASS
L03 3B5P West Double Bedroom No 2	0.4	70	FAIL	2.9%	PASS
L04 2B3P SE Bedroom No 1	0.9	82	FAIL	3.8%	FAIL
L04 2B3P SE Bedroom No 2	0.7	75	FAIL	3.5%	FAIL
L04 1B2P S Bedroom No 1	0.8	79	FAIL	3.8%	FAIL
L04 2B3P NE Bedroom No 1	0.6	72	FAIL	3.3%	FAIL
L04 2B3P NE Bedroom No 2	0	64	FAIL	2.6%	PASS
L04 2B4P SW Bedroom No 1	0.3	77	FAIL	2.8%	PASS
L04 2B4P SW Bedroom No 2	0.7	78	FAIL	3.4%	FAIL
L04 3B5P NW Bedroom No 1	0.2	75	FAIL	2.7%	PASS
L04 3B5P NW Bedroom No 2	0	69	FAIL	2.7%	PASS
L04 3B5P NW Bedroom No 3	0.6	70	FAIL	3.0%	FAIL
L05 2B3P SE Bedroom No 1	0.9	82	FAIL	3.8%	FAIL
L05 2B3P SE Bedroom No 2	0.7	73	FAIL	3.4%	FAIL
L05 1B2P S Bedroom No 1	0.8	79	FAIL	3.8%	FAIL
L05 2B3P NE Bedroom No 1	0.7	72	FAIL	3.3%	FAIL
L05 2B3P NE Bedroom No 2	0	64	FAIL	2.6%	PASS
L05 2B4P SW Bedroom No 1	0.2	74	FAIL	2.7%	PASS
L05 2B4P SW Bedroom No 2	0.7	79	FAIL	3.4%	FAIL
L05 3B5P NW Bedroom No 1	0.1	75	FAIL	2.7%	PASS
L05 3B5P NW Bedroom No 2	0.1	70	FAIL	2.7%	PASS

	Natural ventilation overheating criteria			Mechanical ventilation overheating criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
L05 3B5P NW Bedroom No 3	0.7	71	FAIL	3.1%	FAIL
L06 2B3P SE Bedroom No 1	0.9	82	FAIL	3.8%	FAIL
L06 2B3P SE Bedroom No 2	0.7	73	FAIL	3.4%	FAIL
L06 1B2P S Bedroom No 1	0.9	79	FAIL	3.8%	FAIL
L06 2B3P NE Bedroom No 1	0.7	72	FAIL	3.3%	FAIL
L06 2B3P NE Bedroom No 2	0	65	FAIL	2.6%	PASS
L06 2B4P SW Bedroom No 1	0.2	74	FAIL	2.7%	PASS
L06 2B4P SW Bedroom No 2	0.7	79	FAIL	3.5%	FAIL
L06 3B5P NW Bedroom No 1	0.1	75	FAIL	2.7%	PASS
L06 3B5P NW Bedroom No 2	0.1	71	FAIL	2.8%	PASS
L06 3B5P NW Bedroom No 3	0.7	71	FAIL	3.2%	FAIL
L07 2B3P SE Bedroom No 1	0.9	82	FAIL	3.9%	FAIL
L07 2B3P SE Bedroom No 2	0.8	73	FAIL	3.4%	FAIL
L07 1B2P S Bedroom No 1	0.9	80	FAIL	3.8%	FAIL
L07 2B3P NE Bedroom No 1	0.7	72	FAIL	3.3%	FAIL
L07 2B3P NE Bedroom No 2	0	66	FAIL	2.6%	PASS
L07 2B4P SW Bedroom No 1	0.2	74	FAIL	2.7%	PASS
L07 2B4P SW Bedroom No 2	0.7	79	FAIL	3.5%	FAIL
L07 3B5P NW Bedroom No 1	0.2	75	FAIL	2.7%	PASS
L07 3B5P NW Bedroom No 2	0.1	72	FAIL	2.8%	PASS
L07 3B5P NW Bedroom No 3	0.7	71	FAIL	3.2%	FAIL
L08 2B3P SE Bedroom No 1	0.9	82	FAIL	3.9%	FAIL
L08 2B3P SE Bedroom No 2	0.8	74	FAIL	3.5%	FAIL
L08 1B2P S Bedroom No 1	0.9	81	FAIL	3.9%	FAIL
L08 2B3P NE Bedroom No 1	0.7	73	FAIL	3.4%	FAIL
L08 2B3P NE Bedroom No 2	0	68	FAIL	2.7%	PASS
L08 2B4P SW Bedroom No 1	0.3	76	FAIL	2.8%	PASS
L08 2B4P SW Bedroom No 2	0.7	79	FAIL	3.5%	FAIL
L08 3B5P NW Bedroom No 1	0.2	75	FAIL	2.7%	PASS
L08 3B5P NW Bedroom No 2	0.1	73	FAIL	2.9%	PASS
L08 3B5P NW Bedroom No 3	0.8	71	FAIL	3.2%	FAIL
L09 2B3P SE Bedroom No 1	1	83	FAIL	4.0%	FAIL
L09 2B3P SE Bedroom No 2	0.8	75	FAIL	3.6%	FAIL
L09 1B2P S Bedroom No 1	1	82	FAIL	4.0%	FAIL
L09 2B3P NE Bedroom No 1	0.8	73	FAIL	3.4%	FAIL
L09 2B3P NE Bedroom No 2	0	71	FAIL	2.8%	PASS
L09 2B4P SW Bedroom No 1	0.3	77	FAIL	2.9%	PASS
L09 2B4P SW Bedroom No 2	0.8	80	FAIL	3.6%	FAIL
L09 3B5P NW Bedroom No 1	0.3	76	FAIL	2.8%	PASS
L09 3B5P NW Bedroom No 2	0.1	74	FAIL	2.9%	PASS
L09 3B5P NW Bedroom No 3	0.8	72	FAIL	3.2%	FAIL
L10 2B3P SE Bedroom No 1	1.4	86	FAIL	4.4%	FAIL
L10 2B3P SE Bedroom No 2	1.1	78	FAIL	3.9%	FAIL
L10 1B2P S Bedroom No 1	1.2	85	FAIL	4.2%	FAIL
L10 2B3P NE Bedroom No 1	1	75	FAIL	3.8%	FAIL
L10 2B3P NE Bedroom No 2	0.1	73	FAIL	2.9%	PASS
L10 2B4P SW Bedroom No 1	0.6	82	FAIL	3.1%	FAIL
L10 2B4P SW Bedroom No 2	1.3	85	FAIL	4.1%	FAIL
L10 3B5P NW Bedroom No 1	0.4	81	FAIL	3.1%	FAIL
L10 3B5P NW Bedroom No 2	0.1	74	FAIL	3.0%	FAIL
L10 3B5P NW Bedroom No 3	0.8	73	FAIL	3.3%	FAIL
L11 1B2P SE Bedroom No 1	1	84	FAIL	4.2%	FAIL
L11 1B2P S Bedroom No 1	1.2	81	FAIL	4.3%	FAIL
L11 1B2P NE Bedroom No 1	0	74	FAIL	3.0%	FAIL
L11 2B3P SW Bedroom No 1	0.8	76	FAIL	3.4%	FAIL
L11 2B3P SW Bedroom No 2	1	83	FAIL	3.9%	FAIL
L11 2B4P NW Bedroom No 1	0.3	68	FAIL	2.7%	PASS
L11 2B4P NW Bedroom No 2	0	69	FAIL	2.7%	PASS

Table A.6 TM59 overheating results for living/kitchen spaces in Plot 1 under the DSY3 2020 weather file.

	Natural ventilation criteria		Mechanical ventilation criteria	
Room Name	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
L01 4B6P East Living/Kitchen No 1	0.1	PASS	7.0%	FAIL
L01 3B5P East Living/Kitchen No 1	0	PASS	5.6%	FAIL
L01 1B2P South Lving/Kitchen No 1	0	PASS	4.4%	FAIL
L01 2B4P West Living/Kitchen No 1	0.1	PASS	5.8%	FAIL
L01 3B5P West Living Room No 1	0	PASS	5.9%	FAIL
L02 4B6P East Living/Kitchen No 1	1.5	PASS	8.8%	FAIL
L02 3B5P East Living/Kitchen No 1	0.6	PASS	7.1%	FAIL
L02 1B2P South Lving/Kitchen No 1	0.5	PASS	6.0%	FAIL
L02 2B4P West Living/Kitchen No 1	1.1	PASS	7.3%	FAIL
L02 3B5P West Living Room No 1	1.1	PASS	7.1%	FAIL
L03 4B6P East Living/Kitchen No 1	2	PASS	9.3%	FAIL
L03 3B5P East Living/Kitchen No 1	1.2	PASS	7.5%	FAIL
L03 1B2P South Lving/Kitchen No 1	0.8	PASS	6.4%	FAIL
L03 2B4P West Living/Kitchen No 1	1.7	PASS	7.8%	FAIL
L03 3B5P West Living Room No 1	1.6	PASS	7.9%	FAIL
L04 2B3P SE Living/Kitchen No 1	2.3	PASS	9.0%	FAIL
L04 1B2P S Living/Kitchen No 1	0.5	PASS	6.0%	FAIL
L04 2B3P NE Living/Kitchen No 1	1.1	PASS	6.9%	FAIL
L04 2B4P SW Living/Kitchen No 1	1.5	PASS	7.4%	FAIL
L04 3B5P NW Living/Kitchen No 1	1.5	PASS	7.3%	FAIL
L05 2B3P SE Living/Kitchen No 1	2.8	PASS	9.5%	FAIL
L05 1B2P S Living/Kitchen No 1	0.5	PASS	6.0%	FAIL
L05 2B3P NE Living/Kitchen No 1	1.2	PASS	7.0%	FAIL
L05 2B4P SW Living/Kitchen No 1	1.5	PASS	7.4%	FAIL
L05 3B5P NW Living/Kitchen No 1	1.4	PASS	7.2%	FAIL
L06 2B3P SE Living/Kitchen No 1	2.9	PASS	9.7%	FAIL
L06 1B2P S Living/Kitchen No 1	0.5	PASS	6.0%	FAIL
L06 2B3P NE Living/Kitchen No 1	1.2	PASS	7.1%	FAIL
L06 2B4P SW Living/Kitchen No 1	1.5	PASS	7.4%	FAIL
L06 3B5P NW Living/Kitchen No 1	1.5	PASS	7.3%	FAIL
L07 2B3P SE Living/Kitchen No 1	2.9	PASS	9.8%	FAIL
L07 1B2P S Living/Kitchen No 1	0.5	PASS	6.0%	FAIL
L07 2B3P NE Living/Kitchen No 1	1.3	PASS	7.3%	FAIL
L07 2B4P SW Living/Kitchen No 1	1.5	PASS	7.5%	FAIL
L07 3B5P NW Living/Kitchen No 1	1.5	PASS	7.4%	FAIL
L08 2B3P SE Living/Kitchen No 1	3.1	FAIL	9.8%	FAIL
L08 1B2P S Living/Kitchen No 1	0.5	PASS	6.0%	FAIL
L08 2B3P NE Living/Kitchen No 1	1.4	PASS	7.5%	FAIL
L08 2B4P SW Living/Kitchen No 1	1.6	PASS	7.6%	FAIL
L08 3B5P NW Living/Kitchen No 1	1.6	PASS	7.5%	FAIL
L09 2B3P SE Living/Kitchen No 1	3.6	FAIL	10.3%	FAIL
L09 1B2P S Living/Kitchen No 1	0.8	PASS	6.5%	FAIL
L09 2B3P NE Living/Kitchen No 1	1.7	PASS	7.9%	FAIL
L09 2B4P SW Living/Kitchen No 1	1.8	PASS	7.8%	FAIL
L09 3B5P NW Living/Kitchen No 1	1.9	PASS	7.9%	FAIL
L10 2B3P SE Living/Kitchen No 1	4.4	FAIL	11.5%	FAIL
L10 1B2P S Living/Kitchen No 1	2.4	PASS	8.6%	FAIL
L10 2B3P NE Living/Kitchen No 1	2.8	PASS	9.6%	FAIL
L10 2B4P SW Living/Kitchen No 1	3.7	FAIL	10.1%	FAIL
L10 3B5P NW Living/Kitchen No 1	2.2	PASS	8.4%	FAIL
L11 1B2P SE Kitchen/Living No 1	1.1	PASS	7.4%	FAIL
L11 1B2P S Kitchen/Living No 1	1.9	PASS	8.4%	FAIL
L11 1B2P NE Living/Kitchen No 1	0.7	PASS	7.0%	FAIL
L11 2B3P SW Kitchen/Living No 1	3.1	FAIL	9.7%	FAIL
L11 2B4P NW kitchen/living No 1	1.4	PASS	8.5%	FAIL

A.1.4 DSY1 2050 overheating results

Table 7.7 TM59 overheating results for bedroom spaces in Plot 1 under the DSY1 2050 weather file.

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
L01 4B6P East Double Bedroom No 1	0.6	66	FAIL	4.6%	FAIL
L01 4B6P East Single Bedroom No 1	0.7	66	FAIL	4.8%	FAIL
L01 4B6P East Double Bedroom No 2	0.9	76	FAIL	5.4%	FAIL
L01 4B6P East Single Bedroom No 2	0.7	62	FAIL	4.8%	FAIL
L01 3B5P East Double Bedroom No 1	0	50	FAIL	2.1%	PASS
L01 3B5P East Double Bedroom No 2	0	33	FAIL	1.6%	PASS
L01 3B5P East Single Bedroom No 1	0	45	FAIL	2.9%	PASS
L01 1B2P South Double Bedroom No 1	0.2	53	FAIL	3.7%	FAIL
L01 2B4P West Double Bedroom No 1	0	50	FAIL	3.2%	FAIL
L01 2B4P West Double Bedroom No 2	0	51	FAIL	3.0%	FAIL
L01 3B5P West Double Bedroom No 1	0	37	FAIL	1.9%	PASS
L01 3B5P West Single Bedroom No 1	0	46	FAIL	3.0%	PASS
L01 3B5P West Double Bedroom No 2	0	49	FAIL	2.6%	PASS
L02 4B6P East Double Bedroom No 1	0.6	80	FAIL	4.7%	FAIL
L02 4B6P East Single Bedroom No 1	0.9	70	FAIL	4.9%	FAIL
L02 4B6P East Double Bedroom No 2	1.6	93	FAIL	5.9%	FAIL
L02 4B6P East Single Bedroom No 2	0.9	70	FAIL	5.2%	FAIL
L02 3B5P East Double Bedroom No 1	0	62	FAIL	2.9%	PASS
L02 3B5P East Double Bedroom No 2	0	49	FAIL	2.3%	PASS
L02 3B5P East Single Bedroom No 1	0.4	55	FAIL	3.4%	FAIL
L02 1B2P South Double Bedroom No 1	0.6	75	FAIL	4.6%	FAIL
L02 2B4P West Double Bedroom No 1	0.3	70	FAIL	3.9%	FAIL
L02 2B4P West Double Bedroom No 2	0.3	68	FAIL	3.7%	FAIL
L02 3B5P West Double Bedroom No 1	0	56	FAIL	3.0%	FAIL
L02 3B5P West Single Bedroom No 1	0.4	61	FAIL	3.7%	FAIL
L02 3B5P West Double Bedroom No 2	0.1	65	FAIL	3.2%	FAIL
L03 4B6P East Double Bedroom No 1	0.7	82	FAIL	4.8%	FAIL
L03 4B6P East Single Bedroom No 1	1.1	72	FAIL	5.2%	FAIL
L03 4B6P East Double Bedroom No 2	1.9	97	FAIL	6.3%	FAIL
L03 4B6P East Single Bedroom No 2	1.2	70	FAIL	5.7%	FAIL
L03 3B5P East Double Bedroom No 1	0.1	75	FAIL	3.5%	FAIL
L03 3B5P East Double Bedroom No 2	0	55	FAIL	2.8%	PASS
L03 3B5P East Single Bedroom No 1	0.6	61	FAIL	4.0%	FAIL
L03 1B2P South Double Bedroom No 1	0.7	80	FAIL	4.9%	FAIL
L03 2B4P West Double Bedroom No 1	0.6	79	FAIL	4.2%	FAIL
L03 2B4P West Double Bedroom No 2	0.5	70	FAIL	3.9%	FAIL
L03 3B5P West Double Bedroom No 1	0	64	FAIL	3.3%	FAIL
L03 3B5P West Single Bedroom No 1	0.6	64	FAIL	3.9%	FAIL
L03 3B5P West Double Bedroom No 2	0.2	72	FAIL	3.5%	FAIL
L04 2B3P SE Bedroom No 1	0.7	80	FAIL	4.8%	FAIL
L04 2B3P SE Bedroom No 2	0.7	76	FAIL	4.7%	FAIL
L04 1B2P S Bedroom No 1	0.7	82	FAIL	4.8%	FAIL
L04 2B3P NE Bedroom No 1	0.7	72	FAIL	4.4%	FAIL
L04 2B3P NE Bedroom No 2	0	58	FAIL	2.8%	PASS
L04 2B4P SW Bedroom No 1	0.2	72	FAIL	3.2%	FAIL
L04 2B4P SW Bedroom No 2	0.7	80	FAIL	4.5%	FAIL
L04 3B5P NW Bedroom No 1	0.1	69	FAIL	3.0%	PASS
L04 3B5P NW Bedroom No 2	0	64	FAIL	3.2%	FAIL
L04 3B5P NW Bedroom No 3	0.6	70	FAIL	4.0%	FAIL
L05 2B3P SE Bedroom No 1	0.7	82	FAIL	4.8%	FAIL
L05 2B3P SE Bedroom No 2	0.7	75	FAIL	4.5%	FAIL
L05 1B2P S Bedroom No 1	0.7	82	FAIL	4.8%	FAIL
L05 2B3P NE Bedroom No 1	0.7	72	FAIL	4.3%	FAIL
L05 2B3P NE Bedroom No 2	0	59	FAIL	2.8%	PASS
L05 2B4P SW Bedroom No 1	0.1	71	FAIL	3.2%	FAIL
L05 2B4P SW Bedroom No 2	0.7	80	FAIL	4.5%	FAIL
L05 3B5P NW Bedroom No 1	0.1	61	FAIL	2.8%	PASS
L05 3B5P NW Bedroom No 2	0	64	FAIL	3.3%	FAIL

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
L05 3B5P NW Bedroom No 3	0.7	70	FAIL	4.1%	FAIL
L06 2B3P SE Bedroom No 1	0.7	83	FAIL	4.8%	FAIL
L06 2B3P SE Bedroom No 2	0.7	75	FAIL	4.5%	FAIL
L06 1B2P S Bedroom No 1	0.7	82	FAIL	4.9%	FAIL
L06 2B3P NE Bedroom No 1	0.7	72	FAIL	4.4%	FAIL
L06 2B3P NE Bedroom No 2	0	59	FAIL	2.9%	PASS
L06 2B4P SW Bedroom No 1	0.1	72	FAIL	3.2%	FAIL
L06 2B4P SW Bedroom No 2	0.7	80	FAIL	4.5%	FAIL
L06 3B5P NW Bedroom No 1	0	62	FAIL	2.9%	PASS
L06 3B5P NW Bedroom No 2	0	68	FAIL	3.3%	FAIL
L06 3B5P NW Bedroom No 3	0.7	72	FAIL	4.1%	FAIL
L07 2B3P SE Bedroom No 1	0.7	83	FAIL	4.9%	FAIL
L07 2B3P SE Bedroom No 2	0.7	75	FAIL	4.6%	FAIL
L07 1B2P S Bedroom No 1	0.7	82	FAIL	4.9%	FAIL
L07 2B3P NE Bedroom No 1	0.8	72	FAIL	4.4%	FAIL
L07 2B3P NE Bedroom No 2	0	61	FAIL	2.9%	PASS
L07 2B4P SW Bedroom No 1	0.2	72	FAIL	3.2%	FAIL
L07 2B4P SW Bedroom No 2	0.7	80	FAIL	4.5%	FAIL
L07 3B5P NW Bedroom No 1	0.1	65	FAIL	2.9%	PASS
L07 3B5P NW Bedroom No 2	0	69	FAIL	3.4%	FAIL
L07 3B5P NW Bedroom No 3	0.7	72	FAIL	4.2%	FAIL
L08 2B3P SE Bedroom No 1	0.7	85	FAIL	4.9%	FAIL
L08 2B3P SE Bedroom No 2	0.8	75	FAIL	4.6%	FAIL
L08 1B2P S Bedroom No 1	0.7	83	FAIL	4.9%	FAIL
L08 2B3P NE Bedroom No 1	0.8	73	FAIL	4.4%	FAIL
L08 2B3P NE Bedroom No 2	0	63	FAIL	3.2%	FAIL
L08 2B4P SW Bedroom No 1	0.2	72	FAIL	3.3%	FAIL
L08 2B4P SW Bedroom No 2	0.7	80	FAIL	4.6%	FAIL
L08 3B5P NW Bedroom No 1	0.1	69	FAIL	3.0%	FAIL
L08 3B5P NW Bedroom No 2	0	69	FAIL	3.5%	FAIL

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
L08 3B5P NW Bedroom No 3	0.7	72	FAIL	4.3%	FAIL
L09 2B3P SE Bedroom No 1	0.8	90	FAIL	5.1%	FAIL
L09 2B3P SE Bedroom No 2	0.8	79	FAIL	4.7%	FAIL
L09 1B2P S Bedroom No 1	0.7	85	FAIL	5.1%	FAIL
L09 2B3P NE Bedroom No 1	0.8	74	FAIL	4.6%	FAIL
L09 2B3P NE Bedroom No 2	0	65	FAIL	3.4%	FAIL
L09 2B4P SW Bedroom No 1	0.2	75	FAIL	3.4%	FAIL
L09 2B4P SW Bedroom No 2	0.7	81	FAIL	4.7%	FAIL
L09 3B5P NW Bedroom No 1	0.1	73	FAIL	3.2%	FAIL
L09 3B5P NW Bedroom No 2	0.1	74	FAIL	3.7%	FAIL
L09 3B5P NW Bedroom No 3	0.7	73	FAIL	4.4%	FAIL
L10 2B3P SE Bedroom No 1	1	101	FAIL	5.7%	FAIL
L10 2B3P SE Bedroom No 2	1	87	FAIL	5.4%	FAIL
L10 1B2P S Bedroom No 1	0.9	93	FAIL	5.5%	FAIL
L10 2B3P NE Bedroom No 1	0.9	82	FAIL	5.3%	FAIL
L10 2B3P NE Bedroom No 2	0.1	72	FAIL	3.6%	FAIL
L10 2B4P SW Bedroom No 1	0.5	86	FAIL	4.0%	FAIL
L10 2B4P SW Bedroom No 2	0.9	98	FAIL	5.5%	FAIL
L10 3B5P NW Bedroom No 1	0.4	84	FAIL	3.7%	FAIL
L10 3B5P NW Bedroom No 2	0.1	75	FAIL	3.8%	FAIL
L10 3B5P NW Bedroom No 3	0.7	73	FAIL	4.5%	FAIL
L11 1B2P SE Bedroom No 1	0.7	94	FAIL	5.4%	FAIL
L11 1B2P S Bedroom No 1	0.8	93	FAIL	5.7%	FAIL
L11 1B2P NE Bedroom No 1	0	69	FAIL	3.7%	FAIL
L11 2B3P SW Bedroom No 1	0.6	85	FAIL	4.7%	FAIL
L11 2B3P SW Bedroom No 2	0.7	95	FAIL	5.2%	FAIL
L11 2B4P NW Bedroom No 1	0.2	71	FAIL	3.4%	FAIL
L11 2B4P NW Bedroom No 2	0	65	FAIL	3.0%	FAIL

Table 7.8 TM59 overheating results for living/kitchen spaces in Plot 1 under the DSY1 2050 weather file.

	Natural ventilation criteria		Mechanical ventilation criteria	
Room Name	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
L01 4B6P East Living/Kitchen No 1	0.3	PASS	9.0%	FAIL
L01 3B5P East Living/Kitchen No 1	0	PASS	6.5%	FAIL
L01 1B2P South Lving/Kitchen No 1	0	PASS	4.8%	FAIL
L01 2B4P West Living/Kitchen No 1	0.1	PASS	7.0%	FAIL
L01 3B5P West Living Room No 1	0	PASS	6.4%	FAIL
L02 4B6P East Living/Kitchen No 1	1.4	PASS	11.7%	FAIL
L02 3B5P East Living/Kitchen No 1	1	PASS	9.5%	FAIL
L02 1B2P South Lving/Kitchen No 1	0.7	PASS	7.2%	FAIL
L02 2B4P West Living/Kitchen No 1	1	PASS	9.3%	FAIL
L02 3B5P West Living Room No 1	1	PASS	9.6%	FAIL
L03 4B6P East Living/Kitchen No 1	1.5	PASS	12.4%	FAIL
L03 3B5P East Living/Kitchen No 1	1.3	PASS	11.0%	FAIL
L03 1B2P South Lving/Kitchen No 1	0.8	PASS	7.8%	FAIL
L03 2B4P West Living/Kitchen No 1	1.3	PASS	10.2%	FAIL
L03 3B5P West Living Room No 1	1.3	PASS	10.5%	FAIL
L04 2B3P SE Living/Kitchen No 1	2.1	PASS	12.0%	FAIL
L04 1B2P S Living/Kitchen No 1	0.6	PASS	6.9%	FAIL
L04 2B3P NE Living/Kitchen No 1	1.1	PASS	9.1%	FAIL
L04 2B4P SW Living/Kitchen No 1	1.3	PASS	9.6%	FAIL
L04 3B5P NW Living/Kitchen No 1	1.1	PASS	9.6%	FAIL
L05 2B3P SE Living/Kitchen No 1	2.4	PASS	12.6%	FAIL
L05 1B2P S Living/Kitchen No 1	0.5	PASS	6.8%	FAIL
L05 2B3P NE Living/Kitchen No 1	1.1	PASS	9.4%	FAIL
L05 2B4P SW Living/Kitchen No 1	1.3	PASS	9.6%	FAIL
L05 3B5P NW Living/Kitchen No 1	1.1	PASS	9.6%	FAIL
L06 2B3P SE Living/Kitchen No 1	2.6	PASS	12.8%	FAIL
L06 1B2P S Living/Kitchen No 1	0.5	PASS	6.8%	FAIL
L06 2B3P NE Living/Kitchen No 1	1.1	PASS	9.6%	FAIL
L06 2B4P SW Living/Kitchen No 1	1.3	PASS	9.8%	FAIL
L06 3B5P NW Living/Kitchen No 1	1.1	PASS	9.7%	FAIL
L07 2B3P SE Living/Kitchen No 1	2.8	PASS	12.8%	FAIL
L07 1B2P S Living/Kitchen No 1	0.6	PASS	6.9%	FAIL
L07 2B3P NE Living/Kitchen No 1	1.1	PASS	9.9%	FAIL
L07 2B4P SW Living/Kitchen No 1	1.3	PASS	9.8%	FAIL
L07 3B5P NW Living/Kitchen No 1	1.1	PASS	10.0%	FAIL
L08 2B3P SE Living/Kitchen No 1	2.9	PASS	12.9%	FAIL
L08 1B2P S Living/Kitchen No 1	0.7	PASS	7.1%	FAIL
L08 2B3P NE Living/Kitchen No 1	1.3	PASS	10.2%	FAIL
L08 2B4P SW Living/Kitchen No 1	1.4	PASS	10.1%	FAIL
L08 3B5P NW Living/Kitchen No 1	1.2	PASS	10.5%	FAIL
L09 2B3P SE Living/Kitchen No 1	3.3	FAIL	13.4%	FAIL
L09 1B2P S Living/Kitchen No 1	0.8	PASS	7.7%	FAIL
L09 2B3P NE Living/Kitchen No 1	1.4	PASS	11.0%	FAIL
L09 2B4P SW Living/Kitchen No 1	1.5	PASS	10.5%	FAIL
L09 3B5P NW Living/Kitchen No 1	1.4	PASS	10.9%	FAIL
L10 2B3P SE Living/Kitchen No 1	4.5	FAIL	15.9%	FAIL
L10 1B2P S Living/Kitchen No 1	2	PASS	11.1%	FAIL
L10 2B3P NE Living/Kitchen No 1	2.2	PASS	13.6%	FAIL
L10 2B4P SW Living/Kitchen No 1	3.3	FAIL	12.8%	FAIL
L10 3B5P NW Living/Kitchen No 1	1.6	PASS	11.5%	FAIL
L11 1B2P SE Kitchen/Living No 1	1.1	PASS	10.2%	FAIL
L11 1B2P S Kitchen/Living No 1	1.6	PASS	11.1%	FAIL
L11 1B2P NE Living/Kitchen No 1	0.9	PASS	9.5%	FAIL
L11 2B3P SW Kitchen/Living No 1	2.7	PASS	13.0%	FAIL
L11 2B4P NW kitchen/living No 1	1.1	PASS	11.2%	FAIL

A.2 Plot 2

A.2.1 DSY1 2020 Overheating results.

Table A.9 TM59 overheating results for studio spaces in Plot 2 under the DSY1 2020 weather file.

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L01 NE STUDIO 1 N1	29.2	0	21	PASS	1.6%	PASS
P2-L01 NE STUDIO 2 N1	29.3	0	21	PASS	1.6%	PASS
P2-L01 NE STUDIO 3 N1	29.2	0	20	PASS	1.3%	PASS
P2-L01 NE STUDIO 4 N1	29.4	0	20	PASS	1.4%	PASS
P2-L01 NE STUDIO 5 N1	29.5	0	23	PASS	1.6%	PASS
P2-L01 NE STUDIO 6 N1	29.5	0	23	PASS	1.7%	PASS
P2-L01 NE STUDIO 7 N1	29.2	0	19	PASS	1.4%	PASS
P2-L01 NORTH CORNER STUDIO N1	29.7	0	26	PASS	2.2%	PASS
P2-L01 SW STUDIO 1 N1	28.8	0	19	PASS	1.1%	PASS
P2-L01 SW STUDIO 2 N1	28.9	0	19	PASS	1.1%	PASS
P2-L01 SW STUDIO 3 N1	28.9	0	20	PASS	1.2%	PASS
P2-L01 SW STUDIO 4 N1	29.4	0	23	PASS	1.5%	PASS
P2-L01 SW STUDIO 5 N1	29.7	0	27	PASS	1.8%	PASS
P2-L01 SW STUDIO 6 N1	29.8	0	28	PASS	1.9%	PASS
P2-L01 SW STUDIO 7 N1	29.7	0	28	PASS	2.0%	PASS
P2-L01 SW STUDIO 8 N1	29.6	0	24	PASS	1.8%	PASS
P2-L01 WEST CORNER WCH STUDIO N1	28.9	0	20	PASS	1.2%	PASS
P2-L02 EAST CORNER STUDIO N1	30.2	0.2	27	PASS	2.4%	PASS
P2-L02 NE STUDIO 1 N1	29.5	0	21	PASS	1.3%	PASS
P2-L02 NE STUDIO 2 N1	29.5	0	22	PASS	1.4%	PASS
P2-L02 NE STUDIO 3 N1	29.4	0	20	PASS	1.1%	PASS
P2-L02 NE STUDIO 4 N1	29.6	0	21	PASS	1.3%	PASS
P2-L02 NE STUDIO 5 N1	29.6	0	21	PASS	1.3%	PASS
P2-L02 NE STUDIO 6 N1	29.6	0	21	PASS	1.3%	PASS
P2-L02 NE STUDIO 7 N1	29.5	0	21	PASS	1.3%	PASS
P2-L02 NE STUDIO 8 N1	29.5	0	21	PASS	1.5%	PASS
P2-L02 NORTH CORNER STUDIO N1	30.1	0.1	26	PASS	2.0%	PASS
P2-L02 SOUTH CORNER STUDIO N1	30.5	0.3	29	PASS	2.6%	PASS
P2-L02 SW STUDIO 1 N1	29	0	18	PASS	0.9%	PASS
P2-L02 SW STUDIO 2 N1	29.1	0	19	PASS	0.9%	PASS
P2-L02 SW STUDIO 3 N1	29	0	17	PASS	0.9%	PASS
P2-L02 SW STUDIO 4 N1	29.2	0	18	PASS	1.0%	PASS
P2-L02 SW STUDIO 5 N1	29.6	0	21	PASS	1.2%	PASS
P2-L02 SW STUDIO 6 N1	29.6	0	21	PASS	1.3%	PASS
P2-L02 SW STUDIO 7 N1	29.6	0	21	PASS	1.3%	PASS
P2-L02 SW STUDIO 8 N1	29.7	0	21	PASS	1.4%	PASS
P2-L02 SW STUDIO N1	29.8	0	22	PASS	1.7%	PASS
P2-L02 WEST CORNER WCH STUDIO N1	29.2	0	20	PASS	1.1%	PASS
P2-L03 EAST CORNER STUDIO N1	30.5	0.3	29	PASS	2.3%	PASS
P2-L03 NE STUDIO 1 N1	29.6	0	21	PASS	1.3%	PASS
P2-L03 NE STUDIO 2 N1	29.6	0	22	PASS	1.4%	PASS
P2-L03 NE STUDIO 3 N1	29.4	0	20	PASS	1.1%	PASS
P2-L03 NE STUDIO 4 N1	29.6	0	21	PASS	1.2%	PASS
P2-L03 NE STUDIO 5 N1	29.6	0	21	PASS	1.3%	PASS
P2-L03 NE STUDIO 6 N1	29.6	0	21	PASS	1.2%	PASS
P2-L03 NE STUDIO 7 N1	29.6	0	21	PASS	1.2%	PASS
P2-L03 NE STUDIO 8 N1	29.7	0	21	PASS	1.4%	PASS
P2-L03 NORTH CORNER STUDIO N1	30.5	0.2	28	PASS	2.0%	PASS
P2-L03 SOUTH CORNER STUDIO N1	30.7	0.4	31	PASS	2.6%	PASS
P2-L03 SW STUDIO 1 N1	29.1	0	18	PASS	0.9%	PASS
P2-L03 SW STUDIO 2 N1	29.1	0	18	PASS	0.9%	PASS
P2-L03 SW STUDIO 3 N1	29	0	18	PASS	0.8%	PASS
P2-L03 SW STUDIO 4 N1	29.2	0	17	PASS	0.9%	PASS
P2-L03 SW STUDIO 5 N1	29.5	0	20	PASS	1.1%	PASS
P2-L03 SW STUDIO 6 N1	29.6	0	20	PASS	1.2%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L03 SW STUDIO 7 N1	29.6	0	20	PASS	1.2%	PASS
P2-L03 SW STUDIO 8 N1	29.7	0	21	PASS	1.3%	PASS
P2-L03 SW STUDIO N1	29.9	0	22	PASS	1.5%	PASS
P2-L03 WEST CORNER WCH STUDIO N1	29.3	0	21	PASS	1.1%	PASS
P2-L04 EAST CORNER STUDIO N1	30.6	0.3	29	PASS	2.4%	PASS
P2-L04 NE STUDIO 1 N1	29.6	0	21	PASS	1.3%	PASS
P2-L04 NE STUDIO 2 N1	29.6	0	22	PASS	1.4%	PASS
P2-L04 NE STUDIO 3 N1	29.4	0	20	PASS	1.1%	PASS
P2-L04 NE STUDIO 4 N1	29.6	0	21	PASS	1.2%	PASS
P2-L04 NE STUDIO 5 N1	29.6	0	21	PASS	1.3%	PASS
P2-L04 NE STUDIO 6 N1	29.6	0	21	PASS	1.2%	PASS
P2-L04 NE STUDIO 7 N1	29.6	0	21	PASS	1.2%	PASS
P2-L04 NE STUDIO 8 N1	29.7	0	21	PASS	1.4%	PASS
P2-L04 NORTH CORNER STUDIO N1	30.5	0.2	28	PASS	2.0%	PASS
P2-L04 SOUTH CORNER STUDIO N1	30.8	0.4	30	PASS	2.6%	PASS
P2-L04 SW STUDIO 1 N1	29.1	0	18	PASS	0.9%	PASS
P2-L04 SW STUDIO 2 N1	29.1	0	18	PASS	0.9%	PASS
P2-L04 SW STUDIO 3 N1	29	0	17	PASS	0.8%	PASS
P2-L04 SW STUDIO 4 N1	29.2	0	17	PASS	0.9%	PASS
P2-L04 SW STUDIO 5 N1	29.5	0	20	PASS	1.1%	PASS
P2-L04 SW STUDIO 6 N1	29.6	0	20	PASS	1.2%	PASS
P2-L04 SW STUDIO 7 N1	29.6	0	20	PASS	1.2%	PASS
P2-L04 SW STUDIO 8 N1	29.8	0	21	PASS	1.3%	PASS
P2-L04 SW STUDIO N1	29.9	0	22	PASS	1.5%	PASS
P2-L04 WEST CORNER WCH STUDIO N1	29.4	0	22	PASS	1.1%	PASS
P2-L05 EAST CORNER STUDIO N1	30.7	0.3	29	PASS	2.5%	PASS
P2-L05 NE STUDIO 1 N1	29.6	0	21	PASS	1.3%	PASS
P2-L05 NE STUDIO 2 N1	29.5	0	21	PASS	1.4%	PASS
P2-L05 NE STUDIO 3 N1	29.4	0	20	PASS	1.1%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L05 NE STUDIO 4 N1	29.6	0	21	PASS	1.3%	PASS
P2-L05 NE STUDIO 5 N1	29.6	0	21	PASS	1.3%	PASS
P2-L05 NE STUDIO 6 N1	29.6	0	21	PASS	1.3%	PASS
P2-L05 NE STUDIO 7 N1	29.7	0	21	PASS	1.3%	PASS
P2-L05 NE STUDIO 8 N1	29.8	0	23	PASS	1.5%	PASS
P2-L05 NORTH CORNER STUDIO N1	30.5	0.2	28	PASS	2.1%	PASS
P2-L05 SOUTH CORNER STUDIO N1	30.8	0.4	30	PASS	2.6%	PASS
P2-L05 SW STUDIO 1 N1	29.1	0	19	PASS	1.0%	PASS
P2-L05 SW STUDIO 2 N1	29.1	0	19	PASS	1.0%	PASS
P2-L05 SW STUDIO 3 N1	29.1	0	18	PASS	0.9%	PASS
P2-L05 SW STUDIO 4 N1	29.3	0	18	PASS	1.0%	PASS
P2-L05 SW STUDIO 5 N1	29.5	0	20	PASS	1.3%	PASS
P2-L05 SW STUDIO 6 N1	29.6	0	21	PASS	1.3%	PASS
P2-L05 SW STUDIO 7 N1	29.7	0	21	PASS	1.3%	PASS
P2-L05 SW STUDIO 8 N1	29.8	0	21	PASS	1.3%	PASS
P2-L05 SW STUDIO N1	29.9	0	23	PASS	1.5%	PASS
P2-L05 WEST CORNER WCH STUDIO N1	29.5	0	22	PASS	1.3%	PASS
P2-L06 EAST CORNER STUDIO N1	30.1	0.1	29	PASS	2.0%	PASS
P2-L06 NE STUDIO 1 N1	29.1	0	22	PASS	1.4%	PASS
P2-L06 NE STUDIO 2 N1	29	0	22	PASS	1.4%	PASS
P2-L06 NE STUDIO 3 N1	28.9	0	21	PASS	1.3%	PASS
P2-L06 NE STUDIO 4 N1	29.2	0	24	PASS	1.6%	PASS
P2-L06 NE STUDIO 5 N1	29.3	0	23	PASS	1.6%	PASS
P2-L06 NE STUDIO 6 N1	29.2	0	20	PASS	1.0%	PASS
P2-L06 NE STUDIO 7 N1	29.3	0	19	PASS	1.0%	PASS
P2-L06 NE STUDIO 8 N1	29.4	0	21	PASS	1.1%	PASS
P2-L06 NORTH CORNER STUDIO N1	30	0.1	29	PASS	2.2%	PASS
P2-L06 SOUTH CORNER STUDIO N1	30.2	0.1	27	PASS	1.9%	PASS
P2-L06 SW STUDIO 1 N1	28.9	0	19	PASS	1.2%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L06 SW STUDIO 2 N1	28.9	0	20	PASS	1.2%	PASS
P2-L06 SW STUDIO 3 N1	28.8	0	20	PASS	1.0%	PASS
P2-L06 SW STUDIO 4 N1	29	0	21	PASS	1.3%	PASS
P2-L06 SW STUDIO 5 N1	29.2	0	23	PASS	1.5%	PASS
P2-L06 SW STUDIO 6 N1	29.3	0	22	PASS	1.4%	PASS
P2-L06 SW STUDIO 7 N1	29.3	0	19	PASS	0.9%	PASS
P2-L06 SW STUDIO 8 N1	29.3	0	19	PASS	0.9%	PASS
P2-L06 SW STUDIO N1	29.5	0	19	PASS	1.0%	PASS
P2-L06 WEST CORNER WCH STUDIO N1	29.1	0	24	PASS	1.6%	PASS
P2-L08 EAST CORNER NE STUDIO N1	30.7	0.4	30	PASS	3.3%	FAIL
P2-L08 NE STUDIO 1 N1	29.3	0	22	PASS	1.8%	PASS
P2-L08 NE STUDIO 2 N1	29.3	0	22	PASS	1.8%	PASS
P2-L08 NE STUDIO 3 N1	29.2	0	21	PASS	1.6%	PASS
P2-L08 NE STUDIO 4 N1	29.6	0	26	PASS	2.1%	PASS
P2-L08 NORTH CORNER STUDIO N1	30.4	0.2	30	PASS	2.6%	PASS
P2-L08 SOUTH CORNER SW STUDIO N1	30.1	0.1	29	PASS	2.6%	PASS
P2-L08 SW STUDIO 1 N1	28.8	0	18	PASS	1.0%	PASS
P2-L08 SW STUDIO 2 N1	28.8	0	19	PASS	1.0%	PASS
P2-L08 SW STUDIO 3 N1	28.9	0	19	PASS	1.2%	PASS
P2-L08 SW STUDIO 4 N1	28.9	0	17	PASS	1.0%	PASS
P2-L08 SW STUDIO 5 N1	29.3	0	20	PASS	1.3%	PASS
P2-L08 WEST CORNER WCH STUDIO N1	29	0	21	PASS	1.4%	PASS
P2-L09 EAST CORNER NE STUDIO N1	30.4	0.3	29	PASS	2.4%	PASS
P2-L09 NE STUDIO 1 N1	29.3	0	20	PASS	1.1%	PASS
P2-L09 NE STUDIO 2 N1	29.3	0	20	PASS	1.1%	PASS
P2-L09 NE STUDIO 3 N1	29.2	0	17	PASS	0.9%	PASS
P2-L09 NE STUDIO 4 N1	29.5	0	21	PASS	1.2%	PASS
P2-L09 NORTH CORNER STUDIO N1	30.1	0	26	PASS	1.8%	PASS
P2-L09 SOUTH CORNER SW STUDIO N1	30.2	0.2	26	PASS	2.1%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L09 SW STUDIO 1 N1	29.1	0	16	PASS	0.8%	PASS
P2-L09 SW STUDIO 2 N1	29.1	0	15	PASS	0.8%	PASS
P2-L09 SW STUDIO 3 N1	29	0	16	PASS	0.8%	PASS
P2-L09 SW STUDIO 4 N1	28.9	0	14	PASS	0.8%	PASS
P2-L09 SW STUDIO 5 N1	29.3	0	17	PASS	0.9%	PASS
P2-L09 WEST CORNER WCH STUDIO N1	29.4	0	21	PASS	1.2%	PASS
P2-L10 EAST CORNER NE STUDIO N1	30.7	0.4	30	PASS	2.8%	PASS
P2-L10 NE STUDIO 1 N1	29.5	0	20	PASS	1.3%	PASS
P2-L10 NE STUDIO 2 N1	29.5	0	21	PASS	1.4%	PASS
P2-L10 NE STUDIO 3 N1	29.3	0	19	PASS	1.1%	PASS
P2-L10 NE STUDIO 4 N1	29.7	0	21	PASS	1.5%	PASS
P2-L10 NORTH CORNER STUDIO N1	30.7	0.2	30	PASS	2.3%	PASS
P2-L10 SOUTH CORNER SW STUDIO N1	30.9	0.4	31	PASS	2.8%	PASS
P2-L10 SW STUDIO 1 N1	29.6	0	21	PASS	1.3%	PASS
P2-L10 SW STUDIO 2 N1	29.5	0	19	PASS	1.2%	PASS
P2-L10 SW STUDIO 3 N1	29.3	0	20	PASS	1.0%	PASS
P2-L10 SW STUDIO 4 N1	29.3	0	17	PASS	1.0%	PASS
P2-L10 SW STUDIO 5 N1	29.7	0	20	PASS	1.4%	PASS
P2-L10 WEST CORNER WCH STUDIO N1	30.3	0.1	26	PASS	2.0%	PASS
P2-L11 EAST CORNER NE STUDIO N1	31	0.5	32	PASS	2.9%	PASS
P2-L11 NE STUDIO 1 N1	29.7	0	22	PASS	1.5%	PASS
P2-L11 NE STUDIO 2 N1	29.7	0	22	PASS	1.5%	PASS
P2-L11 NE STUDIO 3 N1	29.5	0	21	PASS	1.2%	PASS
P2-L11 NE STUDIO 4 N1	29.8	0	23	PASS	1.6%	PASS
P2-L11 NORTH CORNER STUDIO N1	31	0.3	31	PASS	2.4%	PASS
P2-L11 SOUTH CORNER SW STUDIO N1	31.1	0.5	32	PASS	2.9%	PASS
P2-L11 SW STUDIO 1 N1	29.8	0	22	PASS	1.5%	PASS
P2-L11 SW STUDIO 2 N1	29.7	0	21	PASS	1.4%	PASS
P2-L11 SW STUDIO 3 N1	29.5	0	21	PASS	1.1%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L11 SW STUDIO 4 N1	29.5	0	20	PASS	1.2%	PASS
P2-L11 SW STUDIO 5 N1	29.8	0	23	PASS	1.4%	PASS
P2-L11 WEST CORNER WCH STUDIO N1	30.7	0.3	30	PASS	2.3%	PASS
P2-L12 EAST CORNER NE STUDIO N1	31	0.5	32	PASS	2.9%	PASS
P2-L12 NE STUDIO 1 N1	29.8	0	23	PASS	1.6%	PASS
P2-L12 NE STUDIO 2 N1	29.8	0	23	PASS	1.6%	PASS
P2-L12 NE STUDIO 3 N1	29.6	0	21	PASS	1.3%	PASS
P2-L12 NE STUDIO 4 N1	29.9	0	23	PASS	1.6%	PASS
P2-L12 NORTH CORNER STUDIO N1	31	0.3	31	PASS	2.5%	PASS
P2-L12 SOUTH CORNER SW STUDIO N1	31.2	0.5	32	PASS	3.0%	PASS
P2-L12 SW STUDIO 1 N1	29.8	0	22	PASS	1.5%	PASS
P2-L12 SW STUDIO 2 N1	29.7	0	21	PASS	1.4%	PASS
P2-L12 SW STUDIO 3 N1	29.5	0	21	PASS	1.1%	PASS
P2-L12 SW STUDIO 4 N1	29.5	0	20	PASS	1.2%	PASS
P2-L12 SW STUDIO 5 N1	29.8	0	23	PASS	1.5%	PASS
P2-L12 WEST CORNER WCH STUDIO N1	30.8	0.3	31	PASS	2.4%	PASS
P2-L13 EAST CORNER NE STUDIO N1	31	0.5	32	PASS	3.0%	PASS
P2-L13 NE STUDIO 1 N1	29.8	0	23	PASS	1.6%	PASS
P2-L13 NE STUDIO 2 N1	29.8	0	23	PASS	1.7%	PASS
P2-L13 NE STUDIO 3 N1	29.6	0	21	PASS	1.3%	PASS
P2-L13 NE STUDIO 4 N1	29.9	0	24	PASS	1.7%	PASS
P2-L13 NORTH CORNER STUDIO N1	31.1	0.4	31	PASS	2.6%	PASS
P2-L13 SOUTH CORNER SW STUDIO N1	31.2	0.5	32	PASS	3.0%	PASS
P2-L13 SW STUDIO 1 N1	29.8	0	23	PASS	1.5%	PASS
P2-L13 SW STUDIO 2 N1	29.7	0	21	PASS	1.3%	PASS
P2-L13 SW STUDIO 3 N1	29.4	0	21	PASS	1.1%	PASS
P2-L13 SW STUDIO 4 N1	29.5	0	20	PASS	1.2%	PASS
P2-L13 SW STUDIO 5 N1	29.8	0	23	PASS	1.5%	PASS
P2-L13 WEST CORNER WCH STUDIO N1	30.7	0.3	31	PASS	2.4%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L14 EAST CORNER NE STUDIO N1	31.1	0.5	32	PASS	3.0%	PASS
P2-L14 NE STUDIO 1 N1	29.9	0	24	PASS	1.7%	PASS
P2-L14 NE STUDIO 2 N1	29.9	0	24	PASS	1.8%	PASS
P2-L14 NE STUDIO 3 N1	29.7	0	22	PASS	1.4%	PASS
P2-L14 NE STUDIO 4 N1	29.9	0.1	24	PASS	1.7%	PASS
P2-L14 NORTH CORNER STUDIO N1	31.1	0.4	31	PASS	2.6%	PASS
P2-L14 SOUTH CORNER SW STUDIO N1	31.2	0.5	32	PASS	3.0%	PASS
P2-L14 SW STUDIO 1 N1	29.8	0	23	PASS	1.5%	PASS
P2-L14 SW STUDIO 2 N1	29.7	0	21	PASS	1.3%	PASS
P2-L14 SW STUDIO 3 N1	29.4	0	21	PASS	1.1%	PASS
P2-L14 SW STUDIO 4 N1	29.5	0	20	PASS	1.2%	PASS
P2-L14 SW STUDIO 5 N1	29.8	0	23	PASS	1.5%	PASS
P2-L14 WEST CORNER WCH STUDIO N1	30.7	0.3	31	PASS	2.4%	PASS
P2-L15 EAST CORNER NE STUDIO N1	31	0.5	32	PASS	3.0%	PASS
P2-L15 NE STUDIO 1 N1	29.9	0	24	PASS	1.7%	PASS
P2-L15 NE STUDIO 2 N1	29.9	0	24	PASS	1.8%	PASS
P2-L15 NE STUDIO 3 N1	29.7	0	22	PASS	1.4%	PASS
P2-L15 NE STUDIO 4 N1	29.9	0	24	PASS	1.7%	PASS
P2-L15 NORTH CORNER STUDIO N1	31.2	0.4	32	PASS	2.6%	PASS
P2-L15 SOUTH CORNER SW STUDIO N1	31.2	0.5	32	PASS	2.9%	PASS
P2-L15 SW STUDIO 1 N1	29.8	0	23	PASS	1.5%	PASS
P2-L15 SW STUDIO 2 N1	29.7	0	20	PASS	1.3%	PASS
P2-L15 SW STUDIO 3 N1	29.4	0	21	PASS	1.1%	PASS
P2-L15 SW STUDIO 4 N1	29.5	0	20	PASS	1.2%	PASS
P2-L15 SW STUDIO 5 N1	29.8	0	23	PASS	1.5%	PASS
P2-L15 WEST CORNER WCH STUDIO N1	30.7	0.3	30	PASS	2.4%	PASS
P2-L16 EAST CORNER NE STUDIO N1	30.5	0.3	29	PASS	2.5%	PASS
P2-L16 NE STUDIO 1 N1	29.6	0	22	PASS	1.2%	PASS
P2-L16 NE STUDIO 2 N1	29.6	0	22	PASS	1.3%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L16 NE STUDIO 3 N1	29.4	0	19	PASS	1.1%	PASS
P2-L16 NE STUDIO 4 N1	29.6	0	21	PASS	1.2%	PASS
P2-L16 NORTH CORNER STUDIO N1	30.6	0.2	29	PASS	2.2%	PASS
P2-L16 SOUTH CORNER SW STUDIO N1	30.6	0.3	30	PASS	2.4%	PASS
P2-L16 SW STUDIO 1 N1	29.4	0	18	PASS	1.0%	PASS
P2-L16 SW STUDIO 2 N1	29.3	0	18	PASS	0.9%	PASS
P2-L16 SW STUDIO 3 N1	29.1	0	17	PASS	0.8%	PASS
P2-L16 SW STUDIO 4 N1	29.2	0	16	PASS	0.8%	PASS
P2-L16 SW STUDIO 5 N1	29.5	0	18	PASS	1.0%	PASS
P2-L16 WEST CORNER WCH STUDIO N1	30.2	0.1	29	PASS	1.9%	PASS

A.2.2 DSY2 2020 Overheating results.

Table A.10 TM59 overheating results for studio spaces in Plot 2 under the DSY2 2020 weather file.

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L01 NE STUDIO 1 N1	0.1	44	FAIL	2.2%	PASS
P2-L01 NE STUDIO 2 N1	0.1	45	FAIL	2.2%	PASS
P2-L01 NE STUDIO 3 N1	0.1	42	FAIL	2.0%	PASS
P2-L01 NE STUDIO 4 N1	0.2	45	FAIL	2.1%	PASS
P2-L01 NE STUDIO 5 N1	0.2	49	FAIL	2.2%	PASS
P2-L01 NE STUDIO 6 N1	0.2	50	FAIL	2.3%	PASS
P2-L01 NE STUDIO 7 N1	0	43	FAIL	2.1%	PASS
P2-L01 NORTH CORNER STUDIO N1	0.3	52	FAIL	2.7%	PASS
P2-L01 SW STUDIO 1 N1	0	43	FAIL	1.9%	PASS
P2-L01 SW STUDIO 2 N1	0	43	FAIL	1.9%	PASS
P2-L01 SW STUDIO 3 N1	0	48	FAIL	2.0%	PASS
P2-L01 SW STUDIO 4 N1	0.4	54	FAIL	2.4%	PASS
P2-L01 SW STUDIO 5 N1	0.5	55	FAIL	2.5%	PASS
P2-L01 SW STUDIO 6 N1	0.6	56	FAIL	2.6%	PASS
P2-L01 SW STUDIO 7 N1	0.6	56	FAIL	2.6%	PASS
P2-L01 SW STUDIO 8 N1	0.4	54	FAIL	2.5%	PASS
P2-L01 WEST CORNER WCH STUDIO N1	0	47	FAIL	2.1%	PASS
P2-L02 EAST CORNER STUDIO N1	0.7	50	FAIL	2.8%	PASS
P2-L02 NE STUDIO 1 N1	0.3	48	FAIL	2.1%	PASS
P2-L02 NE STUDIO 2 N1	0.2	48	FAIL	2.2%	PASS
P2-L02 NE STUDIO 3 N1	0.2	45	FAIL	1.9%	PASS
P2-L02 NE STUDIO 4 N1	0.2	47	FAIL	2.0%	PASS
P2-L02 NE STUDIO 5 N1	0.2	47	FAIL	2.0%	PASS
P2-L02 NE STUDIO 6 N1	0.2	47	FAIL	2.0%	PASS
P2-L02 NE STUDIO 7 N1	0.2	47	FAIL	2.0%	PASS
P2-L02 NE STUDIO 8 N1	0.2	47	FAIL	2.1%	PASS
P2-L02 NORTH CORNER STUDIO N1	0.5	54	FAIL	2.6%	PASS
P2-L02 SOUTH CORNER STUDIO N1	1	57	FAIL	3.0%	FAIL
P2-L02 SW STUDIO 1 N1	0.1	44	FAIL	1.8%	PASS
P2-L02 SW STUDIO 2 N1	0.1	45	FAIL	1.8%	PASS
P2-L02 SW STUDIO 3 N1	0.1	46	FAIL	1.9%	PASS
P2-L02 SW STUDIO 4 N1	0.2	46	FAIL	1.9%	PASS
P2-L02 SW STUDIO 5 N1	0.4	49	FAIL	2.0%	PASS
P2-L02 SW STUDIO 6 N1	0.5	50	FAIL	2.1%	PASS
P2-L02 SW STUDIO 7 N1	0.5	50	FAIL	2.1%	PASS
P2-L02 SW STUDIO 8 N1	0.5	51	FAIL	2.2%	PASS
P2-L02 SW STUDIO N1	0.5	50	FAIL	2.3%	PASS
P2-L02 WEST CORNER WCH STUDIO N1	0.1	53	FAIL	2.0%	PASS
P2-L03 EAST CORNER STUDIO N1	0.8	52	FAIL	2.8%	PASS
P2-L03 NE STUDIO 1 N1	0.4	47	FAIL	2.1%	PASS
P2-L03 NE STUDIO 2 N1	0.3	48	FAIL	2.1%	PASS
P2-L03 NE STUDIO 3 N1	0.2	44	FAIL	1.9%	PASS
P2-L03 NE STUDIO 4 N1	0.2	47	FAIL	2.0%	PASS
P2-L03 NE STUDIO 5 N1	0.2	47	FAIL	2.0%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L03 NE STUDIO 6 N1	0.2	47	FAIL	2.0%	PASS
P2-L03 NE STUDIO 7 N1	0.2	47	FAIL	2.0%	PASS
P2-L03 NE STUDIO 8 N1	0.4	49	FAIL	2.1%	PASS
P2-L03 NORTH CORNER STUDIO N1	0.5	54	FAIL	2.6%	PASS
P2-L03 SOUTH CORNER STUDIO N1	1.2	61	FAIL	3.0%	FAIL
P2-L03 SW STUDIO 1 N1	0.2	44	FAIL	1.8%	PASS
P2-L03 SW STUDIO 2 N1	0.2	44	FAIL	1.8%	PASS
P2-L03 SW STUDIO 3 N1	0.2	44	FAIL	1.8%	PASS
P2-L03 SW STUDIO 4 N1	0.2	43	FAIL	1.9%	PASS
P2-L03 SW STUDIO 5 N1	0.4	47	FAIL	2.0%	PASS
P2-L03 SW STUDIO 6 N1	0.4	49	FAIL	2.0%	PASS
P2-L03 SW STUDIO 7 N1	0.5	49	FAIL	2.0%	PASS
P2-L03 SW STUDIO 8 N1	0.5	50	FAIL	2.1%	PASS
P2-L03 SW STUDIO N1	0.6	51	FAIL	2.2%	PASS
P2-L03 WEST CORNER WCH STUDIO N1	0.1	52	FAIL	2.0%	PASS
P2-L04 EAST CORNER STUDIO N1	0.9	52	FAIL	2.8%	PASS
P2-L04 NE STUDIO 1 N1	0.3	47	FAIL	2.1%	PASS
P2-L04 NE STUDIO 2 N1	0.3	48	FAIL	2.1%	PASS
P2-L04 NE STUDIO 3 N1	0.2	44	FAIL	2.0%	PASS
P2-L04 NE STUDIO 4 N1	0.2	47	FAIL	2.0%	PASS
P2-L04 NE STUDIO 5 N1	0.2	47	FAIL	2.0%	PASS
P2-L04 NE STUDIO 6 N1	0.2	47	FAIL	2.0%	PASS
P2-L04 NE STUDIO 7 N1	0.2	47	FAIL	2.0%	PASS
P2-L04 NE STUDIO 8 N1	0.4	48	FAIL	2.1%	PASS
P2-L04 NORTH CORNER STUDIO N1	0.5	54	FAIL	2.6%	PASS
P2-L04 SOUTH CORNER STUDIO N1	1.2	60	FAIL	3.0%	FAIL
P2-L04 SW STUDIO 1 N1	0.2	44	FAIL	1.8%	PASS
P2-L04 SW STUDIO 2 N1	0.2	44	FAIL	1.8%	PASS
P2-L04 SW STUDIO 3 N1	0.1	44	FAIL	1.8%	PASS
P2-L04 SW STUDIO 4 N1	0.2	43	FAIL	1.9%	PASS
P2-L04 SW STUDIO 5 N1	0.4	46	FAIL	2.0%	PASS
P2-L04 SW STUDIO 6 N1	0.4	49	FAIL	2.0%	PASS
P2-L04 SW STUDIO 7 N1	0.5	49	FAIL	2.0%	PASS
P2-L04 SW STUDIO 8 N1	0.5	49	FAIL	2.1%	PASS
P2-L04 SW STUDIO N1	0.6	51	FAIL	2.2%	PASS
P2-L04 WEST CORNER WCH STUDIO N1	0.1	52	FAIL	2.0%	PASS
P2-L05 EAST CORNER STUDIO N1	0.9	54	FAIL	2.9%	PASS
P2-L05 NE STUDIO 1 N1	0.3	48	FAIL	2.1%	PASS
P2-L05 NE STUDIO 2 N1	0.2	50	FAIL	2.1%	PASS
P2-L05 NE STUDIO 3 N1	0.2	46	FAIL	2.0%	PASS
P2-L05 NE STUDIO 4 N1	0.3	48	FAIL	2.1%	PASS
P2-L05 NE STUDIO 5 N1	0.3	48	FAIL	2.1%	PASS
P2-L05 NE STUDIO 6 N1	0.3	47	FAIL	2.0%	PASS
P2-L05 NE STUDIO 7 N1	0.2	47	FAIL	2.0%	PASS
P2-L05 NE STUDIO 8 N1	0.4	49	FAIL	2.2%	PASS
P2-L05 NORTH CORNER STUDIO N1	0.5	54	FAIL	2.6%	PASS
P2-L05 SOUTH CORNER STUDIO N1	1.2	61	FAIL	3.0%	FAIL
P2-L05 SW STUDIO 1 N1	0.1	44	FAIL	1.8%	PASS
P2-L05 SW STUDIO 2 N1	0.1	45	FAIL	1.8%	PASS
P2-L05 SW STUDIO 3 N1	0.1	46	FAIL	1.9%	PASS
P2-L05 SW STUDIO 4 N1	0.2	46	FAIL	1.9%	PASS
P2-L05 SW STUDIO 5 N1	0.4	47	FAIL	2.0%	PASS
P2-L05 SW STUDIO 6 N1	0.4	48	FAIL	2.1%	PASS
P2-L05 SW STUDIO 7 N1	0.5	49	FAIL	2.1%	PASS
P2-L05 SW STUDIO 8 N1	0.5	49	FAIL	2.1%	PASS
P2-L05 SW STUDIO N1	0.6	51	FAIL	2.2%	PASS
P2-L05 WEST CORNER WCH STUDIO N1	0.1	53	FAIL	2.1%	PASS
P2-L06 EAST CORNER STUDIO N1	0.5	57	FAIL	2.7%	PASS
P2-L06 NE STUDIO 1 N1	0	47	FAIL	2.2%	PASS
P2-L06 NE STUDIO 2 N1	0	46	FAIL	2.1%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L06 NE STUDIO 3 N1	0	44	FAIL	2.0%	PASS
P2-L06 NE STUDIO 4 N1	0.1	49	FAIL	2.2%	PASS
P2-L06 NE STUDIO 5 N1	0.1	48	FAIL	2.2%	PASS
P2-L06 NE STUDIO 6 N1	0.1	49	FAIL	2.0%	PASS
P2-L06 NE STUDIO 7 N1	0.1	49	FAIL	2.0%	PASS
P2-L06 NE STUDIO 8 N1	0.1	51	FAIL	2.0%	PASS
P2-L06 NORTH CORNER STUDIO N1	0.2	53	FAIL	2.6%	PASS
P2-L06 SOUTH CORNER STUDIO N1	0.8	60	FAIL	2.7%	PASS
P2-L06 SW STUDIO 1 N1	0	45	FAIL	1.9%	PASS
P2-L06 SW STUDIO 2 N1	0	44	FAIL	1.8%	PASS
P2-L06 SW STUDIO 3 N1	0	44	FAIL	1.8%	PASS
P2-L06 SW STUDIO 4 N1	0	48	FAIL	2.0%	PASS
P2-L06 SW STUDIO 5 N1	0.1	49	FAIL	2.2%	PASS
P2-L06 SW STUDIO 6 N1	0.1	49	FAIL	2.2%	PASS
P2-L06 SW STUDIO 7 N1	0.1	51	FAIL	2.0%	PASS
P2-L06 SW STUDIO 8 N1	0.1	51	FAIL	1.9%	PASS
P2-L06 SW STUDIO N1	0.2	51	FAIL	2.0%	PASS
P2-L06 WEST CORNER WCH STUDIO N1	0	51	FAIL	2.2%	PASS
P2-L08 EAST CORNER NE STUDIO N1	1.1	57	FAIL	3.6%	FAIL
P2-L08 NE STUDIO 1 N1	0.1	45	FAIL	2.2%	PASS
P2-L08 NE STUDIO 2 N1	0.1	45	FAIL	2.3%	PASS
P2-L08 NE STUDIO 3 N1	0	43	FAIL	2.2%	PASS
P2-L08 NE STUDIO 4 N1	0.3	49	FAIL	2.5%	PASS
P2-L08 NORTH CORNER STUDIO N1	0.4	53	FAIL	2.9%	PASS
P2-L08 SOUTH CORNER SW STUDIO N1	0.5	54	FAIL	3.0%	PASS
P2-L08 SW STUDIO 1 N1	0	41	FAIL	1.8%	PASS
P2-L08 SW STUDIO 2 N1	0	41	FAIL	1.8%	PASS
P2-L08 SW STUDIO 3 N1	0	42	FAIL	1.9%	PASS
P2-L08 SW STUDIO 4 N1	0	42	FAIL	1.9%	PASS
P2-L08 SW STUDIO 5 N1	0	47	FAIL	2.1%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L08 WEST CORNER WCH STUDIO N1	0	50	FAIL	2.2%	PASS
P2-L09 EAST CORNER NE STUDIO N1	0.9	59	FAIL	3.0%	FAIL
P2-L09 NE STUDIO 1 N1	0.1	48	FAIL	2.0%	PASS
P2-L09 NE STUDIO 2 N1	0.1	48	FAIL	2.0%	PASS
P2-L09 NE STUDIO 3 N1	0.1	47	FAIL	2.0%	PASS
P2-L09 NE STUDIO 4 N1	0.2	49	FAIL	2.1%	PASS
P2-L09 NORTH CORNER STUDIO N1	0.4	54	FAIL	2.5%	PASS
P2-L09 SOUTH CORNER SW STUDIO N1	0.7	55	FAIL	2.7%	PASS
P2-L09 SW STUDIO 1 N1	0	43	FAIL	1.7%	PASS
P2-L09 SW STUDIO 2 N1	0	42	FAIL	1.7%	PASS
P2-L09 SW STUDIO 3 N1	0	44	FAIL	1.7%	PASS
P2-L09 SW STUDIO 4 N1	0	42	FAIL	1.6%	PASS
P2-L09 SW STUDIO 5 N1	0.1	44	FAIL	1.8%	PASS
P2-L09 WEST CORNER WCH STUDIO N1	0.1	54	FAIL	2.0%	PASS
P2-L10 EAST CORNER NE STUDIO N1	1.2	56	FAIL	3.3%	FAIL
P2-L10 NE STUDIO 1 N1	0.2	44	FAIL	2.0%	PASS
P2-L10 NE STUDIO 2 N1	0.2	44	FAIL	2.1%	PASS
P2-L10 NE STUDIO 3 N1	0.2	43	FAIL	2.0%	PASS
P2-L10 NE STUDIO 4 N1	0.4	46	FAIL	2.2%	PASS
P2-L10 NORTH CORNER STUDIO N1	0.6	56	FAIL	2.8%	PASS
P2-L10 SOUTH CORNER SW STUDIO N1	1.2	60	FAIL	3.3%	FAIL
P2-L10 SW STUDIO 1 N1	0.3	45	FAIL	2.0%	PASS
P2-L10 SW STUDIO 2 N1	0.2	44	FAIL	2.0%	PASS
P2-L10 SW STUDIO 3 N1	0.2	43	FAIL	1.9%	PASS
P2-L10 SW STUDIO 4 N1	0.2	42	FAIL	1.9%	PASS
P2-L10 SW STUDIO 5 N1	0.4	46	FAIL	2.1%	PASS
P2-L10 WEST CORNER WCH STUDIO N1	0.5	56	FAIL	2.6%	PASS
P2-L11 EAST CORNER NE STUDIO N1	1.4	59	FAIL	3.4%	FAIL
P2-L11 NE STUDIO 1 N1	0.4	50	FAIL	2.2%	PASS
P2-L11 NE STUDIO 2 N1	0.4	49	FAIL	2.2%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L11 NE STUDIO 3 N1	0.2	46	FAIL	2.0%	PASS
P2-L11 NE STUDIO 4 N1	0.5	51	FAIL	2.3%	PASS
P2-L11 NORTH CORNER STUDIO N1	0.8	57	FAIL	2.8%	PASS
P2-L11 SOUTH CORNER SW STUDIO N1	1.3	61	FAIL	3.3%	FAIL
P2-L11 SW STUDIO 1 N1	0.4	49	FAIL	2.1%	PASS
P2-L11 SW STUDIO 2 N1	0.4	48	FAIL	2.1%	PASS
P2-L11 SW STUDIO 3 N1	0.2	47	FAIL	2.0%	PASS
P2-L11 SW STUDIO 4 N1	0.3	45	FAIL	1.9%	PASS
P2-L11 SW STUDIO 5 N1	0.5	51	FAIL	2.2%	PASS
P2-L11 WEST CORNER WCH STUDIO N1	0.8	64	FAIL	3.0%	PASS
P2-L12 EAST CORNER NE STUDIO N1	1.4	59	FAIL	3.4%	FAIL
P2-L12 NE STUDIO 1 N1	0.4	51	FAIL	2.2%	PASS
P2-L12 NE STUDIO 2 N1	0.4	51	FAIL	2.3%	PASS
P2-L12 NE STUDIO 3 N1	0.3	46	FAIL	2.1%	PASS
P2-L12 NE STUDIO 4 N1	0.5	51	FAIL	2.4%	PASS
P2-L12 NORTH CORNER STUDIO N1	0.8	57	FAIL	2.9%	PASS
P2-L12 SOUTH CORNER SW STUDIO N1	1.4	62	FAIL	3.4%	FAIL
P2-L12 SW STUDIO 1 N1	0.5	51	FAIL	2.1%	PASS
P2-L12 SW STUDIO 2 N1	0.4	49	FAIL	2.1%	PASS
P2-L12 SW STUDIO 3 N1	0.2	47	FAIL	2.0%	PASS
P2-L12 SW STUDIO 4 N1	0.3	47	FAIL	2.0%	PASS
P2-L12 SW STUDIO 5 N1	0.5	51	FAIL	2.2%	PASS
P2-L12 WEST CORNER WCH STUDIO N1	0.8	66	FAIL	3.0%	FAIL
P2-L13 EAST CORNER NE STUDIO N1	1.4	60	FAIL	3.4%	FAIL
P2-L13 NE STUDIO 1 N1	0.4	51	FAIL	2.2%	PASS
P2-L13 NE STUDIO 2 N1	0.4	52	FAIL	2.3%	PASS
P2-L13 NE STUDIO 3 N1	0.3	46	FAIL	2.1%	PASS
P2-L13 NE STUDIO 4 N1	0.5	51	FAIL	2.4%	PASS
P2-L13 NORTH CORNER STUDIO N1	0.8	57	FAIL	2.9%	PASS
P2-L13 SOUTH CORNER SW STUDIO N1	1.4	62	FAIL	3.4%	FAIL

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L13 SW STUDIO 1 N1	0.5	51	FAIL	2.1%	PASS
P2-L13 SW STUDIO 2 N1	0.4	49	FAIL	2.0%	PASS
P2-L13 SW STUDIO 3 N1	0.2	47	FAIL	2.0%	PASS
P2-L13 SW STUDIO 4 N1	0.3	47	FAIL	2.0%	PASS
P2-L13 SW STUDIO 5 N1	0.5	51	FAIL	2.2%	PASS
P2-L13 WEST CORNER WCH STUDIO N1	0.8	66	FAIL	3.0%	FAIL
P2-L14 EAST CORNER NE STUDIO N1	1.4	60	FAIL	3.5%	FAIL
P2-L14 NE STUDIO 1 N1	0.4	51	FAIL	2.3%	PASS
P2-L14 NE STUDIO 2 N1	0.4	52	FAIL	2.4%	PASS
P2-L14 NE STUDIO 3 N1	0.3	47	FAIL	2.1%	PASS
P2-L14 NE STUDIO 4 N1	0.5	51	FAIL	2.4%	PASS
P2-L14 NORTH CORNER STUDIO N1	0.8	59	FAIL	3.0%	FAIL
P2-L14 SOUTH CORNER SW STUDIO N1	1.4	62	FAIL	3.4%	FAIL
P2-L14 SW STUDIO 1 N1	0.5	51	FAIL	2.1%	PASS
P2-L14 SW STUDIO 2 N1	0.4	49	FAIL	2.0%	PASS
P2-L14 SW STUDIO 3 N1	0.2	47	FAIL	2.0%	PASS
P2-L14 SW STUDIO 4 N1	0.3	47	FAIL	2.0%	PASS
P2-L14 SW STUDIO 5 N1	0.5	51	FAIL	2.2%	PASS
P2-L14 WEST CORNER WCH STUDIO N1	0.8	66	FAIL	3.0%	FAIL
P2-L15 EAST CORNER NE STUDIO N1	1.4	59	FAIL	3.4%	FAIL
P2-L15 NE STUDIO 1 N1	0.4	51	FAIL	2.3%	PASS
P2-L15 NE STUDIO 2 N1	0.4	52	FAIL	2.4%	PASS
P2-L15 NE STUDIO 3 N1	0.3	47	FAIL	2.1%	PASS
P2-L15 NE STUDIO 4 N1	0.5	51	FAIL	2.4%	PASS
P2-L15 NORTH CORNER STUDIO N1	0.9	59	FAIL	3.0%	FAIL
P2-L15 SOUTH CORNER SW STUDIO N1	1.4	62	FAIL	3.4%	FAIL
P2-L15 SW STUDIO 1 N1	0.5	50	FAIL	2.1%	PASS
P2-L15 SW STUDIO 2 N1	0.4	49	FAIL	2.1%	PASS
P2-L15 SW STUDIO 3 N1	0.2	47	FAIL	2.0%	PASS
P2-L15 SW STUDIO 4 N1	0.3	46	FAIL	2.0%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L15 SW STUDIO 5 N1	0.5	51	FAIL	2.2%	PASS
P2-L15 WEST CORNER WCH STUDIO N1	0.9	66	FAIL	3.0%	FAIL
P2-L16 EAST CORNER NE STUDIO N1	1.1	59	FAIL	3.1%	FAIL
P2-L16 NE STUDIO 1 N1	0.2	51	FAIL	2.1%	PASS
P2-L16 NE STUDIO 2 N1	0.2	51	FAIL	2.2%	PASS
P2-L16 NE STUDIO 3 N1	0.1	47	FAIL	2.0%	PASS
P2-L16 NE STUDIO 4 N1	0.2	51	FAIL	2.2%	PASS
P2-L16 NORTH CORNER STUDIO N1	0.6	58	FAIL	2.8%	PASS
P2-L16 SOUTH CORNER SW STUDIO N1	1.1	60	FAIL	3.0%	FAIL
P2-L16 SW STUDIO 1 N1	0.2	51	FAIL	2.0%	PASS
P2-L16 SW STUDIO 2 N1	0.2	46	FAIL	1.9%	PASS
P2-L16 SW STUDIO 3 N1	0.1	48	FAIL	1.8%	PASS
P2-L16 SW STUDIO 4 N1	0.1	46	FAIL	1.8%	PASS
P2-L16 SW STUDIO 5 N1	0.3	51	FAIL	2.0%	PASS
P2-L16 WEST CORNER WCH STUDIO N1	0.6	64	FAIL	2.7%	PASS

A.2.3 DSY3 2020 Overheating results.

Table A.11 TM59 overheating results for studio spaces in Plot 2 under the DSY3 2020 weather file.

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L01 NE STUDIO 1 N1	0.3	69	FAIL	3.0%	FAIL
P2-L01 NE STUDIO 2 N1	0.2	71	FAIL	3.2%	FAIL
P2-L01 NE STUDIO 3 N1	0.2	66	FAIL	3.0%	PASS
P2-L01 NE STUDIO 4 N1	0.3	69	FAIL	3.1%	FAIL
P2-L01 NE STUDIO 5 N1	0.4	73	FAIL	3.3%	FAIL
P2-L01 NE STUDIO 6 N1	0.4	73	FAIL	3.3%	FAIL
P2-L01 NE STUDIO 7 N1	0.2	67	FAIL	3.1%	FAIL
P2-L01 NORTH CORNER STUDIO N1	0.5	73	FAIL	3.6%	FAIL
P2-L01 SW STUDIO 1 N1	0	57	FAIL	2.5%	PASS
P2-L01 SW STUDIO 2 N1	0.1	59	FAIL	2.6%	PASS
P2-L01 SW STUDIO 3 N1	0	66	FAIL	2.7%	PASS
P2-L01 SW STUDIO 4 N1	0.2	73	FAIL	3.3%	FAIL
P2-L01 SW STUDIO 5 N1	0.4	77	FAIL	3.5%	FAIL
P2-L01 SW STUDIO 6 N1	0.5	78	FAIL	3.6%	FAIL
P2-L01 SW STUDIO 7 N1	0.4	79	FAIL	3.7%	FAIL
P2-L01 SW STUDIO 8 N1	0.2	72	FAIL	3.6%	FAIL
P2-L01 WEST CORNER WCH STUDIO N1	0	67	FAIL	2.9%	PASS
P2-L02 EAST CORNER STUDIO N1	0.9	72	FAIL	3.8%	FAIL
P2-L02 NE STUDIO 1 N1	0.5	69	FAIL	3.0%	PASS
P2-L02 NE STUDIO 2 N1	0.4	70	FAIL	3.1%	FAIL
P2-L02 NE STUDIO 3 N1	0.3	68	FAIL	2.8%	PASS
P2-L02 NE STUDIO 4 N1	0.5	69	FAIL	3.0%	PASS
P2-L02 NE STUDIO 5 N1	0.5	71	FAIL	3.0%	FAIL
P2-L02 NE STUDIO 6 N1	0.5	71	FAIL	3.0%	FAIL
P2-L02 NE STUDIO 7 N1	0.5	70	FAIL	3.0%	PASS
P2-L02 NE STUDIO 8 N1	0.4	70	FAIL	3.1%	FAIL
P2-L02 NORTH CORNER STUDIO N1	0.8	78	FAIL	3.4%	FAIL
P2-L02 SOUTH CORNER STUDIO N1	1	76	FAIL	4.2%	FAIL
P2-L02 SW STUDIO 1 N1	0.2	65	FAIL	2.5%	PASS
P2-L02 SW STUDIO 2 N1	0.2	65	FAIL	2.5%	PASS
P2-L02 SW STUDIO 3 N1	0.1	66	FAIL	2.5%	PASS
P2-L02 SW STUDIO 4 N1	0.2	65	FAIL	2.6%	PASS
P2-L02 SW STUDIO 5 N1	0.4	69	FAIL	2.9%	PASS
P2-L02 SW STUDIO 6 N1	0.5	70	FAIL	2.9%	PASS
P2-L02 SW STUDIO 7 N1	0.5	71	FAIL	3.0%	PASS
P2-L02 SW STUDIO 8 N1	0.4	71	FAIL	3.0%	FAIL
P2-L02 SW STUDIO N1	0.4	72	FAIL	3.3%	FAIL
P2-L02 WEST CORNER WCH STUDIO N1	0.2	75	FAIL	2.8%	PASS
P2-L03 EAST CORNER STUDIO N1	1.1	77	FAIL	3.8%	FAIL
P2-L03 NE STUDIO 1 N1	0.5	70	FAIL	3.0%	PASS

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L03 NE STUDIO 2 N1	0.5	70	FAIL	3.0%	FAIL
P2-L03 NE STUDIO 3 N1	0.3	67	FAIL	2.8%	PASS
P2-L03 NE STUDIO 4 N1	0.5	69	FAIL	3.0%	PASS
P2-L03 NE STUDIO 5 N1	0.5	70	FAIL	3.0%	PASS
P2-L03 NE STUDIO 6 N1	0.5	70	FAIL	3.0%	FAIL
P2-L03 NE STUDIO 7 N1	0.5	70	FAIL	3.0%	PASS
P2-L03 NE STUDIO 8 N1	0.5	71	FAIL	3.0%	FAIL
P2-L03 NORTH CORNER STUDIO N1	1	80	FAIL	3.5%	FAIL
P2-L03 SOUTH CORNER STUDIO N1	1.2	81	FAIL	4.2%	FAIL
P2-L03 SW STUDIO 1 N1	0.2	65	FAIL	2.5%	PASS
P2-L03 SW STUDIO 2 N1	0.2	65	FAIL	2.5%	PASS
P2-L03 SW STUDIO 3 N1	0.1	65	FAIL	2.4%	PASS
P2-L03 SW STUDIO 4 N1	0.2	65	FAIL	2.5%	PASS
P2-L03 SW STUDIO 5 N1	0.3	67	FAIL	2.8%	PASS
P2-L03 SW STUDIO 6 N1	0.4	68	FAIL	2.8%	PASS
P2-L03 SW STUDIO 7 N1	0.4	69	FAIL	2.9%	PASS
P2-L03 SW STUDIO 8 N1	0.4	70	FAIL	2.9%	PASS
P2-L03 SW STUDIO N1	0.5	72	FAIL	3.1%	FAIL
P2-L03 WEST CORNER WCH STUDIO N1	0.2	76	FAIL	2.9%	PASS
P2-L04 EAST CORNER STUDIO N1	1.2	78	FAIL	3.8%	FAIL
P2-L04 NE STUDIO 1 N1	0.5	70	FAIL	3.0%	PASS
P2-L04 NE STUDIO 2 N1	0.5	69	FAIL	3.0%	FAIL
P2-L04 NE STUDIO 3 N1	0.3	66	FAIL	2.8%	PASS
P2-L04 NE STUDIO 4 N1	0.5	69	FAIL	3.0%	PASS
P2-L04 NE STUDIO 5 N1	0.5	69	FAIL	3.0%	PASS
P2-L04 NE STUDIO 6 N1	0.5	70	FAIL	3.0%	PASS
P2-L04 NE STUDIO 7 N1	0.5	71	FAIL	3.0%	FAIL
P2-L04 NE STUDIO 8 N1	0.6	72	FAIL	3.1%	FAIL
P2-L04 NORTH CORNER STUDIO N1	1	81	FAIL	3.5%	FAIL
P2-L04 SOUTH CORNER STUDIO N1	1.3	81	FAIL	4.2%	FAIL
P2-L04 SW STUDIO 1 N1	0.2	65	FAIL	2.5%	PASS
P2-L04 SW STUDIO 2 N1	0.2	65	FAIL	2.5%	PASS
P2-L04 SW STUDIO 3 N1	0.1	66	FAIL	2.4%	PASS
P2-L04 SW STUDIO 4 N1	0.2	65	FAIL	2.5%	PASS
P2-L04 SW STUDIO 5 N1	0.3	67	FAIL	2.8%	PASS
P2-L04 SW STUDIO 6 N1	0.4	67	FAIL	2.8%	PASS
P2-L04 SW STUDIO 7 N1	0.4	68	FAIL	2.9%	PASS
P2-L04 SW STUDIO 8 N1	0.5	69	FAIL	2.9%	PASS
P2-L04 SW STUDIO N1	0.5	71	FAIL	3.1%	FAIL
P2-L04 WEST CORNER WCH STUDIO N1	0.3	76	FAIL	2.9%	PASS
P2-L05 EAST CORNER STUDIO N1	1.3	80	FAIL	3.9%	FAIL
P2-L05 NE STUDIO 1 N1	0.5	70	FAIL	3.0%	PASS
P2-L05 NE STUDIO 2 N1	0.5	70	FAIL	3.0%	PASS
P2-L05 NE STUDIO 3 N1	0.4	67	FAIL	2.8%	PASS
P2-L05 NE STUDIO 4 N1	0.5	69	FAIL	2.9%	PASS
P2-L05 NE STUDIO 5 N1	0.5	70	FAIL	3.0%	PASS
P2-L05 NE STUDIO 6 N1	0.5	70	FAIL	3.0%	PASS
P2-L05 NE STUDIO 7 N1	0.5	72	FAIL	3.0%	FAIL
P2-L05 NE STUDIO 8 N1	0.6	72	FAIL	3.1%	FAIL
P2-L05 NORTH CORNER STUDIO N1	1	79	FAIL	3.5%	FAIL
P2-L05 SOUTH CORNER STUDIO N1	1.3	81	FAIL	4.2%	FAIL
P2-L05 SW STUDIO 1 N1	0.2	66	FAIL	2.5%	PASS
P2-L05 SW STUDIO 2 N1	0.2	66	FAIL	2.5%	PASS
P2-L05 SW STUDIO 3 N1	0.2	66	FAIL	2.4%	PASS
P2-L05 SW STUDIO 4 N1	0.2	65	FAIL	2.5%	PASS
P2-L05 SW STUDIO 5 N1	0.4	67	FAIL	2.8%	PASS
P2-L05 SW STUDIO 6 N1	0.5	69	FAIL	2.9%	PASS
P2-L05 SW STUDIO 7 N1	0.5	69	FAIL	2.9%	PASS
P2-L05 SW STUDIO 8 N1	0.5	70	FAIL	3.0%	PASS
P2-L05 SW STUDIO N1	0.5	72	FAIL	3.1%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L05 WEST CORNER WCH STUDIO N1	0.4	77	FAIL	3.0%	PASS
P2-L06 EAST CORNER STUDIO N1	0.8	86	FAIL	3.6%	FAIL
P2-L06 NE STUDIO 1 N1	0.2	68	FAIL	2.9%	PASS
P2-L06 NE STUDIO 2 N1	0.1	69	FAIL	2.9%	PASS
P2-L06 NE STUDIO 3 N1	0.1	68	FAIL	2.8%	PASS
P2-L06 NE STUDIO 4 N1	0.3	70	FAIL	3.0%	FAIL
P2-L06 NE STUDIO 5 N1	0.4	69	FAIL	3.0%	PASS
P2-L06 NE STUDIO 6 N1	0.2	71	FAIL	2.8%	PASS
P2-L06 NE STUDIO 7 N1	0.3	75	FAIL	2.8%	PASS
P2-L06 NE STUDIO 8 N1	0.5	78	FAIL	3.0%	PASS
P2-L06 NORTH CORNER STUDIO N1	0.6	76	FAIL	3.6%	FAIL
P2-L06 SOUTH CORNER STUDIO N1	0.7	80	FAIL	3.5%	FAIL
P2-L06 SW STUDIO 1 N1	0.1	67	FAIL	2.6%	PASS
P2-L06 SW STUDIO 2 N1	0.1	64	FAIL	2.6%	PASS
P2-L06 SW STUDIO 3 N1	0	64	FAIL	2.5%	PASS
P2-L06 SW STUDIO 4 N1	0.1	69	FAIL	2.8%	PASS
P2-L06 SW STUDIO 5 N1	0.2	69	FAIL	2.9%	PASS
P2-L06 SW STUDIO 6 N1	0.2	70	FAIL	2.9%	PASS
P2-L06 SW STUDIO 7 N1	0.2	69	FAIL	2.6%	PASS
P2-L06 SW STUDIO 8 N1	0.2	69	FAIL	2.6%	PASS
P2-L06 SW STUDIO N1	0.3	71	FAIL	2.7%	PASS
P2-L06 WEST CORNER WCH STUDIO N1	0.1	74	FAIL	3.0%	FAIL
P2-L08 EAST CORNER NE STUDIO N1	1.2	76	FAIL	4.7%	FAIL
P2-L08 NE STUDIO 1 N1	0.4	69	FAIL	3.1%	FAIL
P2-L08 NE STUDIO 2 N1	0.3	69	FAIL	3.2%	FAIL
P2-L08 NE STUDIO 3 N1	0.2	61	FAIL	2.9%	PASS
P2-L08 NE STUDIO 4 N1	0.5	70	FAIL	3.4%	FAIL
P2-L08 NORTH CORNER STUDIO N1	0.8	74	FAIL	3.9%	FAIL
P2-L08 SOUTH CORNER SW STUDIO N1	0.7	74	FAIL	3.9%	FAIL
P2-L08 SW STUDIO 1 N1	0	62	FAIL	2.5%	PASS
P2-L08 SW STUDIO 2 N1	0	61	FAIL	2.5%	PASS
P2-L08 SW STUDIO 3 N1	0	57	FAIL	2.5%	PASS
P2-L08 SW STUDIO 4 N1	0	61	FAIL	2.5%	PASS
P2-L08 SW STUDIO 5 N1	0.2	66	FAIL	2.8%	PASS
P2-L08 WEST CORNER WCH STUDIO N1	0.1	71	FAIL	3.0%	PASS
P2-L09 EAST CORNER NE STUDIO N1	1	82	FAIL	3.9%	FAIL
P2-L09 NE STUDIO 1 N1	0.4	69	FAIL	2.8%	PASS
P2-L09 NE STUDIO 2 N1	0.3	71	FAIL	2.9%	PASS
P2-L09 NE STUDIO 3 N1	0.2	67	FAIL	2.7%	PASS
P2-L09 NE STUDIO 4 N1	0.5	70	FAIL	2.9%	PASS
P2-L09 NORTH CORNER STUDIO N1	0.8	81	FAIL	3.4%	FAIL
P2-L09 SOUTH CORNER SW STUDIO N1	0.8	81	FAIL	3.7%	FAIL
P2-L09 SW STUDIO 1 N1	0.1	64	FAIL	2.5%	PASS
P2-L09 SW STUDIO 2 N1	0.1	64	FAIL	2.4%	PASS
P2-L09 SW STUDIO 3 N1	0.1	65	FAIL	2.4%	PASS
P2-L09 SW STUDIO 4 N1	0.1	64	FAIL	2.4%	PASS
P2-L09 SW STUDIO 5 N1	0.2	64	FAIL	2.6%	PASS
P2-L09 WEST CORNER WCH STUDIO N1	0.2	80	FAIL	3.0%	PASS
P2-L10 EAST CORNER NE STUDIO N1	1.4	81	FAIL	4.3%	FAIL
P2-L10 NE STUDIO 1 N1	0.4	69	FAIL	3.0%	FAIL
P2-L10 NE STUDIO 2 N1	0.3	69	FAIL	3.0%	FAIL
P2-L10 NE STUDIO 3 N1	0.2	66	FAIL	2.8%	PASS
P2-L10 NE STUDIO 4 N1	0.5	69	FAIL	3.1%	FAIL
P2-L10 NORTH CORNER STUDIO N1	1.1	82	FAIL	3.8%	FAIL
P2-L10 SOUTH CORNER SW STUDIO N1	1.3	82	FAIL	4.4%	FAIL
P2-L10 SW STUDIO 1 N1	0.3	68	FAIL	2.9%	PASS
P2-L10 SW STUDIO 2 N1	0.2	66	FAIL	2.8%	PASS
P2-L10 SW STUDIO 3 N1	0.1	67	FAIL	2.7%	PASS
P2-L10 SW STUDIO 4 N1	0.2	66	FAIL	2.7%	PASS
P2-L10 SW STUDIO 5 N1	0.4	68	FAIL	2.9%	PASS

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L10 WEST CORNER WCH STUDIO N1	0.8	88	FAIL	3.7%	FAIL
P2-L11 EAST CORNER NE STUDIO N1	1.6	84	FAIL	4.4%	FAIL
P2-L11 NE STUDIO 1 N1	0.6	72	FAIL	3.1%	FAIL
P2-L11 NE STUDIO 2 N1	0.5	73	FAIL	3.2%	FAIL
P2-L11 NE STUDIO 3 N1	0.4	68	FAIL	2.9%	PASS
P2-L11 NE STUDIO 4 N1	0.6	71	FAIL	3.2%	FAIL
P2-L11 NORTH CORNER STUDIO N1	1.2	85	FAIL	3.9%	FAIL
P2-L11 SOUTH CORNER SW STUDIO N1	1.4	85	FAIL	4.5%	FAIL
P2-L11 SW STUDIO 1 N1	0.5	71	FAIL	3.0%	PASS
P2-L11 SW STUDIO 2 N1	0.4	68	FAIL	2.9%	PASS
P2-L11 SW STUDIO 3 N1	0.2	68	FAIL	2.7%	PASS
P2-L11 SW STUDIO 4 N1	0.2	66	FAIL	2.7%	PASS
P2-L11 SW STUDIO 5 N1	0.5	72	FAIL	3.0%	FAIL
P2-L11 WEST CORNER WCH STUDIO N1	1.1	91	FAIL	4.0%	FAIL
P2-L12 EAST CORNER NE STUDIO N1	1.6	85	FAIL	4.5%	FAIL
P2-L12 NE STUDIO 1 N1	0.6	73	FAIL	3.1%	FAIL
P2-L12 NE STUDIO 2 N1	0.6	75	FAIL	3.2%	FAIL
P2-L12 NE STUDIO 3 N1	0.5	68	FAIL	2.9%	PASS
P2-L12 NE STUDIO 4 N1	0.6	71	FAIL	3.2%	FAIL
P2-L12 NORTH CORNER STUDIO N1	1.3	85	FAIL	3.9%	FAIL
P2-L12 SOUTH CORNER SW STUDIO N1	1.5	86	FAIL	4.5%	FAIL
P2-L12 SW STUDIO 1 N1	0.5	71	FAIL	3.0%	PASS
P2-L12 SW STUDIO 2 N1	0.4	69	FAIL	2.9%	PASS
P2-L12 SW STUDIO 3 N1	0.3	69	FAIL	2.7%	PASS
P2-L12 SW STUDIO 4 N1	0.3	67	FAIL	2.7%	PASS
P2-L12 SW STUDIO 5 N1	0.5	72	FAIL	3.0%	FAIL
P2-L12 WEST CORNER WCH STUDIO N1	1.1	92	FAIL	4.1%	FAIL
P2-L13 EAST CORNER NE STUDIO N1	1.6	85	FAIL	4.5%	FAIL
P2-L13 NE STUDIO 1 N1	0.6	74	FAIL	3.2%	FAIL
P2-L13 NE STUDIO 2 N1	0.6	76	FAIL	3.2%	FAIL
P2-L13 NE STUDIO 3 N1	0.5	69	FAIL	3.0%	FAIL
P2-L13 NE STUDIO 4 N1	0.7	71	FAIL	3.2%	FAIL
P2-L13 NORTH CORNER STUDIO N1	1.4	85	FAIL	4.0%	FAIL
P2-L13 SOUTH CORNER SW STUDIO N1	1.5	86	FAIL	4.5%	FAIL
P2-L13 SW STUDIO 1 N1	0.5	71	FAIL	3.0%	PASS
P2-L13 SW STUDIO 2 N1	0.4	69	FAIL	2.9%	PASS
P2-L13 SW STUDIO 3 N1	0.3	69	FAIL	2.7%	PASS
P2-L13 SW STUDIO 4 N1	0.3	67	FAIL	2.7%	PASS
P2-L13 SW STUDIO 5 N1	0.5	72	FAIL	3.0%	FAIL
P2-L13 WEST CORNER WCH STUDIO N1	1.1	92	FAIL	4.1%	FAIL
P2-L14 EAST CORNER NE STUDIO N1	1.6	85	FAIL	4.5%	FAIL
P2-L14 NE STUDIO 1 N1	0.7	75	FAIL	3.3%	FAIL
P2-L14 NE STUDIO 2 N1	0.6	77	FAIL	3.3%	FAIL
P2-L14 NE STUDIO 3 N1	0.5	70	FAIL	3.0%	FAIL
P2-L14 NE STUDIO 4 N1	0.7	72	FAIL	3.2%	FAIL
P2-L14 NORTH CORNER STUDIO N1	1.5	87	FAIL	4.1%	FAIL
P2-L14 SOUTH CORNER SW STUDIO N1	1.5	86	FAIL	4.5%	FAIL
P2-L14 SW STUDIO 1 N1	0.5	71	FAIL	3.0%	PASS
P2-L14 SW STUDIO 2 N1	0.4	69	FAIL	2.9%	PASS
P2-L14 SW STUDIO 3 N1	0.3	69	FAIL	2.7%	PASS
P2-L14 SW STUDIO 4 N1	0.3	67	FAIL	2.7%	PASS
P2-L14 SW STUDIO 5 N1	0.5	72	FAIL	3.0%	FAIL
P2-L14 WEST CORNER WCH STUDIO N1	1.1	92	FAIL	4.1%	FAIL
P2-L15 EAST CORNER NE STUDIO N1	1.6	85	FAIL	4.5%	FAIL
P2-L15 NE STUDIO 1 N1	0.7	75	FAIL	3.3%	FAIL
P2-L15 NE STUDIO 2 N1	0.6	77	FAIL	3.4%	FAIL
P2-L15 NE STUDIO 3 N1	0.5	70	FAIL	3.0%	FAIL
P2-L15 NE STUDIO 4 N1	0.7	72	FAIL	3.2%	FAIL
P2-L15 NORTH CORNER STUDIO N1	1.6	87	FAIL	4.2%	FAIL
P2-L15 SOUTH CORNER SW STUDIO N1	1.5	85	FAIL	4.5%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L15 SW STUDIO 1 N1	0.5	71	FAIL	3.0%	PASS
P2-L15 SW STUDIO 2 N1	0.4	68	FAIL	2.9%	PASS
P2-L15 SW STUDIO 3 N1	0.3	67	FAIL	2.7%	PASS
P2-L15 SW STUDIO 4 N1	0.3	67	FAIL	2.7%	PASS
P2-L15 SW STUDIO 5 N1	0.5	72	FAIL	3.0%	FAIL
P2-L15 WEST CORNER WCH STUDIO N1	1.1	92	FAIL	4.1%	FAIL
P2-L16 EAST CORNER NE STUDIO N1	1.2	85	FAIL	4.1%	FAIL
P2-L16 NE STUDIO 1 N1	0.6	79	FAIL	3.1%	FAIL
P2-L16 NE STUDIO 2 N1	0.5	80	FAIL	3.2%	FAIL
P2-L16 NE STUDIO 3 N1	0.4	71	FAIL	2.9%	PASS
P2-L16 NE STUDIO 4 N1	0.6	75	FAIL	3.1%	FAIL
P2-L16 NORTH CORNER STUDIO N1	1.2	88	FAIL	3.8%	FAIL
P2-L16 SOUTH CORNER SW STUDIO N1	1.1	83	FAIL	4.0%	FAIL
P2-L16 SW STUDIO 1 N1	0.3	69	FAIL	2.7%	PASS
P2-L16 SW STUDIO 2 N1	0.2	67	FAIL	2.6%	PASS
P2-L16 SW STUDIO 3 N1	0.1	66	FAIL	2.5%	PASS
P2-L16 SW STUDIO 4 N1	0.1	66	FAIL	2.5%	PASS
P2-L16 SW STUDIO 5 N1	0.3	69	FAIL	2.7%	PASS
P2-L16 WEST CORNER WCH STUDIO N1	0.8	92	FAIL	3.7%	FAIL

A.2.4 DSY1 2050 Overheating results.

Table A.12 TM59 overheating results for studio spaces in Plot 2 under the DSY1 2050 weather file.

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L01 NE STUDIO 1 N1	0.1	70	FAIL	4.1%	FAIL
P2-L01 NE STUDIO 2 N1	0.1	72	FAIL	4.3%	FAIL
P2-L01 NE STUDIO 3 N1	0.2	71	FAIL	3.9%	FAIL
P2-L01 NE STUDIO 4 N1	0.4	70	FAIL	4.1%	FAIL
P2-L01 NE STUDIO 5 N1	0.4	76	FAIL	4.3%	FAIL
P2-L01 NE STUDIO 6 N1	0.4	76	FAIL	4.3%	FAIL
P2-L01 NE STUDIO 7 N1	0	69	FAIL	4.1%	FAIL
P2-L01 NORTH CORNER STUDIO N1	0.4	76	FAIL	5.0%	FAIL
P2-L01 SW STUDIO 1 N1	0	59	FAIL	3.1%	FAIL
P2-L01 SW STUDIO 2 N1	0	61	FAIL	3.2%	FAIL
P2-L01 SW STUDIO 3 N1	0	67	FAIL	3.4%	FAIL
P2-L01 SW STUDIO 4 N1	0.3	77	FAIL	4.3%	FAIL
P2-L01 SW STUDIO 5 N1	0.5	83	FAIL	4.7%	FAIL
P2-L01 SW STUDIO 6 N1	0.5	84	FAIL	4.8%	FAIL
P2-L01 SW STUDIO 7 N1	0.5	84	FAIL	4.8%	FAIL
P2-L01 SW STUDIO 8 N1	0.3	76	FAIL	4.8%	FAIL
P2-L01 WEST CORNER WCH STUDIO N1	0	68	FAIL	3.7%	FAIL
P2-L02 EAST CORNER STUDIO N1	0.7	77	FAIL	5.2%	FAIL
P2-L02 NE STUDIO 1 N1	0.4	70	FAIL	3.8%	FAIL
P2-L02 NE STUDIO 2 N1	0.4	76	FAIL	4.1%	FAIL
P2-L02 NE STUDIO 3 N1	0.3	67	FAIL	3.5%	FAIL
P2-L02 NE STUDIO 4 N1	0.4	71	FAIL	3.8%	FAIL
P2-L02 NE STUDIO 5 N1	0.5	71	FAIL	3.8%	FAIL
P2-L02 NE STUDIO 6 N1	0.5	71	FAIL	3.8%	FAIL
P2-L02 NE STUDIO 7 N1	0.4	71	FAIL	3.7%	FAIL
P2-L02 NE STUDIO 8 N1	0.4	72	FAIL	4.0%	FAIL
P2-L02 NORTH CORNER STUDIO N1	0.7	82	FAIL	4.7%	FAIL
P2-L02 SOUTH CORNER STUDIO N1	0.9	84	FAIL	5.8%	FAIL
P2-L02 SW STUDIO 1 N1	0	61	FAIL	3.0%	PASS
P2-L02 SW STUDIO 2 N1	0.1	62	FAIL	3.0%	FAIL
P2-L02 SW STUDIO 3 N1	0	62	FAIL	3.0%	FAIL
P2-L02 SW STUDIO 4 N1	0.1	62	FAIL	3.2%	FAIL
P2-L02 SW STUDIO 5 N1	0.4	68	FAIL	3.6%	FAIL
P2-L02 SW STUDIO 6 N1	0.5	70	FAIL	3.7%	FAIL
P2-L02 SW STUDIO 7 N1	0.5	70	FAIL	3.7%	FAIL
P2-L02 SW STUDIO 8 N1	0.5	72	FAIL	3.9%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L02 SW STUDIO N1	0.5	73	FAIL	4.3%	FAIL
P2-L02 WEST CORNER WCH STUDIO N1	0.1	74	FAIL	3.6%	FAIL
P2-L03 EAST CORNER STUDIO N1	0.9	82	FAIL	5.2%	FAIL
P2-L03 NE STUDIO 1 N1	0.5	72	FAIL	3.7%	FAIL
P2-L03 NE STUDIO 2 N1	0.5	75	FAIL	4.0%	FAIL
P2-L03 NE STUDIO 3 N1	0.3	66	FAIL	3.4%	FAIL
P2-L03 NE STUDIO 4 N1	0.5	71	FAIL	3.7%	FAIL
P2-L03 NE STUDIO 5 N1	0.5	72	FAIL	3.8%	FAIL
P2-L03 NE STUDIO 6 N1	0.5	72	FAIL	3.8%	FAIL
P2-L03 NE STUDIO 7 N1	0.5	72	FAIL	3.7%	FAIL
P2-L03 NE STUDIO 8 N1	0.5	73	FAIL	3.9%	FAIL
P2-L03 NORTH CORNER STUDIO N1	0.8	84	FAIL	4.7%	FAIL
P2-L03 SOUTH CORNER STUDIO N1	1	90	FAIL	5.7%	FAIL
P2-L03 SW STUDIO 1 N1	0.1	60	FAIL	3.0%	PASS
P2-L03 SW STUDIO 2 N1	0.2	61	FAIL	3.0%	PASS
P2-L03 SW STUDIO 3 N1	0	60	FAIL	2.9%	PASS
P2-L03 SW STUDIO 4 N1	0.1	61	FAIL	3.1%	FAIL
P2-L03 SW STUDIO 5 N1	0.4	67	FAIL	3.4%	FAIL
P2-L03 SW STUDIO 6 N1	0.5	68	FAIL	3.5%	FAIL
P2-L03 SW STUDIO 7 N1	0.4	69	FAIL	3.6%	FAIL
P2-L03 SW STUDIO 8 N1	0.5	71	FAIL	3.6%	FAIL
P2-L03 SW STUDIO N1	0.5	76	FAIL	4.1%	FAIL
P2-L03 WEST CORNER WCH STUDIO N1	0.2	75	FAIL	3.6%	FAIL
P2-L04 EAST CORNER STUDIO N1	1	83	FAIL	5.4%	FAIL
P2-L04 NE STUDIO 1 N1	0.5	72	FAIL	3.7%	FAIL
P2-L04 NE STUDIO 2 N1	0.5	73	FAIL	3.9%	FAIL
P2-L04 NE STUDIO 3 N1	0.3	66	FAIL	3.4%	FAIL
P2-L04 NE STUDIO 4 N1	0.5	70	FAIL	3.7%	FAIL
P2-L04 NE STUDIO 5 N1	0.5	71	FAIL	3.8%	FAIL
P2-L04 NE STUDIO 6 N1	0.5	72	FAIL	3.8%	FAIL
P2-L04 NE STUDIO 7 N1	0.5	73	FAIL	3.8%	FAIL
P2-L04 NE STUDIO 8 N1	0.5	75	FAIL	4.0%	FAIL
P2-L04 NORTH CORNER STUDIO N1	0.8	83	FAIL	4.7%	FAIL
P2-L04 SOUTH CORNER STUDIO N1	1.1	90	FAIL	5.8%	FAIL
P2-L04 SW STUDIO 1 N1	0.2	60	FAIL	3.0%	FAIL
P2-L04 SW STUDIO 2 N1	0.2	60	FAIL	3.0%	PASS
P2-L04 SW STUDIO 3 N1	0.1	59	FAIL	2.9%	PASS
P2-L04 SW STUDIO 4 N1	0.1	59	FAIL	3.0%	FAIL
P2-L04 SW STUDIO 5 N1	0.4	67	FAIL	3.4%	FAIL
P2-L04 SW STUDIO 6 N1	0.4	68	FAIL	3.5%	FAIL
P2-L04 SW STUDIO 7 N1	0.4	68	FAIL	3.5%	FAIL
P2-L04 SW STUDIO 8 N1	0.5	70	FAIL	3.6%	FAIL
P2-L04 SW STUDIO N1	0.5	76	FAIL	4.0%	FAIL
P2-L04 WEST CORNER WCH STUDIO N1	0.2	76	FAIL	3.7%	FAIL
P2-L05 EAST CORNER STUDIO N1	1.1	86	FAIL	5.5%	FAIL
P2-L05 NE STUDIO 1 N1	0.4	71	FAIL	3.7%	FAIL
P2-L05 NE STUDIO 2 N1	0.4	76	FAIL	4.0%	FAIL
P2-L05 NE STUDIO 3 N1	0.2	66	FAIL	3.5%	FAIL
P2-L05 NE STUDIO 4 N1	0.4	70	FAIL	3.8%	FAIL
P2-L05 NE STUDIO 5 N1	0.5	71	FAIL	3.8%	FAIL
P2-L05 NE STUDIO 6 N1	0.5	72	FAIL	3.8%	FAIL
P2-L05 NE STUDIO 7 N1	0.5	75	FAIL	3.9%	FAIL
P2-L05 NE STUDIO 8 N1	0.5	78	FAIL	4.1%	FAIL
P2-L05 NORTH CORNER STUDIO N1	0.8	86	FAIL	4.8%	FAIL
P2-L05 SOUTH CORNER STUDIO N1	1	89	FAIL	5.8%	FAIL
P2-L05 SW STUDIO 1 N1	0.2	64	FAIL	3.1%	FAIL
P2-L05 SW STUDIO 2 N1	0.2	62	FAIL	3.1%	FAIL
P2-L05 SW STUDIO 3 N1	0.1	61	FAIL	3.1%	FAIL
P2-L05 SW STUDIO 4 N1	0.1	63	FAIL	3.2%	FAIL
P2-L05 SW STUDIO 5 N1	0.4	67	FAIL	3.5%	FAIL

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L05 SW STUDIO 6 N1	0.4	69	FAIL	3.6%	FAIL
P2-L05 SW STUDIO 7 N1	0.5	69	FAIL	3.6%	FAIL
P2-L05 SW STUDIO 8 N1	0.5	71	FAIL	3.7%	FAIL
P2-L05 SW STUDIO N1	0.5	75	FAIL	3.9%	FAIL
P2-L05 WEST CORNER WCH STUDIO N1	0.3	77	FAIL	3.9%	FAIL
P2-L06 EAST CORNER STUDIO N1	0.8	86	FAIL	4.8%	FAIL
P2-L06 NE STUDIO 1 N1	0	71	FAIL	3.9%	FAIL
P2-L06 NE STUDIO 2 N1	0	71	FAIL	3.9%	FAIL
P2-L06 NE STUDIO 3 N1	0	68	FAIL	3.6%	FAIL
P2-L06 NE STUDIO 4 N1	0.1	73	FAIL	4.1%	FAIL
P2-L06 NE STUDIO 5 N1	0.2	72	FAIL	4.0%	FAIL
P2-L06 NE STUDIO 6 N1	0.2	69	FAIL	3.4%	FAIL
P2-L06 NE STUDIO 7 N1	0.2	68	FAIL	3.4%	FAIL
P2-L06 NE STUDIO 8 N1	0.3	73	FAIL	3.6%	FAIL
P2-L06 NORTH CORNER STUDIO N1	0.4	86	FAIL	4.9%	FAIL
P2-L06 SOUTH CORNER STUDIO N1	0.7	84	FAIL	4.7%	FAIL
P2-L06 SW STUDIO 1 N1	0	68	FAIL	3.2%	FAIL
P2-L06 SW STUDIO 2 N1	0	67	FAIL	3.2%	FAIL
P2-L06 SW STUDIO 3 N1	0	64	FAIL	3.1%	FAIL
P2-L06 SW STUDIO 4 N1	0	70	FAIL	3.6%	FAIL
P2-L06 SW STUDIO 5 N1	0	72	FAIL	3.8%	FAIL
P2-L06 SW STUDIO 6 N1	0.1	71	FAIL	3.8%	FAIL
P2-L06 SW STUDIO 7 N1	0.1	65	FAIL	3.2%	FAIL
P2-L06 SW STUDIO 8 N1	0.1	64	FAIL	3.1%	FAIL
P2-L06 SW STUDIO N1	0.2	70	FAIL	3.3%	FAIL
P2-L06 WEST CORNER WCH STUDIO N1	0	77	FAIL	4.1%	FAIL
P2-L08 EAST CORNER NE STUDIO N1	1.3	89	FAIL	6.4%	FAIL
P2-L08 NE STUDIO 1 N1	0.1	71	FAIL	4.2%	FAIL
P2-L08 NE STUDIO 2 N1	0.1	71	FAIL	4.5%	FAIL
P2-L08 NE STUDIO 3 N1	0	68	FAIL	4.1%	FAIL
P2-L08 NE STUDIO 4 N1	0.3	73	FAIL	4.6%	FAIL
P2-L08 NORTH CORNER STUDIO N1	0.7	86	FAIL	5.5%	FAIL
P2-L08 SOUTH CORNER SW STUDIO N1	0.6	81	FAIL	5.4%	FAIL
P2-L08 SW STUDIO 1 N1	0	60	FAIL	3.1%	FAIL
P2-L08 SW STUDIO 2 N1	0	59	FAIL	3.1%	FAIL
P2-L08 SW STUDIO 3 N1	0	66	FAIL	3.4%	FAIL
P2-L08 SW STUDIO 4 N1	0	59	FAIL	3.1%	FAIL
P2-L08 SW STUDIO 5 N1	0	65	FAIL	3.5%	FAIL
P2-L08 WEST CORNER WCH STUDIO N1	0	71	FAIL	3.9%	FAIL
P2-L09 EAST CORNER NE STUDIO N1	0.9	84	FAIL	5.4%	FAIL
P2-L09 NE STUDIO 1 N1	0.2	66	FAIL	3.5%	FAIL
P2-L09 NE STUDIO 2 N1	0.1	69	FAIL	3.7%	FAIL
P2-L09 NE STUDIO 3 N1	0.1	61	FAIL	3.3%	FAIL
P2-L09 NE STUDIO 4 N1	0.3	70	FAIL	3.7%	FAIL
P2-L09 NORTH CORNER STUDIO N1	0.6	82	FAIL	4.6%	FAIL
P2-L09 SOUTH CORNER SW STUDIO N1	0.8	81	FAIL	5.1%	FAIL
P2-L09 SW STUDIO 1 N1	0	54	FAIL	2.8%	PASS
P2-L09 SW STUDIO 2 N1	0.1	53	FAIL	2.8%	PASS
P2-L09 SW STUDIO 3 N1	0	55	FAIL	2.8%	PASS
P2-L09 SW STUDIO 4 N1	0	49	FAIL	2.6%	PASS
P2-L09 SW STUDIO 5 N1	0.1	59	FAIL	3.1%	FAIL
P2-L09 WEST CORNER WCH STUDIO N1	0.1	70	FAIL	3.7%	FAIL
P2-L10 EAST CORNER NE STUDIO N1	1.2	87	FAIL	6.1%	FAIL
P2-L10 NE STUDIO 1 N1	0.5	73	FAIL	4.0%	FAIL
P2-L10 NE STUDIO 2 N1	0.4	73	FAIL	4.1%	FAIL
P2-L10 NE STUDIO 3 N1	0.2	64	FAIL	3.6%	FAIL
P2-L10 NE STUDIO 4 N1	0.5	72	FAIL	4.1%	FAIL
P2-L10 NORTH CORNER STUDIO N1	1	84	FAIL	5.3%	FAIL
P2-L10 SOUTH CORNER SW STUDIO N1	1.1	94	FAIL	6.1%	FAIL
P2-L10 SW STUDIO 1 N1	0.4	71	FAIL	3.7%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L10 SW STUDIO 2 N1	0.4	67	FAIL	3.4%	FAIL
P2-L10 SW STUDIO 3 N1	0.2	64	FAIL	3.1%	FAIL
P2-L10 SW STUDIO 4 N1	0.2	63	FAIL	3.1%	FAIL
P2-L10 SW STUDIO 5 N1	0.5	70	FAIL	3.8%	FAIL
P2-L10 WEST CORNER WCH STUDIO N1	0.7	90	FAIL	5.0%	FAIL
P2-L11 EAST CORNER NE STUDIO N1	1.3	98	FAIL	6.3%	FAIL
P2-L11 NE STUDIO 1 N1	0.5	77	FAIL	4.1%	FAIL
P2-L11 NE STUDIO 2 N1	0.5	78	FAIL	4.3%	FAIL
P2-L11 NE STUDIO 3 N1	0.4	69	FAIL	3.7%	FAIL
P2-L11 NE STUDIO 4 N1	0.6	75	FAIL	4.2%	FAIL
P2-L11 NORTH CORNER STUDIO N1	1.1	91	FAIL	5.4%	FAIL
P2-L11 SOUTH CORNER SW STUDIO N1	1.2	98	FAIL	6.2%	FAIL
P2-L11 SW STUDIO 1 N1	0.5	77	FAIL	3.9%	FAIL
P2-L11 SW STUDIO 2 N1	0.5	72	FAIL	3.7%	FAIL
P2-L11 SW STUDIO 3 N1	0.3	72	FAIL	3.3%	FAIL
P2-L11 SW STUDIO 4 N1	0.3	68	FAIL	3.3%	FAIL
P2-L11 SW STUDIO 5 N1	0.5	75	FAIL	3.9%	FAIL
P2-L11 WEST CORNER WCH STUDIO N1	0.9	101	FAIL	5.5%	FAIL
P2-L12 EAST CORNER NE STUDIO N1	1.4	99	FAIL	6.4%	FAIL
P2-L12 NE STUDIO 1 N1	0.5	77	FAIL	4.1%	FAIL
P2-L12 NE STUDIO 2 N1	0.5	78	FAIL	4.3%	FAIL
P2-L12 NE STUDIO 3 N1	0.5	69	FAIL	3.8%	FAIL
P2-L12 NE STUDIO 4 N1	0.6	77	FAIL	4.3%	FAIL
P2-L12 NORTH CORNER STUDIO N1	1.2	92	FAIL	5.5%	FAIL
P2-L12 SOUTH CORNER SW STUDIO N1	1.3	99	FAIL	6.3%	FAIL
P2-L12 SW STUDIO 1 N1	0.5	77	FAIL	3.9%	FAIL
P2-L12 SW STUDIO 2 N1	0.5	72	FAIL	3.7%	FAIL
P2-L12 SW STUDIO 3 N1	0.3	73	FAIL	3.4%	FAIL
P2-L12 SW STUDIO 4 N1	0.4	68	FAIL	3.3%	FAIL
P2-L12 SW STUDIO 5 N1	0.5	76	FAIL	4.0%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L12 WEST CORNER WCH STUDIO N1	0.9	103	FAIL	5.6%	FAIL
P2-L13 EAST CORNER NE STUDIO N1	1.4	99	FAIL	6.4%	FAIL
P2-L13 NE STUDIO 1 N1	0.5	77	FAIL	4.2%	FAIL
P2-L13 NE STUDIO 2 N1	0.5	78	FAIL	4.5%	FAIL
P2-L13 NE STUDIO 3 N1	0.5	73	FAIL	3.9%	FAIL
P2-L13 NE STUDIO 4 N1	0.6	77	FAIL	4.3%	FAIL
P2-L13 NORTH CORNER STUDIO N1	1.3	94	FAIL	5.6%	FAIL
P2-L13 SOUTH CORNER SW STUDIO N1	1.3	99	FAIL	6.3%	FAIL
P2-L13 SW STUDIO 1 N1	0.5	77	FAIL	3.9%	FAIL
P2-L13 SW STUDIO 2 N1	0.5	70	FAIL	3.6%	FAIL
P2-L13 SW STUDIO 3 N1	0.3	73	FAIL	3.4%	FAIL
P2-L13 SW STUDIO 4 N1	0.3	67	FAIL	3.3%	FAIL
P2-L13 SW STUDIO 5 N1	0.5	76	FAIL	4.0%	FAIL
P2-L13 WEST CORNER WCH STUDIO N1	0.9	103	FAIL	5.6%	FAIL
P2-L14 EAST CORNER NE STUDIO N1	1.4	99	FAIL	6.4%	FAIL
P2-L14 NE STUDIO 1 N1	0.6	79	FAIL	4.3%	FAIL
P2-L14 NE STUDIO 2 N1	0.6	80	FAIL	4.6%	FAIL
P2-L14 NE STUDIO 3 N1	0.5	75	FAIL	4.0%	FAIL
P2-L14 NE STUDIO 4 N1	0.6	78	FAIL	4.4%	FAIL
P2-L14 NORTH CORNER STUDIO N1	1.4	98	FAIL	5.8%	FAIL
P2-L14 SOUTH CORNER SW STUDIO N1	1.3	99	FAIL	6.3%	FAIL
P2-L14 SW STUDIO 1 N1	0.5	77	FAIL	3.9%	FAIL
P2-L14 SW STUDIO 2 N1	0.5	71	FAIL	3.6%	FAIL
P2-L14 SW STUDIO 3 N1	0.3	73	FAIL	3.4%	FAIL
P2-L14 SW STUDIO 4 N1	0.3	67	FAIL	3.3%	FAIL
P2-L14 SW STUDIO 5 N1	0.5	76	FAIL	4.0%	FAIL
P2-L14 WEST CORNER WCH STUDIO N1	0.9	103	FAIL	5.7%	FAIL
P2-L15 EAST CORNER NE STUDIO N1	1.4	99	FAIL	6.4%	FAIL
P2-L15 NE STUDIO 1 N1	0.6	79	FAIL	4.4%	FAIL
P2-L15 NE STUDIO 2 N1	0.6	80	FAIL	4.6%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P2-L15 NE STUDIO 3 N1	0.5	75	FAIL	4.1%	FAIL
P2-L15 NE STUDIO 4 N1	0.6	78	FAIL	4.4%	FAIL
P2-L15 NORTH CORNER STUDIO N1	1.4	99	FAIL	5.9%	FAIL
P2-L15 SOUTH CORNER SW STUDIO N1	1.3	99	FAIL	6.3%	FAIL
P2-L15 SW STUDIO 1 N1	0.5	75	FAIL	3.9%	FAIL
P2-L15 SW STUDIO 2 N1	0.5	71	FAIL	3.6%	FAIL
P2-L15 SW STUDIO 3 N1	0.3	71	FAIL	3.3%	FAIL
P2-L15 SW STUDIO 4 N1	0.3	67	FAIL	3.3%	FAIL
P2-L15 SW STUDIO 5 N1	0.5	75	FAIL	4.0%	FAIL
P2-L15 WEST CORNER WCH STUDIO N1	0.9	103	FAIL	5.7%	FAIL
P2-L16 EAST CORNER NE STUDIO N1	1.1	86	FAIL	5.6%	FAIL
P2-L16 NE STUDIO 1 N1	0.4	74	FAIL	3.9%	FAIL
P2-L16 NE STUDIO 2 N1	0.4	80	FAIL	4.2%	FAIL
P2-L16 NE STUDIO 3 N1	0.2	70	FAIL	3.6%	FAIL
P2-L16 NE STUDIO 4 N1	0.5	73	FAIL	3.9%	FAIL
P2-L16 NORTH CORNER STUDIO N1	0.9	94	FAIL	5.2%	FAIL
P2-L16 SOUTH CORNER SW STUDIO N1	1	89	FAIL	5.6%	FAIL
P2-L16 SW STUDIO 1 N1	0.2	64	FAIL	3.3%	FAIL
P2-L16 SW STUDIO 2 N1	0.2	62	FAIL	3.1%	FAIL
P2-L16 SW STUDIO 3 N1	0.1	57	FAIL	2.9%	PASS
P2-L16 SW STUDIO 4 N1	0.1	56	FAIL	2.9%	PASS
P2-L16 SW STUDIO 5 N1	0.3	65	FAIL	3.3%	FAIL
P2-L16 WEST CORNER WCH STUDIO N1	0.7	92	FAIL	4.9%	FAIL

A.3 Plot 3

A.3.1 DSY1 2020 Overheating results.

Table A.13 TM59 overheating results for bedroom spaces in Plot 3 under the DSY1 2020 weather file.

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L02 CLUSTER BED N1	29.8	0	30	PASS	1.5%	PASS
P3-L02 CLUSTER BED N2	30	0	30	PASS	1.6%	PASS
P3-L02 CLUSTER BED N3	29.5	0	23	PASS	1.2%	PASS
P3-L02 CLUSTER BED N4	29.5	0	23	PASS	1.2%	PASS
P3-L02 CLUSTER BED N5	29.5	0	23	PASS	1.3%	PASS
P3-L02 CLUSTER BED N6	29.3	0	23	PASS	1.3%	PASS
P3-L02 ACC. CLUSTER BED N1	29.5	0	25	PASS	1.4%	PASS
P3-L02 CLUSTER BED N7	29.7	0	23	PASS	1.5%	PASS
P3-L02 CLUSTER BED N8	29.5	0	23	PASS	1.4%	PASS
P3-L02 CLUSTER BED N9	29.5	0	23	PASS	1.3%	PASS
P3-L02 CLUSTER BED N10	29.7	0	28	PASS	1.6%	PASS
P3-L02 CLUSTER BED N11	29.8	0	27	PASS	1.5%	PASS
P3-L02 CLUSTER BED N12	29.5	0	23	PASS	1.2%	PASS
P3-L02 CLUSTER BED N13	29.4	0	22	PASS	1.2%	PASS
P3-L02 CLUSTER BED N14	29.5	0	22	PASS	1.2%	PASS
P3-L02 CLUSTER BED N15	29.5	0	22	PASS	1.3%	PASS
P3-L02 ACC. CLUSTER BED N3	29.3	0	28	PASS	1.3%	PASS
P3-L02 ACC. CLUSTER BED N2	29.3	0	25	PASS	1.4%	PASS
P3-L02 CLUSTER BED N16	29.5	0	24	PASS	1.4%	PASS
P3-L02 CLUSTER BED N17	29.5	0	22	PASS	1.4%	PASS
P3-L02 CLUSTER BED N18	29.4	0	24	PASS	1.6%	PASS
P3-L02 CLUSTER BED N19	29.3	0	24	PASS	1.6%	PASS
P3-L02 CLUSTER BED N20	29.4	0	26	PASS	1.6%	PASS
P3-L02 CLUSTER BED N21	29.3	0	20	PASS	1.1%	PASS
P3-L02 CLUSTER BED N22	29.6	0	20	PASS	1.2%	PASS
P3-L02 CLUSTER BED N23	29.6	0	20	PASS	1.2%	PASS
P3-L02 CLUSTER BED N24	29.4	0	20	PASS	1.1%	PASS
P3-L02 CLUSTER BED N25	29.4	0	20	PASS	1.1%	PASS
P3-L02 CLUSTER BED N26	29.3	0	20	PASS	1.1%	PASS
P3-L02 CLUSTER BED N27	29.7	0	27	PASS	1.4%	PASS
P3-L02 CLUSTER BED N28	29.9	0.1	28	PASS	1.6%	PASS
P3-L02 CLUSTER BED N29	29.4	0	22	PASS	1.2%	PASS
P3-L02 CLUSTER BED N30	29.2	0	20	PASS	1.0%	PASS
P3-L02 CLUSTER BED N31	29.3	0	21	PASS	1.1%	PASS
P3-L02 CLUSTER BED N32	29.2	0	20	PASS	1.1%	PASS
P3-L02 CLUSTER BED N33	29.1	0	22	PASS	1.1%	PASS
P3-L01 ACC. CLUSTER BED N1	28.9	0	21	PASS	1.6%	PASS
P3-L01 CLUSTER BED N1	29.5	0	26	PASS	1.8%	PASS
P3-L01 CLUSTER BED N2	29.2	0	23	PASS	1.4%	PASS
P3-L01 CLUSTER BED N3	29.1	0	22	PASS	1.4%	PASS
P3-L01 CLUSTER BED N4	28.8	0	22	PASS	1.5%	PASS
P3-L01 CLUSTER BED N5	29.1	0	23	PASS	1.6%	PASS
P3-L01 CLUSTER BED N6	29.1	0	23	PASS	1.5%	PASS
P3-L01 CLUSTER BED N7	29.1	0	22	PASS	1.4%	PASS
P3-L01 CLUSTER BED N8	29	0	22	PASS	1.4%	PASS
P3-L01 CLUSTER BED N9	29	0	23	PASS	1.6%	PASS
P3-L01 CLUSTER BED N10	29.5	0	25	PASS	1.7%	PASS
P3-L01 CLUSTER BED N11	29.2	0	23	PASS	1.5%	PASS
P3-L01 CLUSTER BED N12	29.1	0	22	PASS	1.4%	PASS
P3-L01 CLUSTER BED N13	29.5	0	26	PASS	1.8%	PASS
P3-L01 CLUSTER BED N14	29.2	0	23	PASS	1.4%	PASS
P3-L01 ACC. CLUSTER BED N2	28.8	0	22	PASS	1.5%	PASS
P3-L01 CLUSTER BED N15	29	0	23	PASS	1.6%	PASS
P3-L01 CLUSTER BED N16	28.5	0	22	PASS	1.7%	PASS
P3-L01 CLUSTER BED N17	28.9	0	20	PASS	1.2%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L01 CLUSTER BED N18	29.2	0	22	PASS	1.3%	PASS
P3-L01 CLUSTER BED N19	29.2	0	22	PASS	1.3%	PASS
P3-L01 CLUSTER BED N20	29	0	21	PASS	1.2%	PASS
P3-L01 CLUSTER BED N21	29	0	21	PASS	1.1%	PASS
P3-L01 CLUSTER BED N22	28.9	0	21	PASS	1.2%	PASS
P3-L01 CLUSTER BED N23	29.3	0	24	PASS	1.5%	PASS
P3-L01 CLUSTER BED N24	29.5	0	26	PASS	1.7%	PASS
P3-L01 CLUSTER BED N25	29.1	0	23	PASS	1.3%	PASS
P3-L01 CLUSTER BED N26	28.9	0	21	PASS	1.1%	PASS
P3-L01 CLUSTER BED N27	28.9	0	21	PASS	1.2%	PASS
P3-L01 CLUSTER BED N28	28.9	0	21	PASS	1.1%	PASS
P3-L01 CLUSTER BED N29	28.6	0	20	PASS	1.1%	PASS
P3-L03 CLUSTER BED N1	29.6	0	24	PASS	1.3%	PASS
P3-L03 CLUSTER BED N2	29.9	0	29	PASS	1.6%	PASS
P3-L03 CLUSTER BED N3	29.5	0	23	PASS	1.3%	PASS
P3-L03 CLUSTER BED N4	29.6	0	24	PASS	1.3%	PASS
P3-L03 CLUSTER BED N5	29.6	0	24	PASS	1.4%	PASS
P3-L03 CLUSTER BED N6	29.6	0	23	PASS	1.5%	PASS
P3-L03 ACC. CLUSTER BED N1	29.6	0	25	PASS	1.6%	PASS
P3-L03 CLUSTER BED N7	29.8	0	24	PASS	1.6%	PASS
P3-L03 CLUSTER BED N8	29.7	0	24	PASS	1.4%	PASS
P3-L03 CLUSTER BED N9	29.6	0	24	PASS	1.3%	PASS
P3-L03 CLUSTER BED N10	29.8	0	29	PASS	1.6%	PASS
P3-L03 CLUSTER BED N11	29.8	0	28	PASS	1.5%	PASS
P3-L03 CLUSTER BED N12	29.5	0	23	PASS	1.3%	PASS
P3-L03 CLUSTER BED N13	29.5	0	23	PASS	1.2%	PASS
P3-L03 CLUSTER BED N14	29.5	0	23	PASS	1.3%	PASS
P3-L03 CLUSTER BED N15	29.5	0	23	PASS	1.3%	PASS
P3-L03 ACC. CLUSTER BED N3	29.1	0	23	PASS	1.2%	PASS
P3-L03 ACC. CLUSTER BED N2	29.4	0	26	PASS	1.5%	PASS
P3-L03 CLUSTER BED N16	29.5	0	25	PASS	1.4%	PASS
P3-L03 CLUSTER BED N17	29.6	0	23	PASS	1.3%	PASS
P3-L03 CLUSTER BED N18	29.6	0	23	PASS	1.3%	PASS
P3-L03 CLUSTER BED N19	29.6	0	23	PASS	1.3%	PASS
P3-L03 CLUSTER BED N20	29.7	0	25	PASS	1.3%	PASS
P3-L03 CLUSTER BED N21	29.5	0	22	PASS	1.2%	PASS
P3-L03 CLUSTER BED N22	29.8	0	22	PASS	1.3%	PASS
P3-L03 CLUSTER BED N23	29.7	0	22	PASS	1.3%	PASS
P3-L03 CLUSTER BED N24	29.5	0	20	PASS	1.1%	PASS
P3-L03 CLUSTER BED N25	29.4	0	21	PASS	1.1%	PASS
P3-L03 CLUSTER BED N26	29.3	0	20	PASS	1.0%	PASS
P3-L03 CLUSTER BED N27	29.7	0	26	PASS	1.4%	PASS
P3-L03 CLUSTER BED N28	29.9	0.1	29	PASS	1.6%	PASS
P3-L03 CLUSTER BED N29	29.5	0	23	PASS	1.2%	PASS
P3-L03 CLUSTER BED N30	29.3	0	21	PASS	1.1%	PASS
P3-L03 CLUSTER BED N31	29.4	0	21	PASS	1.1%	PASS
P3-L03 CLUSTER BED N32	29.3	0	21	PASS	1.1%	PASS
P3-L03 CLUSTER BED N33	29.2	0	22	PASS	1.2%	PASS
P3-L08 CLUSTER BED N1	29.8	0.1	27	PASS	2.2%	PASS
P3-L08 CLUSTER BED N2	29.1	0	24	PASS	1.6%	PASS
P3-L08 CLUSTER BED N3	29.2	0	23	PASS	1.6%	PASS
P3-L08 CLUSTER BED N4	29.2	0	23	PASS	1.7%	PASS
P3-L08 CLUSTER BED N5	29.2	0	23	PASS	1.7%	PASS
P3-L08 CLUSTER BED N6	29	0	23	PASS	1.7%	PASS
P3-L08 CLUSTER BED N7	29.3	0	25	PASS	1.9%	PASS
P3-L08 CLUSTER BED N8	29.3	0	25	PASS	1.8%	PASS
P3-L08 ACC. CLUSTER BED N1	29	0	26	PASS	2.0%	PASS
P3-L08 CLUSTER BED N9	29.3	0	24	PASS	1.7%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L08 CLUSTER BED N10	29.3	0	24	PASS	1.7%	PASS
P3-L08 CLUSTER BED N11	29.4	0	26	PASS	1.6%	PASS
P3-L08 CLUSTER BED N12	29.5	0	25	PASS	1.8%	PASS
P3-L08 CLUSTER BED N13	29.2	0	23	PASS	1.5%	PASS
P3-L08 CLUSTER BED N14	29.1	0	22	PASS	1.4%	PASS
P3-L08 CLUSTER BED N15	29.3	0	24	PASS	1.7%	PASS
P3-L08 CLUSTER BED N16	29.4	0	25	PASS	1.7%	PASS
P3-L08 CLUSTER BED N17	29.5	0	25	PASS	1.8%	PASS
P3-L08 CLUSTER BED N18	29.4	0	22	PASS	1.9%	PASS
P3-L08 CLUSTER BED N19	29.9	0.3	29	PASS	2.6%	PASS
P3-L08 CLUSTER BED N20	29.7	0	28	PASS	2.4%	PASS
P3-L08 CLUSTER BED N21	29.5	0	28	PASS	2.3%	PASS
P3-L08 CLUSTER BED N22	29.6	0	28	PASS	2.4%	PASS
P3-L08 CLUSTER BED N23	29.5	0	28	PASS	2.3%	PASS
P3-L08 CLUSTER BED N24	29.2	0	23	PASS	2.0%	PASS
P3-L10 CLUSTER BED N1	30.1	0.2	28	PASS	1.9%	PASS
P3-L10 CLUSTER BED N2	29.5	0	23	PASS	1.3%	PASS
P3-L10 CLUSTER BED N3	29.5	0	23	PASS	1.3%	PASS
P3-L10 CLUSTER BED N4	29.6	0	23	PASS	1.4%	PASS
P3-L10 CLUSTER BED N5	29.5	0	23	PASS	1.4%	PASS
P3-L10 CLUSTER BED N6	29.4	0	22	PASS	1.4%	PASS
P3-L10 CLUSTER BED N7	29.7	0	28	PASS	1.7%	PASS
P3-L10 CLUSTER BED N8	29.7	0	25	PASS	1.5%	PASS
P3-L10 ACC. CLUSTER BED N1	29.6	0	27	PASS	1.8%	PASS
P3-L10 CLUSTER BED N9	29.7	0	25	PASS	1.5%	PASS
P3-L10 CLUSTER BED N10	29.7	0	25	PASS	1.5%	PASS
P3-L10 CLUSTER BED N11	29.7	0	28	PASS	1.4%	PASS
P3-L11 CLUSTER BED N1	30.1	0.3	28	PASS	1.9%	PASS
P3-L11 CLUSTER BED N2	29.5	0	23	PASS	1.3%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L11 CLUSTER BED N3	29.5	0	23	PASS	1.3%	PASS
P3-L11 CLUSTER BED N4	29.6	0	23	PASS	1.4%	PASS
P3-L11 CLUSTER BED N5	29.5	0	23	PASS	1.4%	PASS
P3-L11 CLUSTER BED N6	29.4	0	22	PASS	1.4%	PASS
P3-L11 CLUSTER BED N7	29.7	0	29	PASS	1.7%	PASS
P3-L11 CLUSTER BED N8	29.7	0	25	PASS	1.5%	PASS
P3-L11 ACC. CLUSTER BED N1	29.6	0	27	PASS	1.8%	PASS
P3-L11 CLUSTER BED N9	29.7	0	25	PASS	1.5%	PASS
P3-L11 CLUSTER BED N10	29.7	0	25	PASS	1.5%	PASS
P3-L11 CLUSTER BED N11	29.7	0	28	PASS	1.4%	PASS
P3-L12 CLUSTER BED N1	30.1	0.3	29	PASS	1.9%	PASS
P3-L12 CLUSTER BED N2	29.5	0	23	PASS	1.3%	PASS
P3-L12 CLUSTER BED N3	29.5	0	23	PASS	1.3%	PASS
P3-L12 CLUSTER BED N4	29.6	0	24	PASS	1.4%	PASS
P3-L12 CLUSTER BED N5	29.5	0	23	PASS	1.4%	PASS
P3-L12 CLUSTER BED N6	29.5	0	22	PASS	1.5%	PASS
P3-L12 CLUSTER BED N7	29.7	0	29	PASS	1.7%	PASS
P3-L12 CLUSTER BED N8	29.7	0	25	PASS	1.5%	PASS
P3-L12 ACC. CLUSTER BED N1	29.6	0	27	PASS	1.8%	PASS
P3-L12 CLUSTER BED N9	29.7	0	25	PASS	1.5%	PASS
P3-L12 CLUSTER BED N10	29.7	0	25	PASS	1.5%	PASS
P3-L12 CLUSTER BED N11	29.8	0	28	PASS	1.5%	PASS
P3-L13 CLUSTER BED N1	30.1	0.3	29	PASS	1.9%	PASS
P3-L13 CLUSTER BED N2	29.5	0	23	PASS	1.3%	PASS
P3-L13 CLUSTER BED N3	29.5	0	23	PASS	1.3%	PASS
P3-L13 CLUSTER BED N4	29.6	0	23	PASS	1.4%	PASS
P3-L13 CLUSTER BED N5	29.5	0	23	PASS	1.4%	PASS
P3-L13 CLUSTER BED N6	29.5	0	22	PASS	1.5%	PASS
P3-L13 CLUSTER BED N7	29.7	0	29	PASS	1.7%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L13 CLUSTER BED N8	29.7	0	25	PASS	1.5%	PASS
P3-L13 ACC. CLUSTER BED N1	29.6	0	27	PASS	1.8%	PASS
P3-L13 CLUSTER BED N9	29.7	0	25	PASS	1.5%	PASS
P3-L13 CLUSTER BED N10	29.7	0	25	PASS	1.5%	PASS
P3-L13 CLUSTER BED N11	29.8	0	28	PASS	1.5%	PASS
P3-L14 CLUSTER BED N1	30.1	0.3	28	PASS	1.9%	PASS
P3-L14 CLUSTER BED N2	29.5	0	23	PASS	1.3%	PASS
P3-L14 CLUSTER BED N3	29.5	0	23	PASS	1.3%	PASS
P3-L14 CLUSTER BED N4	29.7	0	24	PASS	1.5%	PASS
P3-L14 CLUSTER BED N5	29.6	0	23	PASS	1.4%	PASS
P3-L14 CLUSTER BED N6	29.5	0	22	PASS	1.5%	PASS
P3-L14 CLUSTER BED N7	29.7	0	29	PASS	1.7%	PASS
P3-L14 CLUSTER BED N8	29.7	0	25	PASS	1.5%	PASS
P3-L14 ACC. CLUSTER BED N1	29.6	0	27	PASS	1.8%	PASS
P3-L14 CLUSTER BED N9	29.7	0	25	PASS	1.5%	PASS
P3-L14 CLUSTER BED N10	29.7	0	25	PASS	1.5%	PASS
P3-L14 CLUSTER BED N11	29.8	0	29	PASS	1.5%	PASS
P3-L15 CLUSTER BED N1	30.1	0.3	29	PASS	1.9%	PASS
P3-L15 CLUSTER BED N2	29.5	0	23	PASS	1.3%	PASS
P3-L15 CLUSTER BED N3	29.5	0	23	PASS	1.3%	PASS
P3-L15 CLUSTER BED N4	29.7	0	25	PASS	1.5%	PASS
P3-L15 CLUSTER BED N5	29.6	0	24	PASS	1.4%	PASS
P3-L15 CLUSTER BED N6	29.5	0	22	PASS	1.5%	PASS
P3-L15 CLUSTER BED N7	29.7	0	29	PASS	1.8%	PASS
P3-L15 CLUSTER BED N8	29.7	0	25	PASS	1.6%	PASS
P3-L15 ACC. CLUSTER BED N1	29.6	0	28	PASS	1.9%	PASS
P3-L15 CLUSTER BED N9	29.7	0	25	PASS	1.5%	PASS
P3-L15 CLUSTER BED N10	29.7	0	25	PASS	1.5%	PASS
P3-L15 CLUSTER BED N11	29.8	0	29	PASS	1.5%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L16 CLUSTER BED N1	30.1	0.3	29	PASS	1.9%	PASS
P3-L16 CLUSTER BED N2	29.5	0	23	PASS	1.3%	PASS
P3-L16 CLUSTER BED N3	29.5	0	23	PASS	1.3%	PASS
P3-L16 CLUSTER BED N4	29.7	0	25	PASS	1.5%	PASS
P3-L16 CLUSTER BED N5	29.6	0	25	PASS	1.4%	PASS
P3-L16 CLUSTER BED N6	29.5	0	23	PASS	1.5%	PASS
P3-L16 CLUSTER BED N7	29.7	0	30	PASS	1.8%	PASS
P3-L16 CLUSTER BED N8	29.7	0	25	PASS	1.6%	PASS
P3-L16 ACC. CLUSTER BED N1	29.6	0	28	PASS	1.9%	PASS
P3-L16 CLUSTER BED N9	29.7	0	25	PASS	1.6%	PASS
P3-L16 CLUSTER BED N10	29.7	0	25	PASS	1.5%	PASS
P3-L16 CLUSTER BED N11	29.8	0	29	PASS	1.5%	PASS
P3-L17 CLUSTER BED N1	30.1	0.3	29	PASS	2.0%	PASS
P3-L17 CLUSTER BED N2	29.5	0	23	PASS	1.4%	PASS
P3-L17 CLUSTER BED N3	29.5	0	23	PASS	1.4%	PASS
P3-L17 CLUSTER BED N4	29.7	0	25	PASS	1.5%	PASS
P3-L17 CLUSTER BED N5	29.6	0	24	PASS	1.5%	PASS
P3-L17 CLUSTER BED N6	29.5	0	24	PASS	1.6%	PASS
P3-L17 CLUSTER BED N7	29.7	0	30	PASS	1.8%	PASS
P3-L17 CLUSTER BED N8	29.7	0	26	PASS	1.6%	PASS
P3-L17 ACC. CLUSTER BED N1	29.6	0	28	PASS	1.9%	PASS
P3-L17 CLUSTER BED N9	29.7	0	26	PASS	1.6%	PASS
P3-L17 CLUSTER BED N10	29.7	0	26	PASS	1.6%	PASS
P3-L17 CLUSTER BED N11	29.8	0	30	PASS	1.5%	PASS
P3-L18 CLUSTER BED N1	30	0.2	28	PASS	2.0%	PASS
P3-L18 CLUSTER BED N2	29.5	0	23	PASS	1.4%	PASS
P3-L18 CLUSTER BED N3	29.5	0	23	PASS	1.4%	PASS
P3-L18 CLUSTER BED N4	29.6	0	24	PASS	1.6%	PASS
P3-L18 CLUSTER BED N5	29.5	0	24	PASS	1.5%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L18 CLUSTER BED N6	29.5	0	23	PASS	1.6%	PASS
P3-L18 CLUSTER BED N7	29.7	0	28	PASS	1.9%	PASS
P3-L18 CLUSTER BED N8	29.6	0	27	PASS	1.7%	PASS
P3-L18 ACC. CLUSTER BED N1	29.5	0	28	PASS	1.9%	PASS
P3-L18 CLUSTER BED N9	29.6	0	26	PASS	1.7%	PASS
P3-L18 CLUSTER BED N10	29.6	0	26	PASS	1.7%	PASS
P3-L18 CLUSTER BED N11	29.7	0	28	PASS	1.6%	PASS
P3-L09 CLUSTER BED N1	29.8	0	30	PASS	1.6%	PASS
P3-L09 CLUSTER BED N2	29.5	0	23	PASS	1.2%	PASS
P3-L09 CLUSTER BED N3	29.5	0	24	PASS	1.2%	PASS
P3-L09 CLUSTER BED N4	29.6	0	24	PASS	1.3%	PASS
P3-L09 CLUSTER BED N5	29.8	0	25	PASS	1.5%	PASS
P3-L09 CLUSTER BED N6	29.8	0	25	PASS	1.6%	PASS
P3-L09 CLUSTER BED N7	29.7	0	23	PASS	1.6%	PASS
P3-L09 CLUSTER BED N8	30.3	0.4	32	PASS	2.4%	PASS
P3-L09 CLUSTER BED N9	30	0.2	31	PASS	2.2%	PASS
P3-L09 CLUSTER BED N10	29.9	0	30	PASS	2.1%	PASS
P3-L09 CLUSTER BED N11	30	0.1	30	PASS	2.2%	PASS
P3-L09 CLUSTER BED N12	29.9	0	30	PASS	2.1%	PASS
P3-L09 CLUSTER BED N13	29.6	0	24	PASS	1.7%	PASS
P3-L10 CLUSTER BED N12	30	0.2	30	PASS	1.8%	PASS
P3-L10 CLUSTER BED N13	29.7	0	25	PASS	1.5%	PASS
P3-L10 CLUSTER BED N14	29.8	0	24	PASS	1.4%	PASS
P3-L10 CLUSTER BED N15	29.9	0	26	PASS	1.6%	PASS
P3-L10 CLUSTER BED N16	30.1	0.1	27	PASS	1.8%	PASS
P3-L10 CLUSTER BED N17	30.1	0.1	26	PASS	1.8%	PASS
P3-L10 CLUSTER BED N18	29.9	0	23	PASS	1.7%	PASS
P3-L10 CLUSTER BED N19	30.3	0.4	32	PASS	2.4%	PASS
P3-L10 CLUSTER BED N20	30.1	0.2	30	PASS	2.2%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L10 CLUSTER BED N21	30	0.1	30	PASS	2.1%	PASS
P3-L10 CLUSTER BED N22	30	0.1	30	PASS	2.1%	PASS
P3-L10 CLUSTER BED N23	30	0	30	PASS	2.1%	PASS
P3-L10 CLUSTER BED N24	29.6	0	24	PASS	1.7%	PASS
P3-L11 CLUSTER BED N12	30	0.3	30	PASS	1.9%	PASS
P3-L11 CLUSTER BED N13	29.8	0	27	PASS	1.6%	PASS
P3-L11 CLUSTER BED N14	29.9	0	27	PASS	1.6%	PASS
P3-L11 CLUSTER BED N15	30	0	27	PASS	1.7%	PASS
P3-L11 CLUSTER BED N16	30.1	0.1	28	PASS	1.8%	PASS
P3-L11 CLUSTER BED N17	30	0	26	PASS	1.8%	PASS
P3-L11 CLUSTER BED N18	29.8	0	23	PASS	1.7%	PASS
P3-L11 CLUSTER BED N19	30.3	0.4	32	PASS	2.4%	PASS
P3-L11 CLUSTER BED N20	30.1	0.2	30	PASS	2.2%	PASS
P3-L11 CLUSTER BED N21	29.9	0.1	30	PASS	2.1%	PASS
P3-L11 CLUSTER BED N22	30	0.1	30	PASS	2.1%	PASS
P3-L11 CLUSTER BED N23	29.9	0	30	PASS	2.1%	PASS
P3-L11 CLUSTER BED N24	29.6	0	24	PASS	1.6%	PASS
P3-L12 CLUSTER BED N12	30.3	0.4	30	PASS	2.2%	PASS
P3-L12 CLUSTER BED N13	30.1	0.2	28	PASS	1.8%	PASS
P3-L12 CLUSTER BED N14	30.1	0.1	29	PASS	1.8%	PASS
P3-L12 CLUSTER BED N15	30.2	0.2	28	PASS	1.9%	PASS
P3-L12 CLUSTER BED N16	30.1	0.1	29	PASS	1.9%	PASS
P3-L12 CLUSTER BED N17	30.1	0.1	27	PASS	1.9%	PASS
P3-L12 CLUSTER BED N18	29.9	0	23	PASS	1.7%	PASS
P3-L12 CLUSTER BED N19	30.3	0.4	32	PASS	2.5%	PASS
P3-L12 CLUSTER BED N20	30.1	0.2	30	PASS	2.2%	PASS
P3-L12 CLUSTER BED N21	30	0.1	30	PASS	2.1%	PASS
P3-L12 CLUSTER BED N22	30	0.1	30	PASS	2.2%	PASS
P3-L12 CLUSTER BED N23	30	0	30	PASS	2.1%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L12 CLUSTER BED N24	29.6	0	24	PASS	1.6%	PASS
P3-L13 CLUSTER BED N12	30.4	0.4	32	PASS	2.2%	PASS
P3-L13 CLUSTER BED N13	30.2	0.3	30	PASS	2.0%	PASS
P3-L13 CLUSTER BED N14	30.1	0	28	PASS	1.8%	PASS
P3-L13 CLUSTER BED N15	30.1	0.2	30	PASS	2.0%	PASS
P3-L13 CLUSTER BED N16	30.1	0.1	29	PASS	1.9%	PASS
P3-L13 CLUSTER BED N17	30	0	27	PASS	1.8%	PASS
P3-L13 CLUSTER BED N18	29.8	0	22	PASS	1.6%	PASS
P3-L13 CLUSTER BED N19	30.3	0.4	32	PASS	2.4%	PASS
P3-L13 CLUSTER BED N20	30.1	0.2	30	PASS	2.2%	PASS
P3-L13 CLUSTER BED N21	29.9	0.1	30	PASS	2.1%	PASS
P3-L13 CLUSTER BED N22	30	0.1	30	PASS	2.1%	PASS
P3-L13 CLUSTER BED N23	29.9	0	30	PASS	2.1%	PASS
P3-L13 CLUSTER BED N24	29.6	0	24	PASS	1.6%	PASS
P3-L14 CLUSTER BED N12	30.5	0.4	32	PASS	2.3%	PASS
P3-L14 CLUSTER BED N13	30.3	0.3	30	PASS	2.1%	PASS
P3-L14 CLUSTER BED N14	30.1	0.1	30	PASS	2.0%	PASS
P3-L14 CLUSTER BED N15	30.2	0.2	30	PASS	2.1%	PASS
P3-L14 CLUSTER BED N16	30.1	0.2	30	PASS	2.0%	PASS
P3-L14 CLUSTER BED N17	30.1	0.1	29	PASS	1.9%	PASS
P3-L14 CLUSTER BED N18	29.9	0	23	PASS	1.7%	PASS
P3-L14 CLUSTER BED N19	30.4	0.4	32	PASS	2.5%	PASS
P3-L14 CLUSTER BED N20	30.1	0.2	30	PASS	2.2%	PASS
P3-L14 CLUSTER BED N21	30	0.1	30	PASS	2.1%	PASS
P3-L14 CLUSTER BED N22	30	0.1	30	PASS	2.2%	PASS
P3-L14 CLUSTER BED N23	30	0.1	30	PASS	2.1%	PASS
P3-L14 CLUSTER BED N24	29.6	0	24	PASS	1.6%	PASS
P3-L15 CLUSTER BED N12	30.4	0.4	32	PASS	2.2%	PASS
P3-L15 CLUSTER BED N13	30.2	0.3	30	PASS	2.1%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L15 CLUSTER BED N14	30.1	0.1	29	PASS	1.8%	PASS
P3-L15 CLUSTER BED N15	30.2	0.2	30	PASS	2.0%	PASS
P3-L15 CLUSTER BED N16	30.1	0.1	29	PASS	1.9%	PASS
P3-L15 CLUSTER BED N17	30.1	0.1	29	PASS	1.8%	PASS
P3-L15 CLUSTER BED N18	29.8	0	22	PASS	1.6%	PASS
P3-L15 CLUSTER BED N19	30.3	0.4	32	PASS	2.4%	PASS
P3-L15 CLUSTER BED N20	30.1	0.2	30	PASS	2.2%	PASS
P3-L15 CLUSTER BED N21	29.9	0.1	30	PASS	2.1%	PASS
P3-L15 CLUSTER BED N22	30	0.1	30	PASS	2.2%	PASS
P3-L15 CLUSTER BED N23	30	0	30	PASS	2.1%	PASS
P3-L15 CLUSTER BED N24	29.6	0	24	PASS	1.6%	PASS
P3-L16 CLUSTER BED N12	30.5	0.4	32	PASS	2.3%	PASS
P3-L16 CLUSTER BED N13	30.3	0.3	30	PASS	2.1%	PASS
P3-L16 CLUSTER BED N14	30.1	0.1	29	PASS	1.9%	PASS
P3-L16 CLUSTER BED N15	30.2	0.2	30	PASS	2.1%	PASS
P3-L16 CLUSTER BED N16	30.1	0.2	29	PASS	2.0%	PASS
P3-L16 CLUSTER BED N17	30.1	0.1	29	PASS	1.9%	PASS
P3-L16 CLUSTER BED N18	29.9	0	23	PASS	1.7%	PASS
P3-L16 CLUSTER BED N19	30.4	0.4	32	PASS	2.5%	PASS
P3-L16 CLUSTER BED N20	30.1	0.2	30	PASS	2.2%	PASS
P3-L16 CLUSTER BED N21	30	0.1	30	PASS	2.1%	PASS
P3-L16 CLUSTER BED N22	30	0.1	30	PASS	2.2%	PASS
P3-L16 CLUSTER BED N23	30	0.1	30	PASS	2.1%	PASS
P3-L16 CLUSTER BED N24	29.6	0	24	PASS	1.7%	PASS
P3-L17 CLUSTER BED N12	30.4	0.4	32	PASS	2.2%	PASS
P3-L17 CLUSTER BED N13	30.2	0.3	30	PASS	2.1%	PASS
P3-L17 CLUSTER BED N14	30.1	0.1	29	PASS	1.9%	PASS
P3-L17 CLUSTER BED N15	30.2	0.2	30	PASS	2.1%	PASS
P3-L17 CLUSTER BED N16	30.1	0.1	29	PASS	1.9%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L17 CLUSTER BED N17	30	0	28	PASS	1.8%	PASS
P3-L17 CLUSTER BED N18	29.8	0	23	PASS	1.6%	PASS
P3-L17 CLUSTER BED N19	30.4	0.4	32	PASS	2.4%	PASS
P3-L17 CLUSTER BED N20	30.1	0.2	30	PASS	2.2%	PASS
P3-L17 CLUSTER BED N21	30	0.1	30	PASS	2.1%	PASS
P3-L17 CLUSTER BED N22	30	0.1	30	PASS	2.2%	PASS
P3-L17 CLUSTER BED N23	30	0.1	30	PASS	2.1%	PASS
P3-L17 CLUSTER BED N24	29.6	0	24	PASS	1.6%	PASS
P3-L18 CLUSTER BED N12	30.5	0.4	32	PASS	2.3%	PASS
P3-L18 CLUSTER BED N13	30.3	0.3	30	PASS	2.1%	PASS
P3-L18 CLUSTER BED N14	30.1	0.1	30	PASS	2.0%	PASS
P3-L18 CLUSTER BED N15	30.2	0.3	30	PASS	2.1%	PASS
P3-L18 CLUSTER BED N16	30.2	0.2	30	PASS	2.0%	PASS
P3-L18 CLUSTER BED N17	30.1	0.1	29	PASS	1.8%	PASS
P3-L18 CLUSTER BED N18	29.9	0	23	PASS	1.7%	PASS
P3-L18 CLUSTER BED N19	30.4	0.4	32	PASS	2.5%	PASS
P3-L18 CLUSTER BED N20	30.1	0.2	30	PASS	2.2%	PASS
P3-L18 CLUSTER BED N21	30	0.1	30	PASS	2.1%	PASS
P3-L18 CLUSTER BED N22	30	0.2	30	PASS	2.2%	PASS
P3-L18 CLUSTER BED N23	30	0.1	30	PASS	2.1%	PASS
P3-L18 CLUSTER BED N24	29.7	0	24	PASS	1.7%	PASS
P3-L19 CLUSTER BED N1	30.4	0.4	32	PASS	2.3%	PASS
P3-L19 CLUSTER BED N2	30.3	0.3	30	PASS	2.1%	PASS
P3-L19 CLUSTER BED N3	30.1	0.1	30	PASS	1.9%	PASS
P3-L19 CLUSTER BED N4	30.2	0.2	30	PASS	2.1%	PASS
P3-L19 CLUSTER BED N5	30.1	0.1	30	PASS	2.0%	PASS
P3-L19 CLUSTER BED N6	30	0	29	PASS	1.8%	PASS
P3-L19 CLUSTER BED N7	29.8	0	23	PASS	1.7%	PASS
P3-L19 CLUSTER BED N8	30.4	0.4	32	PASS	2.4%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L19 CLUSTER BED N9	30.1	0.2	30	PASS	2.2%	PASS
P3-L19 CLUSTER BED N10	30	0.1	30	PASS	2.1%	PASS
P3-L19 CLUSTER BED N11	30	0.1	30	PASS	2.2%	PASS
P3-L19 CLUSTER BED N12	30	0.1	30	PASS	2.1%	PASS
P3-L19 CLUSTER BED N13	29.6	0	24	PASS	1.7%	PASS
P3-L20 CLUSTER BED N1	30.5	0.4	32	PASS	2.4%	PASS
P3-L20 CLUSTER BED N2	30.3	0.3	30	PASS	2.1%	PASS
P3-L20 CLUSTER BED N3	30.2	0.2	30	PASS	2.0%	PASS
P3-L20 CLUSTER BED N4	30.3	0.3	30	PASS	2.1%	PASS
P3-L20 CLUSTER BED N5	30.2	0.2	30	PASS	2.0%	PASS
P3-L20 CLUSTER BED N6	30.1	0.1	30	PASS	2.0%	PASS
P3-L20 CLUSTER BED N7	29.9	0	24	PASS	1.8%	PASS
P3-L20 CLUSTER BED N8	30.4	0.4	32	PASS	2.5%	PASS
P3-L20 CLUSTER BED N9	30.1	0.2	30	PASS	2.3%	PASS
P3-L20 CLUSTER BED N10	30	0.1	30	PASS	2.1%	PASS
P3-L20 CLUSTER BED N11	30	0.2	30	PASS	2.2%	PASS
P3-L20 CLUSTER BED N12	30	0.1	30	PASS	2.1%	PASS
P3-L20 CLUSTER BED N13	29.7	0	24	PASS	1.7%	PASS
P3-L21 CLUSTER BED N1	30.4	0.4	31	PASS	2.4%	PASS
P3-L21 CLUSTER BED N2	30.2	0.3	28	PASS	2.1%	PASS
P3-L21 CLUSTER BED N3	30	0	28	PASS	1.9%	PASS
P3-L21 CLUSTER BED N4	30.2	0.2	28	PASS	2.1%	PASS
P3-L21 CLUSTER BED N5	30.1	0.1	28	PASS	2.0%	PASS
P3-L21 CLUSTER BED N6	30	0	28	PASS	1.9%	PASS
P3-L21 CLUSTER BED N7	29.9	0	24	PASS	1.8%	PASS
P3-L21 CLUSTER BED N8	30.2	0.4	32	PASS	2.5%	PASS
P3-L21 CLUSTER BED N9	30	0.1	29	PASS	2.3%	PASS
P3-L21 CLUSTER BED N10	29.8	0	30	PASS	2.1%	PASS
P3-L21 CLUSTER BED N11	29.9	0	28	PASS	2.2%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L21 CLUSTER BED N12	29.8	0	28	PASS	2.1%	PASS
P3-L21 CLUSTER BED N13	29.6	0	23	PASS	1.7%	PASS
P3-L04 CLUSTER BED N1	29.7	0	24	PASS	1.4%	PASS
P3-L04 CLUSTER BED N2	30	0	30	PASS	1.8%	PASS
P3-L04 CLUSTER BED N3	29.6	0	24	PASS	1.5%	PASS
P3-L04 CLUSTER BED N4	29.8	0	25	PASS	1.6%	PASS
P3-L04 CLUSTER BED N5	29.8	0	25	PASS	1.6%	PASS
P3-L04 CLUSTER BED N6	29.6	0	23	PASS	1.6%	PASS
P3-L04 ACC. CLUSTER BED N1	29.7	0	27	PASS	1.6%	PASS
P3-L04 CLUSTER BED N7	29.8	0	25	PASS	1.6%	PASS
P3-L04 CLUSTER BED N8	29.7	0	24	PASS	1.5%	PASS
P3-L04 CLUSTER BED N9	29.6	0	24	PASS	1.4%	PASS
P3-L04 CLUSTER BED N10	29.9	0	29	PASS	1.6%	PASS
P3-L04 CLUSTER BED N11	29.8	0	28	PASS	1.5%	PASS
P3-L04 CLUSTER BED N12	29.6	0	23	PASS	1.3%	PASS
P3-L04 CLUSTER BED N13	29.5	0	23	PASS	1.2%	PASS
P3-L04 CLUSTER BED N14	29.5	0	23	PASS	1.3%	PASS
P3-L04 CLUSTER BED N15	29.5	0	23	PASS	1.3%	PASS
P3-L04 ACC. CLUSTER BED N3	29.1	0	23	PASS	1.2%	PASS
P3-L04 ACC. CLUSTER BED N2	29.5	0	27	PASS	1.6%	PASS
P3-L04 CLUSTER BED N16	29.6	0	25	PASS	1.5%	PASS
P3-L04 CLUSTER BED N17	29.6	0	24	PASS	1.4%	PASS
P3-L04 CLUSTER BED N18	29.6	0	23	PASS	1.3%	PASS
P3-L04 CLUSTER BED N19	29.6	0	23	PASS	1.3%	PASS
P3-L04 CLUSTER BED N20	29.7	0	25	PASS	1.3%	PASS
P3-L04 CLUSTER BED N21	29.6	0	22	PASS	1.3%	PASS
P3-L04 CLUSTER BED N22	29.9	0	23	PASS	1.4%	PASS
P3-L04 CLUSTER BED N23	29.9	0	23	PASS	1.4%	PASS
P3-L04 CLUSTER BED N24	29.7	0	22	PASS	1.2%	PASS
P3-L04 CLUSTER BED N25	29.6	0	22	PASS	1.2%	PASS
P3-L04 CLUSTER BED N26	29.4	0	20	PASS	1.1%	PASS
P3-L04 CLUSTER BED N27	29.8	0	28	PASS	1.4%	PASS
P3-L04 CLUSTER BED N28	29.9	0.1	30	PASS	1.7%	PASS
P3-L04 CLUSTER BED N29	29.5	0	23	PASS	1.3%	PASS
P3-L04 CLUSTER BED N30	29.4	0	22	PASS	1.1%	PASS
P3-L04 CLUSTER BED N31	29.4	0	22	PASS	1.2%	PASS
P3-L04 CLUSTER BED N32	29.4	0	23	PASS	1.2%	PASS
P3-L04 CLUSTER BED N33	29.4	0	22	PASS	1.4%	PASS
P3-L05 CLUSTER BED N1	29.8	0	26	PASS	1.6%	PASS
P3-L05 CLUSTER BED N2	30	0	29	PASS	1.9%	PASS
P3-L05 CLUSTER BED N3	29.7	0	24	PASS	1.6%	PASS
P3-L05 CLUSTER BED N4	29.8	0	26	PASS	1.6%	PASS
P3-L05 CLUSTER BED N5	29.7	0	26	PASS	1.7%	PASS
P3-L05 CLUSTER BED N6	29.6	0	23	PASS	1.7%	PASS
P3-L05 ACC. CLUSTER BED N1	29.7	0	25	PASS	1.7%	PASS
P3-L05 CLUSTER BED N7	29.8	0	24	PASS	1.6%	PASS
P3-L05 CLUSTER BED N8	29.7	0	24	PASS	1.5%	PASS
P3-L05 CLUSTER BED N9	29.6	0	22	PASS	1.4%	PASS
P3-L05 CLUSTER BED N10	29.9	0	29	PASS	1.7%	PASS
P3-L05 CLUSTER BED N11	29.8	0	28	PASS	1.5%	PASS
P3-L05 CLUSTER BED N12	29.5	0	23	PASS	1.3%	PASS
P3-L05 CLUSTER BED N13	29.5	0	23	PASS	1.2%	PASS
P3-L05 CLUSTER BED N14	29.5	0	23	PASS	1.3%	PASS
P3-L05 CLUSTER BED N15	29.5	0	23	PASS	1.3%	PASS
P3-L05 ACC. CLUSTER BED N3	29.1	0	23	PASS	1.2%	PASS
P3-L05 ACC. CLUSTER BED N2	29.5	0	26	PASS	1.7%	PASS
P3-L05 CLUSTER BED N16	29.6	0	25	PASS	1.5%	PASS
P3-L05 CLUSTER BED N17	29.6	0	23	PASS	1.4%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L05 CLUSTER BED N18	29.5	0	23	PASS	1.4%	PASS
P3-L05 CLUSTER BED N19	29.5	0	23	PASS	1.3%	PASS
P3-L05 CLUSTER BED N20	29.7	0	25	PASS	1.3%	PASS
P3-L05 CLUSTER BED N21	29.5	0	22	PASS	1.3%	PASS
P3-L05 CLUSTER BED N22	29.9	0	24	PASS	1.5%	PASS
P3-L05 CLUSTER BED N23	29.9	0	24	PASS	1.5%	PASS
P3-L05 CLUSTER BED N24	29.6	0	23	PASS	1.2%	PASS
P3-L05 CLUSTER BED N25	29.6	0	21	PASS	1.2%	PASS
P3-L05 CLUSTER BED N26	29.4	0	22	PASS	1.2%	PASS
P3-L05 CLUSTER BED N27	29.8	0	27	PASS	1.5%	PASS
P3-L05 CLUSTER BED N28	29.9	0.1	29	PASS	1.7%	PASS
P3-L05 CLUSTER BED N29	29.6	0	23	PASS	1.3%	PASS
P3-L05 CLUSTER BED N30	29.4	0	23	PASS	1.2%	PASS
P3-L05 CLUSTER BED N31	29.5	0	23	PASS	1.3%	PASS
P3-L05 CLUSTER BED N32	29.5	0	23	PASS	1.3%	PASS
P3-L05 CLUSTER BED N33	29.4	0	23	PASS	1.4%	PASS
P3-L06 CLUSTER BED N1	29.2	0	27	PASS	1.7%	PASS
P3-L06 CLUSTER BED N2	29.7	0	29	PASS	2.0%	PASS
P3-L06 CLUSTER BED N3	29.2	0	25	PASS	1.7%	PASS
P3-L06 CLUSTER BED N4	29.3	0	25	PASS	1.7%	PASS
P3-L06 CLUSTER BED N5	29.2	0	25	PASS	1.7%	PASS
P3-L06 CLUSTER BED N6	29	0	24	PASS	1.7%	PASS
P3-L06 ACC. CLUSTER BED N1	29.3	0	23	PASS	1.5%	PASS
P3-L06 CLUSTER BED N7	29.4	0	23	PASS	1.3%	PASS
P3-L06 CLUSTER BED N8	29.4	0	22	PASS	1.2%	PASS
P3-L06 CLUSTER BED N9	29.3	0	22	PASS	1.1%	PASS
P3-L06 CLUSTER BED N10	29.6	0	28	PASS	1.5%	PASS
P3-L06 CLUSTER BED N11	29.5	0	24	PASS	1.3%	PASS
P3-L06 CLUSTER BED N12	29.2	0	22	PASS	1.1%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L06 CLUSTER BED N13	29.1	0	22	PASS	1.1%	PASS
P3-L06 CLUSTER BED N14	29.1	0	22	PASS	1.1%	PASS
P3-L06 CLUSTER BED N15	29.1	0	22	PASS	1.1%	PASS
P3-L06 ACC. CLUSTER BED N3	28.8	0	22	PASS	1.1%	PASS
P3-L06 ACC. CLUSTER BED N2	28.9	0	26	PASS	1.6%	PASS
P3-L06 CLUSTER BED N16	29.1	0	26	PASS	1.5%	PASS
P3-L06 CLUSTER BED N17	29.1	0	25	PASS	1.4%	PASS
P3-L06 CLUSTER BED N18	29.1	0	25	PASS	1.4%	PASS
P3-L06 CLUSTER BED N19	29.1	0	25	PASS	1.4%	PASS
P3-L06 CLUSTER BED N20	29.3	0	27	PASS	1.4%	PASS
P3-L06 CLUSTER BED N21	29	0	21	PASS	1.3%	PASS
P3-L06 CLUSTER BED N22	29.3	0	24	PASS	1.6%	PASS
P3-L06 CLUSTER BED N23	29.3	0	25	PASS	1.5%	PASS
P3-L06 CLUSTER BED N24	29.1	0	24	PASS	1.4%	PASS
P3-L06 CLUSTER BED N25	29	0	22	PASS	1.2%	PASS
P3-L06 CLUSTER BED N26	29	0	21	PASS	1.2%	PASS
P3-L06 CLUSTER BED N27	29.5	0	29	PASS	1.6%	PASS
P3-L06 CLUSTER BED N28	29.6	0	29	PASS	1.8%	PASS
P3-L06 CLUSTER BED N29	29.2	0	26	PASS	1.5%	PASS
P3-L06 CLUSTER BED N30	29	0	23	PASS	1.3%	PASS
P3-L06 CLUSTER BED N31	29.1	0	24	PASS	1.4%	PASS
P3-L06 CLUSTER BED N32	29	0	24	PASS	1.4%	PASS
P3-L06 CLUSTER BED N33	28.9	0	24	PASS	1.5%	PASS
P3-L09 CLUSTER BED N14	29.7	0	28	PASS	1.5%	PASS
P3-L09 CLUSTER BED N15	29.6	0	24	PASS	1.5%	PASS
P3-L09 CLUSTER BED N16	29.6	0	24	PASS	1.5%	PASS
P3-L09 ACC. CLUSTER BED N1	29.5	0	28	PASS	1.8%	PASS
P3-L09 CLUSTER BED N17	29.6	0	25	PASS	1.5%	PASS
P3-L09 CLUSTER BED N18	29.6	0	27	PASS	1.7%	PASS

		Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Maximum operative temperature (°C)	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L09 CLUSTER BED N19	29.4	0	23	PASS	1.5%	PASS
P3-L09 CLUSTER BED N20	29.5	0	24	PASS	1.4%	PASS
P3-L09 CLUSTER BED N21	29.6	0	24	PASS	1.5%	PASS
P3-L09 CLUSTER BED N22	29.5	0	23	PASS	1.4%	PASS
P3-L09 CLUSTER BED N23	29.5	0	23	PASS	1.3%	PASS
P3-L09 CLUSTER BED N24	30	0.2	29	PASS	2.0%	PASS

Table A.14 TM59 overheating results for living/kitchen spaces in Plot 3 under the DSY1 2020 weather file.

		Natural ventilation criteria		Mechanical ventilation criteria	
Room Name	Maximum operative temperature (°C)	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
P3-L18 CLUSTER LIVING/KITCHEN N2	33.6	3	PASS	6.7%	FAIL
P3-L18 CLUSTER LIVING/KITCHEN N1	33.5	2.6	PASS	6.0%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N4	32.1	1.6	PASS	6.0%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N3	32.6	2	PASS	6.0%	FAIL
P3-L21 CLUSTER LIVING/KITCHEN N2	33.2	2.8	PASS	7.4%	FAIL
P3-L21 CLUSTER LIVING/KITCHEN N1	33.2	2.8	PASS	7.3%	FAIL
P3-L20 CLUSTER LIVING/KITCHEN N2	33.3	2.9	PASS	7.2%	FAIL
P3-L20 CLUSTER LIVING/KITCHEN N1	33.3	2.8	PASS	7.3%	FAIL
P3-L19 CLUSTER LIVING/KITCHEN N2	33.2	2.7	PASS	7.0%	FAIL
P3-L19 CLUSTER LIVING/KITCHEN N1	33.2	2.8	PASS	7.0%	FAIL
P3-L18 CLUSTER LIVING/KITCHEN N4	33.2	2.9	PASS	7.2%	FAIL
P3-L18 CLUSTER LIVING/KITCHEN N3	33.2	2.8	PASS	7.2%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N2	33.7	3	PASS	6.6%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N1	33.5	2.6	PASS	5.9%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N2	33.7	3	PASS	6.6%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N1	33.5	2.5	PASS	5.8%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N4	33.2	2.7	PASS	7.1%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N3	33.2	2.7	PASS	7.0%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N4	32.4	2	PASS	6.2%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N3	32.8	2.2	PASS	6.2%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N4	33.2	2.9	PASS	7.2%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N3	33.2	2.8	PASS	7.2%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N4	32.4	1.9	PASS	6.2%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N3	32.8	2.2	PASS	6.1%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N2	33.7	3	PASS	6.6%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N1	33.5	2.5	PASS	5.8%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N2	33.7	3	PASS	6.5%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N1	33.5	2.5	PASS	5.8%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N4	32.3	1.9	PASS	6.0%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N3	32.8	2.2	PASS	6.1%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N4	33.2	2.7	PASS	7.1%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N3	33.2	2.7	PASS	6.9%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N4	33.2	2.9	PASS	7.1%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N3	33.2	2.8	PASS	7.2%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N3	32.8	2.2	PASS	6.1%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N4	31.9	1.4	PASS	5.7%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N2	33.7	3	PASS	6.5%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N1	33.5	2.4	PASS	5.8%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N3	32.4	2	PASS	6.2%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N4	33.1	2.5	PASS	6.9%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N3	33.2	2.7	PASS	6.9%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N2	33.7	3	PASS	6.6%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N1	33.5	2.4	PASS	5.8%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N4	33	2.5	PASS	7.0%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N3	33.2	2.8	PASS	7.2%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N2	33.7	3	PASS	6.6%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N1	33.5	2.4	PASS	5.8%	FAIL

		Natural ventilation criteria		Mechanical ventilation criteria	
Room Name	Maximum operative temperature (°C)	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
P3-L11 CLUSTER LIVING/KITCHEN N4	32.9	2.4	PASS	6.7%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N3	33.2	2.7	PASS	6.9%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N2	33.6	3	PASS	6.6%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N1	33.5	2.4	PASS	5.8%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N4	32.9	2.4	PASS	6.8%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N3	33.2	2.8	PASS	7.2%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N3	33.6	3	PASS	6.6%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N4	33.4	2.4	PASS	5.8%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N2	33.2	2.7	PASS	6.5%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N1	33.1	2.3	PASS	5.8%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N2	32.8	2.3	PASS	6.6%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N1	33.1	2.8	PASS	6.9%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N4	32.3	2.2	PASS	7.0%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N3	32.7	2.5	PASS	7.3%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N2	32.5	2.1	PASS	6.5%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N1	32.8	2.4	PASS	6.9%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N5	32.9	2.5	PASS	6.6%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N6	33.3	2.4	PASS	5.7%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N2	32.7	2.1	PASS	6.2%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N1	33	2.5	PASS	6.7%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N5	33.1	2.4	PASS	6.3%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N6	33.3	2.4	PASS	5.5%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N2	32.7	2	PASS	6.1%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N1	33	2.5	PASS	6.6%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N5	33	2.4	PASS	6.2%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N6	33.3	2.4	PASS	5.6%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N2	32.6	1.9	PASS	6.1%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N1	33	2.4	PASS	6.6%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N5	32.9	2.2	PASS	6.0%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N6	33.2	2.3	PASS	5.5%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N2	32.6	1.9	PASS	6.2%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N1	33	2.4	PASS	6.6%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N5	32.5	1.7	PASS	5.5%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N6	32.9	1.9	PASS	5.5%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N5	32.1	1.8	PASS	6.0%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N4	32.5	2.2	PASS	6.6%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N1	32.2	2	PASS	6.3%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N2	32	1.7	PASS	6.0%	FAIL

A.3.2 DSY2 2020 Overheating results.

Table A.15 TM59 overheating results for bedroom spaces in Plot 3 under the DSY2 2020 weather file.

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L02 CLUSTER BED N1	0.6	56	FAIL	2.3%	PASS
P3-L02 CLUSTER BED N2	0.7	56	FAIL	2.4%	PASS
P3-L02 CLUSTER BED N3	0.4	50	FAIL	2.1%	PASS
P3-L02 CLUSTER BED N4	0.3	50	FAIL	2.2%	PASS
P3-L02 CLUSTER BED N5	0.3	50	FAIL	2.2%	PASS
P3-L02 CLUSTER BED N6	0.2	51	FAIL	2.2%	PASS
P3-L02 ACC. CLUSTER BED N1	0.2	56	FAIL	2.5%	PASS
P3-L02 CLUSTER BED N7	0.4	50	FAIL	2.3%	PASS
P3-L02 CLUSTER BED N8	0.5	50	FAIL	2.2%	PASS
P3-L02 CLUSTER BED N9	0.4	50	FAIL	2.2%	PASS
P3-L02 CLUSTER BED N10	0.6	52	FAIL	2.3%	PASS
P3-L02 CLUSTER BED N11	0.6	52	FAIL	2.2%	PASS
P3-L02 CLUSTER BED N12	0.4	50	FAIL	2.1%	PASS
P3-L02 CLUSTER BED N13	0.3	50	FAIL	2.1%	PASS
P3-L02 CLUSTER BED N14	0.4	50	FAIL	2.1%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L02 CLUSTER BED N15	0.4	50	FAIL	2.1%	PASS
P3-L02 ACC. CLUSTER BED N3	0.2	58	FAIL	2.2%	PASS
P3-L02 ACC. CLUSTER BED N2	0.2	55	FAIL	2.4%	PASS
P3-L02 CLUSTER BED N16	0.4	51	FAIL	2.2%	PASS
P3-L02 CLUSTER BED N17	0.3	50	FAIL	2.2%	PASS
P3-L02 CLUSTER BED N18	0.2	49	FAIL	2.3%	PASS
P3-L02 CLUSTER BED N19	0.2	49	FAIL	2.3%	PASS
P3-L02 CLUSTER BED N20	0.2	50	FAIL	2.3%	PASS
P3-L02 CLUSTER BED N21	0.1	46	FAIL	2.0%	PASS
P3-L02 CLUSTER BED N22	0.1	49	FAIL	2.1%	PASS
P3-L02 CLUSTER BED N23	0.1	49	FAIL	2.0%	PASS
P3-L02 CLUSTER BED N24	0.1	48	FAIL	2.0%	PASS
P3-L02 CLUSTER BED N25	0.1	48	FAIL	2.0%	PASS
P3-L02 CLUSTER BED N26	0.1	48	FAIL	2.0%	PASS
P3-L02 CLUSTER BED N27	0.7	52	FAIL	2.3%	PASS
P3-L02 CLUSTER BED N28	0.6	54	FAIL	2.4%	PASS
P3-L02 CLUSTER BED N29	0.3	50	FAIL	2.2%	PASS
P3-L02 CLUSTER BED N30	0.1	49	FAIL	2.1%	PASS
P3-L02 CLUSTER BED N31	0.1	49	FAIL	2.1%	PASS
P3-L02 CLUSTER BED N32	0.1	49	FAIL	2.0%	PASS
P3-L02 CLUSTER BED N33	0.1	48	FAIL	2.1%	PASS
P3-L01 ACC. CLUSTER BED N1	0	46	FAIL	2.3%	PASS
P3-L01 CLUSTER BED N1	0.3	50	FAIL	2.4%	PASS
P3-L01 CLUSTER BED N2	0	46	FAIL	2.2%	PASS
P3-L01 CLUSTER BED N3	0	44	FAIL	2.1%	PASS
P3-L01 CLUSTER BED N4	0	43	FAIL	2.1%	PASS
P3-L01 CLUSTER BED N5	0	43	FAIL	2.3%	PASS
P3-L01 CLUSTER BED N6	0	43	FAIL	2.2%	PASS
P3-L01 CLUSTER BED N7	0	43	FAIL	2.2%	PASS
P3-L01 CLUSTER BED N8	0	45	FAIL	2.2%	PASS
P3-L01 CLUSTER BED N9	0	47	FAIL	2.3%	PASS
P3-L01 CLUSTER BED N10	0.2	48	FAIL	2.3%	PASS
P3-L01 CLUSTER BED N11	0.1	45	FAIL	2.2%	PASS
P3-L01 CLUSTER BED N12	0	45	FAIL	2.1%	PASS
P3-L01 CLUSTER BED N13	0.2	48	FAIL	2.4%	PASS
P3-L01 CLUSTER BED N14	0.1	45	FAIL	2.2%	PASS
P3-L01 ACC. CLUSTER BED N2	0	49	FAIL	2.3%	PASS
P3-L01 CLUSTER BED N15	0	45	FAIL	2.3%	PASS
P3-L01 CLUSTER BED N16	0	42	FAIL	2.3%	PASS
P3-L01 CLUSTER BED N17	0	41	FAIL	2.0%	PASS
P3-L01 CLUSTER BED N18	0	42	FAIL	2.1%	PASS
P3-L01 CLUSTER BED N19	0	42	FAIL	2.0%	PASS
P3-L01 CLUSTER BED N20	0	42	FAIL	2.0%	PASS
P3-L01 CLUSTER BED N21	0	42	FAIL	1.9%	PASS
P3-L01 CLUSTER BED N22	0	43	FAIL	2.0%	PASS
P3-L01 CLUSTER BED N23	0.3	48	FAIL	2.3%	PASS
P3-L01 CLUSTER BED N24	0.3	50	FAIL	2.4%	PASS
P3-L01 CLUSTER BED N25	0	43	FAIL	2.1%	PASS
P3-L01 CLUSTER BED N26	0	43	FAIL	2.0%	PASS
P3-L01 CLUSTER BED N27	0	43	FAIL	2.0%	PASS
P3-L01 CLUSTER BED N28	0	43	FAIL	2.0%	PASS
P3-L01 CLUSTER BED N29	0	41	FAIL	2.0%	PASS
P3-L03 CLUSTER BED N1	0.5	52	FAIL	2.2%	PASS
P3-L03 CLUSTER BED N2	0.8	53	FAIL	2.4%	PASS
P3-L03 CLUSTER BED N3	0.5	52	FAIL	2.2%	PASS
P3-L03 CLUSTER BED N4	0.5	52	FAIL	2.3%	PASS
P3-L03 CLUSTER BED N5	0.5	52	FAIL	2.3%	PASS
P3-L03 CLUSTER BED N6	0.4	53	FAIL	2.4%	PASS
P3-L03 ACC. CLUSTER BED N1	0.3	58	FAIL	2.6%	PASS
P3-L03 CLUSTER BED N7	0.6	52	FAIL	2.3%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L03 CLUSTER BED N8	0.6	52	FAIL	2.2%	PASS
P3-L03 CLUSTER BED N9	0.6	52	FAIL	2.2%	PASS
P3-L03 CLUSTER BED N10	0.7	53	FAIL	2.4%	PASS
P3-L03 CLUSTER BED N11	0.6	52	FAIL	2.3%	PASS
P3-L03 CLUSTER BED N12	0.5	52	FAIL	2.2%	PASS
P3-L03 CLUSTER BED N13	0.4	51	FAIL	2.1%	PASS
P3-L03 CLUSTER BED N14	0.5	50	FAIL	2.1%	PASS
P3-L03 CLUSTER BED N15	0.4	49	FAIL	2.1%	PASS
P3-L03 ACC. CLUSTER BED N3	0.1	54	FAIL	2.2%	PASS
P3-L03 ACC. CLUSTER BED N2	0.3	56	FAIL	2.4%	PASS
P3-L03 CLUSTER BED N16	0.5	53	FAIL	2.3%	PASS
P3-L03 CLUSTER BED N17	0.5	50	FAIL	2.1%	PASS
P3-L03 CLUSTER BED N18	0.4	50	FAIL	2.1%	PASS
P3-L03 CLUSTER BED N19	0.4	50	FAIL	2.1%	PASS
P3-L03 CLUSTER BED N20	0.5	52	FAIL	2.2%	PASS
P3-L03 CLUSTER BED N21	0.1	46	FAIL	2.0%	PASS
P3-L03 CLUSTER BED N22	0.2	49	FAIL	2.1%	PASS
P3-L03 CLUSTER BED N23	0.2	49	FAIL	2.1%	PASS
P3-L03 CLUSTER BED N24	0.2	49	FAIL	2.1%	PASS
P3-L03 CLUSTER BED N25	0.1	48	FAIL	2.0%	PASS
P3-L03 CLUSTER BED N26	0.2	48	FAIL	2.0%	PASS
P3-L03 CLUSTER BED N27	0.7	52	FAIL	2.3%	PASS
P3-L03 CLUSTER BED N28	0.7	54	FAIL	2.4%	PASS
P3-L03 CLUSTER BED N29	0.4	49	FAIL	2.1%	PASS
P3-L03 CLUSTER BED N30	0.2	50	FAIL	2.1%	PASS
P3-L03 CLUSTER BED N31	0.2	49	FAIL	2.1%	PASS
P3-L03 CLUSTER BED N32	0.2	49	FAIL	2.0%	PASS
P3-L03 CLUSTER BED N33	0.2	50	FAIL	2.2%	PASS
P3-L08 CLUSTER BED N1	0.7	54	FAIL	2.7%	PASS
P3-L08 CLUSTER BED N2	0.2	49	FAIL	2.3%	PASS
P3-L08 CLUSTER BED N3	0.2	48	FAIL	2.4%	PASS
P3-L08 CLUSTER BED N4	0.3	49	FAIL	2.5%	PASS
P3-L08 CLUSTER BED N5	0.2	48	FAIL	2.4%	PASS
P3-L08 CLUSTER BED N6	0.1	45	FAIL	2.4%	PASS
P3-L08 CLUSTER BED N7	0.2	50	FAIL	2.5%	PASS
P3-L08 CLUSTER BED N8	0.2	49	FAIL	2.4%	PASS
P3-L08 ACC. CLUSTER BED N1	0	53	FAIL	2.6%	PASS
P3-L08 CLUSTER BED N9	0.2	49	FAIL	2.4%	PASS
P3-L08 CLUSTER BED N10	0.2	49	FAIL	2.4%	PASS
P3-L08 CLUSTER BED N11	0.2	51	FAIL	2.4%	PASS
P3-L08 CLUSTER BED N12	0.2	52	FAIL	2.4%	PASS
P3-L08 CLUSTER BED N13	0	45	FAIL	2.1%	PASS
P3-L08 CLUSTER BED N14	0	46	FAIL	2.1%	PASS
P3-L08 CLUSTER BED N15	0.1	46	FAIL	2.2%	PASS
P3-L08 CLUSTER BED N16	0.1	47	FAIL	2.3%	PASS
P3-L08 CLUSTER BED N17	0.1	48	FAIL	2.3%	PASS
P3-L08 CLUSTER BED N18	0.1	46	FAIL	2.3%	PASS
P3-L08 CLUSTER BED N19	0.7	55	FAIL	2.9%	PASS
P3-L08 CLUSTER BED N20	0.4	51	FAIL	2.8%	PASS
P3-L08 CLUSTER BED N21	0.3	52	FAIL	2.7%	PASS
P3-L08 CLUSTER BED N22	0.3	51	FAIL	2.8%	PASS
P3-L08 CLUSTER BED N23	0.3	50	FAIL	2.7%	PASS
P3-L08 CLUSTER BED N24	0.1	45	FAIL	2.5%	PASS
P3-L10 CLUSTER BED N1	0.8	57	FAIL	2.6%	PASS
P3-L10 CLUSTER BED N2	0.6	53	FAIL	2.2%	PASS
P3-L10 CLUSTER BED N3	0.6	52	FAIL	2.2%	PASS
P3-L10 CLUSTER BED N4	0.7	52	FAIL	2.3%	PASS
P3-L10 CLUSTER BED N5	0.6	52	FAIL	2.3%	PASS
P3-L10 CLUSTER BED N6	0.6	54	FAIL	2.4%	PASS
P3-L10 CLUSTER BED N7	0.6	54	FAIL	2.4%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L10 CLUSTER BED N8	0.6	54	FAIL	2.4%	PASS
P3-L10 ACC. CLUSTER BED N1	0.3	60	FAIL	2.6%	PASS
P3-L10 CLUSTER BED N9	0.5	53	FAIL	2.3%	PASS
P3-L10 CLUSTER BED N10	0.6	53	FAIL	2.3%	PASS
P3-L10 CLUSTER BED N11	0.6	54	FAIL	2.2%	PASS
P3-L11 CLUSTER BED N1	0.9	57	FAIL	2.6%	PASS
P3-L11 CLUSTER BED N2	0.6	55	FAIL	2.2%	PASS
P3-L11 CLUSTER BED N3	0.7	52	FAIL	2.2%	PASS
P3-L11 CLUSTER BED N4	0.7	52	FAIL	2.3%	PASS
P3-L11 CLUSTER BED N5	0.7	52	FAIL	2.3%	PASS
P3-L11 CLUSTER BED N6	0.6	55	FAIL	2.4%	PASS
P3-L11 CLUSTER BED N7	0.6	55	FAIL	2.5%	PASS
P3-L11 CLUSTER BED N8	0.6	54	FAIL	2.4%	PASS
P3-L11 ACC. CLUSTER BED N1	0.4	61	FAIL	2.7%	PASS
P3-L11 CLUSTER BED N9	0.6	53	FAIL	2.3%	PASS
P3-L11 CLUSTER BED N10	0.6	53	FAIL	2.3%	PASS
P3-L11 CLUSTER BED N11	0.6	54	FAIL	2.2%	PASS
P3-L12 CLUSTER BED N1	0.9	57	FAIL	2.6%	PASS
P3-L12 CLUSTER BED N2	0.6	55	FAIL	2.2%	PASS
P3-L12 CLUSTER BED N3	0.7	52	FAIL	2.2%	PASS
P3-L12 CLUSTER BED N4	0.7	52	FAIL	2.3%	PASS
P3-L12 CLUSTER BED N5	0.7	52	FAIL	2.3%	PASS
P3-L12 CLUSTER BED N6	0.6	55	FAIL	2.4%	PASS
P3-L12 CLUSTER BED N7	0.6	55	FAIL	2.5%	PASS
P3-L12 CLUSTER BED N8	0.6	54	FAIL	2.4%	PASS
P3-L12 ACC. CLUSTER BED N1	0.4	61	FAIL	2.7%	PASS
P3-L12 CLUSTER BED N9	0.6	53	FAIL	2.3%	PASS
P3-L12 CLUSTER BED N10	0.6	54	FAIL	2.3%	PASS
P3-L12 CLUSTER BED N11	0.6	54	FAIL	2.2%	PASS
P3-L13 CLUSTER BED N1	0.9	57	FAIL	2.6%	PASS
P3-L13 CLUSTER BED N2	0.6	55	FAIL	2.2%	PASS
P3-L13 CLUSTER BED N3	0.7	52	FAIL	2.3%	PASS
P3-L13 CLUSTER BED N4	0.7	52	FAIL	2.3%	PASS
P3-L13 CLUSTER BED N5	0.7	52	FAIL	2.3%	PASS
P3-L13 CLUSTER BED N6	0.6	55	FAIL	2.5%	PASS
P3-L13 CLUSTER BED N7	0.6	55	FAIL	2.5%	PASS
P3-L13 CLUSTER BED N8	0.6	54	FAIL	2.4%	PASS
P3-L13 ACC. CLUSTER BED N1	0.4	61	FAIL	2.7%	PASS
P3-L13 CLUSTER BED N9	0.6	53	FAIL	2.3%	PASS
P3-L13 CLUSTER BED N10	0.6	54	FAIL	2.3%	PASS
P3-L13 CLUSTER BED N11	0.6	54	FAIL	2.2%	PASS
P3-L14 CLUSTER BED N1	0.9	57	FAIL	2.6%	PASS
P3-L14 CLUSTER BED N2	0.6	55	FAIL	2.2%	PASS
P3-L14 CLUSTER BED N3	0.7	52	FAIL	2.3%	PASS
P3-L14 CLUSTER BED N4	0.7	52	FAIL	2.3%	PASS
P3-L14 CLUSTER BED N5	0.7	52	FAIL	2.3%	PASS
P3-L14 CLUSTER BED N6	0.6	55	FAIL	2.5%	PASS
P3-L14 CLUSTER BED N7	0.6	56	FAIL	2.5%	PASS
P3-L14 CLUSTER BED N8	0.6	54	FAIL	2.4%	PASS
P3-L14 ACC. CLUSTER BED N1	0.4	61	FAIL	2.7%	PASS
P3-L14 CLUSTER BED N9	0.6	54	FAIL	2.3%	PASS
P3-L14 CLUSTER BED N10	0.6	54	FAIL	2.4%	PASS
P3-L14 CLUSTER BED N11	0.6	54	FAIL	2.2%	PASS
P3-L15 CLUSTER BED N1	0.9	57	FAIL	2.6%	PASS
P3-L15 CLUSTER BED N2	0.6	55	FAIL	2.2%	PASS
P3-L15 CLUSTER BED N3	0.7	52	FAIL	2.3%	PASS
P3-L15 CLUSTER BED N4	0.7	52	FAIL	2.3%	PASS
P3-L15 CLUSTER BED N5	0.7	52	FAIL	2.3%	PASS
P3-L15 CLUSTER BED N6	0.7	55	FAIL	2.5%	PASS
P3-L15 CLUSTER BED N7	0.6	56	FAIL	2.5%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L15 CLUSTER BED N8	0.6	54	FAIL	2.4%	PASS
P3-L15 ACC. CLUSTER BED N1	0.4	62	FAIL	2.7%	PASS
P3-L15 CLUSTER BED N9	0.6	54	FAIL	2.4%	PASS
P3-L15 CLUSTER BED N10	0.6	54	FAIL	2.4%	PASS
P3-L15 CLUSTER BED N11	0.6	55	FAIL	2.3%	PASS
P3-L16 CLUSTER BED N1	0.9	57	FAIL	2.6%	PASS
P3-L16 CLUSTER BED N2	0.6	55	FAIL	2.2%	PASS
P3-L16 CLUSTER BED N3	0.7	52	FAIL	2.3%	PASS
P3-L16 CLUSTER BED N4	0.7	52	FAIL	2.3%	PASS
P3-L16 CLUSTER BED N5	0.7	52	FAIL	2.3%	PASS
P3-L16 CLUSTER BED N6	0.7	56	FAIL	2.5%	PASS
P3-L16 CLUSTER BED N7	0.6	56	FAIL	2.6%	PASS
P3-L16 CLUSTER BED N8	0.6	54	FAIL	2.4%	PASS
P3-L16 ACC. CLUSTER BED N1	0.5	62	FAIL	2.7%	PASS
P3-L16 CLUSTER BED N9	0.6	54	FAIL	2.4%	PASS
P3-L16 CLUSTER BED N10	0.6	54	FAIL	2.4%	PASS
P3-L16 CLUSTER BED N11	0.6	55	FAIL	2.3%	PASS
P3-L17 CLUSTER BED N1	0.9	57	FAIL	2.6%	PASS
P3-L17 CLUSTER BED N2	0.6	55	FAIL	2.3%	PASS
P3-L17 CLUSTER BED N3	0.7	52	FAIL	2.3%	PASS
P3-L17 CLUSTER BED N4	0.7	52	FAIL	2.3%	PASS
P3-L17 CLUSTER BED N5	0.7	52	FAIL	2.3%	PASS
P3-L17 CLUSTER BED N6	0.7	56	FAIL	2.5%	PASS
P3-L17 CLUSTER BED N7	0.7	56	FAIL	2.6%	PASS
P3-L17 CLUSTER BED N8	0.6	54	FAIL	2.4%	PASS
P3-L17 ACC. CLUSTER BED N1	0.5	62	FAIL	2.7%	PASS
P3-L17 CLUSTER BED N9	0.6	54	FAIL	2.4%	PASS
P3-L17 CLUSTER BED N10	0.6	54	FAIL	2.4%	PASS
P3-L17 CLUSTER BED N11	0.6	55	FAIL	2.3%	PASS
P3-L18 CLUSTER BED N1	0.9	55	FAIL	2.7%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L18 CLUSTER BED N2	0.6	54	FAIL	2.3%	PASS
P3-L18 CLUSTER BED N3	0.6	52	FAIL	2.3%	PASS
P3-L18 CLUSTER BED N4	0.7	52	FAIL	2.4%	PASS
P3-L18 CLUSTER BED N5	0.7	52	FAIL	2.4%	PASS
P3-L18 CLUSTER BED N6	0.5	54	FAIL	2.6%	PASS
P3-L18 CLUSTER BED N7	0.6	56	FAIL	2.5%	PASS
P3-L18 CLUSTER BED N8	0.6	54	FAIL	2.4%	PASS
P3-L18 ACC. CLUSTER BED N1	0.4	62	FAIL	2.8%	PASS
P3-L18 CLUSTER BED N9	0.6	52	FAIL	2.3%	PASS
P3-L18 CLUSTER BED N10	0.6	54	FAIL	2.3%	PASS
P3-L18 CLUSTER BED N11	0.6	54	FAIL	2.3%	PASS
P3-L09 CLUSTER BED N1	0.6	53	FAIL	2.3%	PASS
P3-L09 CLUSTER BED N2	0.3	49	FAIL	2.0%	PASS
P3-L09 CLUSTER BED N3	0.1	49	FAIL	2.0%	PASS
P3-L09 CLUSTER BED N4	0.3	49	FAIL	2.1%	PASS
P3-L09 CLUSTER BED N5	0.3	51	FAIL	2.2%	PASS
P3-L09 CLUSTER BED N6	0.4	53	FAIL	2.3%	PASS
P3-L09 CLUSTER BED N7	0.3	49	FAIL	2.3%	PASS
P3-L09 CLUSTER BED N8	0.8	60	FAIL	2.9%	PASS
P3-L09 CLUSTER BED N9	0.8	56	FAIL	2.8%	PASS
P3-L09 CLUSTER BED N10	0.7	58	FAIL	2.8%	PASS
P3-L09 CLUSTER BED N11	0.7	56	FAIL	2.8%	PASS
P3-L09 CLUSTER BED N12	0.7	56	FAIL	2.8%	PASS
P3-L09 CLUSTER BED N13	0.4	50	FAIL	2.5%	PASS
P3-L10 CLUSTER BED N12	0.7	54	FAIL	2.4%	PASS
P3-L10 CLUSTER BED N13	0.5	50	FAIL	2.2%	PASS
P3-L10 CLUSTER BED N14	0.2	51	FAIL	2.1%	PASS
P3-L10 CLUSTER BED N15	0.5	53	FAIL	2.3%	PASS
P3-L10 CLUSTER BED N16	0.5	53	FAIL	2.4%	PASS
P3-L10 CLUSTER BED N17	0.6	53	FAIL	2.4%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L10 CLUSTER BED N18	0.4	51	FAIL	2.3%	PASS
P3-L10 CLUSTER BED N19	0.9	60	FAIL	3.0%	PASS
P3-L10 CLUSTER BED N20	0.8	57	FAIL	2.9%	PASS
P3-L10 CLUSTER BED N21	0.7	59	FAIL	2.8%	PASS
P3-L10 CLUSTER BED N22	0.8	56	FAIL	2.8%	PASS
P3-L10 CLUSTER BED N23	0.7	57	FAIL	2.8%	PASS
P3-L10 CLUSTER BED N24	0.5	50	FAIL	2.5%	PASS
P3-L11 CLUSTER BED N12	0.8	55	FAIL	2.5%	PASS
P3-L11 CLUSTER BED N13	0.5	53	FAIL	2.3%	PASS
P3-L11 CLUSTER BED N14	0.3	52	FAIL	2.3%	PASS
P3-L11 CLUSTER BED N15	0.5	53	FAIL	2.4%	PASS
P3-L11 CLUSTER BED N16	0.5	53	FAIL	2.4%	PASS
P3-L11 CLUSTER BED N17	0.7	53	FAIL	2.4%	PASS
P3-L11 CLUSTER BED N18	0.5	52	FAIL	2.3%	PASS
P3-L11 CLUSTER BED N19	0.9	59	FAIL	2.9%	PASS
P3-L11 CLUSTER BED N20	0.8	58	FAIL	2.8%	PASS
P3-L11 CLUSTER BED N21	0.7	59	FAIL	2.8%	PASS
P3-L11 CLUSTER BED N22	0.8	57	FAIL	2.8%	PASS
P3-L11 CLUSTER BED N23	0.7	57	FAIL	2.8%	PASS
P3-L11 CLUSTER BED N24	0.5	50	FAIL	2.5%	PASS
P3-L12 CLUSTER BED N12	0.8	57	FAIL	2.6%	PASS
P3-L12 CLUSTER BED N13	0.7	54	FAIL	2.5%	PASS
P3-L12 CLUSTER BED N14	0.5	53	FAIL	2.4%	PASS
P3-L12 CLUSTER BED N15	0.7	54	FAIL	2.5%	PASS
P3-L12 CLUSTER BED N16	0.6	54	FAIL	2.5%	PASS
P3-L12 CLUSTER BED N17	0.7	54	FAIL	2.5%	PASS
P3-L12 CLUSTER BED N18	0.7	53	FAIL	2.4%	PASS
P3-L12 CLUSTER BED N19	0.9	60	FAIL	3.0%	PASS
P3-L12 CLUSTER BED N20	0.8	58	FAIL	2.9%	PASS
P3-L12 CLUSTER BED N21	0.8	59	FAIL	2.8%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L12 CLUSTER BED N22	0.8	57	FAIL	2.8%	PASS
P3-L12 CLUSTER BED N23	0.8	57	FAIL	2.8%	PASS
P3-L12 CLUSTER BED N24	0.5	50	FAIL	2.5%	PASS
P3-L13 CLUSTER BED N12	0.8	58	FAIL	2.6%	PASS
P3-L13 CLUSTER BED N13	0.7	54	FAIL	2.5%	PASS
P3-L13 CLUSTER BED N14	0.7	55	FAIL	2.5%	PASS
P3-L13 CLUSTER BED N15	0.8	54	FAIL	2.5%	PASS
P3-L13 CLUSTER BED N16	0.8	54	FAIL	2.5%	PASS
P3-L13 CLUSTER BED N17	0.7	54	FAIL	2.4%	PASS
P3-L13 CLUSTER BED N18	0.7	53	FAIL	2.4%	PASS
P3-L13 CLUSTER BED N19	0.9	60	FAIL	2.9%	PASS
P3-L13 CLUSTER BED N20	0.8	58	FAIL	2.8%	PASS
P3-L13 CLUSTER BED N21	0.7	59	FAIL	2.8%	PASS
P3-L13 CLUSTER BED N22	0.8	57	FAIL	2.8%	PASS
P3-L13 CLUSTER BED N23	0.8	57	FAIL	2.8%	PASS
P3-L13 CLUSTER BED N24	0.5	50	FAIL	2.5%	PASS
P3-L14 CLUSTER BED N12	1	60	FAIL	2.8%	PASS
P3-L14 CLUSTER BED N13	0.9	56	FAIL	2.7%	PASS
P3-L14 CLUSTER BED N14	0.8	57	FAIL	2.5%	PASS
P3-L14 CLUSTER BED N15	0.8	55	FAIL	2.6%	PASS
P3-L14 CLUSTER BED N16	0.8	56	FAIL	2.6%	PASS
P3-L14 CLUSTER BED N17	0.8	54	FAIL	2.5%	PASS
P3-L14 CLUSTER BED N18	0.7	53	FAIL	2.4%	PASS
P3-L14 CLUSTER BED N19	0.9	60	FAIL	3.0%	PASS
P3-L14 CLUSTER BED N20	0.8	58	FAIL	2.9%	PASS
P3-L14 CLUSTER BED N21	0.8	59	FAIL	2.8%	PASS
P3-L14 CLUSTER BED N22	0.8	57	FAIL	2.8%	PASS
P3-L14 CLUSTER BED N23	0.8	57	FAIL	2.8%	PASS
P3-L14 CLUSTER BED N24	0.5	50	FAIL	2.5%	PASS
P3-L15 CLUSTER BED N12	0.9	60	FAIL	2.8%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L15 CLUSTER BED N13	0.9	56	FAIL	2.6%	PASS
P3-L15 CLUSTER BED N14	0.8	57	FAIL	2.5%	PASS
P3-L15 CLUSTER BED N15	0.8	55	FAIL	2.6%	PASS
P3-L15 CLUSTER BED N16	0.8	56	FAIL	2.5%	PASS
P3-L15 CLUSTER BED N17	0.8	54	FAIL	2.5%	PASS
P3-L15 CLUSTER BED N18	0.7	53	FAIL	2.4%	PASS
P3-L15 CLUSTER BED N19	0.9	60	FAIL	2.9%	PASS
P3-L15 CLUSTER BED N20	0.8	58	FAIL	2.8%	PASS
P3-L15 CLUSTER BED N21	0.7	59	FAIL	2.8%	PASS
P3-L15 CLUSTER BED N22	0.8	57	FAIL	2.8%	PASS
P3-L15 CLUSTER BED N23	0.8	57	FAIL	2.8%	PASS
P3-L15 CLUSTER BED N24	0.5	50	FAIL	2.5%	PASS
P3-L16 CLUSTER BED N12	1	61	FAIL	2.9%	PASS
P3-L16 CLUSTER BED N13	0.9	56	FAIL	2.7%	PASS
P3-L16 CLUSTER BED N14	0.8	57	FAIL	2.5%	PASS
P3-L16 CLUSTER BED N15	0.8	55	FAIL	2.6%	PASS
P3-L16 CLUSTER BED N16	0.8	57	FAIL	2.6%	PASS
P3-L16 CLUSTER BED N17	0.8	55	FAIL	2.6%	PASS
P3-L16 CLUSTER BED N18	0.7	53	FAIL	2.4%	PASS
P3-L16 CLUSTER BED N19	0.9	60	FAIL	3.0%	PASS
P3-L16 CLUSTER BED N20	0.8	58	FAIL	2.9%	PASS
P3-L16 CLUSTER BED N21	0.8	59	FAIL	2.8%	PASS
P3-L16 CLUSTER BED N22	0.8	57	FAIL	2.8%	PASS
P3-L16 CLUSTER BED N23	0.8	57	FAIL	2.8%	PASS
P3-L16 CLUSTER BED N24	0.5	50	FAIL	2.5%	PASS
P3-L17 CLUSTER BED N12	0.9	60	FAIL	2.8%	PASS
P3-L17 CLUSTER BED N13	0.9	56	FAIL	2.6%	PASS
P3-L17 CLUSTER BED N14	0.8	57	FAIL	2.5%	PASS
P3-L17 CLUSTER BED N15	0.8	55	FAIL	2.6%	PASS
P3-L17 CLUSTER BED N16	0.8	56	FAIL	2.5%	PASS
P3-L17 CLUSTER BED N17	0.8	54	FAIL	2.5%	PASS
P3-L17 CLUSTER BED N18	0.7	53	FAIL	2.4%	PASS
P3-L17 CLUSTER BED N19	0.9	60	FAIL	3.0%	PASS
P3-L17 CLUSTER BED N20	0.8	58	FAIL	2.9%	PASS
P3-L17 CLUSTER BED N21	0.7	59	FAIL	2.8%	PASS
P3-L17 CLUSTER BED N22	0.8	57	FAIL	2.8%	PASS
P3-L17 CLUSTER BED N23	0.8	57	FAIL	2.8%	PASS
P3-L17 CLUSTER BED N24	0.5	50	FAIL	2.5%	PASS
P3-L18 CLUSTER BED N12	1.1	61	FAIL	2.9%	PASS
P3-L18 CLUSTER BED N13	0.9	58	FAIL	2.7%	PASS
P3-L18 CLUSTER BED N14	0.8	59	FAIL	2.6%	PASS
P3-L18 CLUSTER BED N15	0.8	55	FAIL	2.6%	PASS
P3-L18 CLUSTER BED N16	0.8	57	FAIL	2.6%	PASS
P3-L18 CLUSTER BED N17	0.8	56	FAIL	2.6%	PASS
P3-L18 CLUSTER BED N18	0.7	53	FAIL	2.4%	PASS
P3-L18 CLUSTER BED N19	0.9	60	FAIL	3.0%	PASS
P3-L18 CLUSTER BED N20	0.8	58	FAIL	2.9%	PASS
P3-L18 CLUSTER BED N21	0.8	59	FAIL	2.8%	PASS
P3-L18 CLUSTER BED N22	0.8	58	FAIL	2.9%	PASS
P3-L18 CLUSTER BED N23	0.8	57	FAIL	2.8%	PASS
P3-L18 CLUSTER BED N24	0.5	50	FAIL	2.5%	PASS
P3-L19 CLUSTER BED N1	1	60	FAIL	2.8%	PASS
P3-L19 CLUSTER BED N2	0.9	58	FAIL	2.7%	PASS
P3-L19 CLUSTER BED N3	0.8	59	FAIL	2.6%	PASS
P3-L19 CLUSTER BED N4	0.8	55	FAIL	2.6%	PASS
P3-L19 CLUSTER BED N5	0.8	57	FAIL	2.6%	PASS
P3-L19 CLUSTER BED N6	0.8	56	FAIL	2.5%	PASS
P3-L19 CLUSTER BED N7	0.7	53	FAIL	2.4%	PASS
P3-L19 CLUSTER BED N8	0.9	60	FAIL	3.0%	PASS
P3-L19 CLUSTER BED N9	0.8	58	FAIL	2.9%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L19 CLUSTER BED N10	0.7	59	FAIL	2.8%	PASS
P3-L19 CLUSTER BED N11	0.8	57	FAIL	2.8%	PASS
P3-L19 CLUSTER BED N12	0.8	57	FAIL	2.8%	PASS
P3-L19 CLUSTER BED N13	0.5	50	FAIL	2.5%	PASS
P3-L20 CLUSTER BED N1	1	61	FAIL	2.9%	PASS
P3-L20 CLUSTER BED N2	0.9	58	FAIL	2.7%	PASS
P3-L20 CLUSTER BED N3	0.8	59	FAIL	2.6%	PASS
P3-L20 CLUSTER BED N4	0.8	55	FAIL	2.6%	PASS
P3-L20 CLUSTER BED N5	0.8	57	FAIL	2.6%	PASS
P3-L20 CLUSTER BED N6	0.8	56	FAIL	2.6%	PASS
P3-L20 CLUSTER BED N7	0.7	55	FAIL	2.5%	PASS
P3-L20 CLUSTER BED N8	0.9	60	FAIL	3.0%	PASS
P3-L20 CLUSTER BED N9	0.8	58	FAIL	2.9%	PASS
P3-L20 CLUSTER BED N10	0.7	59	FAIL	2.8%	PASS
P3-L20 CLUSTER BED N11	0.8	57	FAIL	2.8%	PASS
P3-L20 CLUSTER BED N12	0.8	57	FAIL	2.8%	PASS
P3-L20 CLUSTER BED N13	0.5	50	FAIL	2.5%	PASS
P3-L21 CLUSTER BED N1	1	60	FAIL	2.9%	PASS
P3-L21 CLUSTER BED N2	0.8	56	FAIL	2.7%	PASS
P3-L21 CLUSTER BED N3	0.7	55	FAIL	2.5%	PASS
P3-L21 CLUSTER BED N4	0.8	55	FAIL	2.6%	PASS
P3-L21 CLUSTER BED N5	0.7	55	FAIL	2.6%	PASS
P3-L21 CLUSTER BED N6	0.7	55	FAIL	2.6%	PASS
P3-L21 CLUSTER BED N7	0.6	55	FAIL	2.5%	PASS
P3-L21 CLUSTER BED N8	0.9	60	FAIL	3.0%	FAIL
P3-L21 CLUSTER BED N9	0.8	55	FAIL	2.8%	PASS
P3-L21 CLUSTER BED N10	0.7	58	FAIL	2.7%	PASS
P3-L21 CLUSTER BED N11	0.7	55	FAIL	2.7%	PASS
P3-L21 CLUSTER BED N12	0.7	56	FAIL	2.7%	PASS
P3-L21 CLUSTER BED N13	0.4	49	FAIL	2.5%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L04 CLUSTER BED N1	0.6	52	FAIL	2.3%	PASS
P3-L04 CLUSTER BED N2	0.8	55	FAIL	2.4%	PASS
P3-L04 CLUSTER BED N3	0.6	52	FAIL	2.3%	PASS
P3-L04 CLUSTER BED N4	0.7	52	FAIL	2.3%	PASS
P3-L04 CLUSTER BED N5	0.7	52	FAIL	2.3%	PASS
P3-L04 CLUSTER BED N6	0.5	53	FAIL	2.4%	PASS
P3-L04 ACC. CLUSTER BED N1	0.3	58	FAIL	2.7%	PASS
P3-L04 CLUSTER BED N7	0.6	52	FAIL	2.3%	PASS
P3-L04 CLUSTER BED N8	0.6	52	FAIL	2.2%	PASS
P3-L04 CLUSTER BED N9	0.6	52	FAIL	2.2%	PASS
P3-L04 CLUSTER BED N10	0.7	53	FAIL	2.4%	PASS
P3-L04 CLUSTER BED N11	0.7	53	FAIL	2.3%	PASS
P3-L04 CLUSTER BED N12	0.5	52	FAIL	2.2%	PASS
P3-L04 CLUSTER BED N13	0.5	51	FAIL	2.2%	PASS
P3-L04 CLUSTER BED N14	0.5	50	FAIL	2.1%	PASS
P3-L04 CLUSTER BED N15	0.5	50	FAIL	2.1%	PASS
P3-L04 ACC. CLUSTER BED N3	0.1	54	FAIL	2.2%	PASS
P3-L04 ACC. CLUSTER BED N2	0.3	57	FAIL	2.5%	PASS
P3-L04 CLUSTER BED N16	0.5	53	FAIL	2.3%	PASS
P3-L04 CLUSTER BED N17	0.5	51	FAIL	2.2%	PASS
P3-L04 CLUSTER BED N18	0.5	51	FAIL	2.2%	PASS
P3-L04 CLUSTER BED N19	0.5	51	FAIL	2.2%	PASS
P3-L04 CLUSTER BED N20	0.5	52	FAIL	2.2%	PASS
P3-L04 CLUSTER BED N21	0.2	49	FAIL	2.1%	PASS
P3-L04 CLUSTER BED N22	0.4	49	FAIL	2.2%	PASS
P3-L04 CLUSTER BED N23	0.2	49	FAIL	2.2%	PASS
P3-L04 CLUSTER BED N24	0.3	49	FAIL	2.1%	PASS
P3-L04 CLUSTER BED N25	0.1	49	FAIL	2.0%	PASS
P3-L04 CLUSTER BED N26	0.2	49	FAIL	2.0%	PASS
P3-L04 CLUSTER BED N27	0.7	53	FAIL	2.3%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L04 CLUSTER BED N28	0.7	54	FAIL	2.4%	PASS
P3-L04 CLUSTER BED N29	0.4	50	FAIL	2.2%	PASS
P3-L04 CLUSTER BED N30	0.2	51	FAIL	2.1%	PASS
P3-L04 CLUSTER BED N31	0.2	49	FAIL	2.1%	PASS
P3-L04 CLUSTER BED N32	0.2	49	FAIL	2.1%	PASS
P3-L04 CLUSTER BED N33	0.2	50	FAIL	2.2%	PASS
P3-L05 CLUSTER BED N1	0.7	52	FAIL	2.4%	PASS
P3-L05 CLUSTER BED N2	0.8	56	FAIL	2.6%	PASS
P3-L05 CLUSTER BED N3	0.7	52	FAIL	2.4%	PASS
P3-L05 CLUSTER BED N4	0.7	52	FAIL	2.4%	PASS
P3-L05 CLUSTER BED N5	0.7	52	FAIL	2.4%	PASS
P3-L05 CLUSTER BED N6	0.7	53	FAIL	2.4%	PASS
P3-L05 ACC. CLUSTER BED N1	0.3	58	FAIL	2.7%	PASS
P3-L05 CLUSTER BED N7	0.6	52	FAIL	2.3%	PASS
P3-L05 CLUSTER BED N8	0.7	52	FAIL	2.3%	PASS
P3-L05 CLUSTER BED N9	0.6	52	FAIL	2.2%	PASS
P3-L05 CLUSTER BED N10	0.7	53	FAIL	2.4%	PASS
P3-L05 CLUSTER BED N11	0.6	52	FAIL	2.3%	PASS
P3-L05 CLUSTER BED N12	0.5	51	FAIL	2.2%	PASS
P3-L05 CLUSTER BED N13	0.4	49	FAIL	2.1%	PASS
P3-L05 CLUSTER BED N14	0.5	50	FAIL	2.1%	PASS
P3-L05 CLUSTER BED N15	0.4	49	FAIL	2.1%	PASS
P3-L05 ACC. CLUSTER BED N3	0.1	54	FAIL	2.2%	PASS
P3-L05 ACC. CLUSTER BED N2	0.3	57	FAIL	2.5%	PASS
P3-L05 CLUSTER BED N16	0.5	53	FAIL	2.3%	PASS
P3-L05 CLUSTER BED N17	0.4	50	FAIL	2.2%	PASS
P3-L05 CLUSTER BED N18	0.4	50	FAIL	2.2%	PASS
P3-L05 CLUSTER BED N19	0.4	50	FAIL	2.2%	PASS
P3-L05 CLUSTER BED N20	0.5	52	FAIL	2.2%	PASS
P3-L05 CLUSTER BED N21	0.1	49	FAIL	2.1%	PASS
P3-L05 CLUSTER BED N22	0.3	49	FAIL	2.3%	PASS
P3-L05 CLUSTER BED N23	0.2	49	FAIL	2.2%	PASS
P3-L05 CLUSTER BED N24	0.3	49	FAIL	2.1%	PASS
P3-L05 CLUSTER BED N25	0.1	49	FAIL	2.0%	PASS
P3-L05 CLUSTER BED N26	0.2	49	FAIL	2.0%	PASS
P3-L05 CLUSTER BED N27	0.7	53	FAIL	2.3%	PASS
P3-L05 CLUSTER BED N28	0.7	56	FAIL	2.5%	PASS
P3-L05 CLUSTER BED N29	0.4	50	FAIL	2.2%	PASS
P3-L05 CLUSTER BED N30	0.2	49	FAIL	2.1%	PASS
P3-L05 CLUSTER BED N31	0.3	49	FAIL	2.2%	PASS
P3-L05 CLUSTER BED N32	0.2	49	FAIL	2.2%	PASS
P3-L05 CLUSTER BED N33	0.2	50	FAIL	2.3%	PASS
P3-L06 CLUSTER BED N1	0.3	54	FAIL	2.5%	PASS
P3-L06 CLUSTER BED N2	0.6	57	FAIL	2.6%	PASS
P3-L06 CLUSTER BED N3	0.3	51	FAIL	2.4%	PASS
P3-L06 CLUSTER BED N4	0.3	51	FAIL	2.4%	PASS
P3-L06 CLUSTER BED N5	0.3	52	FAIL	2.4%	PASS
P3-L06 CLUSTER BED N6	0.1	50	FAIL	2.4%	PASS
P3-L06 ACC. CLUSTER BED N1	0.2	56	FAIL	2.5%	PASS
P3-L06 CLUSTER BED N7	0.3	51	FAIL	2.2%	PASS
P3-L06 CLUSTER BED N8	0.2	52	FAIL	2.2%	PASS
P3-L06 CLUSTER BED N9	0.2	52	FAIL	2.1%	PASS
P3-L06 CLUSTER BED N10	0.5	53	FAIL	2.2%	PASS
P3-L06 CLUSTER BED N11	0.4	52	FAIL	2.1%	PASS
P3-L06 CLUSTER BED N12	0.1	50	FAIL	2.0%	PASS
P3-L06 CLUSTER BED N13	0.1	49	FAIL	2.0%	PASS
P3-L06 CLUSTER BED N14	0.1	49	FAIL	2.0%	PASS
P3-L06 CLUSTER BED N15	0.1	49	FAIL	2.0%	PASS
P3-L06 ACC. CLUSTER BED N3	0	51	FAIL	2.0%	PASS
P3-L06 ACC. CLUSTER BED N2	0	53	FAIL	2.4%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L06 CLUSTER BED N16	0	51	FAIL	2.3%	PASS
P3-L06 CLUSTER BED N17	0	50	FAIL	2.2%	PASS
P3-L06 CLUSTER BED N18	0	50	FAIL	2.2%	PASS
P3-L06 CLUSTER BED N19	0	50	FAIL	2.2%	PASS
P3-L06 CLUSTER BED N20	0.2	53	FAIL	2.2%	PASS
P3-L06 CLUSTER BED N21	0	45	FAIL	2.1%	PASS
P3-L06 CLUSTER BED N22	0	49	FAIL	2.2%	PASS
P3-L06 CLUSTER BED N23	0	49	FAIL	2.2%	PASS
P3-L06 CLUSTER BED N24	0	49	FAIL	2.1%	PASS
P3-L06 CLUSTER BED N25	0	46	FAIL	2.0%	PASS
P3-L06 CLUSTER BED N26	0	47	FAIL	2.0%	PASS
P3-L06 CLUSTER BED N27	0.2	52	FAIL	2.3%	PASS
P3-L06 CLUSTER BED N28	0.3	54	FAIL	2.5%	PASS
P3-L06 CLUSTER BED N29	0	50	FAIL	2.3%	PASS
P3-L06 CLUSTER BED N30	0	49	FAIL	2.2%	PASS
P3-L06 CLUSTER BED N31	0	50	FAIL	2.2%	PASS
P3-L06 CLUSTER BED N32	0	50	FAIL	2.2%	PASS
P3-L06 CLUSTER BED N33	0	49	FAIL	2.3%	PASS
P3-L09 CLUSTER BED N14	0.6	54	FAIL	2.2%	PASS
P3-L09 CLUSTER BED N15	0.6	53	FAIL	2.4%	PASS
P3-L09 CLUSTER BED N16	0.5	52	FAIL	2.3%	PASS
P3-L09 ACC. CLUSTER BED N1	0.3	58	FAIL	2.6%	PASS
P3-L09 CLUSTER BED N17	0.5	53	FAIL	2.4%	PASS
P3-L09 CLUSTER BED N18	0.5	54	FAIL	2.5%	PASS
P3-L09 CLUSTER BED N19	0.5	53	FAIL	2.4%	PASS
P3-L09 CLUSTER BED N20	0.6	52	FAIL	2.3%	PASS
P3-L09 CLUSTER BED N21	0.7	52	FAIL	2.3%	PASS
P3-L09 CLUSTER BED N22	0.6	52	FAIL	2.2%	PASS
P3-L09 CLUSTER BED N23	0.6	52	FAIL	2.2%	PASS
P3-L09 CLUSTER BED N24	0.8	56	FAIL	2.6%	PASS

Table A.16 TM59 overheating results for living/kitchen spaces in Plot 3 under the DSY2 2020 weather file.

	Natural ventilation criteria		Mechanical ventilation criteria	
Room Name	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
P3-L18 CLUSTER LIVING/KITCHEN N2	4.2	FAIL	6.3%	FAIL
P3-L18 CLUSTER LIVING/KITCHEN N1	3.8	FAIL	5.7%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N4	3	PASS	5.8%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N3	3.3	FAIL	5.8%	FAIL
P3-L21 CLUSTER LIVING/KITCHEN N2	4.2	FAIL	7.1%	FAIL
P3-L21 CLUSTER LIVING/KITCHEN N1	4.2	FAIL	7.0%	FAIL
P3-L20 CLUSTER LIVING/KITCHEN N2	4.2	FAIL	7.1%	FAIL
P3-L20 CLUSTER LIVING/KITCHEN N1	4.3	FAIL	6.9%	FAIL
P3-L19 CLUSTER LIVING/KITCHEN N2	4.2	FAIL	7.0%	FAIL
P3-L19 CLUSTER LIVING/KITCHEN N1	4.2	FAIL	6.7%	FAIL
P3-L18 CLUSTER LIVING/KITCHEN N4	4.2	FAIL	7.1%	FAIL
P3-L18 CLUSTER LIVING/KITCHEN N3	4.2	FAIL	6.9%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N2	4.2	FAIL	6.4%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N1	3.7	FAIL	5.6%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N2	4.2	FAIL	6.3%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N1	3.7	FAIL	5.6%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N4	4.2	FAIL	7.0%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N3	4.2	FAIL	6.7%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N4	3.3	FAIL	6.0%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N3	3.6	FAIL	5.9%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N4	4.2	FAIL	7.2%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N3	4.2	FAIL	6.9%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N4	3.3	FAIL	6.1%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N3	3.5	FAIL	5.9%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N2	4.2	FAIL	6.4%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N1	3.7	FAIL	5.5%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N2	4.2	FAIL	6.3%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N1	3.7	FAIL	5.5%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria	
Room Name	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
P3-L03 CLUSTER LIVING/KITCHEN N4	3.2	FAIL	6.0%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N3	3.4	FAIL	5.9%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N4	4.2	FAIL	7.0%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N3	4.2	FAIL	6.7%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N4	4.1	FAIL	7.0%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N3	4.2	FAIL	6.9%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N3	3.4	FAIL	5.9%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N4	2.9	PASS	5.7%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N2	4.2	FAIL	6.4%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N1	3.7	FAIL	5.5%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N3	3.2	FAIL	5.8%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N4	4.1	FAIL	6.8%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N3	4.2	FAIL	6.7%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N2	4.1	FAIL	6.4%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N1	3.7	FAIL	5.5%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N4	4	FAIL	6.8%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N3	4.2	FAIL	6.9%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N2	4.1	FAIL	6.4%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N1	3.7	FAIL	5.5%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N4	4	FAIL	6.8%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N3	4.2	FAIL	6.8%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N2	4.1	FAIL	6.4%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N1	3.7	FAIL	5.5%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N4	4	FAIL	6.8%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N3	4.2	FAIL	6.9%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N3	4.1	FAIL	6.4%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N4	3.7	FAIL	5.5%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N2	3.9	FAIL	6.3%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N1	3.6	FAIL	5.5%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N2	3.9	FAIL	6.7%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N1	4.2	FAIL	6.8%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N4	3.5	FAIL	6.9%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N3	3.8	FAIL	7.0%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N2	3.3	FAIL	6.3%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N1	3.9	FAIL	6.5%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N5	3.6	FAIL	6.1%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N6	3.6	FAIL	5.4%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N2	3.4	FAIL	6.4%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N1	4	FAIL	6.6%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N5	3.7	FAIL	6.0%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N6	3.7	FAIL	5.3%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N2	3.5	FAIL	6.3%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N1	3.9	FAIL	6.6%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N5	3.7	FAIL	6.0%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N6	3.6	FAIL	5.3%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N2	3.4	FAIL	6.2%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N1	4	FAIL	6.6%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N5	3.6	FAIL	6.0%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N6	3.6	FAIL	5.3%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N2	3.4	FAIL	6.3%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N1	3.9	FAIL	6.6%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N5	3	PASS	5.5%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N6	3.2	FAIL	5.3%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N5	3.2	FAIL	6.1%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N4	3.6	FAIL	6.4%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N1	3.1	FAIL	6.0%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N2	2.9	PASS	5.9%	FAIL

A.3.3 DSY3 2020 Overheating results.

Table A.17 TM59 overheating results for bedroom spaces in Plot 3 under the DSY3 2020 weather file.

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L02 CLUSTER BED N1	0.7	77	FAIL	3.1%	FAIL
P3-L02 CLUSTER BED N2	0.7	78	FAIL	3.2%	FAIL
P3-L02 CLUSTER BED N3	0.6	71	FAIL	2.9%	PASS
P3-L02 CLUSTER BED N4	0.6	72	FAIL	3.0%	PASS
P3-L02 CLUSTER BED N5	0.6	72	FAIL	3.1%	FAIL
P3-L02 CLUSTER BED N6	0.4	73	FAIL	3.1%	FAIL
P3-L02 ACC. CLUSTER BED N1	0.3	80	FAIL	3.3%	FAIL
P3-L02 CLUSTER BED N7	0.6	72	FAIL	3.1%	FAIL
P3-L02 CLUSTER BED N8	0.6	72	FAIL	3.1%	FAIL
P3-L02 CLUSTER BED N9	0.6	72	FAIL	3.1%	FAIL
P3-L02 CLUSTER BED N10	0.7	74	FAIL	3.2%	FAIL
P3-L02 CLUSTER BED N11	0.7	73	FAIL	3.2%	FAIL
P3-L02 CLUSTER BED N12	0.6	72	FAIL	3.0%	FAIL
P3-L02 CLUSTER BED N13	0.6	72	FAIL	3.0%	PASS
P3-L02 CLUSTER BED N14	0.6	70	FAIL	3.0%	FAIL
P3-L02 CLUSTER BED N15	0.6	72	FAIL	3.1%	FAIL
P3-L02 ACC. CLUSTER BED N3	0.6	83	FAIL	3.2%	FAIL
P3-L02 ACC. CLUSTER BED N2	0.5	83	FAIL	3.3%	FAIL
P3-L02 CLUSTER BED N16	0.6	72	FAIL	3.1%	FAIL
P3-L02 CLUSTER BED N17	0.6	70	FAIL	3.0%	FAIL
P3-L02 CLUSTER BED N18	0.5	71	FAIL	3.2%	FAIL
P3-L02 CLUSTER BED N19	0.5	71	FAIL	3.1%	FAIL
P3-L02 CLUSTER BED N20	0.5	72	FAIL	3.1%	FAIL
P3-L02 CLUSTER BED N21	0.4	71	FAIL	2.9%	PASS
P3-L02 CLUSTER BED N22	0.6	71	FAIL	2.9%	PASS
P3-L02 CLUSTER BED N23	0.6	71	FAIL	2.8%	PASS
P3-L02 CLUSTER BED N24	0.5	70	FAIL	2.8%	PASS
P3-L02 CLUSTER BED N25	0.5	69	FAIL	2.7%	PASS
P3-L02 CLUSTER BED N26	0.5	70	FAIL	2.8%	PASS
P3-L02 CLUSTER BED N27	0.6	72	FAIL	3.1%	FAIL
P3-L02 CLUSTER BED N28	0.7	75	FAIL	3.3%	FAIL
P3-L02 CLUSTER BED N29	0.5	70	FAIL	3.0%	PASS
P3-L02 CLUSTER BED N30	0.5	70	FAIL	2.9%	PASS
P3-L02 CLUSTER BED N31	0.5	70	FAIL	2.9%	PASS
P3-L02 CLUSTER BED N32	0.5	70	FAIL	2.9%	PASS
P3-L02 CLUSTER BED N33	0.3	71	FAIL	3.0%	PASS
P3-L01 ACC. CLUSTER BED N1	0	70	FAIL	3.2%	FAIL
P3-L01 CLUSTER BED N1	0.6	69	FAIL	3.2%	FAIL
P3-L01 CLUSTER BED N2	0.3	68	FAIL	3.0%	PASS
P3-L01 CLUSTER BED N3	0.2	62	FAIL	2.9%	PASS
P3-L01 CLUSTER BED N4	0	63	FAIL	3.0%	PASS
P3-L01 CLUSTER BED N5	0.3	63	FAIL	3.0%	FAIL
P3-L01 CLUSTER BED N6	0.3	63	FAIL	3.0%	FAIL
P3-L01 CLUSTER BED N7	0.2	61	FAIL	2.9%	PASS
P3-L01 CLUSTER BED N8	0.1	64	FAIL	3.0%	PASS
P3-L01 CLUSTER BED N9	0.1	71	FAIL	3.2%	FAIL
P3-L01 CLUSTER BED N10	0.6	71	FAIL	3.2%	FAIL
P3-L01 CLUSTER BED N11	0.4	67	FAIL	3.0%	PASS
P3-L01 CLUSTER BED N12	0.3	62	FAIL	2.9%	PASS
P3-L01 CLUSTER BED N13	0.6	67	FAIL	3.2%	FAIL
P3-L01 CLUSTER BED N14	0.4	62	FAIL	2.9%	PASS
P3-L01 ACC. CLUSTER BED N2	0	71	FAIL	3.2%	FAIL
P3-L01 CLUSTER BED N15	0.2	67	FAIL	3.1%	FAIL
P3-L01 CLUSTER BED N16	0	60	FAIL	3.0%	FAIL
P3-L01 CLUSTER BED N17	0	60	FAIL	2.7%	PASS
P3-L01 CLUSTER BED N18	0.3	61	FAIL	2.8%	PASS
P3-L01 CLUSTER BED N19	0.3	61	FAIL	2.7%	PASS
P3-L01 CLUSTER BED N20	0.2	61	FAIL	2.7%	PASS

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L01 CLUSTER BED N21	0.1	61	FAIL	2.6%	PASS
P3-L01 CLUSTER BED N22	0.2	61	FAIL	2.7%	PASS
P3-L01 CLUSTER BED N23	0.4	68	FAIL	3.2%	FAIL
P3-L01 CLUSTER BED N24	0.5	71	FAIL	3.2%	FAIL
P3-L01 CLUSTER BED N25	0.2	61	FAIL	2.9%	PASS
P3-L01 CLUSTER BED N26	0.1	61	FAIL	2.7%	PASS
P3-L01 CLUSTER BED N27	0.1	61	FAIL	2.8%	PASS
P3-L01 CLUSTER BED N28	0.1	61	FAIL	2.8%	PASS
P3-L01 CLUSTER BED N29	0	60	FAIL	2.8%	PASS
P3-L03 CLUSTER BED N1	0.6	72	FAIL	3.0%	FAIL
P3-L03 CLUSTER BED N2	0.7	75	FAIL	3.3%	FAIL
P3-L03 CLUSTER BED N3	0.6	72	FAIL	3.1%	FAIL
P3-L03 CLUSTER BED N4	0.6	72	FAIL	3.1%	FAIL
P3-L03 CLUSTER BED N5	0.6	72	FAIL	3.1%	FAIL
P3-L03 CLUSTER BED N6	0.4	77	FAIL	3.4%	FAIL
P3-L03 ACC. CLUSTER BED N1	0.4	83	FAIL	3.5%	FAIL
P3-L03 CLUSTER BED N7	0.6	73	FAIL	3.2%	FAIL
P3-L03 CLUSTER BED N8	0.6	72	FAIL	3.1%	FAIL
P3-L03 CLUSTER BED N9	0.6	72	FAIL	3.1%	FAIL
P3-L03 CLUSTER BED N10	0.7	76	FAIL	3.3%	FAIL
P3-L03 CLUSTER BED N11	0.7	74	FAIL	3.2%	FAIL
P3-L03 CLUSTER BED N12	0.6	72	FAIL	3.1%	FAIL
P3-L03 CLUSTER BED N13	0.6	72	FAIL	3.0%	FAIL
P3-L03 CLUSTER BED N14	0.6	72	FAIL	3.1%	FAIL
P3-L03 CLUSTER BED N15	0.6	72	FAIL	3.1%	FAIL
P3-L03 ACC. CLUSTER BED N3	0.3	80	FAIL	3.1%	FAIL
P3-L03 ACC. CLUSTER BED N2	0.6	86	FAIL	3.4%	FAIL
P3-L03 CLUSTER BED N16	0.6	78	FAIL	3.2%	FAIL
P3-L03 CLUSTER BED N17	0.6	73	FAIL	3.1%	FAIL
P3-L03 CLUSTER BED N18	0.6	73	FAIL	3.1%	FAIL
P3-L03 CLUSTER BED N19	0.6	72	FAIL	3.1%	FAIL
P3-L03 CLUSTER BED N20	0.6	72	FAIL	3.0%	FAIL
P3-L03 CLUSTER BED N21	0.5	71	FAIL	2.9%	PASS
P3-L03 CLUSTER BED N22	0.6	73	FAIL	3.0%	PASS
P3-L03 CLUSTER BED N23	0.6	72	FAIL	2.9%	PASS
P3-L03 CLUSTER BED N24	0.5	72	FAIL	2.9%	PASS
P3-L03 CLUSTER BED N25	0.5	71	FAIL	2.7%	PASS
P3-L03 CLUSTER BED N26	0.5	70	FAIL	2.8%	PASS
P3-L03 CLUSTER BED N27	0.6	73	FAIL	3.2%	FAIL
P3-L03 CLUSTER BED N28	0.7	76	FAIL	3.4%	FAIL
P3-L03 CLUSTER BED N29	0.6	72	FAIL	3.0%	FAIL
P3-L03 CLUSTER BED N30	0.5	72	FAIL	2.9%	PASS
P3-L03 CLUSTER BED N31	0.5	72	FAIL	3.0%	PASS
P3-L03 CLUSTER BED N32	0.5	72	FAIL	3.0%	PASS
P3-L03 CLUSTER BED N33	0.4	76	FAIL	3.1%	FAIL
P3-L08 CLUSTER BED N1	0.7	74	FAIL	3.6%	FAIL
P3-L08 CLUSTER BED N2	0.2	71	FAIL	3.2%	FAIL
P3-L08 CLUSTER BED N3	0.3	68	FAIL	3.2%	FAIL
P3-L08 CLUSTER BED N4	0.4	68	FAIL	3.3%	FAIL
P3-L08 CLUSTER BED N5	0.2	66	FAIL	3.2%	FAIL
P3-L08 CLUSTER BED N6	0	66	FAIL	3.3%	FAIL
P3-L08 CLUSTER BED N7	0.5	72	FAIL	3.3%	FAIL
P3-L08 CLUSTER BED N8	0.5	70	FAIL	3.2%	FAIL
P3-L08 ACC. CLUSTER BED N1	0.1	77	FAIL	3.4%	FAIL
P3-L08 CLUSTER BED N9	0.5	70	FAIL	3.2%	FAIL
P3-L08 CLUSTER BED N10	0.5	70	FAIL	3.2%	FAIL
P3-L08 CLUSTER BED N11	0.5	73	FAIL	3.2%	FAIL
P3-L08 CLUSTER BED N12	0.5	71	FAIL	3.2%	FAIL
P3-L08 CLUSTER BED N13	0.4	65	FAIL	2.9%	PASS
P3-L08 CLUSTER BED N14	0.4	70	FAIL	2.9%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L08 CLUSTER BED N15	0.4	69	FAIL	3.0%	FAIL
P3-L08 CLUSTER BED N16	0.4	70	FAIL	3.0%	FAIL
P3-L08 CLUSTER BED N17	0.4	70	FAIL	3.2%	FAIL
P3-L08 CLUSTER BED N18	0.4	67	FAIL	3.2%	FAIL
P3-L08 CLUSTER BED N19	0.8	79	FAIL	3.9%	FAIL
P3-L08 CLUSTER BED N20	0.7	76	FAIL	3.7%	FAIL
P3-L08 CLUSTER BED N21	0.7	77	FAIL	3.7%	FAIL
P3-L08 CLUSTER BED N22	0.7	76	FAIL	3.7%	FAIL
P3-L08 CLUSTER BED N23	0.7	77	FAIL	3.7%	FAIL
P3-L08 CLUSTER BED N24	0.5	71	FAIL	3.4%	FAIL
P3-L10 CLUSTER BED N1	1	76	FAIL	3.5%	FAIL
P3-L10 CLUSTER BED N2	0.5	75	FAIL	3.1%	FAIL
P3-L10 CLUSTER BED N3	0.6	73	FAIL	3.1%	FAIL
P3-L10 CLUSTER BED N4	0.6	73	FAIL	3.2%	FAIL
P3-L10 CLUSTER BED N5	0.5	73	FAIL	3.2%	FAIL
P3-L10 CLUSTER BED N6	0.4	77	FAIL	3.4%	FAIL
P3-L10 CLUSTER BED N7	0.7	80	FAIL	3.4%	FAIL
P3-L10 CLUSTER BED N8	0.7	75	FAIL	3.2%	FAIL
P3-L10 ACC. CLUSTER BED N1	0.7	92	FAIL	3.7%	FAIL
P3-L10 CLUSTER BED N9	0.7	74	FAIL	3.2%	FAIL
P3-L10 CLUSTER BED N10	0.7	74	FAIL	3.2%	FAIL
P3-L10 CLUSTER BED N11	0.7	76	FAIL	3.2%	FAIL
P3-L11 CLUSTER BED N1	1	76	FAIL	3.5%	FAIL
P3-L11 CLUSTER BED N2	0.5	76	FAIL	3.1%	FAIL
P3-L11 CLUSTER BED N3	0.6	73	FAIL	3.1%	FAIL
P3-L11 CLUSTER BED N4	0.6	73	FAIL	3.2%	FAIL
P3-L11 CLUSTER BED N5	0.5	74	FAIL	3.2%	FAIL
P3-L11 CLUSTER BED N6	0.4	77	FAIL	3.4%	FAIL
P3-L11 CLUSTER BED N7	0.7	81	FAIL	3.4%	FAIL
P3-L11 CLUSTER BED N8	0.7	76	FAIL	3.2%	FAIL

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L11 ACC. CLUSTER BED N1	0.7	92	FAIL	3.7%	FAIL
P3-L11 CLUSTER BED N9	0.7	75	FAIL	3.2%	FAIL
P3-L11 CLUSTER BED N10	0.7	75	FAIL	3.2%	FAIL
P3-L11 CLUSTER BED N11	0.7	76	FAIL	3.2%	FAIL
P3-L12 CLUSTER BED N1	1	76	FAIL	3.5%	FAIL
P3-L12 CLUSTER BED N2	0.5	77	FAIL	3.2%	FAIL
P3-L12 CLUSTER BED N3	0.6	73	FAIL	3.2%	FAIL
P3-L12 CLUSTER BED N4	0.6	74	FAIL	3.2%	FAIL
P3-L12 CLUSTER BED N5	0.5	74	FAIL	3.2%	FAIL
P3-L12 CLUSTER BED N6	0.4	77	FAIL	3.4%	FAIL
P3-L12 CLUSTER BED N7	0.7	81	FAIL	3.4%	FAIL
P3-L12 CLUSTER BED N8	0.7	76	FAIL	3.2%	FAIL
P3-L12 ACC. CLUSTER BED N1	0.7	93	FAIL	3.7%	FAIL
P3-L12 CLUSTER BED N9	0.7	75	FAIL	3.2%	FAIL
P3-L12 CLUSTER BED N10	0.7	75	FAIL	3.2%	FAIL
P3-L12 CLUSTER BED N11	0.7	77	FAIL	3.2%	FAIL
P3-L13 CLUSTER BED N1	1	76	FAIL	3.5%	FAIL
P3-L13 CLUSTER BED N2	0.5	77	FAIL	3.2%	FAIL
P3-L13 CLUSTER BED N3	0.6	73	FAIL	3.1%	FAIL
P3-L13 CLUSTER BED N4	0.6	74	FAIL	3.2%	FAIL
P3-L13 CLUSTER BED N5	0.6	74	FAIL	3.2%	FAIL
P3-L13 CLUSTER BED N6	0.4	77	FAIL	3.4%	FAIL
P3-L13 CLUSTER BED N7	0.7	81	FAIL	3.4%	FAIL
P3-L13 CLUSTER BED N8	0.7	77	FAIL	3.2%	FAIL
P3-L13 ACC. CLUSTER BED N1	0.7	93	FAIL	3.8%	FAIL
P3-L13 CLUSTER BED N9	0.7	75	FAIL	3.2%	FAIL
P3-L13 CLUSTER BED N10	0.7	75	FAIL	3.2%	FAIL
P3-L13 CLUSTER BED N11	0.7	77	FAIL	3.2%	FAIL
P3-L14 CLUSTER BED N1	1	76	FAIL	3.5%	FAIL
P3-L14 CLUSTER BED N2	0.5	77	FAIL	3.2%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L14 CLUSTER BED N3	0.6	73	FAIL	3.1%	FAIL
P3-L14 CLUSTER BED N4	0.6	74	FAIL	3.2%	FAIL
P3-L14 CLUSTER BED N5	0.6	74	FAIL	3.2%	FAIL
P3-L14 CLUSTER BED N6	0.4	77	FAIL	3.4%	FAIL
P3-L14 CLUSTER BED N7	0.8	81	FAIL	3.4%	FAIL
P3-L14 CLUSTER BED N8	0.7	77	FAIL	3.2%	FAIL
P3-L14 ACC. CLUSTER BED N1	0.7	93	FAIL	3.8%	FAIL
P3-L14 CLUSTER BED N9	0.7	75	FAIL	3.2%	FAIL
P3-L14 CLUSTER BED N10	0.7	75	FAIL	3.2%	FAIL
P3-L14 CLUSTER BED N11	0.7	77	FAIL	3.2%	FAIL
P3-L15 CLUSTER BED N1	1	76	FAIL	3.5%	FAIL
P3-L15 CLUSTER BED N2	0.6	78	FAIL	3.2%	FAIL
P3-L15 CLUSTER BED N3	0.6	73	FAIL	3.1%	FAIL
P3-L15 CLUSTER BED N4	0.6	74	FAIL	3.2%	FAIL
P3-L15 CLUSTER BED N5	0.6	74	FAIL	3.2%	FAIL
P3-L15 CLUSTER BED N6	0.4	77	FAIL	3.4%	FAIL
P3-L15 CLUSTER BED N7	0.8	81	FAIL	3.4%	FAIL
P3-L15 CLUSTER BED N8	0.7	77	FAIL	3.3%	FAIL
P3-L15 ACC. CLUSTER BED N1	0.7	93	FAIL	3.8%	FAIL
P3-L15 CLUSTER BED N9	0.7	76	FAIL	3.2%	FAIL
P3-L15 CLUSTER BED N10	0.7	75	FAIL	3.2%	FAIL
P3-L15 CLUSTER BED N11	0.7	78	FAIL	3.2%	FAIL
P3-L16 CLUSTER BED N1	1	77	FAIL	3.5%	FAIL
P3-L16 CLUSTER BED N2	0.6	78	FAIL	3.2%	FAIL
P3-L16 CLUSTER BED N3	0.6	74	FAIL	3.2%	FAIL
P3-L16 CLUSTER BED N4	0.6	74	FAIL	3.3%	FAIL
P3-L16 CLUSTER BED N5	0.6	74	FAIL	3.2%	FAIL
P3-L16 CLUSTER BED N6	0.4	77	FAIL	3.4%	FAIL
P3-L16 CLUSTER BED N7	0.8	81	FAIL	3.4%	FAIL
P3-L16 CLUSTER BED N8	0.7	77	FAIL	3.3%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L16 ACC. CLUSTER BED N1	0.7	93	FAIL	3.8%	FAIL
P3-L16 CLUSTER BED N9	0.7	76	FAIL	3.2%	FAIL
P3-L16 CLUSTER BED N10	0.7	75	FAIL	3.2%	FAIL
P3-L16 CLUSTER BED N11	0.7	79	FAIL	3.3%	FAIL
P3-L17 CLUSTER BED N1	1	78	FAIL	3.6%	FAIL
P3-L17 CLUSTER BED N2	0.5	79	FAIL	3.2%	FAIL
P3-L17 CLUSTER BED N3	0.6	74	FAIL	3.2%	FAIL
P3-L17 CLUSTER BED N4	0.6	74	FAIL	3.3%	FAIL
P3-L17 CLUSTER BED N5	0.6	74	FAIL	3.2%	FAIL
P3-L17 CLUSTER BED N6	0.4	77	FAIL	3.4%	FAIL
P3-L17 CLUSTER BED N7	0.8	81	FAIL	3.4%	FAIL
P3-L17 CLUSTER BED N8	0.7	77	FAIL	3.3%	FAIL
P3-L17 ACC. CLUSTER BED N1	0.7	93	FAIL	3.8%	FAIL
P3-L17 CLUSTER BED N9	0.7	76	FAIL	3.2%	FAIL
P3-L17 CLUSTER BED N10	0.7	76	FAIL	3.2%	FAIL
P3-L17 CLUSTER BED N11	0.7	79	FAIL	3.3%	FAIL
P3-L18 CLUSTER BED N1	1	77	FAIL	3.7%	FAIL
P3-L18 CLUSTER BED N2	0.4	77	FAIL	3.3%	FAIL
P3-L18 CLUSTER BED N3	0.5	75	FAIL	3.3%	FAIL
P3-L18 CLUSTER BED N4	0.5	75	FAIL	3.3%	FAIL
P3-L18 CLUSTER BED N5	0.5	75	FAIL	3.3%	FAIL
P3-L18 CLUSTER BED N6	0.3	75	FAIL	3.5%	FAIL
P3-L18 CLUSTER BED N7	0.8	81	FAIL	3.5%	FAIL
P3-L18 CLUSTER BED N8	0.7	78	FAIL	3.3%	FAIL
P3-L18 ACC. CLUSTER BED N1	0.6	92	FAIL	3.8%	FAIL
P3-L18 CLUSTER BED N9	0.7	77	FAIL	3.3%	FAIL
P3-L18 CLUSTER BED N10	0.7	77	FAIL	3.3%	FAIL
P3-L18 CLUSTER BED N11	0.6	78	FAIL	3.3%	FAIL
P3-L09 CLUSTER BED N1	0.7	74	FAIL	3.2%	FAIL
P3-L09 CLUSTER BED N2	0.6	72	FAIL	2.9%	PASS

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L09 CLUSTER BED N3	0.5	71	FAIL	2.8%	PASS
P3-L09 CLUSTER BED N4	0.6	72	FAIL	3.0%	PASS
P3-L09 CLUSTER BED N5	0.6	73	FAIL	3.0%	FAIL
P3-L09 CLUSTER BED N6	0.6	73	FAIL	3.1%	FAIL
P3-L09 CLUSTER BED N7	0.6	73	FAIL	3.2%	FAIL
P3-L09 CLUSTER BED N8	1.3	85	FAIL	3.9%	FAIL
P3-L09 CLUSTER BED N9	1	83	FAIL	3.7%	FAIL
P3-L09 CLUSTER BED N10	0.8	83	FAIL	3.6%	FAIL
P3-L09 CLUSTER BED N11	0.9	80	FAIL	3.6%	FAIL
P3-L09 CLUSTER BED N12	0.8	80	FAIL	3.6%	FAIL
P3-L09 CLUSTER BED N13	0.7	74	FAIL	3.3%	FAIL
P3-L10 CLUSTER BED N12	0.9	80	FAIL	3.3%	FAIL
P3-L10 CLUSTER BED N13	0.7	73	FAIL	3.0%	FAIL
P3-L10 CLUSTER BED N14	0.6	76	FAIL	3.1%	FAIL
P3-L10 CLUSTER BED N15	0.7	73	FAIL	3.1%	FAIL
P3-L10 CLUSTER BED N16	0.8	78	FAIL	3.2%	FAIL
P3-L10 CLUSTER BED N17	0.8	79	FAIL	3.4%	FAIL
P3-L10 CLUSTER BED N18	0.7	78	FAIL	3.3%	FAIL
P3-L10 CLUSTER BED N19	1.4	86	FAIL	3.9%	FAIL
P3-L10 CLUSTER BED N20	1.1	83	FAIL	3.7%	FAIL
P3-L10 CLUSTER BED N21	0.9	83	FAIL	3.7%	FAIL
P3-L10 CLUSTER BED N22	1	82	FAIL	3.7%	FAIL
P3-L10 CLUSTER BED N23	0.9	82	FAIL	3.7%	FAIL
P3-L10 CLUSTER BED N24	0.7	75	FAIL	3.3%	FAIL
P3-L11 CLUSTER BED N12	1	83	FAIL	3.4%	FAIL
P3-L11 CLUSTER BED N13	0.7	73	FAIL	3.1%	FAIL
P3-L11 CLUSTER BED N14	0.7	79	FAIL	3.1%	FAIL
P3-L11 CLUSTER BED N15	0.8	77	FAIL	3.2%	FAIL
P3-L11 CLUSTER BED N16	0.8	79	FAIL	3.3%	FAIL
P3-L11 CLUSTER BED N17	0.8	79	FAIL	3.4%	FAIL

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L11 CLUSTER BED N18	0.7	78	FAIL	3.3%	FAIL
P3-L11 CLUSTER BED N19	1.4	86	FAIL	3.9%	FAIL
P3-L11 CLUSTER BED N20	1.1	83	FAIL	3.7%	FAIL
P3-L11 CLUSTER BED N21	0.9	84	FAIL	3.7%	FAIL
P3-L11 CLUSTER BED N22	1	82	FAIL	3.7%	FAIL
P3-L11 CLUSTER BED N23	1	82	FAIL	3.7%	FAIL
P3-L11 CLUSTER BED N24	0.7	75	FAIL	3.3%	FAIL
P3-L12 CLUSTER BED N12	1.2	85	FAIL	3.6%	FAIL
P3-L12 CLUSTER BED N13	0.9	78	FAIL	3.4%	FAIL
P3-L12 CLUSTER BED N14	0.8	79	FAIL	3.3%	FAIL
P3-L12 CLUSTER BED N15	1	77	FAIL	3.4%	FAIL
P3-L12 CLUSTER BED N16	0.9	79	FAIL	3.4%	FAIL
P3-L12 CLUSTER BED N17	0.9	80	FAIL	3.5%	FAIL
P3-L12 CLUSTER BED N18	0.7	78	FAIL	3.5%	FAIL
P3-L12 CLUSTER BED N19	1.4	86	FAIL	3.9%	FAIL
P3-L12 CLUSTER BED N20	1.2	83	FAIL	3.7%	FAIL
P3-L12 CLUSTER BED N21	1	84	FAIL	3.7%	FAIL
P3-L12 CLUSTER BED N22	1	82	FAIL	3.7%	FAIL
P3-L12 CLUSTER BED N23	1	82	FAIL	3.7%	FAIL
P3-L12 CLUSTER BED N24	0.7	75	FAIL	3.3%	FAIL
P3-L13 CLUSTER BED N12	1.3	85	FAIL	3.8%	FAIL
P3-L13 CLUSTER BED N13	0.9	79	FAIL	3.5%	FAIL
P3-L13 CLUSTER BED N14	0.8	79	FAIL	3.4%	FAIL
P3-L13 CLUSTER BED N15	0.9	79	FAIL	3.6%	FAIL
P3-L13 CLUSTER BED N16	0.8	81	FAIL	3.5%	FAIL
P3-L13 CLUSTER BED N17	0.7	80	FAIL	3.5%	FAIL
P3-L13 CLUSTER BED N18	0.7	78	FAIL	3.4%	FAIL
P3-L13 CLUSTER BED N19	1.4	86	FAIL	3.9%	FAIL
P3-L13 CLUSTER BED N20	1.1	83	FAIL	3.7%	FAIL
P3-L13 CLUSTER BED N21	1	84	FAIL	3.7%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L13 CLUSTER BED N22	1	82	FAIL	3.7%	FAIL
P3-L13 CLUSTER BED N23	1	82	FAIL	3.7%	FAIL
P3-L13 CLUSTER BED N24	0.7	75	FAIL	3.3%	FAIL
P3-L14 CLUSTER BED N12	1.3	85	FAIL	3.9%	FAIL
P3-L14 CLUSTER BED N13	1	82	FAIL	3.8%	FAIL
P3-L14 CLUSTER BED N14	0.9	81	FAIL	3.5%	FAIL
P3-L14 CLUSTER BED N15	0.9	81	FAIL	3.7%	FAIL
P3-L14 CLUSTER BED N16	0.9	81	FAIL	3.6%	FAIL
P3-L14 CLUSTER BED N17	0.9	81	FAIL	3.6%	FAIL
P3-L14 CLUSTER BED N18	0.7	78	FAIL	3.5%	FAIL
P3-L14 CLUSTER BED N19	1.4	86	FAIL	3.9%	FAIL
P3-L14 CLUSTER BED N20	1.2	84	FAIL	3.8%	FAIL
P3-L14 CLUSTER BED N21	1	84	FAIL	3.7%	FAIL
P3-L14 CLUSTER BED N22	1.1	82	FAIL	3.7%	FAIL
P3-L14 CLUSTER BED N23	1	82	FAIL	3.7%	FAIL
P3-L14 CLUSTER BED N24	0.7	75	FAIL	3.3%	FAIL
P3-L15 CLUSTER BED N12	1.2	86	FAIL	3.9%	FAIL
P3-L15 CLUSTER BED N13	0.9	81	FAIL	3.7%	FAIL
P3-L15 CLUSTER BED N14	0.8	81	FAIL	3.5%	FAIL
P3-L15 CLUSTER BED N15	0.9	81	FAIL	3.6%	FAIL
P3-L15 CLUSTER BED N16	0.8	81	FAIL	3.6%	FAIL
P3-L15 CLUSTER BED N17	0.8	81	FAIL	3.5%	FAIL
P3-L15 CLUSTER BED N18	0.7	78	FAIL	3.5%	FAIL
P3-L15 CLUSTER BED N19	1.4	86	FAIL	3.9%	FAIL
P3-L15 CLUSTER BED N20	1.1	84	FAIL	3.7%	FAIL
P3-L15 CLUSTER BED N21	1	84	FAIL	3.7%	FAIL
P3-L15 CLUSTER BED N22	1	82	FAIL	3.7%	FAIL
P3-L15 CLUSTER BED N23	1	82	FAIL	3.7%	FAIL
P3-L15 CLUSTER BED N24	0.7	75	FAIL	3.3%	FAIL
P3-L16 CLUSTER BED N12	1.3	86	FAIL	4.0%	FAIL
P3-L16 CLUSTER BED N13	1	82	FAIL	3.8%	FAIL
P3-L16 CLUSTER BED N14	0.9	81	FAIL	3.5%	FAIL
P3-L16 CLUSTER BED N15	0.9	81	FAIL	3.7%	FAIL
P3-L16 CLUSTER BED N16	0.9	81	FAIL	3.6%	FAIL
P3-L16 CLUSTER BED N17	0.9	81	FAIL	3.6%	FAIL
P3-L16 CLUSTER BED N18	0.7	78	FAIL	3.5%	FAIL
P3-L16 CLUSTER BED N19	1.4	86	FAIL	3.9%	FAIL
P3-L16 CLUSTER BED N20	1.2	84	FAIL	3.8%	FAIL
P3-L16 CLUSTER BED N21	1	85	FAIL	3.7%	FAIL
P3-L16 CLUSTER BED N22	1.1	82	FAIL	3.7%	FAIL
P3-L16 CLUSTER BED N23	1	82	FAIL	3.7%	FAIL
P3-L16 CLUSTER BED N24	0.7	75	FAIL	3.3%	FAIL
P3-L17 CLUSTER BED N12	1.3	86	FAIL	3.9%	FAIL
P3-L17 CLUSTER BED N13	0.9	82	FAIL	3.7%	FAIL
P3-L17 CLUSTER BED N14	0.8	81	FAIL	3.5%	FAIL
P3-L17 CLUSTER BED N15	0.9	81	FAIL	3.6%	FAIL
P3-L17 CLUSTER BED N16	0.8	81	FAIL	3.6%	FAIL
P3-L17 CLUSTER BED N17	0.7	80	FAIL	3.5%	FAIL
P3-L17 CLUSTER BED N18	0.7	78	FAIL	3.4%	FAIL
P3-L17 CLUSTER BED N19	1.4	86	FAIL	3.9%	FAIL
P3-L17 CLUSTER BED N20	1.2	84	FAIL	3.7%	FAIL
P3-L17 CLUSTER BED N21	1	85	FAIL	3.7%	FAIL
P3-L17 CLUSTER BED N22	1.1	82	FAIL	3.7%	FAIL
P3-L17 CLUSTER BED N23	1	82	FAIL	3.7%	FAIL
P3-L17 CLUSTER BED N24	0.7	75	FAIL	3.3%	FAIL
P3-L18 CLUSTER BED N12	1.3	86	FAIL	4.0%	FAIL
P3-L18 CLUSTER BED N13	1	82	FAIL	3.8%	FAIL
P3-L18 CLUSTER BED N14	0.9	81	FAIL	3.6%	FAIL
P3-L18 CLUSTER BED N15	0.9	81	FAIL	3.7%	FAIL
P3-L18 CLUSTER BED N16	0.9	81	FAIL	3.7%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L18 CLUSTER BED N17	0.8	81	FAIL	3.6%	FAIL
P3-L18 CLUSTER BED N18	0.8	78	FAIL	3.5%	FAIL
P3-L18 CLUSTER BED N19	1.4	86	FAIL	3.9%	FAIL
P3-L18 CLUSTER BED N20	1.2	85	FAIL	3.8%	FAIL
P3-L18 CLUSTER BED N21	1	85	FAIL	3.7%	FAIL
P3-L18 CLUSTER BED N22	1.1	82	FAIL	3.7%	FAIL
P3-L18 CLUSTER BED N23	1	82	FAIL	3.7%	FAIL
P3-L18 CLUSTER BED N24	0.7	76	FAIL	3.3%	FAIL
P3-L19 CLUSTER BED N1	1.2	86	FAIL	3.9%	FAIL
P3-L19 CLUSTER BED N2	0.9	82	FAIL	3.7%	FAIL
P3-L19 CLUSTER BED N3	0.8	81	FAIL	3.5%	FAIL
P3-L19 CLUSTER BED N4	0.9	81	FAIL	3.7%	FAIL
P3-L19 CLUSTER BED N5	0.9	81	FAIL	3.6%	FAIL
P3-L19 CLUSTER BED N6	0.8	81	FAIL	3.5%	FAIL
P3-L19 CLUSTER BED N7	0.7	78	FAIL	3.5%	FAIL
P3-L19 CLUSTER BED N8	1.4	86	FAIL	3.9%	FAIL
P3-L19 CLUSTER BED N9	1.2	85	FAIL	3.7%	FAIL
P3-L19 CLUSTER BED N10	1	85	FAIL	3.7%	FAIL
P3-L19 CLUSTER BED N11	1.1	82	FAIL	3.7%	FAIL
P3-L19 CLUSTER BED N12	1	82	FAIL	3.7%	FAIL
P3-L19 CLUSTER BED N13	0.7	76	FAIL	3.3%	FAIL
P3-L20 CLUSTER BED N1	1.3	87	FAIL	4.0%	FAIL
P3-L20 CLUSTER BED N2	1	82	FAIL	3.8%	FAIL
P3-L20 CLUSTER BED N3	0.9	81	FAIL	3.6%	FAIL
P3-L20 CLUSTER BED N4	0.9	81	FAIL	3.7%	FAIL
P3-L20 CLUSTER BED N5	0.9	81	FAIL	3.7%	FAIL
P3-L20 CLUSTER BED N6	0.9	81	FAIL	3.6%	FAIL
P3-L20 CLUSTER BED N7	0.8	78	FAIL	3.5%	FAIL
P3-L20 CLUSTER BED N8	1.4	86	FAIL	3.9%	FAIL
P3-L20 CLUSTER BED N9	1.2	85	FAIL	3.8%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L20 CLUSTER BED N10	1	84	FAIL	3.7%	FAIL
P3-L20 CLUSTER BED N11	1	82	FAIL	3.7%	FAIL
P3-L20 CLUSTER BED N12	1	82	FAIL	3.7%	FAIL
P3-L20 CLUSTER BED N13	0.7	76	FAIL	3.3%	FAIL
P3-L21 CLUSTER BED N1	1.3	83	FAIL	4.0%	FAIL
P3-L21 CLUSTER BED N2	1	79	FAIL	3.8%	FAIL
P3-L21 CLUSTER BED N3	0.9	80	FAIL	3.7%	FAIL
P3-L21 CLUSTER BED N4	0.9	79	FAIL	3.7%	FAIL
P3-L21 CLUSTER BED N5	0.9	80	FAIL	3.7%	FAIL
P3-L21 CLUSTER BED N6	0.9	79	FAIL	3.6%	FAIL
P3-L21 CLUSTER BED N7	0.7	78	FAIL	3.6%	FAIL
P3-L21 CLUSTER BED N8	1.4	86	FAIL	4.0%	FAIL
P3-L21 CLUSTER BED N9	1	83	FAIL	3.8%	FAIL
P3-L21 CLUSTER BED N10	0.9	81	FAIL	3.6%	FAIL
P3-L21 CLUSTER BED N11	1	81	FAIL	3.7%	FAIL
P3-L21 CLUSTER BED N12	0.9	81	FAIL	3.7%	FAIL
P3-L21 CLUSTER BED N13	0.7	76	FAIL	3.4%	FAIL
P3-L04 CLUSTER BED N1	0.6	73	FAIL	3.2%	FAIL
P3-L04 CLUSTER BED N2	0.8	75	FAIL	3.4%	FAIL
P3-L04 CLUSTER BED N3	0.6	73	FAIL	3.2%	FAIL
P3-L04 CLUSTER BED N4	0.7	74	FAIL	3.3%	FAIL
P3-L04 CLUSTER BED N5	0.6	74	FAIL	3.3%	FAIL
P3-L04 CLUSTER BED N6	0.5	78	FAIL	3.4%	FAIL
P3-L04 ACC. CLUSTER BED N1	0.4	83	FAIL	3.5%	FAIL
P3-L04 CLUSTER BED N7	0.7	74	FAIL	3.3%	FAIL
P3-L04 CLUSTER BED N8	0.6	72	FAIL	3.2%	FAIL
P3-L04 CLUSTER BED N9	0.6	72	FAIL	3.1%	FAIL
P3-L04 CLUSTER BED N10	0.7	77	FAIL	3.3%	FAIL
P3-L04 CLUSTER BED N11	0.7	74	FAIL	3.2%	FAIL
P3-L04 CLUSTER BED N12	0.6	72	FAIL	3.1%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L04 CLUSTER BED N13	0.6	72	FAIL	3.0%	FAIL
P3-L04 CLUSTER BED N14	0.6	72	FAIL	3.1%	FAIL
P3-L04 CLUSTER BED N15	0.6	72	FAIL	3.1%	FAIL
P3-L04 ACC. CLUSTER BED N3	0.3	81	FAIL	3.1%	FAIL
P3-L04 ACC. CLUSTER BED N2	0.6	89	FAIL	3.6%	FAIL
P3-L04 CLUSTER BED N16	0.6	80	FAIL	3.3%	FAIL
P3-L04 CLUSTER BED N17	0.6	74	FAIL	3.1%	FAIL
P3-L04 CLUSTER BED N18	0.6	74	FAIL	3.1%	FAIL
P3-L04 CLUSTER BED N19	0.6	72	FAIL	3.1%	FAIL
P3-L04 CLUSTER BED N20	0.6	72	FAIL	3.0%	FAIL
P3-L04 CLUSTER BED N21	0.5	72	FAIL	3.0%	FAIL
P3-L04 CLUSTER BED N22	0.6	73	FAIL	3.1%	FAIL
P3-L04 CLUSTER BED N23	0.6	73	FAIL	3.0%	FAIL
P3-L04 CLUSTER BED N24	0.5	72	FAIL	2.9%	PASS
P3-L04 CLUSTER BED N25	0.5	71	FAIL	2.8%	PASS
P3-L04 CLUSTER BED N26	0.5	72	FAIL	2.8%	PASS
P3-L04 CLUSTER BED N27	0.6	73	FAIL	3.2%	FAIL
P3-L04 CLUSTER BED N28	0.7	77	FAIL	3.4%	FAIL
P3-L04 CLUSTER BED N29	0.6	72	FAIL	3.1%	FAIL
P3-L04 CLUSTER BED N30	0.5	72	FAIL	3.0%	PASS
P3-L04 CLUSTER BED N31	0.6	72	FAIL	3.0%	FAIL
P3-L04 CLUSTER BED N32	0.6	72	FAIL	3.0%	FAIL
P3-L04 CLUSTER BED N33	0.5	80	FAIL	3.3%	FAIL
P3-L05 CLUSTER BED N1	0.6	73	FAIL	3.3%	FAIL
P3-L05 CLUSTER BED N2	0.8	76	FAIL	3.5%	FAIL
P3-L05 CLUSTER BED N3	0.6	73	FAIL	3.3%	FAIL
P3-L05 CLUSTER BED N4	0.6	73	FAIL	3.3%	FAIL
P3-L05 CLUSTER BED N5	0.6	73	FAIL	3.3%	FAIL
P3-L05 CLUSTER BED N6	0.4	76	FAIL	3.5%	FAIL
P3-L05 ACC. CLUSTER BED N1	0.4	83	FAIL	3.5%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L05 CLUSTER BED N7	0.6	74	FAIL	3.3%	FAIL
P3-L05 CLUSTER BED N8	0.6	73	FAIL	3.2%	FAIL
P3-L05 CLUSTER BED N9	0.6	73	FAIL	3.1%	FAIL
P3-L05 CLUSTER BED N10	0.7	77	FAIL	3.3%	FAIL
P3-L05 CLUSTER BED N11	0.7	74	FAIL	3.2%	FAIL
P3-L05 CLUSTER BED N12	0.6	73	FAIL	3.1%	FAIL
P3-L05 CLUSTER BED N13	0.6	72	FAIL	3.0%	FAIL
P3-L05 CLUSTER BED N14	0.6	73	FAIL	3.1%	FAIL
P3-L05 CLUSTER BED N15	0.6	72	FAIL	3.1%	FAIL
P3-L05 ACC. CLUSTER BED N3	0.3	82	FAIL	3.1%	FAIL
P3-L05 ACC. CLUSTER BED N2	0.6	88	FAIL	3.5%	FAIL
P3-L05 CLUSTER BED N16	0.6	77	FAIL	3.2%	FAIL
P3-L05 CLUSTER BED N17	0.6	73	FAIL	3.1%	FAIL
P3-L05 CLUSTER BED N18	0.6	73	FAIL	3.1%	FAIL
P3-L05 CLUSTER BED N19	0.6	72	FAIL	3.1%	FAIL
P3-L05 CLUSTER BED N20	0.6	72	FAIL	3.0%	FAIL
P3-L05 CLUSTER BED N21	0.5	72	FAIL	3.0%	PASS
P3-L05 CLUSTER BED N22	0.6	72	FAIL	3.1%	FAIL
P3-L05 CLUSTER BED N23	0.6	72	FAIL	3.0%	PASS
P3-L05 CLUSTER BED N24	0.5	72	FAIL	2.9%	PASS
P3-L05 CLUSTER BED N25	0.5	71	FAIL	2.8%	PASS
P3-L05 CLUSTER BED N26	0.5	70	FAIL	2.8%	PASS
P3-L05 CLUSTER BED N27	0.6	74	FAIL	3.2%	FAIL
P3-L05 CLUSTER BED N28	0.8	77	FAIL	3.4%	FAIL
P3-L05 CLUSTER BED N29	0.6	73	FAIL	3.2%	FAIL
P3-L05 CLUSTER BED N30	0.6	73	FAIL	3.1%	FAIL
P3-L05 CLUSTER BED N31	0.6	73	FAIL	3.1%	FAIL
P3-L05 CLUSTER BED N32	0.6	73	FAIL	3.1%	FAIL
P3-L05 CLUSTER BED N33	0.6	80	FAIL	3.4%	FAIL
P3-L06 CLUSTER BED N1	0.4	74	FAIL	3.3%	FAIL

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L06 CLUSTER BED N2	0.6	79	FAIL	3.5%	FAIL
P3-L06 CLUSTER BED N3	0.4	73	FAIL	3.3%	FAIL
P3-L06 CLUSTER BED N4	0.3	73	FAIL	3.3%	FAIL
P3-L06 CLUSTER BED N5	0.3	73	FAIL	3.3%	FAIL
P3-L06 CLUSTER BED N6	0	73	FAIL	3.3%	FAIL
P3-L06 ACC. CLUSTER BED N1	0.2	80	FAIL	3.4%	FAIL
P3-L06 CLUSTER BED N7	0.4	71	FAIL	3.1%	FAIL
P3-L06 CLUSTER BED N8	0.4	72	FAIL	3.0%	PASS
P3-L06 CLUSTER BED N9	0.4	72	FAIL	2.9%	PASS
P3-L06 CLUSTER BED N10	0.6	76	FAIL	3.2%	FAIL
P3-L06 CLUSTER BED N11	0.5	74	FAIL	3.0%	FAIL
P3-L06 CLUSTER BED N12	0.4	74	FAIL	2.9%	PASS
P3-L06 CLUSTER BED N13	0.4	71	FAIL	2.8%	PASS
P3-L06 CLUSTER BED N14	0.4	72	FAIL	2.9%	PASS
P3-L06 CLUSTER BED N15	0.3	71	FAIL	2.9%	PASS
P3-L06 ACC. CLUSTER BED N3	0.1	82	FAIL	3.1%	FAIL
P3-L06 ACC. CLUSTER BED N2	0.1	81	FAIL	3.3%	FAIL
P3-L06 CLUSTER BED N16	0.4	75	FAIL	3.2%	FAIL
P3-L06 CLUSTER BED N17	0.4	71	FAIL	3.0%	FAIL
P3-L06 CLUSTER BED N18	0.3	71	FAIL	3.0%	PASS
P3-L06 CLUSTER BED N19	0.3	71	FAIL	3.0%	PASS
P3-L06 CLUSTER BED N20	0.5	72	FAIL	3.0%	FAIL
P3-L06 CLUSTER BED N21	0.1	69	FAIL	2.9%	PASS
P3-L06 CLUSTER BED N22	0.4	71	FAIL	3.0%	FAIL
P3-L06 CLUSTER BED N23	0.4	71	FAIL	2.9%	PASS
P3-L06 CLUSTER BED N24	0.4	70	FAIL	2.9%	PASS
P3-L06 CLUSTER BED N25	0.2	69	FAIL	2.7%	PASS
P3-L06 CLUSTER BED N26	0.3	70	FAIL	2.8%	PASS
P3-L06 CLUSTER BED N27	0.5	73	FAIL	3.1%	FAIL
P3-L06 CLUSTER BED N28	0.6	76	FAIL	3.3%	FAIL
P3-L06 CLUSTER BED N29	0.4	71	FAIL	3.1%	FAIL
P3-L06 CLUSTER BED N30	0.2	72	FAIL	3.0%	FAIL
P3-L06 CLUSTER BED N31	0.3	72	FAIL	3.1%	FAIL
P3-L06 CLUSTER BED N32	0.2	72	FAIL	3.1%	FAIL
P3-L06 CLUSTER BED N33	0.1	72	FAIL	3.2%	FAIL
P3-L09 CLUSTER BED N14	0.7	76	FAIL	3.2%	FAIL
P3-L09 CLUSTER BED N15	0.6	73	FAIL	3.2%	FAIL
P3-L09 CLUSTER BED N16	0.6	73	FAIL	3.2%	FAIL
P3-L09 ACC. CLUSTER BED N1	0.6	89	FAIL	3.7%	FAIL
P3-L09 CLUSTER BED N17	0.6	74	FAIL	3.2%	FAIL
P3-L09 CLUSTER BED N18	0.7	77	FAIL	3.4%	FAIL
P3-L09 CLUSTER BED N19	0.4	73	FAIL	3.3%	FAIL
P3-L09 CLUSTER BED N20	0.6	73	FAIL	3.1%	FAIL
P3-L09 CLUSTER BED N21	0.6	73	FAIL	3.2%	FAIL
P3-L09 CLUSTER BED N22	0.6	73	FAIL	3.1%	FAIL
P3-L09 CLUSTER BED N23	0.5	73	FAIL	3.1%	FAIL
P3-L09 CLUSTER BED N24	0.9	77	FAIL	3.5%	FAIL

Table A.18 TM59 overheating results for living/kitchen spaces in Plot 3 under the DSY2 2020 weather file.

	Natural ventilation criteria		Mechanical ventilation criteria	
Room Name	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
P3-L18 CLUSTER LIVING/KITCHEN N2	6	FAIL	8.9%	FAIL
P3-L18 CLUSTER LIVING/KITCHEN N1	5.5	FAIL	8.3%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N4	4.2	FAIL	8.3%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N3	4.7	FAIL	8.2%	FAIL
P3-L21 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	9.6%	FAIL
P3-L21 CLUSTER LIVING/KITCHEN N1	5.7	FAIL	9.4%	FAIL
P3-L20 CLUSTER LIVING/KITCHEN N2	5.8	FAIL	9.5%	FAIL
P3-L20 CLUSTER LIVING/KITCHEN N1	5.7	FAIL	9.4%	FAIL
P3-L19 CLUSTER LIVING/KITCHEN N2	5.4	FAIL	9.4%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria	
Room Name	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
P3-L19 CLUSTER LIVING/KITCHEN N1	5.6	FAIL	9.2%	FAIL
P3-L18 CLUSTER LIVING/KITCHEN N4	5.7	FAIL	9.5%	FAIL
P3-L18 CLUSTER LIVING/KITCHEN N3	5.7	FAIL	9.4%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	8.9%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N1	5.2	FAIL	8.2%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	8.8%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N1	5.2	FAIL	8.2%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N4	5.4	FAIL	9.4%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N3	5.6	FAIL	9.2%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N4	4.8	FAIL	8.7%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N3	5.1	FAIL	8.5%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N4	5.7	FAIL	9.6%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N3	5.7	FAIL	9.4%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N4	4.7	FAIL	8.7%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N3	5.1	FAIL	8.5%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	8.8%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N1	5.2	FAIL	8.2%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	8.9%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N1	5.2	FAIL	8.2%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N4	4.5	FAIL	8.6%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N3	5.1	FAIL	8.4%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N4	5.5	FAIL	9.4%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N3	5.6	FAIL	9.3%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N4	5.6	FAIL	9.6%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N3	5.6	FAIL	9.4%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N3	5	FAIL	8.4%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N4	4	FAIL	8.4%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N2	5.8	FAIL	8.9%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N1	5.2	FAIL	8.1%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N3	4.5	FAIL	8.2%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria	
Room Name	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
P3-L13 CLUSTER LIVING/KITCHEN N4	5.3	FAIL	9.3%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N3	5.6	FAIL	9.3%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	8.9%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N1	5.2	FAIL	8.1%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N4	5.5	FAIL	9.3%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N3	5.7	FAIL	9.4%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	8.9%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N1	5.2	FAIL	8.1%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N4	5.2	FAIL	9.1%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N3	5.7	FAIL	9.2%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	8.9%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N1	5.2	FAIL	8.1%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N4	5.3	FAIL	9.1%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N3	5.7	FAIL	9.4%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N3	5.8	FAIL	8.9%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N4	5.2	FAIL	8.1%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N2	5.4	FAIL	8.8%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N1	4.8	FAIL	8.0%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N2	4.9	FAIL	8.8%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N1	5.6	FAIL	9.3%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N4	4.7	FAIL	9.0%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N3	5.1	FAIL	9.4%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N2	4.5	FAIL	8.3%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N1	5	FAIL	8.9%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N5	4.7	FAIL	8.6%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N6	4.9	FAIL	7.9%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N2	4.7	FAIL	8.3%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N1	5.3	FAIL	8.8%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N5	5.1	FAIL	8.5%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N6	4.9	FAIL	7.8%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria	
Room Name	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
P3-L04 CLUSTER LIVING/KITCHEN N2	4.7	FAIL	8.3%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N1	5.3	FAIL	8.8%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N5	5	FAIL	8.5%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N6	4.9	FAIL	7.8%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N2	4.6	FAIL	8.2%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N1	5.2	FAIL	8.8%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N5	4.9	FAIL	8.3%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N6	4.9	FAIL	7.7%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N2	4.6	FAIL	8.2%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N1	5.2	FAIL	8.8%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N5	4.4	FAIL	8.0%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N6	4.7	FAIL	7.7%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N5	4.1	FAIL	8.1%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N4	4.7	FAIL	8.7%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N1	4.3	FAIL	8.4%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N2	3.8	FAIL	8.4%	FAIL

A.3.4 DSY1 2050 Overheating results.

Table A.19 TM59 overheating results for bedroom spaces in Plot 3 under the DSY1 2050 weather file.

	Natural ventilation criteria			Mechanical ventilation criteria	
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L02 CLUSTER BED N1	0.6	79	FAIL	4.1%	FAIL
P3-L02 CLUSTER BED N2	0.6	81	FAIL	4.2%	FAIL
P3-L02 CLUSTER BED N3	0.5	75	FAIL	3.9%	FAIL
P3-L02 CLUSTER BED N4	0.4	71	FAIL	3.9%	FAIL
P3-L02 CLUSTER BED N5	0.5	72	FAIL	3.9%	FAIL
P3-L02 CLUSTER BED N6	0.4	73	FAIL	4.1%	FAIL
P3-L02 ACC. CLUSTER BED N1	0.3	81	FAIL	4.3%	FAIL
P3-L02 CLUSTER BED N7	0.6	72	FAIL	4.0%	FAIL
P3-L02 CLUSTER BED N8	0.5	71	FAIL	3.9%	FAIL
P3-L02 CLUSTER BED N9	0.5	71	FAIL	3.8%	FAIL
P3-L02 CLUSTER BED N10	0.6	77	FAIL	4.2%	FAIL
P3-L02 CLUSTER BED N11	0.6	76	FAIL	4.1%	FAIL
P3-L02 CLUSTER BED N12	0.4	72	FAIL	3.8%	FAIL
P3-L02 CLUSTER BED N13	0.4	71	FAIL	3.7%	FAIL
P3-L02 CLUSTER BED N14	0.4	71	FAIL	3.8%	FAIL
P3-L02 CLUSTER BED N15	0.4	71	FAIL	3.9%	FAIL
P3-L02 ACC. CLUSTER BED N3	0.4	85	FAIL	3.9%	FAIL
P3-L02 ACC. CLUSTER BED N2	0.4	82	FAIL	4.3%	FAIL
P3-L02 CLUSTER BED N16	0.4	75	FAIL	4.0%	FAIL
P3-L02 CLUSTER BED N17	0.4	73	FAIL	3.9%	FAIL
P3-L02 CLUSTER BED N18	0.3	72	FAIL	4.1%	FAIL
P3-L02 CLUSTER BED N19	0.2	72	FAIL	4.1%	FAIL
P3-L02 CLUSTER BED N20	0.3	74	FAIL	4.0%	FAIL
P3-L02 CLUSTER BED N21	0.4	70	FAIL	3.6%	FAIL
P3-L02 CLUSTER BED N22	0.4	71	FAIL	3.7%	FAIL
P3-L02 CLUSTER BED N23	0.4	71	FAIL	3.6%	FAIL
P3-L02 CLUSTER BED N24	0.4	70	FAIL	3.5%	FAIL
P3-L02 CLUSTER BED N25	0.4	71	FAIL	3.5%	FAIL
P3-L02 CLUSTER BED N26	0.3	70	FAIL	3.5%	FAIL
P3-L02 CLUSTER BED N27	0.6	76	FAIL	4.0%	FAIL
P3-L02 CLUSTER BED N28	0.6	78	FAIL	4.3%	FAIL
P3-L02 CLUSTER BED N29	0.4	70	FAIL	3.7%	FAIL
P3-L02 CLUSTER BED N30	0.2	71	FAIL	3.6%	FAIL
P3-L02 CLUSTER BED N31	0.3	70	FAIL	3.6%	FAIL
P3-L02 CLUSTER BED N32	0.3	71	FAIL	3.6%	FAIL
P3-L02 CLUSTER BED N33	0.1	70	FAIL	3.8%	FAIL
P3-L01 ACC. CLUSTER BED N1	0	70	FAIL	4.1%	FAIL
P3-L01 CLUSTER BED N1	0.2	74	FAIL	4.3%	FAIL
P3-L01 CLUSTER BED N2	0.1	70	FAIL	4.0%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L01 CLUSTER BED N3	0	68	FAIL	3.9%	FAIL
P3-L01 CLUSTER BED N4	0	65	FAIL	3.9%	FAIL
P3-L01 CLUSTER BED N5	0	67	FAIL	3.9%	FAIL
P3-L01 CLUSTER BED N6	0	66	FAIL	3.9%	FAIL
P3-L01 CLUSTER BED N7	0	66	FAIL	3.8%	FAIL
P3-L01 CLUSTER BED N8	0	67	FAIL	3.8%	FAIL
P3-L01 CLUSTER BED N9	0	73	FAIL	4.1%	FAIL
P3-L01 CLUSTER BED N10	0.2	74	FAIL	4.1%	FAIL
P3-L01 CLUSTER BED N11	0.1	68	FAIL	3.9%	FAIL
P3-L01 CLUSTER BED N12	0	66	FAIL	3.8%	FAIL
P3-L01 CLUSTER BED N13	0.2	72	FAIL	4.3%	FAIL
P3-L01 CLUSTER BED N14	0.1	66	FAIL	3.8%	FAIL
P3-L01 ACC. CLUSTER BED N2	0	70	FAIL	4.1%	FAIL
P3-L01 CLUSTER BED N15	0	68	FAIL	4.1%	FAIL
P3-L01 CLUSTER BED N16	0	60	FAIL	4.1%	FAIL
P3-L01 CLUSTER BED N17	0	60	FAIL	3.4%	FAIL
P3-L01 CLUSTER BED N18	0	66	FAIL	3.6%	FAIL
P3-L01 CLUSTER BED N19	0	65	FAIL	3.5%	FAIL
P3-L01 CLUSTER BED N20	0	64	FAIL	3.4%	FAIL
P3-L01 CLUSTER BED N21	0	64	FAIL	3.3%	FAIL
P3-L01 CLUSTER BED N22	0	64	FAIL	3.4%	FAIL
P3-L01 CLUSTER BED N23	0.2	71	FAIL	4.1%	FAIL
P3-L01 CLUSTER BED N24	0.2	74	FAIL	4.3%	FAIL
P3-L01 CLUSTER BED N25	0	66	FAIL	3.7%	FAIL
P3-L01 CLUSTER BED N26	0	64	FAIL	3.5%	FAIL
P3-L01 CLUSTER BED N27	0	65	FAIL	3.6%	FAIL
P3-L01 CLUSTER BED N28	0	65	FAIL	3.5%	FAIL
P3-L01 CLUSTER BED N29	0	60	FAIL	3.6%	FAIL
P3-L03 CLUSTER BED N1	0.5	75	FAIL	3.9%	FAIL
P3-L03 CLUSTER BED N2	0.7	79	FAIL	4.3%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L03 CLUSTER BED N3	0.5	73	FAIL	4.0%	FAIL
P3-L03 CLUSTER BED N4	0.6	75	FAIL	4.1%	FAIL
P3-L03 CLUSTER BED N5	0.6	75	FAIL	4.1%	FAIL
P3-L03 CLUSTER BED N6	0.7	77	FAIL	4.3%	FAIL
P3-L03 ACC. CLUSTER BED N1	0.7	85	FAIL	4.5%	FAIL
P3-L03 CLUSTER BED N7	0.7	75	FAIL	4.2%	FAIL
P3-L03 CLUSTER BED N8	0.6	75	FAIL	4.0%	FAIL
P3-L03 CLUSTER BED N9	0.5	74	FAIL	3.9%	FAIL
P3-L03 CLUSTER BED N10	0.7	79	FAIL	4.2%	FAIL
P3-L03 CLUSTER BED N11	0.6	77	FAIL	4.1%	FAIL
P3-L03 CLUSTER BED N12	0.5	74	FAIL	3.9%	FAIL
P3-L03 CLUSTER BED N13	0.4	73	FAIL	3.8%	FAIL
P3-L03 CLUSTER BED N14	0.5	73	FAIL	3.9%	FAIL
P3-L03 CLUSTER BED N15	0.5	71	FAIL	3.9%	FAIL
P3-L03 ACC. CLUSTER BED N3	0.2	80	FAIL	3.9%	FAIL
P3-L03 ACC. CLUSTER BED N2	0.6	86	FAIL	4.5%	FAIL
P3-L03 CLUSTER BED N16	0.5	77	FAIL	4.1%	FAIL
P3-L03 CLUSTER BED N17	0.5	75	FAIL	3.9%	FAIL
P3-L03 CLUSTER BED N18	0.5	75	FAIL	3.9%	FAIL
P3-L03 CLUSTER BED N19	0.5	75	FAIL	3.9%	FAIL
P3-L03 CLUSTER BED N20	0.5	76	FAIL	3.8%	FAIL
P3-L03 CLUSTER BED N21	0.5	71	FAIL	3.7%	FAIL
P3-L03 CLUSTER BED N22	0.5	75	FAIL	3.8%	FAIL
P3-L03 CLUSTER BED N23	0.5	72	FAIL	3.7%	FAIL
P3-L03 CLUSTER BED N24	0.4	71	FAIL	3.6%	FAIL
P3-L03 CLUSTER BED N25	0.4	71	FAIL	3.5%	FAIL
P3-L03 CLUSTER BED N26	0.3	71	FAIL	3.5%	FAIL
P3-L03 CLUSTER BED N27	0.6	76	FAIL	4.1%	FAIL
P3-L03 CLUSTER BED N28	0.6	79	FAIL	4.3%	FAIL
P3-L03 CLUSTER BED N29	0.4	73	FAIL	3.8%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L03 CLUSTER BED N30	0.3	72	FAIL	3.7%	FAIL
P3-L03 CLUSTER BED N31	0.4	71	FAIL	3.7%	FAIL
P3-L03 CLUSTER BED N32	0.4	71	FAIL	3.7%	FAIL
P3-L03 CLUSTER BED N33	0.4	77	FAIL	4.0%	FAIL
P3-L08 CLUSTER BED N1	0.5	77	FAIL	4.9%	FAIL
P3-L08 CLUSTER BED N2	0	74	FAIL	4.1%	FAIL
P3-L08 CLUSTER BED N3	0.1	72	FAIL	4.2%	FAIL
P3-L08 CLUSTER BED N4	0.1	72	FAIL	4.3%	FAIL
P3-L08 CLUSTER BED N5	0.1	71	FAIL	4.2%	FAIL
P3-L08 CLUSTER BED N6	0	71	FAIL	4.4%	FAIL
P3-L08 CLUSTER BED N7	0.2	74	FAIL	4.5%	FAIL
P3-L08 CLUSTER BED N8	0.2	72	FAIL	4.3%	FAIL
P3-L08 ACC. CLUSTER BED N1	0	80	FAIL	4.7%	FAIL
P3-L08 CLUSTER BED N9	0.2	71	FAIL	4.3%	FAIL
P3-L08 CLUSTER BED N10	0.2	71	FAIL	4.2%	FAIL
P3-L08 CLUSTER BED N11	0.2	76	FAIL	4.2%	FAIL
P3-L08 CLUSTER BED N12	0.2	75	FAIL	4.3%	FAIL
P3-L08 CLUSTER BED N13	0.1	68	FAIL	3.7%	FAIL
P3-L08 CLUSTER BED N14	0	71	FAIL	3.7%	FAIL
P3-L08 CLUSTER BED N15	0.1	70	FAIL	3.9%	FAIL
P3-L08 CLUSTER BED N16	0.2	71	FAIL	4.0%	FAIL
P3-L08 CLUSTER BED N17	0.3	72	FAIL	4.1%	FAIL
P3-L08 CLUSTER BED N18	0.1	70	FAIL	4.2%	FAIL
P3-L08 CLUSTER BED N19	0.6	90	FAIL	5.4%	FAIL
P3-L08 CLUSTER BED N20	0.5	83	FAIL	5.2%	FAIL
P3-L08 CLUSTER BED N21	0.4	85	FAIL	5.0%	FAIL
P3-L08 CLUSTER BED N22	0.5	81	FAIL	5.1%	FAIL
P3-L08 CLUSTER BED N23	0.4	80	FAIL	5.0%	FAIL
P3-L08 CLUSTER BED N24	0.1	71	FAIL	4.6%	FAIL
P3-L10 CLUSTER BED N1	0.8	81	FAIL	4.6%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L10 CLUSTER BED N2	0.5	76	FAIL	3.9%	FAIL
P3-L10 CLUSTER BED N3	0.5	73	FAIL	3.9%	FAIL
P3-L10 CLUSTER BED N4	0.6	74	FAIL	4.1%	FAIL
P3-L10 CLUSTER BED N5	0.5	74	FAIL	4.0%	FAIL
P3-L10 CLUSTER BED N6	0.5	75	FAIL	4.2%	FAIL
P3-L10 CLUSTER BED N7	0.7	82	FAIL	4.4%	FAIL
P3-L10 CLUSTER BED N8	0.7	76	FAIL	4.1%	FAIL
P3-L10 ACC. CLUSTER BED N1	0.7	90	FAIL	4.8%	FAIL
P3-L10 CLUSTER BED N9	0.6	76	FAIL	4.1%	FAIL
P3-L10 CLUSTER BED N10	0.6	76	FAIL	4.1%	FAIL
P3-L10 CLUSTER BED N11	0.6	80	FAIL	4.0%	FAIL
P3-L11 CLUSTER BED N1	0.8	81	FAIL	4.6%	FAIL
P3-L11 CLUSTER BED N2	0.5	76	FAIL	3.9%	FAIL
P3-L11 CLUSTER BED N3	0.5	73	FAIL	4.0%	FAIL
P3-L11 CLUSTER BED N4	0.6	74	FAIL	4.1%	FAIL
P3-L11 CLUSTER BED N5	0.5	74	FAIL	4.0%	FAIL
P3-L11 CLUSTER BED N6	0.5	76	FAIL	4.3%	FAIL
P3-L11 CLUSTER BED N7	0.7	82	FAIL	4.4%	FAIL
P3-L11 CLUSTER BED N8	0.7	76	FAIL	4.1%	FAIL
P3-L11 ACC. CLUSTER BED N1	0.7	91	FAIL	4.8%	FAIL
P3-L11 CLUSTER BED N9	0.7	76	FAIL	4.1%	FAIL
P3-L11 CLUSTER BED N10	0.6	76	FAIL	4.1%	FAIL
P3-L11 CLUSTER BED N11	0.6	80	FAIL	4.0%	FAIL
P3-L12 CLUSTER BED N1	0.8	81	FAIL	4.7%	FAIL
P3-L12 CLUSTER BED N2	0.5	76	FAIL	3.9%	FAIL
P3-L12 CLUSTER BED N3	0.5	73	FAIL	4.0%	FAIL
P3-L12 CLUSTER BED N4	0.6	74	FAIL	4.1%	FAIL
P3-L12 CLUSTER BED N5	0.5	74	FAIL	4.1%	FAIL
P3-L12 CLUSTER BED N6	0.6	76	FAIL	4.3%	FAIL
P3-L12 CLUSTER BED N7	0.7	82	FAIL	4.5%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L12 CLUSTER BED N8	0.7	77	FAIL	4.2%	FAIL
P3-L12 ACC. CLUSTER BED N1	0.7	91	FAIL	4.8%	FAIL
P3-L12 CLUSTER BED N9	0.7	76	FAIL	4.1%	FAIL
P3-L12 CLUSTER BED N10	0.7	76	FAIL	4.1%	FAIL
P3-L12 CLUSTER BED N11	0.6	80	FAIL	4.0%	FAIL
P3-L13 CLUSTER BED N1	0.8	81	FAIL	4.7%	FAIL
P3-L13 CLUSTER BED N2	0.5	76	FAIL	3.9%	FAIL
P3-L13 CLUSTER BED N3	0.5	74	FAIL	4.0%	FAIL
P3-L13 CLUSTER BED N4	0.6	74	FAIL	4.1%	FAIL
P3-L13 CLUSTER BED N5	0.6	74	FAIL	4.1%	FAIL
P3-L13 CLUSTER BED N6	0.6	76	FAIL	4.3%	FAIL
P3-L13 CLUSTER BED N7	0.7	83	FAIL	4.5%	FAIL
P3-L13 CLUSTER BED N8	0.7	77	FAIL	4.2%	FAIL
P3-L13 ACC. CLUSTER BED N1	0.7	92	FAIL	4.8%	FAIL
P3-L13 CLUSTER BED N9	0.7	76	FAIL	4.1%	FAIL
P3-L13 CLUSTER BED N10	0.7	76	FAIL	4.1%	FAIL
P3-L13 CLUSTER BED N11	0.6	80	FAIL	4.0%	FAIL
P3-L14 CLUSTER BED N1	0.8	81	FAIL	4.7%	FAIL
P3-L14 CLUSTER BED N2	0.5	76	FAIL	3.9%	FAIL
P3-L14 CLUSTER BED N3	0.5	74	FAIL	4.0%	FAIL
P3-L14 CLUSTER BED N4	0.6	75	FAIL	4.1%	FAIL
P3-L14 CLUSTER BED N5	0.6	75	FAIL	4.1%	FAIL
P3-L14 CLUSTER BED N6	0.6	77	FAIL	4.4%	FAIL
P3-L14 CLUSTER BED N7	0.7	83	FAIL	4.5%	FAIL
P3-L14 CLUSTER BED N8	0.7	77	FAIL	4.2%	FAIL
P3-L14 ACC. CLUSTER BED N1	0.7	92	FAIL	4.9%	FAIL
P3-L14 CLUSTER BED N9	0.7	76	FAIL	4.1%	FAIL
P3-L14 CLUSTER BED N10	0.7	76	FAIL	4.1%	FAIL
P3-L14 CLUSTER BED N11	0.6	80	FAIL	4.1%	FAIL
P3-L15 CLUSTER BED N1	0.8	82	FAIL	4.7%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L15 CLUSTER BED N2	0.5	76	FAIL	3.9%	FAIL
P3-L15 CLUSTER BED N3	0.5	74	FAIL	4.0%	FAIL
P3-L15 CLUSTER BED N4	0.6	76	FAIL	4.2%	FAIL
P3-L15 CLUSTER BED N5	0.6	75	FAIL	4.1%	FAIL
P3-L15 CLUSTER BED N6	0.6	78	FAIL	4.5%	FAIL
P3-L15 CLUSTER BED N7	0.7	83	FAIL	4.5%	FAIL
P3-L15 CLUSTER BED N8	0.7	77	FAIL	4.2%	FAIL
P3-L15 ACC. CLUSTER BED N1	0.7	93	FAIL	4.9%	FAIL
P3-L15 CLUSTER BED N9	0.7	76	FAIL	4.1%	FAIL
P3-L15 CLUSTER BED N10	0.7	76	FAIL	4.1%	FAIL
P3-L15 CLUSTER BED N11	0.6	80	FAIL	4.1%	FAIL
P3-L16 CLUSTER BED N1	0.8	83	FAIL	4.7%	FAIL
P3-L16 CLUSTER BED N2	0.5	76	FAIL	3.9%	FAIL
P3-L16 CLUSTER BED N3	0.5	75	FAIL	4.0%	FAIL
P3-L16 CLUSTER BED N4	0.6	76	FAIL	4.2%	FAIL
P3-L16 CLUSTER BED N5	0.6	76	FAIL	4.1%	FAIL
P3-L16 CLUSTER BED N6	0.7	79	FAIL	4.5%	FAIL
P3-L16 CLUSTER BED N7	0.7	84	FAIL	4.6%	FAIL
P3-L16 CLUSTER BED N8	0.7	77	FAIL	4.2%	FAIL
P3-L16 ACC. CLUSTER BED N1	0.7	94	FAIL	5.0%	FAIL
P3-L16 CLUSTER BED N9	0.7	76	FAIL	4.2%	FAIL
P3-L16 CLUSTER BED N10	0.7	77	FAIL	4.1%	FAIL
P3-L16 CLUSTER BED N11	0.6	81	FAIL	4.1%	FAIL
P3-L17 CLUSTER BED N1	0.8	84	FAIL	4.8%	FAIL
P3-L17 CLUSTER BED N2	0.5	77	FAIL	4.0%	FAIL
P3-L17 CLUSTER BED N3	0.5	75	FAIL	4.1%	FAIL
P3-L17 CLUSTER BED N4	0.6	76	FAIL	4.2%	FAIL
P3-L17 CLUSTER BED N5	0.6	75	FAIL	4.1%	FAIL
P3-L17 CLUSTER BED N6	0.7	79	FAIL	4.5%	FAIL
P3-L17 CLUSTER BED N7	0.7	85	FAIL	4.6%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L17 CLUSTER BED N8	0.7	77	FAIL	4.3%	FAIL
P3-L17 ACC. CLUSTER BED N1	0.7	97	FAIL	5.1%	FAIL
P3-L17 CLUSTER BED N9	0.7	76	FAIL	4.2%	FAIL
P3-L17 CLUSTER BED N10	0.7	77	FAIL	4.2%	FAIL
P3-L17 CLUSTER BED N11	0.6	81	FAIL	4.1%	FAIL
P3-L18 CLUSTER BED N1	0.8	82	FAIL	4.9%	FAIL
P3-L18 CLUSTER BED N2	0.6	78	FAIL	4.1%	FAIL
P3-L18 CLUSTER BED N3	0.6	75	FAIL	4.1%	FAIL
P3-L18 CLUSTER BED N4	0.7	77	FAIL	4.3%	FAIL
P3-L18 CLUSTER BED N5	0.6	77	FAIL	4.3%	FAIL
P3-L18 CLUSTER BED N6	0.7	80	FAIL	4.7%	FAIL
P3-L18 CLUSTER BED N7	0.7	86	FAIL	4.7%	FAIL
P3-L18 CLUSTER BED N8	0.6	80	FAIL	4.4%	FAIL
P3-L18 ACC. CLUSTER BED N1	0.7	98	FAIL	5.2%	FAIL
P3-L18 CLUSTER BED N9	0.6	78	FAIL	4.3%	FAIL
P3-L18 CLUSTER BED N10	0.7	79	FAIL	4.3%	FAIL
P3-L18 CLUSTER BED N11	0.6	82	FAIL	4.2%	FAIL
P3-L09 CLUSTER BED N1	0.6	78	FAIL	4.1%	FAIL
P3-L09 CLUSTER BED N2	0.4	73	FAIL	3.7%	FAIL
P3-L09 CLUSTER BED N3	0.4	76	FAIL	3.7%	FAIL
P3-L09 CLUSTER BED N4	0.4	75	FAIL	3.8%	FAIL
P3-L09 CLUSTER BED N5	0.5	76	FAIL	3.9%	FAIL
P3-L09 CLUSTER BED N6	0.5	76	FAIL	4.1%	FAIL
P3-L09 CLUSTER BED N7	0.5	76	FAIL	4.2%	FAIL
P3-L09 CLUSTER BED N8	0.9	95	FAIL	5.3%	FAIL
P3-L09 CLUSTER BED N9	0.8	88	FAIL	5.0%	FAIL
P3-L09 CLUSTER BED N10	0.8	88	FAIL	4.9%	FAIL
P3-L09 CLUSTER BED N11	0.8	87	FAIL	4.9%	FAIL
P3-L09 CLUSTER BED N12	0.8	87	FAIL	4.9%	FAIL
P3-L09 CLUSTER BED N13	0.6	78	FAIL	4.5%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L10 CLUSTER BED N12	0.7	83	FAIL	4.4%	FAIL
P3-L10 CLUSTER BED N13	0.7	75	FAIL	3.9%	FAIL
P3-L10 CLUSTER BED N14	0.6	77	FAIL	4.0%	FAIL
P3-L10 CLUSTER BED N15	0.7	78	FAIL	4.2%	FAIL
P3-L10 CLUSTER BED N16	0.7	79	FAIL	4.2%	FAIL
P3-L10 CLUSTER BED N17	0.7	80	FAIL	4.3%	FAIL
P3-L10 CLUSTER BED N18	0.7	78	FAIL	4.3%	FAIL
P3-L10 CLUSTER BED N19	0.9	97	FAIL	5.4%	FAIL
P3-L10 CLUSTER BED N20	0.8	90	FAIL	5.1%	FAIL
P3-L10 CLUSTER BED N21	0.8	89	FAIL	4.9%	FAIL
P3-L10 CLUSTER BED N22	0.8	88	FAIL	4.9%	FAIL
P3-L10 CLUSTER BED N23	0.8	88	FAIL	4.9%	FAIL
P3-L10 CLUSTER BED N24	0.7	80	FAIL	4.5%	FAIL
P3-L11 CLUSTER BED N12	0.8	85	FAIL	4.5%	FAIL
P3-L11 CLUSTER BED N13	0.7	78	FAIL	4.1%	FAIL
P3-L11 CLUSTER BED N14	0.7	80	FAIL	4.1%	FAIL
P3-L11 CLUSTER BED N15	0.7	79	FAIL	4.2%	FAIL
P3-L11 CLUSTER BED N16	0.7	80	FAIL	4.3%	FAIL
P3-L11 CLUSTER BED N17	0.7	80	FAIL	4.5%	FAIL
P3-L11 CLUSTER BED N18	0.7	78	FAIL	4.3%	FAIL
P3-L11 CLUSTER BED N19	0.9	97	FAIL	5.3%	FAIL
P3-L11 CLUSTER BED N20	0.8	90	FAIL	5.0%	FAIL
P3-L11 CLUSTER BED N21	0.8	89	FAIL	4.8%	FAIL
P3-L11 CLUSTER BED N22	0.8	88	FAIL	4.9%	FAIL
P3-L11 CLUSTER BED N23	0.8	87	FAIL	4.8%	FAIL
P3-L11 CLUSTER BED N24	0.7	80	FAIL	4.4%	FAIL
P3-L12 CLUSTER BED N12	0.9	88	FAIL	4.8%	FAIL
P3-L12 CLUSTER BED N13	0.7	80	FAIL	4.4%	FAIL
P3-L12 CLUSTER BED N14	0.7	80	FAIL	4.3%	FAIL
P3-L12 CLUSTER BED N15	0.7	81	FAIL	4.5%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L12 CLUSTER BED N16	0.7	80	FAIL	4.4%	FAIL
P3-L12 CLUSTER BED N17	0.7	80	FAIL	4.6%	FAIL
P3-L12 CLUSTER BED N18	0.7	78	FAIL	4.5%	FAIL
P3-L12 CLUSTER BED N19	0.9	98	FAIL	5.4%	FAIL
P3-L12 CLUSTER BED N20	0.8	90	FAIL	5.1%	FAIL
P3-L12 CLUSTER BED N21	0.8	89	FAIL	4.9%	FAIL
P3-L12 CLUSTER BED N22	0.8	88	FAIL	4.9%	FAIL
P3-L12 CLUSTER BED N23	0.8	87	FAIL	4.9%	FAIL
P3-L12 CLUSTER BED N24	0.7	80	FAIL	4.4%	FAIL
P3-L13 CLUSTER BED N12	0.9	92	FAIL	5.0%	FAIL
P3-L13 CLUSTER BED N13	0.7	82	FAIL	4.6%	FAIL
P3-L13 CLUSTER BED N14	0.7	80	FAIL	4.4%	FAIL
P3-L13 CLUSTER BED N15	0.7	81	FAIL	4.6%	FAIL
P3-L13 CLUSTER BED N16	0.7	81	FAIL	4.6%	FAIL
P3-L13 CLUSTER BED N17	0.7	81	FAIL	4.5%	FAIL
P3-L13 CLUSTER BED N18	0.7	78	FAIL	4.4%	FAIL
P3-L13 CLUSTER BED N19	0.9	98	FAIL	5.3%	FAIL
P3-L13 CLUSTER BED N20	0.8	90	FAIL	5.0%	FAIL
P3-L13 CLUSTER BED N21	0.8	89	FAIL	4.8%	FAIL
P3-L13 CLUSTER BED N22	0.8	88	FAIL	4.9%	FAIL
P3-L13 CLUSTER BED N23	0.8	87	FAIL	4.9%	FAIL
P3-L13 CLUSTER BED N24	0.7	80	FAIL	4.4%	FAIL
P3-L14 CLUSTER BED N12	0.9	95	FAIL	5.3%	FAIL
P3-L14 CLUSTER BED N13	0.7	86	FAIL	4.9%	FAIL
P3-L14 CLUSTER BED N14	0.7	81	FAIL	4.6%	FAIL
P3-L14 CLUSTER BED N15	0.7	84	FAIL	4.8%	FAIL
P3-L14 CLUSTER BED N16	0.7	81	FAIL	4.6%	FAIL
P3-L14 CLUSTER BED N17	0.7	81	FAIL	4.6%	FAIL
P3-L14 CLUSTER BED N18	0.7	78	FAIL	4.5%	FAIL
P3-L14 CLUSTER BED N19	0.9	98	FAIL	5.4%	FAIL
P3-L14 CLUSTER BED N20	0.8	91	FAIL	5.1%	FAIL
P3-L14 CLUSTER BED N21	0.8	89	FAIL	4.9%	FAIL
P3-L14 CLUSTER BED N22	0.8	88	FAIL	5.0%	FAIL
P3-L14 CLUSTER BED N23	0.8	88	FAIL	4.9%	FAIL
P3-L14 CLUSTER BED N24	0.7	81	FAIL	4.5%	FAIL
P3-L15 CLUSTER BED N12	0.9	95	FAIL	5.3%	FAIL
P3-L15 CLUSTER BED N13	0.7	84	FAIL	4.8%	FAIL
P3-L15 CLUSTER BED N14	0.7	81	FAIL	4.5%	FAIL
P3-L15 CLUSTER BED N15	0.7	82	FAIL	4.7%	FAIL
P3-L15 CLUSTER BED N16	0.7	81	FAIL	4.6%	FAIL
P3-L15 CLUSTER BED N17	0.7	81	FAIL	4.5%	FAIL
P3-L15 CLUSTER BED N18	0.7	78	FAIL	4.5%	FAIL
P3-L15 CLUSTER BED N19	0.9	98	FAIL	5.4%	FAIL
P3-L15 CLUSTER BED N20	0.8	90	FAIL	5.0%	FAIL
P3-L15 CLUSTER BED N21	0.8	89	FAIL	4.9%	FAIL
P3-L15 CLUSTER BED N22	0.8	88	FAIL	4.9%	FAIL
P3-L15 CLUSTER BED N23	0.8	88	FAIL	4.9%	FAIL
P3-L15 CLUSTER BED N24	0.7	81	FAIL	4.5%	FAIL
P3-L16 CLUSTER BED N12	0.9	96	FAIL	5.3%	FAIL
P3-L16 CLUSTER BED N13	0.7	86	FAIL	4.9%	FAIL
P3-L16 CLUSTER BED N14	0.7	82	FAIL	4.6%	FAIL
P3-L16 CLUSTER BED N15	0.7	84	FAIL	4.8%	FAIL
P3-L16 CLUSTER BED N16	0.7	82	FAIL	4.6%	FAIL
P3-L16 CLUSTER BED N17	0.7	81	FAIL	4.6%	FAIL
P3-L16 CLUSTER BED N18	0.7	78	FAIL	4.5%	FAIL
P3-L16 CLUSTER BED N19	0.9	98	FAIL	5.4%	FAIL
P3-L16 CLUSTER BED N20	0.8	91	FAIL	5.1%	FAIL
P3-L16 CLUSTER BED N21	0.8	89	FAIL	4.9%	FAIL
P3-L16 CLUSTER BED N22	0.8	88	FAIL	5.0%	FAIL
P3-L16 CLUSTER BED N23	0.8	88	FAIL	4.9%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L16 CLUSTER BED N24	0.7	81	FAIL	4.5%	FAIL
P3-L17 CLUSTER BED N12	0.9	96	FAIL	5.3%	FAIL
P3-L17 CLUSTER BED N13	0.7	85	FAIL	4.8%	FAIL
P3-L17 CLUSTER BED N14	0.7	82	FAIL	4.6%	FAIL
P3-L17 CLUSTER BED N15	0.7	83	FAIL	4.7%	FAIL
P3-L17 CLUSTER BED N16	0.7	81	FAIL	4.6%	FAIL
P3-L17 CLUSTER BED N17	0.7	81	FAIL	4.5%	FAIL
P3-L17 CLUSTER BED N18	0.7	78	FAIL	4.5%	FAIL
P3-L17 CLUSTER BED N19	0.9	98	FAIL	5.4%	FAIL
P3-L17 CLUSTER BED N20	0.8	92	FAIL	5.1%	FAIL
P3-L17 CLUSTER BED N21	0.8	89	FAIL	4.9%	FAIL
P3-L17 CLUSTER BED N22	0.8	88	FAIL	4.9%	FAIL
P3-L17 CLUSTER BED N23	0.8	88	FAIL	4.9%	FAIL
P3-L17 CLUSTER BED N24	0.7	82	FAIL	4.5%	FAIL
P3-L18 CLUSTER BED N12	0.9	97	FAIL	5.4%	FAIL
P3-L18 CLUSTER BED N13	0.7	87	FAIL	5.0%	FAIL
P3-L18 CLUSTER BED N14	0.7	83	FAIL	4.6%	FAIL
P3-L18 CLUSTER BED N15	0.7	84	FAIL	4.8%	FAIL
P3-L18 CLUSTER BED N16	0.7	83	FAIL	4.7%	FAIL
P3-L18 CLUSTER BED N17	0.7	82	FAIL	4.6%	FAIL
P3-L18 CLUSTER BED N18	0.7	79	FAIL	4.6%	FAIL
P3-L18 CLUSTER BED N19	1	98	FAIL	5.4%	FAIL
P3-L18 CLUSTER BED N20	0.8	93	FAIL	5.1%	FAIL
P3-L18 CLUSTER BED N21	0.8	89	FAIL	4.9%	FAIL
P3-L18 CLUSTER BED N22	0.8	89	FAIL	5.0%	FAIL
P3-L18 CLUSTER BED N23	0.8	88	FAIL	4.9%	FAIL
P3-L18 CLUSTER BED N24	0.7	82	FAIL	4.5%	FAIL
P3-L19 CLUSTER BED N1	0.9	96	FAIL	5.3%	FAIL
P3-L19 CLUSTER BED N2	0.7	86	FAIL	4.9%	FAIL
P3-L19 CLUSTER BED N3	0.7	82	FAIL	4.6%	FAIL
P3-L19 CLUSTER BED N4	0.7	84	FAIL	4.7%	FAIL
P3-L19 CLUSTER BED N5	0.7	83	FAIL	4.7%	FAIL
P3-L19 CLUSTER BED N6	0.7	81	FAIL	4.5%	FAIL
P3-L19 CLUSTER BED N7	0.7	79	FAIL	4.5%	FAIL
P3-L19 CLUSTER BED N8	0.9	98	FAIL	5.4%	FAIL
P3-L19 CLUSTER BED N9	0.8	93	FAIL	5.1%	FAIL
P3-L19 CLUSTER BED N10	0.8	89	FAIL	4.9%	FAIL
P3-L19 CLUSTER BED N11	0.8	89	FAIL	5.0%	FAIL
P3-L19 CLUSTER BED N12	0.8	88	FAIL	4.9%	FAIL
P3-L19 CLUSTER BED N13	0.7	82	FAIL	4.5%	FAIL
P3-L20 CLUSTER BED N1	0.9	97	FAIL	5.5%	FAIL
P3-L20 CLUSTER BED N2	0.7	88	FAIL	5.0%	FAIL
P3-L20 CLUSTER BED N3	0.7	84	FAIL	4.7%	FAIL
P3-L20 CLUSTER BED N4	0.7	86	FAIL	4.9%	FAIL
P3-L20 CLUSTER BED N5	0.7	85	FAIL	4.8%	FAIL
P3-L20 CLUSTER BED N6	0.7	82	FAIL	4.7%	FAIL
P3-L20 CLUSTER BED N7	0.7	80	FAIL	4.6%	FAIL
P3-L20 CLUSTER BED N8	1	99	FAIL	5.5%	FAIL
P3-L20 CLUSTER BED N9	0.8	94	FAIL	5.1%	FAIL
P3-L20 CLUSTER BED N10	0.8	89	FAIL	4.9%	FAIL
P3-L20 CLUSTER BED N11	0.8	90	FAIL	5.0%	FAIL
P3-L20 CLUSTER BED N12	0.8	88	FAIL	4.9%	FAIL
P3-L20 CLUSTER BED N13	0.7	82	FAIL	4.6%	FAIL
P3-L21 CLUSTER BED N1	0.9	94	FAIL	5.5%	FAIL
P3-L21 CLUSTER BED N2	0.7	85	FAIL	5.0%	FAIL
P3-L21 CLUSTER BED N3	0.7	85	FAIL	4.8%	FAIL
P3-L21 CLUSTER BED N4	0.7	84	FAIL	5.0%	FAIL
P3-L21 CLUSTER BED N5	0.7	84	FAIL	4.9%	FAIL
P3-L21 CLUSTER BED N6	0.7	84	FAIL	4.9%	FAIL
P3-L21 CLUSTER BED N7	0.7	81	FAIL	4.8%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L21 CLUSTER BED N8	0.9	96	FAIL	5.5%	FAIL
P3-L21 CLUSTER BED N9	0.8	89	FAIL	5.2%	FAIL
P3-L21 CLUSTER BED N10	0.8	88	FAIL	4.9%	FAIL
P3-L21 CLUSTER BED N11	0.8	88	FAIL	5.1%	FAIL
P3-L21 CLUSTER BED N12	0.8	87	FAIL	5.0%	FAIL
P3-L21 CLUSTER BED N13	0.7	79	FAIL	4.6%	FAIL
P3-L04 CLUSTER BED N1	0.6	76	FAIL	4.1%	FAIL
P3-L04 CLUSTER BED N2	0.8	82	FAIL	4.4%	FAIL
P3-L04 CLUSTER BED N3	0.6	75	FAIL	4.2%	FAIL
P3-L04 CLUSTER BED N4	0.7	75	FAIL	4.3%	FAIL
P3-L04 CLUSTER BED N5	0.7	75	FAIL	4.3%	FAIL
P3-L04 CLUSTER BED N6	0.7	77	FAIL	4.4%	FAIL
P3-L04 ACC. CLUSTER BED N1	0.7	86	FAIL	4.7%	FAIL
P3-L04 CLUSTER BED N7	0.8	75	FAIL	4.2%	FAIL
P3-L04 CLUSTER BED N8	0.6	75	FAIL	4.1%	FAIL
P3-L04 CLUSTER BED N9	0.6	75	FAIL	3.9%	FAIL
P3-L04 CLUSTER BED N10	0.7	80	FAIL	4.2%	FAIL
P3-L04 CLUSTER BED N11	0.6	77	FAIL	4.1%	FAIL
P3-L04 CLUSTER BED N12	0.5	74	FAIL	3.9%	FAIL
P3-L04 CLUSTER BED N13	0.5	74	FAIL	3.9%	FAIL
P3-L04 CLUSTER BED N14	0.5	75	FAIL	3.9%	FAIL
P3-L04 CLUSTER BED N15	0.5	73	FAIL	3.9%	FAIL
P3-L04 ACC. CLUSTER BED N3	0.2	82	FAIL	4.0%	FAIL
P3-L04 ACC. CLUSTER BED N2	0.6	87	FAIL	4.6%	FAIL
P3-L04 CLUSTER BED N16	0.6	78	FAIL	4.2%	FAIL
P3-L04 CLUSTER BED N17	0.5	76	FAIL	4.0%	FAIL
P3-L04 CLUSTER BED N18	0.5	76	FAIL	3.9%	FAIL
P3-L04 CLUSTER BED N19	0.5	74	FAIL	3.9%	FAIL
P3-L04 CLUSTER BED N20	0.5	75	FAIL	3.8%	FAIL
P3-L04 CLUSTER BED N21	0.5	73	FAIL	3.8%	FAIL
P3-L04 CLUSTER BED N22	0.6	77	FAIL	3.9%	FAIL
P3-L04 CLUSTER BED N23	0.6	75	FAIL	3.8%	FAIL
P3-L04 CLUSTER BED N24	0.5	72	FAIL	3.7%	FAIL
P3-L04 CLUSTER BED N25	0.5	72	FAIL	3.6%	FAIL
P3-L04 CLUSTER BED N26	0.4	71	FAIL	3.6%	FAIL
P3-L04 CLUSTER BED N27	0.7	77	FAIL	4.1%	FAIL
P3-L04 CLUSTER BED N28	0.7	81	FAIL	4.3%	FAIL
P3-L04 CLUSTER BED N29	0.5	74	FAIL	3.9%	FAIL
P3-L04 CLUSTER BED N30	0.4	74	FAIL	3.7%	FAIL
P3-L04 CLUSTER BED N31	0.4	74	FAIL	3.8%	FAIL
P3-L04 CLUSTER BED N32	0.4	74	FAIL	3.8%	FAIL
P3-L04 CLUSTER BED N33	0.4	80	FAIL	4.3%	FAIL
P3-L05 CLUSTER BED N1	0.6	76	FAIL	4.2%	FAIL
P3-L05 CLUSTER BED N2	0.8	81	FAIL	4.6%	FAIL
P3-L05 CLUSTER BED N3	0.6	75	FAIL	4.3%	FAIL
P3-L05 CLUSTER BED N4	0.7	75	FAIL	4.2%	FAIL
P3-L05 CLUSTER BED N5	0.6	75	FAIL	4.3%	FAIL
P3-L05 CLUSTER BED N6	0.6	77	FAIL	4.5%	FAIL
P3-L05 ACC. CLUSTER BED N1	0.7	84	FAIL	4.7%	FAIL
P3-L05 CLUSTER BED N7	0.7	75	FAIL	4.2%	FAIL
P3-L05 CLUSTER BED N8	0.6	75	FAIL	4.2%	FAIL
P3-L05 CLUSTER BED N9	0.5	75	FAIL	4.0%	FAIL
P3-L05 CLUSTER BED N10	0.7	80	FAIL	4.3%	FAIL
P3-L05 CLUSTER BED N11	0.6	77	FAIL	4.1%	FAIL
P3-L05 CLUSTER BED N12	0.5	74	FAIL	3.9%	FAIL
P3-L05 CLUSTER BED N13	0.5	74	FAIL	3.9%	FAIL
P3-L05 CLUSTER BED N14	0.5	75	FAIL	3.9%	FAIL
P3-L05 CLUSTER BED N15	0.5	73	FAIL	3.9%	FAIL
P3-L05 ACC. CLUSTER BED N3	0.2	81	FAIL	4.0%	FAIL
P3-L05 ACC. CLUSTER BED N2	0.5	87	FAIL	4.6%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L05 CLUSTER BED N16	0.5	77	FAIL	4.2%	FAIL
P3-L05 CLUSTER BED N17	0.5	76	FAIL	4.0%	FAIL
P3-L05 CLUSTER BED N18	0.5	75	FAIL	3.9%	FAIL
P3-L05 CLUSTER BED N19	0.5	73	FAIL	3.9%	FAIL
P3-L05 CLUSTER BED N20	0.5	76	FAIL	3.8%	FAIL
P3-L05 CLUSTER BED N21	0.5	71	FAIL	3.8%	FAIL
P3-L05 CLUSTER BED N22	0.5	75	FAIL	3.9%	FAIL
P3-L05 CLUSTER BED N23	0.5	75	FAIL	3.8%	FAIL
P3-L05 CLUSTER BED N24	0.4	72	FAIL	3.7%	FAIL
P3-L05 CLUSTER BED N25	0.4	71	FAIL	3.6%	FAIL
P3-L05 CLUSTER BED N26	0.4	70	FAIL	3.6%	FAIL
P3-L05 CLUSTER BED N27	0.7	77	FAIL	4.2%	FAIL
P3-L05 CLUSTER BED N28	0.6	80	FAIL	4.4%	FAIL
P3-L05 CLUSTER BED N29	0.4	76	FAIL	4.0%	FAIL
P3-L05 CLUSTER BED N30	0.4	75	FAIL	3.8%	FAIL
P3-L05 CLUSTER BED N31	0.4	74	FAIL	3.9%	FAIL
P3-L05 CLUSTER BED N32	0.4	75	FAIL	3.9%	FAIL
P3-L05 CLUSTER BED N33	0.4	80	FAIL	4.4%	FAIL
P3-L06 CLUSTER BED N1	0.1	77	FAIL	4.2%	FAIL
P3-L06 CLUSTER BED N2	0.5	84	FAIL	4.7%	FAIL
P3-L06 CLUSTER BED N3	0.1	75	FAIL	4.2%	FAIL
P3-L06 CLUSTER BED N4	0.1	75	FAIL	4.2%	FAIL
P3-L06 CLUSTER BED N5	0.1	75	FAIL	4.2%	FAIL
P3-L06 CLUSTER BED N6	0	73	FAIL	4.3%	FAIL
P3-L06 ACC. CLUSTER BED N1	0.1	79	FAIL	4.2%	FAIL
P3-L06 CLUSTER BED N7	0.4	76	FAIL	4.0%	FAIL
P3-L06 CLUSTER BED N8	0.4	75	FAIL	3.8%	FAIL
P3-L06 CLUSTER BED N9	0.3	73	FAIL	3.7%	FAIL
P3-L06 CLUSTER BED N10	0.6	78	FAIL	4.1%	FAIL
P3-L06 CLUSTER BED N11	0.4	75	FAIL	3.7%	FAIL
P3-L06 CLUSTER BED N12	0.3	74	FAIL	3.6%	FAIL
P3-L06 CLUSTER BED N13	0.2	73	FAIL	3.6%	FAIL
P3-L06 CLUSTER BED N14	0.3	73	FAIL	3.6%	FAIL
P3-L06 CLUSTER BED N15	0.2	72	FAIL	3.7%	FAIL
P3-L06 ACC. CLUSTER BED N3	0	76	FAIL	3.7%	FAIL
P3-L06 ACC. CLUSTER BED N2	0	81	FAIL	4.3%	FAIL
P3-L06 CLUSTER BED N16	0.1	74	FAIL	4.1%	FAIL
P3-L06 CLUSTER BED N17	0.1	73	FAIL	3.9%	FAIL
P3-L06 CLUSTER BED N18	0.1	72	FAIL	3.8%	FAIL
P3-L06 CLUSTER BED N19	0.1	72	FAIL	3.8%	FAIL
P3-L06 CLUSTER BED N20	0.2	76	FAIL	3.8%	FAIL
P3-L06 CLUSTER BED N21	0	70	FAIL	3.5%	FAIL
P3-L06 CLUSTER BED N22	0	72	FAIL	3.8%	FAIL
P3-L06 CLUSTER BED N23	0.1	72	FAIL	3.7%	FAIL
P3-L06 CLUSTER BED N24	0	72	FAIL	3.6%	FAIL
P3-L06 CLUSTER BED N25	0	72	FAIL	3.5%	FAIL
P3-L06 CLUSTER BED N26	0	71	FAIL	3.5%	FAIL
P3-L06 CLUSTER BED N27	0.2	80	FAIL	4.2%	FAIL
P3-L06 CLUSTER BED N28	0.3	84	FAIL	4.4%	FAIL
P3-L06 CLUSTER BED N29	0.1	74	FAIL	4.0%	FAIL
P3-L06 CLUSTER BED N30	0	73	FAIL	3.8%	FAIL
P3-L06 CLUSTER BED N31	0	72	FAIL	3.9%	FAIL
P3-L06 CLUSTER BED N32	0	74	FAIL	3.9%	FAIL
P3-L06 CLUSTER BED N33	0	75	FAIL	4.2%	FAIL
P3-L09 CLUSTER BED N14	0.5	80	FAIL	4.1%	FAIL
P3-L09 CLUSTER BED N15	0.5	77	FAIL	4.1%	FAIL
P3-L09 CLUSTER BED N16	0.5	77	FAIL	4.1%	FAIL
P3-L09 ACC. CLUSTER BED N1	0.6	89	FAIL	4.7%	FAIL
P3-L09 CLUSTER BED N17	0.5	77	FAIL	4.1%	FAIL
P3-L09 CLUSTER BED N18	0.6	80	FAIL	4.4%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria		
Room name	Criterion A	Criterion B	PASS/FAIL	Criterion 1	PASS/FAIL
P3-L09 CLUSTER BED N19	0.4	74	FAIL	4.2%	FAIL
P3-L09 CLUSTER BED N20	0.5	73	FAIL	4.0%	FAIL
P3-L09 CLUSTER BED N21	0.5	73	FAIL	4.1%	FAIL
P3-L09 CLUSTER BED N22	0.5	71	FAIL	4.0%	FAIL
P3-L09 CLUSTER BED N23	0.4	75	FAIL	3.9%	FAIL
P3-L09 CLUSTER BED N24	0.7	80	FAIL	4.7%	FAIL

Table A.20 TM59 overheating results for living/kitchen spaces in Plot 3 under the DSY1 2050 weather file.

	Natural ventilation criteria		Mechanical ventilation criteria	
Room Name	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
P3-L18 CLUSTER LIVING/KITCHEN N2	6	FAIL	11.5%	FAIL
P3-L18 CLUSTER LIVING/KITCHEN N1	5.7	FAIL	11.1%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N4	4.1	FAIL	11.4%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N3	4.6	FAIL	11.2%	FAIL
P3-L21 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	13.4%	FAIL
P3-L21 CLUSTER LIVING/KITCHEN N1	5.9	FAIL	12.9%	FAIL
P3-L20 CLUSTER LIVING/KITCHEN N2	6	FAIL	13.3%	FAIL
P3-L20 CLUSTER LIVING/KITCHEN N1	6	FAIL	13.0%	FAIL
P3-L19 CLUSTER LIVING/KITCHEN N2	5.7	FAIL	13.0%	FAIL
P3-L19 CLUSTER LIVING/KITCHEN N1	5.8	FAIL	12.9%	FAIL
P3-L18 CLUSTER LIVING/KITCHEN N4	6	FAIL	13.3%	FAIL
P3-L18 CLUSTER LIVING/KITCHEN N3	6	FAIL	13.0%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	11.5%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N1	5.6	FAIL	11.0%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	11.4%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N1	5.6	FAIL	10.9%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N4	5.8	FAIL	13.0%	FAIL
P3-L17 CLUSTER LIVING/KITCHEN N3	5.9	FAIL	12.9%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N4	4.6	FAIL	11.8%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N3	5.2	FAIL	11.5%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N4	6.1	FAIL	13.3%	FAIL
P3-L16 CLUSTER LIVING/KITCHEN N3	6	FAIL	13.0%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N4	4.6	FAIL	11.8%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N3	5.2	FAIL	11.5%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	11.4%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N1	5.4	FAIL	10.9%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	11.4%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N1	5.4	FAIL	10.9%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N4	4.3	FAIL	11.7%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N3	5.1	FAIL	11.5%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N4	5.9	FAIL	13.0%	FAIL
P3-L15 CLUSTER LIVING/KITCHEN N3	5.9	FAIL	12.9%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N4	6.1	FAIL	13.3%	FAIL
P3-L14 CLUSTER LIVING/KITCHEN N3	6	FAIL	13.1%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N3	4.9	FAIL	11.4%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N4	3.7	FAIL	11.3%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	11.5%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N1	5.4	FAIL	10.8%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N3	4.1	FAIL	11.2%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N4	5.8	FAIL	13.0%	FAIL
P3-L13 CLUSTER LIVING/KITCHEN N3	5.9	FAIL	13.0%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	11.5%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N1	5.4	FAIL	10.8%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N4	5.9	FAIL	13.1%	FAIL
P3-L12 CLUSTER LIVING/KITCHEN N3	6	FAIL	13.1%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	11.5%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N1	5.4	FAIL	10.8%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N4	5.5	FAIL	12.7%	FAIL
P3-L11 CLUSTER LIVING/KITCHEN N3	5.9	FAIL	12.9%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N2	5.9	FAIL	11.5%	FAIL

	Natural ventilation criteria		Mechanical ventilation criteria	
Room Name	Criterion A	NV PASS/FAIL	Criterion 1	MV PASS/FAIL
P3-L10 CLUSTER LIVING/KITCHEN N1	5.4	FAIL	10.8%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N4	5.6	FAIL	12.9%	FAIL
P3-L10 CLUSTER LIVING/KITCHEN N3	6	FAIL	13.1%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N3	5.8	FAIL	11.5%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N4	5.4	FAIL	10.9%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N2	5.3	FAIL	11.4%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N1	4.9	FAIL	10.7%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N2	5.1	FAIL	12.6%	FAIL
P3-L09 CLUSTER LIVING/KITCHEN N1	5.9	FAIL	13.0%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N4	5	FAIL	12.6%	FAIL
P3-L08 CLUSTER LIVING/KITCHEN N3	5.5	FAIL	12.9%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N2	4.7	FAIL	11.8%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N1	5.2	FAIL	12.2%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N5	4.8	FAIL	11.6%	FAIL
P3-L06 CLUSTER LIVING/KITCHEN N6	4.9	FAIL	10.5%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N2	4.9	FAIL	11.8%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N1	5.6	FAIL	12.3%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N5	5.1	FAIL	11.5%	FAIL
P3-L05 CLUSTER LIVING/KITCHEN N6	5.3	FAIL	10.5%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N2	4.8	FAIL	11.8%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N1	5.6	FAIL	12.3%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N5	5.1	FAIL	11.4%	FAIL
P3-L04 CLUSTER LIVING/KITCHEN N6	5.1	FAIL	10.5%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N2	4.7	FAIL	11.8%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N1	5.6	FAIL	12.3%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N5	4.9	FAIL	11.3%	FAIL
P3-L03 CLUSTER LIVING/KITCHEN N6	5	FAIL	10.5%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N2	4.7	FAIL	11.8%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N1	5.5	FAIL	12.4%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N5	4.2	FAIL	10.8%	FAIL
P3-L02 CLUSTER LIVING/KITCHEN N6	4.3	FAIL	10.3%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N5	4	FAIL	11.4%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N4	4.9	FAIL	12.0%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N1	4.4	FAIL	11.4%	FAIL
P3-L01 CLUSTER LIVING/KITCHEN N2	3.9	FAIL	11.4%	FAIL

Appendix B - Modelled Natural Ventilation Opening Areas

B.1 Plot 1

Table 7.21 Equivalent orifice areas provided by windows modelled in Plot 1, and which of these are treated as openable in the final overheating assessment

Room name	Equivalent orifice area (m^2)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
L01 Corridor/Landing No 1	0.7	3.9	No
L01 Stairs No 1	0.9	4	No
L01 4B6P East Double Bedroom No 1	0.7	4.8	No
L01 4B6P East Single Bedroom No 1	0.3	3.8	No
L01 4B6P East Double Bedroom No 2	0.7	5.2	No
L01 4B6P East Single Bedroom No 2	0.3	3.9	No
L01 4B6P East Living/Kitchen No 1	3.3	7.3	No
L01 3B5P East Double Bedroom No 1	0.3	1.8	No
L01 3B5P East Double Bedroom No 2	0.5	3.2	No
L01 3B5P East Single Bedroom No 1	0.5	4.9	No
L01 3B5P East Living/Kitchen No 1	2.2	5.5	No
L01 1B2P South Lving/Kitchen No 1	1.4	4.5	No
L01 1B2P South Double Bedroom No 1	0.7	4	No
L01 2B4P West Double Bedroom No 1	0.6	3.5	No
L01 2B4P West Double Bedroom No 2	0.6	4.5	No
L01 2B4P West Living/Kitchen No 1	2.5	6.6	No
L01 3B5P West Double Bedroom No 1	0.7	4.5	No
L01 3B5P West Single Bedroom No 1	0.5	4.7	No
L01 3B5P West Double Bedroom No 2	0.6	4.2	No
L01 3B5P West Living Room No 1	3.3	6.9	No
L02 Corridor/Landing No 1	0.7	3.9	No
L02 Stairs No 1	0.9	4	No
L02 4B6P East Double Bedroom No 1	0.5	3.6	No
L02 4B6P East Single Bedroom No 1	0.3	3.8	No
L02 4B6P East Double Bedroom No 2	0.7	5.2	No
L02 4B6P East Single Bedroom No 2	0.3	3.9	No
L02 4B6P East Living/Kitchen No 1	3.3	7.3	No
L02 3B5P East Double Bedroom No 1	0.3	1.8	No
L02 3B5P East Double Bedroom No 2	0.5	3.2	No
L02 3B5P East Single Bedroom No 1	0.5	4.9	No
L02 3B5P East Living/Kitchen No 1	2.2	5.5	No
L02 1B2P South Lving/Kitchen No 1	1.4	4.5	No
L02 1B2P South Double Bedroom No 1	0.7	4	No
L02 2B4P West Double Bedroom No 1	0.6	3.5	No
L02 2B4P West Double Bedroom No 2	0.6	4.5	No
L02 2B4P West Living/Kitchen No 1	2.5	6.6	No
L02 3B5P West Double Bedroom No 1	0.7	4.5	No
L02 3B5P West Single Bedroom No 1	0.5	4.7	No
L02 3B5P West Double Bedroom No 2	0.6	4.2	No
L02 3B5P West Living Room No 1	3.3	6.9	No
L03 Corridor/Landing No 1	0.7	3.9	No
L03 Stairs No 1	0.9	4	No
L03 4B6P East Double Bedroom No 1	0.5	3.6	No
L03 4B6P East Single Bedroom No 1	0.3	3.8	No
L03 4B6P East Double Bedroom No 2	0.7	5.2	No
L03 4B6P East Single Bedroom No 2	0.3	3.9	No
L03 4B6P East Living/Kitchen No 1	3.3	7.3	No
L03 3B5P East Double Bedroom No 1	0.3	1.8	No
L03 3B5P East Double Bedroom No 2	0.5	3.2	No
L03 3B5P East Single Bedroom No 1	0.5	4.9	No
L03 3B5P East Living/Kitchen No 1	2.2	5.5	No
L03 1B2P South Lving/Kitchen No 1	1.4	4.5	No
L03 1B2P South Double Bedroom No 1	0.7	4	No
L03 2B4P West Double Bedroom No 1	0.6	3.5	No
L03 2B4P West Double Bedroom No 2	0.6	4.5	No
L03 2B4P West Living/Kitchen No 1	2.5	6.6	No
L03 3B5P West Double Bedroom No 1	0.7	4.5	No
L03 3B5P West Single Bedroom No 1	0.5	4.7	No
L03 3B5P West Double Bedroom No 2	0.6	4.2	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
L03 3B5P West Living Room No 1	3.3	6.9	No
L04 Corridor/Landing No 1	0.7	3.9	No
L04 Stairs No 1	0.9	4	No
L04 2B3P SE Bedroom No 1	0.6	3.5	No
L04 2B3P SE Bedroom No 2	0.5	4.3	No
L04 2B3P SE Living/Kitchen No 1	2.2	6.6	No
L04 1B2P S Living/Kitchen No 1	1.1	3.6	No
L04 1B2P S Bedroom No 1	0.7	3.7	No
L04 2B3P NE Living/Kitchen No 1	2.3	7.1	No
L04 2B3P NE Bedroom No 1	0.5	4.3	No
L04 2B3P NE Bedroom No 2	0.4	2.6	No
L04 2B4P SW Bedroom No 1	0.6	3.7	No
L04 2B4P SW Bedroom No 2	0.6	3.7	No
L04 2B4P SW Living/Kitchen No 1	2.1	5.8	No
L04 3B5P NW Bedroom No 1	0.6	3.1	No
L04 3B5P NW Bedroom No 2	0.5	3.4	No
L04 3B5P NW Living/Kitchen No 1	2.6	7.1	No
L04 3B5P NW Bedroom No 3	0.4	4.8	No
L05 Corridor/Landing No 1	0.7	3.9	No
L05 Stairs No 1	0.9	4	No
L05 2B3P SE Bedroom No 1	0.6	3.5	No
L05 2B3P SE Bedroom No 2	0.5	4.3	No
L05 2B3P SE Living/Kitchen No 1	2.2	6.6	No
L05 1B2P S Living/Kitchen No 1	1.1	3.6	No
L05 1B2P S Bedroom No 1	0.7	3.7	No
L05 2B3P NE Living/Kitchen No 1	2.3	7.1	No
L05 2B3P NE Bedroom No 1	0.5	4.3	No
L05 2B3P NE Bedroom No 2	0.4	2.6	No
L05 2B4P SW Bedroom No 1	0.6	3.7	No
L05 2B4P SW Bedroom No 2	0.6	3.7	No
L05 2B4P SW Living/Kitchen No 1	2.1	5.8	No
L05 3B5P NW Bedroom No 1	0.6	3.1	No
L05 3B5P NW Bedroom No 2	0.5	3.4	No
L05 3B5P NW Living/Kitchen No 1	2.6	7.1	No
L05 3B5P NW Bedroom No 3	0.4	4.8	No
L06 Corridor/Landing No 1	0.7	3.9	No
L06 Stairs No 1	0.9	4	No
L06 2B3P SE Bedroom No 1	0.6	3.5	No
L06 2B3P SE Bedroom No 2	0.5	4.3	No
L06 2B3P SE Living/Kitchen No 1	2.2	6.6	No
L06 1B2P S Living/Kitchen No 1	1.1	3.6	No
L06 1B2P S Bedroom No 1	0.7	3.7	No
L06 2B3P NE Living/Kitchen No 1	2.3	7.1	No
L06 2B3P NE Bedroom No 1	0.5	4.3	No
L06 2B3P NE Bedroom No 2	0.4	2.6	No
L06 2B4P SW Bedroom No 1	0.6	3.7	No
L06 2B4P SW Bedroom No 2	0.6	3.7	No
L06 2B4P SW Living/Kitchen No 1	2.1	5.8	No
L06 3B5P NW Bedroom No 1	0.6	3.1	No
L06 3B5P NW Bedroom No 2	0.5	3.4	No
L06 3B5P NW Living/Kitchen No 1	2.6	7.1	No
L06 3B5P NW Bedroom No 3	0.4	4.8	No
L07 Corridor/Landing No 1	0.7	3.9	No
L07 Stairs No 1	0.9	4	No
L07 2B3P SE Bedroom No 1	0.6	3.5	No
L07 2B3P SE Bedroom No 2	0.5	4.3	No
L07 2B3P SE Living/Kitchen No 1	2.2	6.6	No
L07 1B2P S Living/Kitchen No 1	1.1	3.6	No
L07 1B2P S Bedroom No 1	0.7	3.7	No
L07 2B3P NE Living/Kitchen No 1	2.3	7.1	No
L07 2B3P NE Bedroom No 1	0.5	4.3	No
L07 2B3P NE Bedroom No 2	0.4	2.6	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
L07 2B4P SW Bedroom No 1	0.6	3.7	No
L07 2B4P SW Bedroom No 2	0.6	3.7	No
L07 2B4P SW Living/Kitchen No 1	2.1	5.8	No
L07 3B5P NW Bedroom No 1	0.6	3.1	No
L07 3B5P NW Bedroom No 2	0.5	3.4	No
L07 3B5P NW Living/Kitchen No 1	2.6	7.1	No
L07 3B5P NW Bedroom No 3	0.4	4.8	No
L08 Corridor/Landing No 1	0.7	3.9	No
L08 Stairs No 1	0.9	4	No
L08 2B3P SE Bedroom No 1	0.6	3.5	No
L08 2B3P SE Bedroom No 2	0.5	4.3	No
L08 2B3P SE Living/Kitchen No 1	2.2	6.6	No
L08 1B2P S Living/Kitchen No 1	1.1	3.6	No
L08 1B2P S Bedroom No 1	0.7	3.7	No
L08 2B3P NE Living/Kitchen No 1	2.3	7.1	No
L08 2B3P NE Bedroom No 1	0.5	4.3	No
L08 2B3P NE Bedroom No 2	0.4	2.6	No
L08 2B4P SW Bedroom No 1	0.6	3.7	No
L08 2B4P SW Bedroom No 2	0.6	3.7	No
L08 2B4P SW Living/Kitchen No 1	2.1	5.8	No
L08 3B5P NW Bedroom No 1	0.6	3.1	No
L08 3B5P NW Bedroom No 2	0.5	3.4	No
L08 3B5P NW Living/Kitchen No 1	2.6	7.1	No
L08 3B5P NW Bedroom No 3	0.4	4.8	No
L09 Corridor/Landing No 1	0.7	3.9	No
L09 Stairs No 1	0.9	4	No
L09 2B3P SE Bedroom No 1	0.6	3.5	No
L09 2B3P SE Bedroom No 2	0.5	4.3	No
L09 2B3P SE Living/Kitchen No 1	2.2	6.6	No
L09 1B2P S Living/Kitchen No 1	1.1	3.6	No
L09 1B2P S Bedroom No 1	0.7	3.7	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
L09 2B3P NE Living/Kitchen No 1	2.3	7.1	No
L09 2B3P NE Bedroom No 1	0.5	4.3	No
L09 2B3P NE Bedroom No 2	0.4	2.6	No
L09 2B4P SW Bedroom No 1	0.6	3.7	No
L09 2B4P SW Bedroom No 2	0.6	3.7	No
L09 2B4P SW Living/Kitchen No 1	2.1	5.8	No
L09 3B5P NW Bedroom No 1	0.6	3.1	No
L09 3B5P NW Bedroom No 2	0.5	3.4	No
L09 3B5P NW Living/Kitchen No 1	2.6	7.1	No
L09 3B5P NW Bedroom No 3	0.4	4.8	No
L10 Corridor/Landing No 1	0.7	3.9	No
L10 Stairs No 1	0.9	4	No
L10 2B3P SE Bedroom No 1	0.6	3.5	No
L10 2B3P SE Bedroom No 2	0.5	4.3	No
L10 2B3P SE Living/Kitchen No 1	2.2	6.6	No
L10 1B2P S Living/Kitchen No 1	1.1	3.6	No
L10 1B2P S Bedroom No 1	0.7	3.7	No
L10 2B3P NE Living/Kitchen No 1	2.3	7.1	No
L10 2B3P NE Bedroom No 1	0.5	4.3	No
L10 2B3P NE Bedroom No 2	0.4	2.6	No
L10 2B4P SW Bedroom No 1	0.6	3.7	No
L10 2B4P SW Bedroom No 2	0.6	3.7	No
L10 2B4P SW Living/Kitchen No 1	2.1	5.8	No
L10 3B5P NW Bedroom No 1	0.6	3.1	No
L10 3B5P NW Bedroom No 2	0.5	3.4	No
L10 3B5P NW Living/Kitchen No 1	2.6	7.1	No
L10 3B5P NW Bedroom No 3	0.4	4.8	No
L11 Corridor/Landing No 1	0.7	3.9	No
L11 Stairs No 1	0.9	4	No
L11 1B2P SE Kitchen/Living No 1	2.5	7	No
L11 1B2P SE Bedroom No 1	0.6	3.3	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
L11 1B2P S Kitchen/Living No 1	1.8	7.8	No
L11 1B2P S Bedroom No 1	0.7	3.9	No
L11 1B2P NE Living/Kitchen No 1	2.6	7.3	No
L11 1B2P NE Bedroom No 1	0.5	2.6	No
L11 2B3P SW Kitchen/Living No 1	3.2	9.5	No
L11 2B3P SW Bedroom No 1	0.3	3	No
L11 2B3P SW Bedroom No 2	0.5	3	No
L11 2B4P NW kitchen/living No 1	3.5	7.2	No

B.2 Plot 2

Table 7.22 Equivalent orifice areas provided by windows modelled in Plot 2, and which of these are treated as openable in the final overheating assessment

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P2-L01 CIRC N1	0.6	0.9	Yes
P2-L01 LOBBY N1	2	10.7	Yes
P2-L01 NE STAIR N1	1.4	7.8	Yes
P2-L01 NE STUDIO 1 N1	1.7	8.3	No
P2-L01 NE STUDIO 2 N1	1.7	8.5	No
P2-L01 NE STUDIO 3 N1	1.7	8.1	No
P2-L01 NE STUDIO 4 N1	1.7	8.4	No
P2-L01 NE STUDIO 5 N1	1.7	8.5	No
P2-L01 NE STUDIO 6 N1	1.7	8.3	No
P2-L01 NE STUDIO 7 N1	1.7	8.2	No
P2-L01 NORTH CORNER STUDIO N1	1.7	6.8	No
P2-L01 SW STAIR N1	1.3	7.4	Yes
P2-L01 SW STUDIO 1 N1	1.7	8.2	No
P2-L01 SW STUDIO 2 N1	1.7	8.4	No
P2-L01 SW STUDIO 3 N1	2	9.1	No
P2-L01 SW STUDIO 4 N1	1.7	8	No
P2-L01 SW STUDIO 5 N1	1.7	8.3	No
P2-L01 SW STUDIO 6 N1	1.7	8.4	No
P2-L01 SW STUDIO 7 N1	1.7	8.2	No
P2-L01 SW STUDIO 8 N1	1.7	8.1	No
P2-L01 WEST CORNER WCH STUDIO N1	3.3	9.7	No
P2-L02 CIRC N1	1.2	1.4	Yes
P2-L02 EAST CORNER STUDIO N1	1.7	8.9	No
P2-L02 LOBBY N1	2	10.7	Yes
P2-L02 NE STAIR N1	1.4	7.8	Yes
P2-L02 NE STUDIO 1 N1	1.7	8.3	No
P2-L02 NE STUDIO 2 N1	1.7	8.5	No
P2-L02 NE STUDIO 3 N1	1.7	8.1	No
P2-L02 NE STUDIO 4 N1	1.7	8.4	No
P2-L02 NE STUDIO 5 N1	1.7	8.5	No
P2-L02 NE STUDIO 6 N1	1.7	8.3	No
P2-L02 NE STUDIO 7 N1	1.7	8.2	No
P2-L02 NE STUDIO 8 N1	1.7	8.4	No
P2-L02 NORTH CORNER STUDIO N1	1.7	6.8	No
P2-L02 SOUTH CORNER STUDIO N1	1.7	8.8	No
P2-L02 SW STAIR N1	1.3	7.4	Yes
P2-L02 SW STUDIO 1 N1	1.7	8.2	No
P2-L02 SW STUDIO 2 N1	1.7	8.4	No
P2-L02 SW STUDIO 3 N1	2	9.1	No
P2-L02 SW STUDIO 4 N1	1.7	8	No
P2-L02 SW STUDIO 5 N1	1.7	8.3	No
P2-L02 SW STUDIO 6 N1	1.7	8.4	No
P2-L02 SW STUDIO 7 N1	1.7	8.2	No
P2-L02 SW STUDIO 8 N1	1.7	8.1	No
P2-L02 SW STUDIO N1	1.7	8.3	No
P2-L02 WEST CORNER WCH STUDIO N1	3.3	9.7	No
P2-L03 CIRC N1	1.2	1.4	Yes
P2-L03 EAST CORNER STUDIO N1	1.7	8.9	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P2-L03 LOBBY N1	2	10.7	Yes
P2-L03 NE STAIR N1	1.4	7.8	Yes
P2-L03 NE STUDIO 1 N1	1.7	8.3	No
P2-L03 NE STUDIO 2 N1	1.7	8.5	No
P2-L03 NE STUDIO 3 N1	1.7	8.1	No
P2-L03 NE STUDIO 4 N1	1.7	8.4	No
P2-L03 NE STUDIO 5 N1	1.7	8.5	No
P2-L03 NE STUDIO 6 N1	1.7	8.3	No
P2-L03 NE STUDIO 7 N1	1.7	8.2	No
P2-L03 NE STUDIO 8 N1	1.7	8.4	No
P2-L03 NORTH CORNER STUDIO N1	1.7	6.8	No
P2-L03 SOUTH CORNER STUDIO N1	1.7	8.8	No
P2-L03 SW STAIR N1	1.3	7.4	Yes
P2-L03 SW STUDIO 1 N1	1.7	8.2	No
P2-L03 SW STUDIO 2 N1	1.7	8.4	No
P2-L03 SW STUDIO 3 N1	2	9.1	No
P2-L03 SW STUDIO 4 N1	1.7	8	No
P2-L03 SW STUDIO 5 N1	1.7	8.3	No
P2-L03 SW STUDIO 6 N1	1.7	8.4	No
P2-L03 SW STUDIO 7 N1	1.7	8.2	No
P2-L03 SW STUDIO 8 N1	1.7	8.1	No
P2-L03 SW STUDIO N1	1.7	8.3	No
P2-L03 WEST CORNER WCH STUDIO N1	3.3	9.7	No
P2-L04 CIRC N1	1.2	1.4	Yes
P2-L04 EAST CORNER STUDIO N1	1.7	8.9	No
P2-L04 LOBBY N1	2	10.7	Yes
P2-L04 NE STAIR N1	1.4	7.8	Yes
P2-L04 NE STUDIO 1 N1	1.7	8.3	No
P2-L04 NE STUDIO 2 N1	1.7	8.5	No
P2-L04 NE STUDIO 3 N1	1.7	8.1	No
P2-L04 NE STUDIO 4 N1	1.7	8.4	No
P2-L04 NE STUDIO 5 N1	1.7	8.5	No
P2-L04 NE STUDIO 6 N1	1.7	8.3	No
P2-L04 NE STUDIO 7 N1	1.7	8.2	No
P2-L04 NE STUDIO 8 N1	1.7	8.4	No
P2-L04 NORTH CORNER STUDIO N1	1.7	6.8	No
P2-L04 SOUTH CORNER STUDIO N1	1.7	8.8	No
P2-L04 SW STAIR N1	1.3	7.4	Yes
P2-L04 SW STUDIO 1 N1	1.7	8.2	No
P2-L04 SW STUDIO 2 N1	1.7	8.4	No
P2-L04 SW STUDIO 3 N1	2	9.1	No
P2-L04 SW STUDIO 4 N1	1.7	8	No
P2-L04 SW STUDIO 5 N1	1.7	8.3	No
P2-L04 SW STUDIO 6 N1	1.7	8.4	No
P2-L04 SW STUDIO 7 N1	1.7	8.2	No
P2-L04 SW STUDIO 8 N1	1.7	8.1	No
P2-L04 SW STUDIO N1	1.7	8.3	No
P2-L04 WEST CORNER WCH STUDIO N1	3.3	9.7	No
P2-L05 CIRC N1	1.2	1.4	Yes
P2-L05 EAST CORNER STUDIO N1	1.7	8.9	No
P2-L05 LOBBY N1	2	10.7	Yes
P2-L05 NE STAIR N1	1.4	7.8	Yes
P2-L05 NE STUDIO 1 N1	1.7	8.3	No
P2-L05 NE STUDIO 2 N1	1.7	8.5	No
P2-L05 NE STUDIO 3 N1	1.7	8.1	No
P2-L05 NE STUDIO 4 N1	1.7	8.4	No
P2-L05 NE STUDIO 5 N1	1.7	8.5	No
P2-L05 NE STUDIO 6 N1	1.7	8.3	No
P2-L05 NE STUDIO 7 N1	1.7	8.2	No
P2-L05 NE STUDIO 8 N1	1.7	8.4	No
P2-L05 NORTH CORNER STUDIO N1	1.7	6.8	No
P2-L05 SOUTH CORNER STUDIO N1	1.7	8.8	No

Room name	Equivalent orifice area (m^2)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P2-L05 SW STAIR N1	1.3	7.4	Yes
P2-L05 SW STUDIO 1 N1	1.7	8.2	No
P2-L05 SW STUDIO 2 N1	1.7	8.4	No
P2-L05 SW STUDIO 3 N1	2	9.1	No
P2-L05 SW STUDIO 4 N1	1.7	8	No
P2-L05 SW STUDIO 5 N1	1.7	8.3	No
P2-L05 SW STUDIO 6 N1	1.7	8.4	No
P2-L05 SW STUDIO 7 N1	1.7	8.2	No
P2-L05 SW STUDIO 8 N1	1.7	8.1	No
P2-L05 SW STUDIO N1	1.7	8.3	No
P2-L05 WEST CORNER WCH STUDIO N1	3.3	9.7	No
P2-L06 CIRC N1	1.2	1.4	Yes
P2-L06 EAST CORNER STUDIO N1	1.7	8.9	No
P2-L06 LOBBY N1	2	10.7	Yes
P2-L06 NE STAIR N1	1.4	7.8	Yes
P2-L06 NE STUDIO 1 N1	1.7	8.3	No
P2-L06 NE STUDIO 2 N1	1.7	8.5	No
P2-L06 NE STUDIO 3 N1	1.7	8.1	No
P2-L06 NE STUDIO 4 N1	1.7	8.4	No
P2-L06 NE STUDIO 5 N1	1.7	8.5	No
P2-L06 NE STUDIO 6 N1	1.7	8.3	No
P2-L06 NE STUDIO 7 N1	1.7	8.2	No
P2-L06 NE STUDIO 8 N1	1.7	8.4	No
P2-L06 NORTH CORNER STUDIO N1	1.7	6.8	No
P2-L06 SOUTH CORNER STUDIO N1	1.7	8.8	No
P2-L06 SW STAIR N1	1.3	7.4	Yes
P2-L06 SW STUDIO 1 N1	1.7	8.2	No
P2-L06 SW STUDIO 2 N1	1.7	8.4	No
P2-L06 SW STUDIO 3 N1	2	9.1	No
P2-L06 SW STUDIO 4 N1	1.7	8	No
P2-L06 SW STUDIO 5 N1	1.7	8.3	No
P2-L06 SW STUDIO 6 N1	1.7	8.4	No
P2-L06 SW STUDIO 7 N1	1.7	8.2	No
P2-L06 SW STUDIO 8 N1	1.7	8.1	No
P2-L06 SW STUDIO N1	1.7	8.3	No
P2-L06 WEST CORNER WCH STUDIO N1	3.3	9.7	No
P2-L08 CIRC N1	1.1	1.9	Yes
P2-L08 EAST CORNER NE STUDIO N1	3.5	18.3	No
P2-L08 LOBBY N1	0.4	2.3	Yes
P2-L08 NE STUDIO 1 N1	1.7	8.4	No
P2-L08 NE STUDIO 2 N1	1.7	8.6	No
P2-L08 NE STUDIO 3 N1	1.7	8.2	No
P2-L08 NE STUDIO 4 N1	1.7	8.6	No
P2-L08 NORTH CORNER STUDIO N1	1.7	6.9	No
P2-L08 SOUTH CORNER SW STUDIO N1	3.4	17.6	No
P2-L08 STAIR N1	0.3	1.9	Yes
P2-L08 STAIR N2	0.4	2.4	Yes
P2-L08 SW STUDIO 1 N1	1.7	8.3	No
P2-L08 SW STUDIO 2 N1	1.7	8.5	No
P2-L08 SW STUDIO 3 N1	1.7	7.6	No
P2-L08 SW STUDIO 4 N1	1.7	8.1	No
P2-L08 SW STUDIO 5 N1	1.7	8.4	No
P2-L08 WEST CORNER WCH STUDIO N1	3.4	9.8	No
P2-L09 CIRC N1	1.1	1.9	Yes
P2-L09 EAST CORNER NE STUDIO N1	3.5	18.3	No
P2-L09 LOBBY N1	0.4	2.3	Yes
P2-L09 NE STUDIO 1 N1	1.7	8.4	No
P2-L09 NE STUDIO 2 N1	1.7	8.6	No
P2-L09 NE STUDIO 3 N1	1.7	8.2	No
P2-L09 NE STUDIO 4 N1	1.7	8.6	No
P2-L09 NORTH CORNER STUDIO N1	1.7	6.9	No
P2-L09 SOUTH CORNER SW STUDIO N1	3.4	17.6	No

Room name	Equivalent orifice area (m^2)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P2-L09 STAIR N1	0.3	1.9	Yes
P2-L09 STAIR N2	0.4	2.4	Yes
P2-L09 SW STUDIO 1 N1	1.7	8.3	No
P2-L09 SW STUDIO 2 N1	1.7	8.5	No
P2-L09 SW STUDIO 3 N1	1.7	7.6	No
P2-L09 SW STUDIO 4 N1	1.7	8.1	No
P2-L09 SW STUDIO 5 N1	1.7	8.4	No
P2-L09 WEST CORNER WCH STUDIO N1	3.4	9.8	No
P2-L10 CIRC N1	1.1	1.9	Yes
P2-L10 EAST CORNER NE STUDIO N1	3.5	18.3	No
P2-L10 LOBBY N1	0.4	2.3	Yes
P2-L10 NE STUDIO 1 N1	1.7	8.4	No
P2-L10 NE STUDIO 2 N1	1.7	8.6	No
P2-L10 NE STUDIO 3 N1	1.7	8.2	No
P2-L10 NE STUDIO 4 N1	1.7	8.6	No
P2-L10 NORTH CORNER STUDIO N1	1.7	6.9	No
P2-L10 SOUTH CORNER SW STUDIO N1	3.4	17.6	No
P2-L10 STAIR N1	0.3	1.9	Yes
P2-L10 STAIR N2	0.4	2.4	Yes
P2-L10 SW STUDIO 1 N1	1.7	8.3	No
P2-L10 SW STUDIO 2 N1	1.7	8.5	No
P2-L10 SW STUDIO 3 N1	1.7	7.6	No
P2-L10 SW STUDIO 4 N1	1.7	8.1	No
P2-L10 SW STUDIO 5 N1	1.7	8.4	No
P2-L10 WEST CORNER WCH STUDIO N1	3.4	9.8	No
P2-L11 CIRC N1	1.1	1.9	Yes
P2-L11 EAST CORNER NE STUDIO N1	3.5	18.3	No
P2-L11 LOBBY N1	0.4	2.3	Yes
P2-L11 NE STUDIO 1 N1	1.7	8.4	No
P2-L11 NE STUDIO 2 N1	1.7	8.6	No
P2-L11 NE STUDIO 3 N1	1.7	8.2	No
P2-L11 NE STUDIO 4 N1	1.7	8.6	No
P2-L11 NORTH CORNER STUDIO N1	1.7	6.9	No
P2-L11 SOUTH CORNER SW STUDIO N1	3.4	17.6	No
P2-L11 STAIR N1	0.3	1.9	Yes
P2-L11 STAIR N2	0.4	2.4	Yes
P2-L11 SW STUDIO 1 N1	1.7	8.3	No
P2-L11 SW STUDIO 2 N1	1.7	8.5	No
P2-L11 SW STUDIO 3 N1	1.7	7.6	No
P2-L11 SW STUDIO 4 N1	1.7	8.1	No
P2-L11 SW STUDIO 5 N1	1.7	8.4	No
P2-L11 WEST CORNER WCH STUDIO N1	3.4	9.8	No
P2-L12 CIRC N1	1.1	1.9	Yes
P2-L12 EAST CORNER NE STUDIO N1	3.5	18.3	No
P2-L12 LOBBY N1	0.4	2.3	Yes
P2-L12 NE STUDIO 1 N1	1.7	8.4	No
P2-L12 NE STUDIO 2 N1	1.7	8.6	No
P2-L12 NE STUDIO 3 N1	1.7	8.2	No
P2-L12 NE STUDIO 4 N1	1.7	8.6	No
P2-L12 NORTH CORNER STUDIO N1	1.7	6.9	No
P2-L12 SOUTH CORNER SW STUDIO N1	3.4	17.6	No
P2-L12 STAIR N1	0.3	1.9	Yes
P2-L12 STAIR N2	0.4	2.4	Yes
P2-L12 SW STUDIO 1 N1	1.7	8.3	No
P2-L12 SW STUDIO 2 N1	1.7	8.5	No
P2-L12 SW STUDIO 3 N1	1.7	7.6	No
P2-L12 SW STUDIO 4 N1	1.7	8.1	No
P2-L12 SW STUDIO 5 N1	1.7	8.4	No
P2-L12 WEST CORNER WCH STUDIO N1	3.4	9.8	No
P2-L13 CIRC N1	1.1	1.9	Yes
P2-L13 EAST CORNER NE STUDIO N1	3.5	18.3	No
P2-L13 LOBBY N1	0.4	2.3	Yes

Room name	Equivalent orifice area (m^2)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P2-L13 NE STUDIO 1 N1	1.7	8.4	No
P2-L13 NE STUDIO 2 N1	1.7	8.6	No
P2-L13 NE STUDIO 3 N1	1.7	8.2	No
P2-L13 NE STUDIO 4 N1	1.7	8.6	No
P2-L13 NORTH CORNER STUDIO N1	1.7	6.9	No
P2-L13 SOUTH CORNER SW STUDIO N1	3.4	17.6	No
P2-L13 STAIR N1	0.3	1.9	Yes
P2-L13 STAIR N2	0.4	2.4	Yes
P2-L13 SW STUDIO 1 N1	1.7	8.3	No
P2-L13 SW STUDIO 2 N1	1.7	8.5	No
P2-L13 SW STUDIO 3 N1	1.7	7.6	No
P2-L13 SW STUDIO 4 N1	1.7	8.1	No
P2-L13 SW STUDIO 5 N1	1.7	8.4	No
P2-L13 WEST CORNER WCH STUDIO N1	3.4	9.8	No
P2-L14 CIRC N1	1.1	1.9	Yes
P2-L14 EAST CORNER NE STUDIO N1	3.5	18.3	No
P2-L14 LOBBY N1	0.4	2.3	Yes
P2-L14 NE STUDIO 1 N1	1.7	8.4	No
P2-L14 NE STUDIO 2 N1	1.7	8.6	No
P2-L14 NE STUDIO 3 N1	1.7	8.2	No
P2-L14 NE STUDIO 4 N1	1.7	8.6	No
P2-L14 NORTH CORNER STUDIO N1	1.7	6.9	No
P2-L14 SOUTH CORNER SW STUDIO N1	3.4	17.6	No
P2-L14 STAIR N1	0.3	1.9	Yes
P2-L14 STAIR N2	0.4	2.4	Yes
P2-L14 SW STUDIO 1 N1	1.7	8.3	No
P2-L14 SW STUDIO 2 N1	1.7	8.5	No
P2-L14 SW STUDIO 3 N1	1.7	7.6	No
P2-L14 SW STUDIO 4 N1	1.7	8.1	No
P2-L14 SW STUDIO 5 N1	1.7	8.4	No
P2-L14 WEST CORNER WCH STUDIO N1	3.4	9.8	No

Room name	Equivalent orifice area (m^2)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P2-L15 CIRC N1	1.1	1.9	Yes
P2-L15 EAST CORNER NE STUDIO N1	3.5	18.3	No
P2-L15 LOBBY N1	0.4	2.3	Yes
P2-L15 NE STUDIO 1 N1	1.7	8.4	No
P2-L15 NE STUDIO 2 N1	1.7	8.6	No
P2-L15 NE STUDIO 3 N1	1.7	8.2	No
P2-L15 NE STUDIO 4 N1	1.7	8.6	No
P2-L15 NORTH CORNER STUDIO N1	1.7	6.9	No
P2-L15 SOUTH CORNER SW STUDIO N1	3.4	17.6	No
P2-L15 STAIR N1	0.3	1.9	Yes
P2-L15 STAIR N2	0.4	2.4	Yes
P2-L15 SW STUDIO 1 N1	1.7	8.3	No
P2-L15 SW STUDIO 2 N1	1.7	8.5	No
P2-L15 SW STUDIO 3 N1	1.7	7.6	No
P2-L15 SW STUDIO 4 N1	1.7	8.1	No
P2-L15 SW STUDIO 5 N1	1.7	8.4	No
P2-L15 WEST CORNER WCH STUDIO N1	3.4	9.8	No
P2-L16 CIRC N1	1.1	1.9	Yes
P2-L16 EAST CORNER NE STUDIO N1	3.5	18.3	No
P2-L16 LOBBY N1	0.4	2.3	Yes
P2-L16 NE STUDIO 1 N1	1.7	8.4	No
P2-L16 NE STUDIO 2 N1	1.7	8.6	No
P2-L16 NE STUDIO 3 N1	1.7	8.2	No
P2-L16 NE STUDIO 4 N1	1.7	8.6	No
P2-L16 NORTH CORNER STUDIO N1	1.7	6.9	No
P2-L16 SOUTH CORNER SW STUDIO N1	3.4	17.6	No
P2-L16 STAIR N1	0.3	1.9	Yes
P2-L16 STAIR N2	0.4	2.4	Yes
P2-L16 SW STUDIO 1 N1	1.7	8.3	No
P2-L16 SW STUDIO 2 N1	1.7	8.5	No
P2-L16 SW STUDIO 3 N1	1.7	7.6	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P2-L16 SW STUDIO 4 N1	1.7	8.1	No
P2-L16 SW STUDIO 5 N1	1.7	8.4	No
P2-L16 WEST CORNER WCH STUDIO N1	3.4	9.8	No

B.3 Plot 3

Table 7.23 Equivalent orifice areas provided by windows modelled in Plot 3, and which of these are treated as openable in the final overheating assessment

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L01 ACC. CLUSTER BED N1	1.0	5.3	No
P3-L01 ACC. CLUSTER BED N2	2.0	11	No
P3-L01 CLUSTER BED N1	1.0	8.5	No
P3-L01 CLUSTER BED N10	1.0	8.6	No
P3-L01 CLUSTER BED N11	1.0	8.4	No
P3-L01 CLUSTER BED N12	1.0	8.4	No
P3-L01 CLUSTER BED N13	1.0	8.8	No
P3-L01 CLUSTER BED N14	1.0	8.5	No
P3-L01 CLUSTER BED N15	1.0	8	No
P3-L01 CLUSTER BED N16	1.0	8.5	No
P3-L01 CLUSTER BED N17	1.0	8.1	No
P3-L01 CLUSTER BED N18	1.0	7.7	No
P3-L01 CLUSTER BED N19	1.0	7.8	No
P3-L01 CLUSTER BED N2	1.0	8.2	No
P3-L01 CLUSTER BED N20	1.0	8.2	No
P3-L01 CLUSTER BED N21	1.0	7.6	No
P3-L01 CLUSTER BED N22	1.0	8.3	No
P3-L01 CLUSTER BED N23	1.0	7.8	No
P3-L01 CLUSTER BED N24	1.0	8.3	No
P3-L01 CLUSTER BED N25	1.0	8.7	No
P3-L01 CLUSTER BED N26	1.0	7.9	No
P3-L01 CLUSTER BED N27	1.0	8.4	No
P3-L01 CLUSTER BED N28	1.0	8.2	No
P3-L01 CLUSTER BED N29	1.0	8	No
P3-L01 CLUSTER BED N3	1.0	8.5	No
P3-L01 CLUSTER BED N4	1.0	8	No
P3-L01 CLUSTER BED N5	1.0	8.6	No
P3-L01 CLUSTER BED N6	1.0	8.3	No
P3-L01 CLUSTER BED N7	1.0	8.3	No
P3-L01 CLUSTER BED N8	1.0	8	No
P3-L01 CLUSTER LIVING/KITCHEN N1	2.0	6	Yes
P3-L01 CLUSTER LIVING/KITCHEN N2	1.0	4.1	Yes
P3-L01 CLUSTER LIVING/KITCHEN N3	2.0	8.2	Yes
P3-L01 CLUSTER LIVING/KITCHEN N4	2.0	6.6	Yes
P3-L01 CLUSTER LIVING/KITCHEN N5	2.0	5.5	Yes
P3-L02 ACC. CLUSTER BED N1	1.0	5.3	No
P3-L02 ACC. CLUSTER BED N2	2.0	11.2	No
P3-L02 ACC. CLUSTER BED N3	1.0	5.4	No
P3-L02 CLUSTER BED N1	1.0	7.9	No
P3-L02 CLUSTER BED N10	1.0	8	No
P3-L02 CLUSTER BED N11	1.0	8.7	No
P3-L02 CLUSTER BED N12	1.0	8.3	No
P3-L02 CLUSTER BED N13	1.0	8.4	No
P3-L02 CLUSTER BED N14	1.0	8.6	No
P3-L02 CLUSTER BED N15	1.0	8.8	No
P3-L02 CLUSTER BED N16	1.0	8.2	No
P3-L02 CLUSTER BED N17	1.0	8.6	No
P3-L02 CLUSTER BED N18	1.0	8.6	No
P3-L02 CLUSTER BED N19	1.0	8.6	No
P3-L02 CLUSTER BED N2	1.0	8.3	No
P3-L02 CLUSTER BED N20	1.0	7.7	No
P3-L02 CLUSTER BED N21	1.0	8.1	No
P3-L02 CLUSTER BED N22	1.0	7.7	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L02 CLUSTER BED N23	1.0	7.8	No
P3-L02 CLUSTER BED N24	1.0	8.2	No
P3-L02 CLUSTER BED N25	1.0	7.6	No
P3-L02 CLUSTER BED N26	1.0	8.3	No
P3-L02 CLUSTER BED N27	1.0	7.8	No
P3-L02 CLUSTER BED N28	1.0	8.3	No
P3-L02 CLUSTER BED N29	1.0	8.7	No
P3-L02 CLUSTER BED N3	1.0	8.6	No
P3-L02 CLUSTER BED N30	1.0	7.9	No
P3-L02 CLUSTER BED N31	1.0	8.4	No
P3-L02 CLUSTER BED N32	1.0	8.2	No
P3-L02 CLUSTER BED N33	1.0	8	No
P3-L02 CLUSTER BED N4	1.0	8.4	No
P3-L02 CLUSTER BED N5	1.0	8.5	No
P3-L02 CLUSTER BED N6	1.0	8.1	No
P3-L02 CLUSTER BED N7	1.0	8.7	No
P3-L02 CLUSTER BED N8	1.0	8.4	No
P3-L02 CLUSTER BED N9	1.0	8.3	No
P3-L02 CLUSTER LIVING/KITCHEN N1	2.0	6.6	Yes
P3-L02 CLUSTER LIVING/KITCHEN N2	2.0	5.5	Yes
P3-L02 CLUSTER LIVING/KITCHEN N3	2.0	8.2	Yes
P3-L02 CLUSTER LIVING/KITCHEN N4	1.0	3.9	Yes
P3-L02 CLUSTER LIVING/KITCHEN N5	2.0	5.9	Yes
P3-L02 CLUSTER LIVING/KITCHEN N6	3.0	8.9	Yes
P3-L03 ACC. CLUSTER BED N1	1.0	5.3	No
P3-L03 ACC. CLUSTER BED N2	2.0	11.2	No
P3-L03 ACC. CLUSTER BED N3	1.0	5.4	No
P3-L03 CLUSTER BED N1	1.0	7.9	No
P3-L03 CLUSTER BED N10	1.0	8	No
P3-L03 CLUSTER BED N11	1.0	8.7	No
P3-L03 CLUSTER BED N12	1.0	8.3	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L03 CLUSTER BED N13	1.0	8.4	No
P3-L03 CLUSTER BED N14	1.0	8.6	No
P3-L03 CLUSTER BED N15	1.0	8.8	No
P3-L03 CLUSTER BED N16	1.0	8.2	No
P3-L03 CLUSTER BED N17	1.0	8.6	No
P3-L03 CLUSTER BED N18	1.0	8.6	No
P3-L03 CLUSTER BED N19	1.0	8.6	No
P3-L03 CLUSTER BED N2	1.0	8.3	No
P3-L03 CLUSTER BED N20	1.0	7.7	No
P3-L03 CLUSTER BED N21	1.0	8.1	No
P3-L03 CLUSTER BED N22	1.0	7.7	No
P3-L03 CLUSTER BED N23	1.0	7.8	No
P3-L03 CLUSTER BED N24	1.0	8.2	No
P3-L03 CLUSTER BED N25	1.0	7.6	No
P3-L03 CLUSTER BED N26	1.0	8.3	No
P3-L03 CLUSTER BED N27	1.0	7.8	No
P3-L03 CLUSTER BED N28	1.0	8.3	No
P3-L03 CLUSTER BED N29	1.0	8.7	No
P3-L03 CLUSTER BED N3	1.0	8.6	No
P3-L03 CLUSTER BED N30	1.0	7.9	No
P3-L03 CLUSTER BED N31	1.0	8.4	No
P3-L03 CLUSTER BED N32	1.0	8.2	No
P3-L03 CLUSTER BED N33	1.0	8	No
P3-L03 CLUSTER BED N4	1.0	8.4	No
P3-L03 CLUSTER BED N5	1.0	8.5	No
P3-L03 CLUSTER BED N6	1.0	8.1	No
P3-L03 CLUSTER BED N7	1.0	8.7	No
P3-L03 CLUSTER BED N8	1.0	8.4	No
P3-L03 CLUSTER BED N9	1.0	8.3	No
P3-L03 CLUSTER LIVING/KITCHEN N1	2.0	6.6	Yes
P3-L03 CLUSTER LIVING/KITCHEN N2	2.0	5.5	Yes

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L03 CLUSTER LIVING/KITCHEN N3	2.0	8.2	Yes
P3-L03 CLUSTER LIVING/KITCHEN N4	1.0	3.9	Yes
P3-L03 CLUSTER LIVING/KITCHEN N5	2.0	5.9	Yes
P3-L03 CLUSTER LIVING/KITCHEN N6	3.0	8.9	Yes
P3-L04 ACC. CLUSTER BED N1	1.0	5.3	No
P3-L04 ACC. CLUSTER BED N2	2.0	11.2	No
P3-L04 ACC. CLUSTER BED N3	1.0	5.4	No
P3-L04 CLUSTER BED N1	1.0	7.9	No
P3-L04 CLUSTER BED N10	1.0	8	No
P3-L04 CLUSTER BED N11	1.0	8.7	No
P3-L04 CLUSTER BED N12	1.0	8.3	No
P3-L04 CLUSTER BED N13	1.0	8.4	No
P3-L04 CLUSTER BED N14	1.0	8.6	No
P3-L04 CLUSTER BED N15	1.0	8.8	No
P3-L04 CLUSTER BED N16	1.0	8.2	No
P3-L04 CLUSTER BED N17	1.0	8.6	No
P3-L04 CLUSTER BED N18	1.0	8.6	No
P3-L04 CLUSTER BED N19	1.0	8.6	No
P3-L04 CLUSTER BED N2	1.0	8.3	No
P3-L04 CLUSTER BED N20	1.0	7.7	No
P3-L04 CLUSTER BED N21	1.0	8.1	No
P3-L04 CLUSTER BED N22	1.0	7.7	No
P3-L04 CLUSTER BED N23	1.0	7.8	No
P3-L04 CLUSTER BED N24	1.0	8.2	No
P3-L04 CLUSTER BED N25	1.0	7.6	No
P3-L04 CLUSTER BED N26	1.0	8.3	No
P3-L04 CLUSTER BED N27	1.0	7.8	No
P3-L04 CLUSTER BED N28	1.0	8.3	No
P3-L04 CLUSTER BED N29	1.0	8.7	No
P3-L04 CLUSTER BED N3	1.0	8.6	No
P3-L04 CLUSTER BED N30	1.0	7.9	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L04 CLUSTER BED N31	1.0	8.4	No
P3-L04 CLUSTER BED N32	1.0	8.2	No
P3-L04 CLUSTER BED N33	1.0	8	No
P3-L04 CLUSTER BED N4	1.0	8.4	No
P3-L04 CLUSTER BED N5	1.0	8.5	No
P3-L04 CLUSTER BED N6	1.0	8.1	No
P3-L04 CLUSTER BED N7	1.0	8.7	No
P3-L04 CLUSTER BED N8	1.0	8.4	No
P3-L04 CLUSTER BED N9	1.0	8.3	No
P3-L04 CLUSTER LIVING/KITCHEN N1	2.0	6.6	Yes
P3-L04 CLUSTER LIVING/KITCHEN N2	2.0	5.5	Yes
P3-L04 CLUSTER LIVING/KITCHEN N3	2.0	8.2	Yes
P3-L04 CLUSTER LIVING/KITCHEN N4	1.0	3.9	Yes
P3-L04 CLUSTER LIVING/KITCHEN N5	2.0	5.9	Yes
P3-L04 CLUSTER LIVING/KITCHEN N6	3.0	8.9	Yes
P3-L05 ACC. CLUSTER BED N1	1.0	5.3	No
P3-L05 ACC. CLUSTER BED N2	2.0	11.2	No
P3-L05 ACC. CLUSTER BED N3	1.0	5.4	No
P3-L05 CLUSTER BED N1	1.0	7.9	No
P3-L05 CLUSTER BED N10	1.0	8	No
P3-L05 CLUSTER BED N11	1.0	8.7	No
P3-L05 CLUSTER BED N12	1.0	8.3	No
P3-L05 CLUSTER BED N13	1.0	8.4	No
P3-L05 CLUSTER BED N14	1.0	8.6	No
P3-L05 CLUSTER BED N15	1.0	8.8	No
P3-L05 CLUSTER BED N16	1.0	8.2	No
P3-L05 CLUSTER BED N17	1.0	8.6	No
P3-L05 CLUSTER BED N18	1.0	8.6	No
P3-L05 CLUSTER BED N19	1.0	8.6	No
P3-L05 CLUSTER BED N2	1.0	8.3	No
P3-L05 CLUSTER BED N20	1.0	7.7	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L05 CLUSTER BED N21	1.0	8.1	No
P3-L05 CLUSTER BED N22	1.0	7.7	No
P3-L05 CLUSTER BED N23	1.0	7.8	No
P3-L05 CLUSTER BED N24	1.0	8.2	No
P3-L05 CLUSTER BED N25	1.0	7.6	No
P3-L05 CLUSTER BED N26	1.0	8.3	No
P3-L05 CLUSTER BED N27	1.0	7.8	No
P3-L05 CLUSTER BED N28	1.0	8.3	No
P3-L05 CLUSTER BED N29	1.0	8.7	No
P3-L05 CLUSTER BED N3	1.0	8.6	No
P3-L05 CLUSTER BED N30	1.0	7.9	No
P3-L05 CLUSTER BED N31	1.0	8.4	No
P3-L05 CLUSTER BED N32	1.0	8.2	No
P3-L05 CLUSTER BED N33	1.0	8	No
P3-L05 CLUSTER BED N4	1.0	8.4	No
P3-L05 CLUSTER BED N5	1.0	8.5	No
P3-L05 CLUSTER BED N6	1.0	8.1	No
P3-L05 CLUSTER BED N7	1.0	8.7	No
P3-L05 CLUSTER BED N8	1.0	8.4	No
P3-L05 CLUSTER BED N9	1.0	8.3	No
P3-L05 CLUSTER LIVING/KITCHEN N1	2.0	6.6	Yes
P3-L05 CLUSTER LIVING/KITCHEN N2	2.0	5.5	Yes
P3-L05 CLUSTER LIVING/KITCHEN N3	2.0	8.2	Yes
P3-L05 CLUSTER LIVING/KITCHEN N4	1.0	3.9	Yes
P3-L05 CLUSTER LIVING/KITCHEN N5	2.0	5.9	Yes
P3-L05 CLUSTER LIVING/KITCHEN N6	3.0	8.9	Yes
P3-L06 ACC. CLUSTER BED N1	1.0	5.3	No
P3-L06 ACC. CLUSTER BED N2	2.0	11.2	No
P3-L06 ACC. CLUSTER BED N3	1.0	5.4	No
P3-L06 CLUSTER BED N1	1.0	7.9	No
P3-L06 CLUSTER BED N10	1.0	8	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L06 CLUSTER BED N11	1.0	8.7	No
P3-L06 CLUSTER BED N12	1.0	8.3	No
P3-L06 CLUSTER BED N13	1.0	8.4	No
P3-L06 CLUSTER BED N14	1.0	8.6	No
P3-L06 CLUSTER BED N15	1.0	8.8	No
P3-L06 CLUSTER BED N16	1.0	8.2	No
P3-L06 CLUSTER BED N17	1.0	8.6	No
P3-L06 CLUSTER BED N18	1.0	8.6	No
P3-L06 CLUSTER BED N19	1.0	8.6	No
P3-L06 CLUSTER BED N2	1.0	8.3	No
P3-L06 CLUSTER BED N20	1.0	7.7	No
P3-L06 CLUSTER BED N21	1.0	8.1	No
P3-L06 CLUSTER BED N22	1.0	7.7	No
P3-L06 CLUSTER BED N23	1.0	7.8	No
P3-L06 CLUSTER BED N24	1.0	8.2	No
P3-L06 CLUSTER BED N25	1.0	7.6	No
P3-L06 CLUSTER BED N26	1.0	8.3	No
P3-L06 CLUSTER BED N27	1.0	7.8	No
P3-L06 CLUSTER BED N28	1.0	8.3	No
P3-L06 CLUSTER BED N29	1.0	8.7	No
P3-L06 CLUSTER BED N3	1.0	8.6	No
P3-L06 CLUSTER BED N30	1.0	7.9	No
P3-L06 CLUSTER BED N31	1.0	8.4	No
P3-L06 CLUSTER BED N32	1.0	8.2	No
P3-L06 CLUSTER BED N33	1.0	8	No
P3-L06 CLUSTER BED N4	1.0	8.4	No
P3-L06 CLUSTER BED N5	1.0	8.5	No
P3-L06 CLUSTER BED N6	1.0	8.1	No
P3-L06 CLUSTER BED N7	1.0	8.7	No
P3-L06 CLUSTER BED N8	1.0	8.4	No
P3-L06 CLUSTER BED N9	1.0	8.3	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L06 CLUSTER LIVING/KITCHEN N1	2.0	6.6	Yes
P3-L06 CLUSTER LIVING/KITCHEN N2	2.0	5.5	Yes
P3-L06 CLUSTER LIVING/KITCHEN N3	2.0	8.2	Yes
P3-L06 CLUSTER LIVING/KITCHEN N4	1.0	3.9	Yes
P3-L06 CLUSTER LIVING/KITCHEN N5	2.0	5.9	Yes
P3-L06 CLUSTER LIVING/KITCHEN N6	3.0	8.9	Yes
P3-L08 ACC. CLUSTER BED N1	2.0	10.2	No
P3-L08 CLUSTER BED N1	1.0	9	No
P3-L08 CLUSTER BED N10	1.0	8.6	No
P3-L08 CLUSTER BED N11	1.0	7.5	No
P3-L08 CLUSTER BED N12	1.0	7.9	No
P3-L08 CLUSTER BED N13	1.0	8.5	No
P3-L08 CLUSTER BED N14	1.0	7.5	No
P3-L08 CLUSTER BED N15	1.0	8.3	No
P3-L08 CLUSTER BED N16	1.0	7.9	No
P3-L08 CLUSTER BED N17	1.0	7.8	No
P3-L08 CLUSTER BED N18	1.0	7.9	No
P3-L08 CLUSTER BED N19	1.0	8.3	No
P3-L08 CLUSTER BED N2	1.0	7.2	No
P3-L08 CLUSTER BED N20	1.0	8.8	No
P3-L08 CLUSTER BED N21	1.0	7.9	No
P3-L08 CLUSTER BED N22	1.0	8.5	No
P3-L08 CLUSTER BED N23	1.0	8.2	No
P3-L08 CLUSTER BED N24	1.0	8.1	No
P3-L08 CLUSTER BED N3	1.0	8.3	No
P3-L08 CLUSTER BED N4	1.0	8.3	No
P3-L08 CLUSTER BED N5	1.0	8.3	No
P3-L08 CLUSTER BED N6	1.0	8	No
P3-L08 CLUSTER BED N7	1.0	8.3	No
P3-L08 CLUSTER BED N8	1.0	8.5	No
P3-L08 CLUSTER BED N9	1.0	8.6	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L08 CLUSTER LIVING/KITCHEN N1	2.0	6	Yes
P3-L08 CLUSTER LIVING/KITCHEN N2	2.0	5.9	Yes
P3-L08 CLUSTER LIVING/KITCHEN N3	1.6	5.4	Yes
P3-L08 CLUSTER LIVING/KITCHEN N4	1.6	4.5	Yes
P3-L08 LOBBY N2	1.0	7.1	No
P3-L08 STAIR N2	1.0	6.6	No
P3-L09 ACC. CLUSTER BED N1	2.0	10.2	No
P3-L09 CLUSTER BED N1	1.0	7.9	No
P3-L09 CLUSTER BED N10	1.0	7.9	No
P3-L09 CLUSTER BED N11	1.0	8.5	No
P3-L09 CLUSTER BED N12	1.0	8.2	No
P3-L09 CLUSTER BED N13	1.0	8.1	No
P3-L09 CLUSTER BED N14	1.0	7.5	No
P3-L09 CLUSTER BED N15	1.0	8.6	No
P3-L09 CLUSTER BED N16	1.0	8.6	No
P3-L09 CLUSTER BED N17	1.0	8.5	No
P3-L09 CLUSTER BED N18	1.0	8.3	No
P3-L09 CLUSTER BED N19	1.0	8	No
P3-L09 CLUSTER BED N2	1.0	8.5	No
P3-L09 CLUSTER BED N20	1.0	8.3	No
P3-L09 CLUSTER BED N21	1.0	8.3	No
P3-L09 CLUSTER BED N22	1.0	8.3	No
P3-L09 CLUSTER BED N23	1.0	7.2	No
P3-L09 CLUSTER BED N24	1.0	9	No
P3-L09 CLUSTER BED N3	1.0	7.5	No
P3-L09 CLUSTER BED N4	1.0	8.3	No
P3-L09 CLUSTER BED N5	1.0	7.9	No
P3-L09 CLUSTER BED N6	1.0	7.8	No
P3-L09 CLUSTER BED N7	1.0	7.9	No
P3-L09 CLUSTER BED N8	1.0	8.3	No
P3-L09 CLUSTER BED N9	1.0	8.8	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L09 CLUSTER LIVING/KITCHEN N1	1.6	5.4	Yes
P3-L09 CLUSTER LIVING/KITCHEN N2	1.6	4.5	Yes
P3-L09 CLUSTER LIVING/KITCHEN N3	2.0	5.9	Yes
P3-L09 CLUSTER LIVING/KITCHEN N4	2.0	6	Yes
P3-L09 LOBBY N1	1.0	7.1	No
P3-L09 STAIR N1	1.0	6.6	No
P3-L10 ACC. CLUSTER BED N1	2.0	10.2	No
P3-L10 CLUSTER BED N1	1.0	9	No
P3-L10 CLUSTER BED N10	1.0	8.6	No
P3-L10 CLUSTER BED N11	1.0	7.5	No
P3-L10 CLUSTER BED N12	1.0	7.9	No
P3-L10 CLUSTER BED N13	1.0	8.5	No
P3-L10 CLUSTER BED N14	1.0	7.5	No
P3-L10 CLUSTER BED N15	1.0	8.3	No
P3-L10 CLUSTER BED N16	1.0	7.9	No
P3-L10 CLUSTER BED N17	1.0	7.8	No
P3-L10 CLUSTER BED N18	1.0	7.9	No
P3-L10 CLUSTER BED N19	1.0	8.3	No
P3-L10 CLUSTER BED N2	1.0	7.2	No
P3-L10 CLUSTER BED N20	1.0	8.8	No
P3-L10 CLUSTER BED N21	1.0	7.9	No
P3-L10 CLUSTER BED N22	1.0	8.5	No
P3-L10 CLUSTER BED N23	1.0	8.2	No
P3-L10 CLUSTER BED N24	1.0	8.1	No
P3-L10 CLUSTER BED N3	1.0	8.3	No
P3-L10 CLUSTER BED N4	1.0	8.3	No
P3-L10 CLUSTER BED N5	1.0	8.3	No
P3-L10 CLUSTER BED N6	1.0	8	No
P3-L10 CLUSTER BED N7	1.0	8.3	No
P3-L10 CLUSTER BED N8	1.0	8.5	No
P3-L10 CLUSTER BED N9	1.0	8.6	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L10 CLUSTER LIVING/KITCHEN N1	2.0	6	Yes
P3-L10 CLUSTER LIVING/KITCHEN N2	2.0	5.9	Yes
P3-L10 CLUSTER LIVING/KITCHEN N3	1.6	5.4	Yes
P3-L10 CLUSTER LIVING/KITCHEN N4	1.6	4.5	Yes
P3-L10 LOBBY N2	1.0	7.1	No
P3-L10 STAIR N3	1.0	6.6	No
P3-L11 ACC. CLUSTER BED N1	2.0	10.2	No
P3-L11 CLUSTER BED N1	1.0	9	No
P3-L11 CLUSTER BED N10	1.0	8.6	No
P3-L11 CLUSTER BED N11	1.0	7.5	No
P3-L11 CLUSTER BED N12	1.0	7.9	No
P3-L11 CLUSTER BED N13	1.0	8.5	No
P3-L11 CLUSTER BED N14	1.0	7.5	No
P3-L11 CLUSTER BED N15	1.0	8.3	No
P3-L11 CLUSTER BED N16	1.0	7.9	No
P3-L11 CLUSTER BED N17	1.0	7.8	No
P3-L11 CLUSTER BED N18	1.0	7.9	No
P3-L11 CLUSTER BED N19	1.0	8.3	No
P3-L11 CLUSTER BED N2	1.0	7.2	No
P3-L11 CLUSTER BED N20	1.0	8.8	No
P3-L11 CLUSTER BED N21	1.0	7.9	No
P3-L11 CLUSTER BED N22	1.0	8.5	No
P3-L11 CLUSTER BED N23	1.0	8.2	No
P3-L11 CLUSTER BED N24	1.0	8.1	No
P3-L11 CLUSTER BED N3	1.0	8.3	No
P3-L11 CLUSTER BED N4	1.0	8.3	No
P3-L11 CLUSTER BED N5	1.0	8.3	No
P3-L11 CLUSTER BED N6	1.0	8	No
P3-L11 CLUSTER BED N7	1.0	8.3	No
P3-L11 CLUSTER BED N8	1.0	8.5	No
P3-L11 CLUSTER BED N9	1.0	8.6	No

Room name	Equivalent orifice area (m^2)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L11 CLUSTER LIVING/KITCHEN N1	2.0	6	Yes
P3-L11 CLUSTER LIVING/KITCHEN N2	2.0	5.9	Yes
P3-L11 CLUSTER LIVING/KITCHEN N3	1.6	5.4	Yes
P3-L11 CLUSTER LIVING/KITCHEN N4	1.6	4.5	Yes
P3-L11 LOBBY N2	1.0	7.1	No
P3-L11 STAIR N3	1.0	6.6	No
P3-L12 ACC. CLUSTER BED N1	2.0	10.2	No
P3-L12 CLUSTER BED N1	1.0	9	No
P3-L12 CLUSTER BED N10	1.0	8.6	No
P3-L12 CLUSTER BED N11	1.0	7.5	No
P3-L12 CLUSTER BED N12	1.0	7.9	No
P3-L12 CLUSTER BED N13	1.0	8.5	No
P3-L12 CLUSTER BED N14	1.0	7.5	No
P3-L12 CLUSTER BED N15	1.0	8.3	No
P3-L12 CLUSTER BED N16	1.0	7.9	No
P3-L12 CLUSTER BED N17	1.0	7.8	No
P3-L12 CLUSTER BED N18	1.0	7.9	No
P3-L12 CLUSTER BED N19	1.0	8.3	No
P3-L12 CLUSTER BED N2	1.0	7.2	No
P3-L12 CLUSTER BED N20	1.0	8.8	No
P3-L12 CLUSTER BED N21	1.0	7.9	No
P3-L12 CLUSTER BED N22	1.0	8.5	No
P3-L12 CLUSTER BED N23	1.0	8.2	No
P3-L12 CLUSTER BED N24	1.0	8.1	No
P3-L12 CLUSTER BED N3	1.0	8.3	No
P3-L12 CLUSTER BED N4	1.0	8.3	No
P3-L12 CLUSTER BED N5	1.0	8.3	No
P3-L12 CLUSTER BED N6	1.0	8	No
P3-L12 CLUSTER BED N7	1.0	8.3	No
P3-L12 CLUSTER BED N8	1.0	8.5	No
P3-L12 CLUSTER BED N9	1.0	8.6	No

Room name	Equivalent orifice area (m^2)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L12 CLUSTER LIVING/KITCHEN N1	2.0	6	Yes
P3-L12 CLUSTER LIVING/KITCHEN N2	2.0	5.9	Yes
P3-L12 CLUSTER LIVING/KITCHEN N3	1.6	5.4	Yes
P3-L12 CLUSTER LIVING/KITCHEN N4	1.6	4.5	Yes
P3-L12 LOBBY N2	1.0	7.1	No
P3-L12 STAIR N3	1.0	6.6	No
P3-L13 ACC. CLUSTER BED N1	2.0	10.2	No
P3-L13 CLUSTER BED N1	1.0	9	No
P3-L13 CLUSTER BED N10	1.0	8.6	No
P3-L13 CLUSTER BED N11	1.0	7.5	No
P3-L13 CLUSTER BED N12	1.0	7.9	No
P3-L13 CLUSTER BED N13	1.0	8.5	No
P3-L13 CLUSTER BED N14	1.0	7.5	No
P3-L13 CLUSTER BED N15	1.0	8.3	No
P3-L13 CLUSTER BED N16	1.0	7.9	No
P3-L13 CLUSTER BED N17	1.0	7.8	No
P3-L13 CLUSTER BED N18	1.0	7.9	No
P3-L13 CLUSTER BED N19	1.0	8.3	No
P3-L13 CLUSTER BED N2	1.0	7.2	No
P3-L13 CLUSTER BED N20	1.0	8.8	No
P3-L13 CLUSTER BED N21	1.0	7.9	No
P3-L13 CLUSTER BED N22	1.0	8.5	No
P3-L13 CLUSTER BED N23	1.0	8.2	No
P3-L13 CLUSTER BED N24	1.0	8.1	No
P3-L13 CLUSTER BED N3	1.0	8.3	No
P3-L13 CLUSTER BED N4	1.0	8.3	No
P3-L13 CLUSTER BED N5	1.0	8.3	No
P3-L13 CLUSTER BED N6	1.0	8	No
P3-L13 CLUSTER BED N7	1.0	8.3	No
P3-L13 CLUSTER BED N8	1.0	8.5	No
P3-L13 CLUSTER BED N9	1.0	8.6	No

Room name	Equivalent orifice area (m^2)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L13 CLUSTER LIVING/KITCHEN N1	2.0	6	Yes
P3-L13 CLUSTER LIVING/KITCHEN N2	2.0	5.9	Yes
P3-L13 CLUSTER LIVING/KITCHEN N3	1.6	5.4	Yes
P3-L13 CLUSTER LIVING/KITCHEN N4	1.6	4.5	Yes
P3-L13 LOBBY N2	1.0	7.1	No
P3-L13 STAIR N3	1.0	6.6	No
P3-L14 ACC. CLUSTER BED N1	2.0	10.2	No
P3-L14 CLUSTER BED N1	1.0	9	No
P3-L14 CLUSTER BED N10	1.0	8.6	No
P3-L14 CLUSTER BED N11	1.0	7.5	No
P3-L14 CLUSTER BED N12	1.0	7.9	No
P3-L14 CLUSTER BED N13	1.0	8.5	No
P3-L14 CLUSTER BED N14	1.0	7.5	No
P3-L14 CLUSTER BED N15	1.0	8.3	No
P3-L14 CLUSTER BED N16	1.0	7.9	No
P3-L14 CLUSTER BED N17	1.0	7.8	No
P3-L14 CLUSTER BED N18	1.0	7.9	No
P3-L14 CLUSTER BED N19	1.0	8.3	No
P3-L14 CLUSTER BED N2	1.0	7.2	No
P3-L14 CLUSTER BED N20	1.0	8.8	No
P3-L14 CLUSTER BED N21	1.0	7.9	No
P3-L14 CLUSTER BED N22	1.0	8.5	No
P3-L14 CLUSTER BED N23	1.0	8.2	No
P3-L14 CLUSTER BED N24	1.0	8.1	No
P3-L14 CLUSTER BED N3	1.0	8.3	No
P3-L14 CLUSTER BED N4	1.0	8.3	No
P3-L14 CLUSTER BED N5	1.0	8.3	No
P3-L14 CLUSTER BED N6	1.0	8	No
P3-L14 CLUSTER BED N7	1.0	8.3	No
P3-L14 CLUSTER BED N8	1.0	8.5	No
P3-L14 CLUSTER BED N9	1.0	8.6	No
P3-L14 CLUSTER LIVING/KITCHEN N1	2.0	6	Yes
P3-L14 CLUSTER LIVING/KITCHEN N2	2.0	5.9	Yes
P3-L14 CLUSTER LIVING/KITCHEN N3	1.6	5.4	Yes
P3-L14 CLUSTER LIVING/KITCHEN N4	1.6	4.5	Yes
P3-L14 LOBBY N2	1.0	7.1	No
P3-L14 STAIR N3	1.0	6.6	No
P3-L15 ACC. CLUSTER BED N1	2.0	10.2	No
P3-L15 CLUSTER BED N1	1.0	9	No
P3-L15 CLUSTER BED N10	1.0	8.6	No
P3-L15 CLUSTER BED N11	1.0	7.5	No
P3-L15 CLUSTER BED N12	1.0	7.9	No
P3-L15 CLUSTER BED N13	1.0	8.5	No
P3-L15 CLUSTER BED N14	1.0	7.5	No
P3-L15 CLUSTER BED N15	1.0	8.3	No
P3-L15 CLUSTER BED N16	1.0	7.9	No
P3-L15 CLUSTER BED N17	1.0	7.8	No
P3-L15 CLUSTER BED N18	1.0	7.9	No
P3-L15 CLUSTER BED N19	1.0	8.3	No
P3-L15 CLUSTER BED N2	1.0	7.2	No
P3-L15 CLUSTER BED N20	1.0	8.8	No
P3-L15 CLUSTER BED N21	1.0	7.9	No
P3-L15 CLUSTER BED N22	1.0	8.5	No
P3-L15 CLUSTER BED N23	1.0	8.2	No
P3-L15 CLUSTER BED N24	1.0	8.1	No
P3-L15 CLUSTER BED N3	1.0	8.3	No
P3-L15 CLUSTER BED N4	1.0	8.3	No
P3-L15 CLUSTER BED N5	1.0	8.3	No
P3-L15 CLUSTER BED N6	1.0	8	No
P3-L15 CLUSTER BED N7	1.0	8.3	No
P3-L15 CLUSTER BED N8	1.0	8.5	No
P3-L15 CLUSTER BED N9	1.0	8.6	No

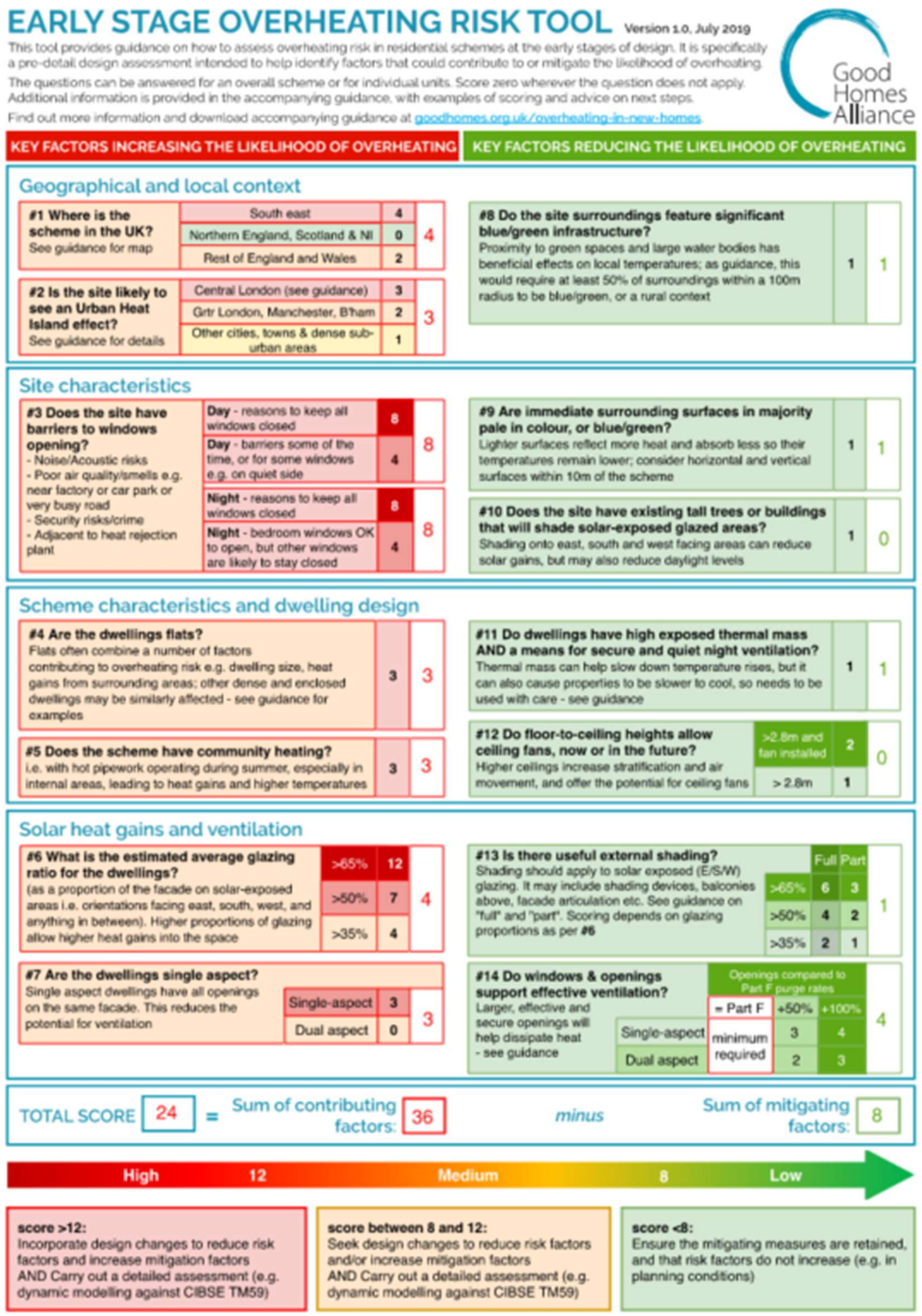
Room name	Equivalent orifice area (m^2)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L15 CLUSTER LIVING/KITCHEN N1	2.0	6	Yes
P3-L15 CLUSTER LIVING/KITCHEN N2	2.0	5.9	Yes
P3-L15 CLUSTER LIVING/KITCHEN N3	1.6	5.4	Yes
P3-L15 CLUSTER LIVING/KITCHEN N4	1.6	4.5	Yes
P3-L15 LOBBY N2	1.0	7.1	No
P3-L15 STAIR N3	1.0	6.6	No
P3-L16 ACC. CLUSTER BED N1	2.0	10.2	No
P3-L16 CLUSTER BED N1	1.0	9	No
P3-L16 CLUSTER BED N10	1.0	8.6	No
P3-L16 CLUSTER BED N11	1.0	7.5	No
P3-L16 CLUSTER BED N12	1.0	7.9	No
P3-L16 CLUSTER BED N13	1.0	8.5	No
P3-L16 CLUSTER BED N14	1.0	7.5	No
P3-L16 CLUSTER BED N15	1.0	8.3	No
P3-L16 CLUSTER BED N16	1.0	7.9	No
P3-L16 CLUSTER BED N17	1.0	7.8	No
P3-L16 CLUSTER BED N18	1.0	7.9	No
P3-L16 CLUSTER BED N19	1.0	8.3	No
P3-L16 CLUSTER BED N2	1.0	7.2	No
P3-L16 CLUSTER BED N20	1.0	8.8	No
P3-L16 CLUSTER BED N21	1.0	7.9	No
P3-L16 CLUSTER BED N22	1.0	8.5	No
P3-L16 CLUSTER BED N23	1.0	8.2	No
P3-L16 CLUSTER BED N24	1.0	8.1	No
P3-L16 CLUSTER BED N3	1.0	8.3	No
P3-L16 CLUSTER BED N4	1.0	8.3	No
P3-L16 CLUSTER BED N5	1.0	8.3	No
P3-L16 CLUSTER BED N6	1.0	8	No
P3-L16 CLUSTER BED N7	1.0	8.3	No
P3-L16 CLUSTER BED N8	1.0	8.5	No
P3-L16 CLUSTER BED N9	1.0	8.6	No
P3-L16 CLUSTER LIVING/KITCHEN N1	2.0	6	Yes
P3-L16 CLUSTER LIVING/KITCHEN N2	2.0	5.9	Yes
P3-L16 CLUSTER LIVING/KITCHEN N3	1.6	5.4	Yes
P3-L16 CLUSTER LIVING/KITCHEN N4	1.6	4.5	Yes
P3-L16 LOBBY N2	1.0	7.1	No
P3-L16 STAIR N3	1.0	6.6	No
P3-L17 ACC. CLUSTER BED N1	2.0	10.2	No
P3-L17 CLUSTER BED N1	1.0	9	No
P3-L17 CLUSTER BED N10	1.0	8.6	No
P3-L17 CLUSTER BED N11	1.0	7.5	No
P3-L17 CLUSTER BED N12	1.0	7.9	No
P3-L17 CLUSTER BED N13	1.0	8.5	No
P3-L17 CLUSTER BED N14	1.0	7.5	No
P3-L17 CLUSTER BED N15	1.0	8.3	No
P3-L17 CLUSTER BED N16	1.0	7.9	No
P3-L17 CLUSTER BED N17	1.0	7.8	No
P3-L17 CLUSTER BED N18	1.0	7.9	No
P3-L17 CLUSTER BED N19	1.0	8.3	No
P3-L17 CLUSTER BED N2	1.0	7.2	No
P3-L17 CLUSTER BED N20	1.0	8.8	No
P3-L17 CLUSTER BED N21	1.0	7.9	No
P3-L17 CLUSTER BED N22	1.0	8.5	No
P3-L17 CLUSTER BED N23	1.0	8.2	No
P3-L17 CLUSTER BED N24	1.0	8.1	No
P3-L17 CLUSTER BED N3	1.0	8.3	No
P3-L17 CLUSTER BED N4	1.0	8.3	No
P3-L17 CLUSTER BED N5	1.0	8.3	No
P3-L17 CLUSTER BED N6	1.0	8	No
P3-L17 CLUSTER BED N7	1.0	8.3	No
P3-L17 CLUSTER BED N8	1.0	8.5	No
P3-L17 CLUSTER BED N9	1.0	8.6	No

Room name	Equivalent orifice area (m^2)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L17 CLUSTER LIVING/KITCHEN N1	2.0	6	Yes
P3-L17 CLUSTER LIVING/KITCHEN N2	2.0	5.9	Yes
P3-L17 CLUSTER LIVING/KITCHEN N3	1.6	5.4	Yes
P3-L17 CLUSTER LIVING/KITCHEN N4	1.6	4.5	Yes
P3-L17 LOBBY N2	1.0	7.1	No
P3-L17 STAIR N3	1.0	6.6	No
P3-L18 ACC. CLUSTER BED N1	2.0	10.2	No
P3-L18 CLUSTER BED N1	1.0	9	No
P3-L18 CLUSTER BED N10	1.0	8.6	No
P3-L18 CLUSTER BED N11	1.0	7.5	No
P3-L18 CLUSTER BED N12	1.0	7.9	No
P3-L18 CLUSTER BED N13	1.0	8.5	No
P3-L18 CLUSTER BED N14	1.0	7.5	No
P3-L18 CLUSTER BED N15	1.0	8.3	No
P3-L18 CLUSTER BED N16	1.0	7.9	No
P3-L18 CLUSTER BED N17	1.0	7.8	No
P3-L18 CLUSTER BED N18	1.0	7.9	No
P3-L18 CLUSTER BED N19	1.0	8.3	No
P3-L18 CLUSTER BED N2	1.0	7.2	No
P3-L18 CLUSTER BED N20	1.0	8.8	No
P3-L18 CLUSTER BED N21	1.0	7.9	No
P3-L18 CLUSTER BED N22	1.0	8.5	No
P3-L18 CLUSTER BED N23	1.0	8.2	No
P3-L18 CLUSTER BED N24	1.0	8.1	No
P3-L18 CLUSTER BED N3	1.0	8.3	No
P3-L18 CLUSTER BED N4	1.0	8.3	No
P3-L18 CLUSTER BED N5	1.0	8.3	No
P3-L18 CLUSTER BED N6	1.0	8	No
P3-L18 CLUSTER BED N7	1.0	8.3	No
P3-L18 CLUSTER BED N8	1.0	8.5	No
P3-L18 CLUSTER BED N9	1.0	8.6	No

Room name	Equivalent orifice area (m^2)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L18 CLUSTER LIVING/KITCHEN N1	2.0	6	Yes
P3-L18 CLUSTER LIVING/KITCHEN N2	2.0	5.9	Yes
P3-L18 CLUSTER LIVING/KITCHEN N3	1.6	5.4	Yes
P3-L18 CLUSTER LIVING/KITCHEN N4	1.6	4.5	Yes
P3-L18 LOBBY N2	1.0	7.1	No
P3-L18 STAIR N3	1.0	6.6	No
P3-L19 CLUSTER BED N1	1.0	7.9	No
P3-L19 CLUSTER BED N10	1.0	7.9	No
P3-L19 CLUSTER BED N11	1.0	8.5	No
P3-L19 CLUSTER BED N12	1.0	8.2	No
P3-L19 CLUSTER BED N13	1.0	8.1	No
P3-L19 CLUSTER BED N2	1.0	8.5	No
P3-L19 CLUSTER BED N3	1.0	7.5	No
P3-L19 CLUSTER BED N4	1.0	8.3	No
P3-L19 CLUSTER BED N5	1.0	7.9	No
P3-L19 CLUSTER BED N6	1.0	7.8	No
P3-L19 CLUSTER BED N7	1.0	7.9	No
P3-L19 CLUSTER BED N8	1.0	8.3	No
P3-L19 CLUSTER BED N9	1.0	8.8	No
P3-L19 CLUSTER LIVING/KITCHEN N1	1.6	5.4	Yes
P3-L19 CLUSTER LIVING/KITCHEN N2	1.6	4.5	Yes
P3-L19 LOBBY N1	1.0	7.1	No
P3-L19 STAIR N1	1.0	6.6	No
P3-L20 CLUSTER BED N1	1.0	7.9	No
P3-L20 CLUSTER BED N10	1.0	7.9	No
P3-L20 CLUSTER BED N11	1.0	8.5	No
P3-L20 CLUSTER BED N12	1.0	8.2	No
P3-L20 CLUSTER BED N13	1.0	8.1	No
P3-L20 CLUSTER BED N2	1.0	8.5	No
P3-L20 CLUSTER BED N3	1.0	7.5	No
P3-L20 CLUSTER BED N4	1.0	8.3	No

Room name	Equivalent orifice area (m²)	Equivalent orifice area (% of floor area)	Opening included in the overheating assessment
P3-L20 CLUSTER BED N5	1.0	7.9	No
P3-L20 CLUSTER BED N6	1.0	7.8	No
P3-L20 CLUSTER BED N7	1.0	7.9	No
P3-L20 CLUSTER BED N8	1.0	8.3	No
P3-L20 CLUSTER BED N9	1.0	8.8	No
P3-L20 CLUSTER LIVING/KITCHEN N1	1.6	5.4	Yes
P3-L20 CLUSTER LIVING/KITCHEN N2	1.6	4.5	Yes
P3-L20 LOBBY N1	1.0	7.1	No
P3-L20 STAIR N1	1.0	6.6	No
P3-L21 CLUSTER BED N1	1.0	7.9	No
P3-L21 CLUSTER BED N10	1.0	7.9	No
P3-L21 CLUSTER BED N11	1.0	8.5	No
P3-L21 CLUSTER BED N12	1.0	8.2	No
P3-L21 CLUSTER BED N13	1.0	8.1	No
P3-L21 CLUSTER BED N2	1.0	8.5	No
P3-L21 CLUSTER BED N3	1.0	7.5	No
P3-L21 CLUSTER BED N4	1.0	8.3	No
P3-L21 CLUSTER BED N5	1.0	7.9	No
P3-L21 CLUSTER BED N6	1.0	7.8	No
P3-L21 CLUSTER BED N7	1.0	7.9	No
P3-L21 CLUSTER BED N8	1.0	8.3	No
P3-L21 CLUSTER BED N9	1.0	8.8	No
P3-L21 CLUSTER LIVING/KITCHEN N1	1.6	5.4	Yes
P3-L21 CLUSTER LIVING/KITCHEN N2	1.6	4.5	Yes
P3-L21 LOBBY N1	1.0	7.1	No
P3-L21 STAIR N1	1.0	6.6	No

Appendix C - Good Homes Alliance Early-Stage Overheating Risk Tool



EARLY STAGE OVERHEATING RISK TOOL

Version 1.0, July 2019

This tool provides guidance on how to assess overheating risk in residential schemes at the early stages of design. It is specifically a pre-detail design assessment intended to help identify factors that could contribute to or mitigate the likelihood of overheating.

The questions can be answered for an overall scheme or for individual units. Score zero wherever the question does not apply. Additional information is provided in the accompanying guidance, with examples of scoring and advice on next steps.

Find out more information and download accompanying guidance at goodhomes.org.uk/overheating-in-new-homes.

Good Homes Alliance

KEY FACTORS INCREASING THE LIKELIHOOD OF OVERHEATING | **KEY FACTORS REDUCING THE LIKELIHOOD OF OVERHEATING**

Geographical and local context

#1 Where is the scheme in the UK? See guidance for map	South east	4	4
	Northern England, Scotland & NI	0	
	Rest of England and Wales	2	
#2 Is the site likely to see an Urban Heat Island effect? See guidance for details	Central London (see guidance)	3	3
	Grtr London, Manchester, B'ham	2	
	Other cities, towns & dense sub-urban areas	1	

#8 Do the site surroundings feature significant blue/green infrastructure? Proximity to green spaces and large water bodies has beneficial effects on local temperatures; as guidance, this would require at least 50% of surroundings within a 100m radius to be blue/green, or a rural context	1	1

Site characteristics

#3 Does the site have barriers to windows opening? - Noise/Acoustic risks - Poor air quality/smells e.g. near factory or car park or very busy road - Security risks/crime - Adjacent to heat rejection plant	**Day** - reasons to keep all windows closed	8	8
	Day - barriers some of the time, or for some windows e.g. on quiet side	4	
	Night - reasons to keep all windows closed	8	8
	Night - bedroom windows OK to open, but other windows are likely to stay closed	4	

#9 Are immediate surrounding surfaces in majority pale in colour, or blue/green? Lighter surfaces reflect more heat and absorb less so their temperatures remain lower; consider horizontal and vertical surfaces within 10m of the scheme	1	1
#10 Does the site have existing tall trees or buildings that will shade solar-exposed glazed areas? Shading onto east, south and west facing areas can reduce solar gains, but may also reduce daylight levels	1	0

Scheme characteristics and dwelling design

#4 Are the dwellings flats? Flats often combine a number of factors contributing to overheating risk e.g. dwelling size, heat gains from surrounding areas; other dense and enclosed dwellings may be similarly affected - see guidance for examples	3	3
#5 Does the scheme have community heating? i.e. with hot pipework operating during summer, especially in internal areas, leading to heat gains and higher temperatures	3	3

#11 Do dwellings have high exposed thermal mass AND a means for secure and quiet night ventilation? Thermal mass can help slow down temperature rises, but it can also cause properties to be slower to cool, so needs to be used with care - see guidance	1	1

#12 Do floor-to-ceiling heights allow ceiling fans, now or in the future? Higher ceilings increase stratification and air movement, and offer the potential for ceiling fans	>2.8m and fan installed	2	0
	> 2.8m	1	

Solar heat gains and ventilation

#6 What is the estimated average glazing ratio for the dwellings? (as a proportion of the facade on solar-exposed areas i.e. orientations facing east, south, west, and anything in between). Higher proportions of glazing allow higher heat gains into the space	>65%	12	4
	>50%	7	
	>35%	4	
#7 Are the dwellings single aspect? Single aspect dwellings have all openings on the same facade. This reduces the potential for ventilation	Single-aspect	3	3
	Dual aspect	0	

#13 Is there useful external shading? Shading should apply to solar exposed (E/S/W) glazing. It may include shading devices, balconies above, facade articulation etc. See guidance on "full" and "part". Scoring depends on glazing proportions as per **#6**		Full	Part	1
	>65%	6	3	
	>50%	4	2	
	>35%	2	1	

#14 Do windows & openings support effective ventilation? Larger, effective and secure openings will help dissipate heat - see guidance		Openings compared to Part F purge rates			4
		= Part F	+50%	+100%	
	Single-aspect	minimum required	3	4	
	Dual aspect		2	3	

TOTAL SCORE 24 = Sum of contributing factors: 36 *minus* Sum of mitigating factors: 8

High — 12 — Medium — 8 — Low

score >12:
Incorporate design changes to reduce risk factors and increase mitigation factors
AND Carry out a detailed assessment (e.g. dynamic modelling against CIBSE TM59)

score between 8 and 12:
Seek design changes to reduce risk factors and/or increase mitigation factors
AND Carry out a detailed assessment (e.g. dynamic modelling against CIBSE TM59)

score <8:
Ensure the mitigating measures are retained, and that risk factors do not increase (e.g. in planning conditions)

Appendix D - Assigning Proportions of Thermal Mass

DN13 Assigning Proportions of Thermal Mass

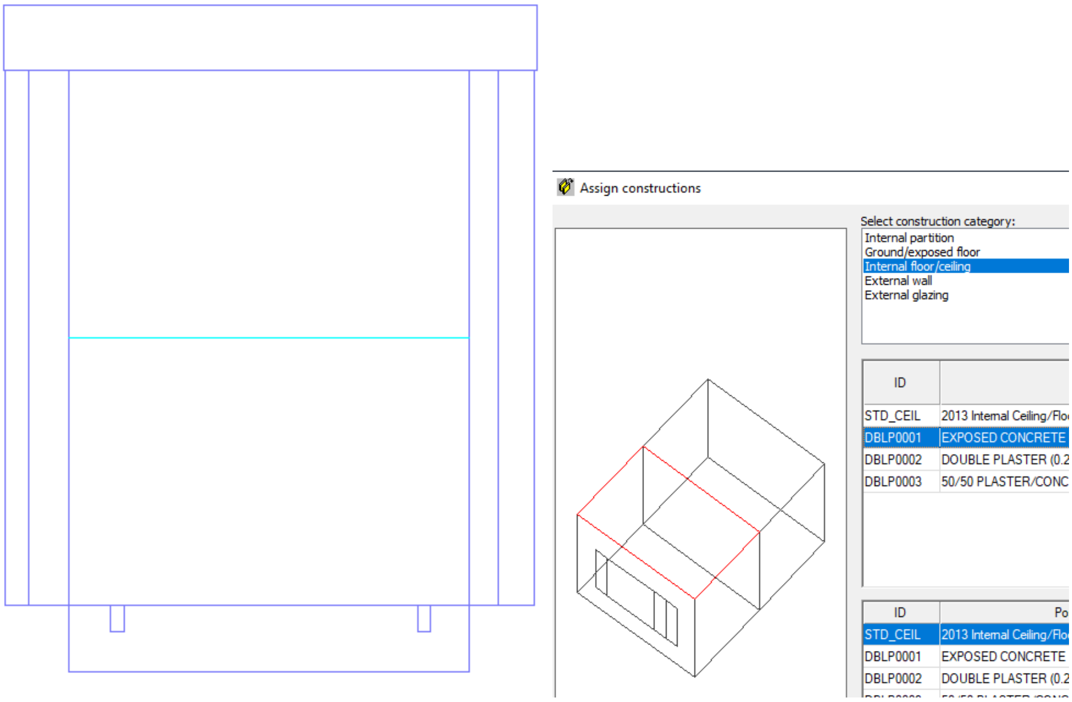
6892 Battersea Park Road
Revision 00, 07.02.2023

Prepared by:	Zac Vandevoir	07/02/2023
Checked by:	Pafsanias Vissariou	23/03/2023
Approved by:	Pafsanias Vissariou	23/03/2023

1 Introduction

As overheating in buildings becomes harder to achieve without mechanical cooling, exposed thermal mass is something we can use to reduce peak summertime temperatures. Following the development of a residential overheating strategy that has managed to avoid cooling using exposed thermal mass and night-time cooling, the input for the combined ceiling construction has been investigated. This is due to the likelihood that the whole ceiling cannot be exposed concrete as a certain percentage will likely be bulkhead for services.

One way of modelling a proportion of the ceiling as exposed concrete is to divide the space then combine the two portions so 2 different ceiling constructions can be assigned.



ID	
STD_CEIL	2013 Internal Ceiling/Flo
DBLP0001	EXPOSED CONCRETE
DBLP0002	DOUBLE PLASTER (0.2
DBLP0003	50/50 PLASTER/CONC

ID	Po
STD_CEIL	2013 Internal Ceiling/Flo
DBLP0001	EXPOSED CONCRETE
DBLP0002	DOUBLE PLASTER (0.2

Figure 1.1 Manually split model with two different ceiling constructions assigned

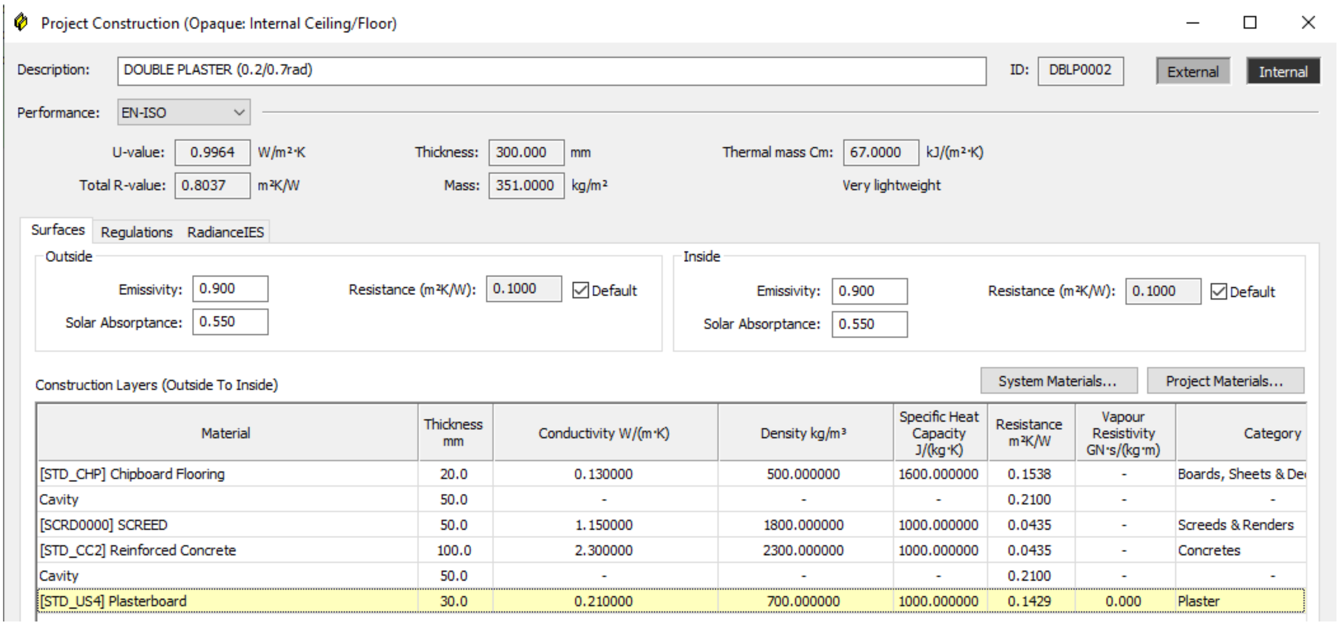
The main downside of using this method is that it is time consuming and does not allow flexibility in the geometry modelling e.g., if the proportion of concrete to plasterboard changes, all spaces must be remodelled.

2 Combining Constructions

In an attempt to speed up this process, we have done some work to see how a certain proportion of plasterboard and concrete can be represented by a single construction, giving flexibility to the future design changes and allowing early-stage analysis of what proportion of concrete is required to meet overheating criteria.

2.1 Method

First, take the 2 constructions that are to be combined. In the example below we are using a default ceiling construction with the plasterboard increased to 30mm along with a construction with 225mm of exposed concrete:



Project Construction (Opaque: Internal Ceiling/Floor)

Description: DOUBLE PLASTER (0.2/0.7rad)
ID: DBLP0002
Performance: EN-ISO

U-value: 0.9964 W/m²·K
Total R-value: 0.8037 m²K/W
Thickness: 300.000 mm
Mass: 351.0000 kg/m²
Thermal mass Cm: 67.0000 kJ/(m²·K)
Very lightweight

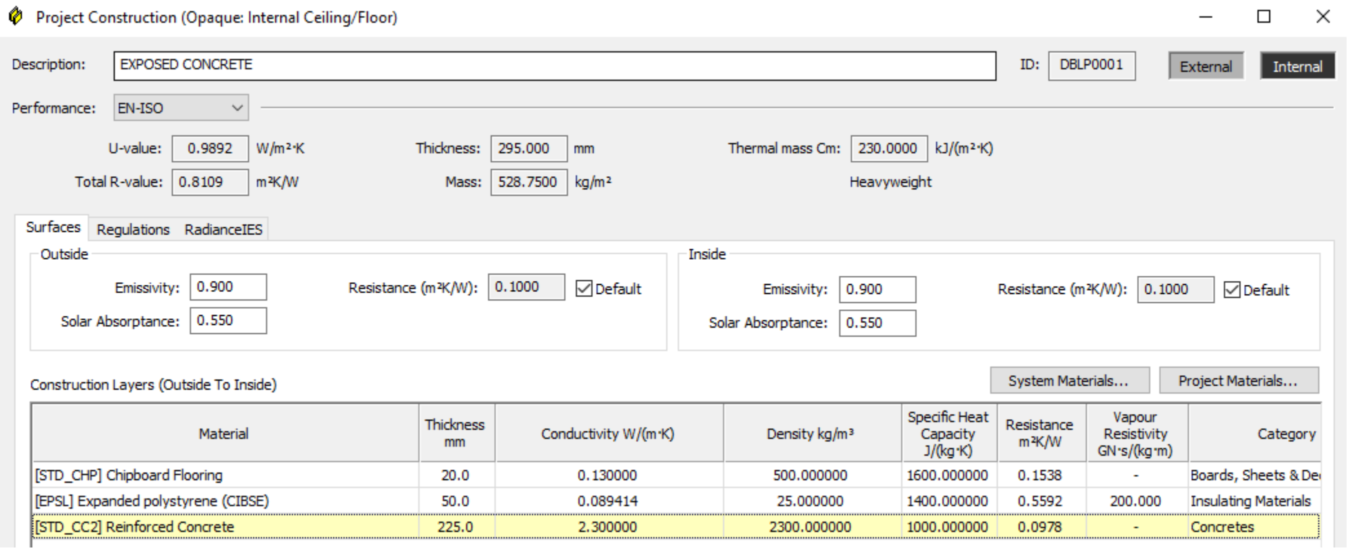
Outside
Emissivity: 0.900
Solar Absorptance: 0.550
Resistance (m²K/W): 0.1000 ☑ Default

Inside
Emissivity: 0.900
Solar Absorptance: 0.550
Resistance (m²K/W): 0.1000 ☑ Default

Construction Layers (Outside To Inside)

Material	Thickness mm	Conductivity W/(m·K)	Density kg/m³	Specific Heat Capacity J/(kg·K)	Resistance m²K/W	Vapour Resistivity GN·s/(kg·m)	Category
[STD_CHP] Chipboard Flooring	20.0	0.130000	500.000000	1600.000000	0.1538	-	Boards, Sheets & De
Cavity	50.0	-	-	-	0.2100	-	-
[SCRD0000] SCREED	50.0	1.150000	1800.000000	1000.000000	0.0435	-	Screeds & Renders
[STD_CC2] Reinforced Concrete	100.0	2.300000	2300.000000	1000.000000	0.0435	-	Concretes
Cavity	50.0	-	-	-	0.2100	-	-
[STD_US4] Plasterboard	30.0	0.210000	700.000000	1000.000000	0.1429	0.000	Plaster

Figure 2.1 30mm plasterboard construction



Description: EXPOSED CONCRETE
ID: DBLP0001
Performance: EN-ISO

U-value: 0.9892 W/m²·K
Total R-value: 0.8109 m²K/W
Thickness: 295.000 mm
Mass: 528.7500 kg/m²
Thermal mass Cm: 230.0000 kJ/(m²·K)
Heavyweight

Outside
Emissivity: 0.900
Solar Absorptance: 0.550
Resistance (m²K/W): 0.1000 ☑ Default

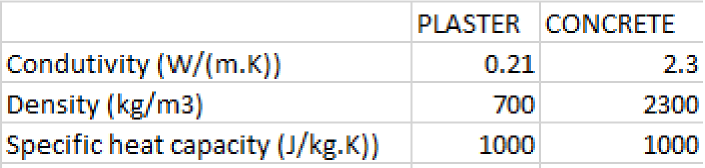
Inside
Emissivity: 0.900
Solar Absorptance: 0.550
Resistance (m²K/W): 0.1000 ☑ Default

Construction Layers (Outside To Inside)

Material	Thickness mm	Conductivity W/(m·K)	Density kg/m³	Specific Heat Capacity J/(kg·K)	Resistance m²K/W	Vapour Resistivity GN·s/(kg·m)	Category
[STD_CHP] Chipboard Flooring	20.0	0.130000	500.000000	1600.000000	0.1538	-	Boards, Sheets & De
[EPSL] Expanded polystyrene (CIBSE)	50.0	0.089414	25.000000	1400.000000	0.5592	200.000	Insulating Materials
[STD_CC2] Reinforced Concrete	225.0	2.300000	2300.000000	1000.000000	0.0978	-	Concretes

Figure 2.2 225mm exposed concrete construction

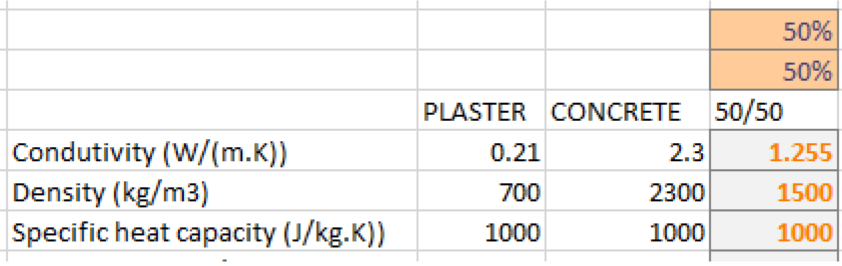
In Excel, take note of the conductivity, density and specific heat capacity for both constructions:



	PLASTER	CONCRETE
Condutivity (W/(m.K))	0.21	2.3
Density (kg/m3)	700	2300
Specific heat capacity (J/kg.K))	1000	1000

Figure 2.3 Required parameters

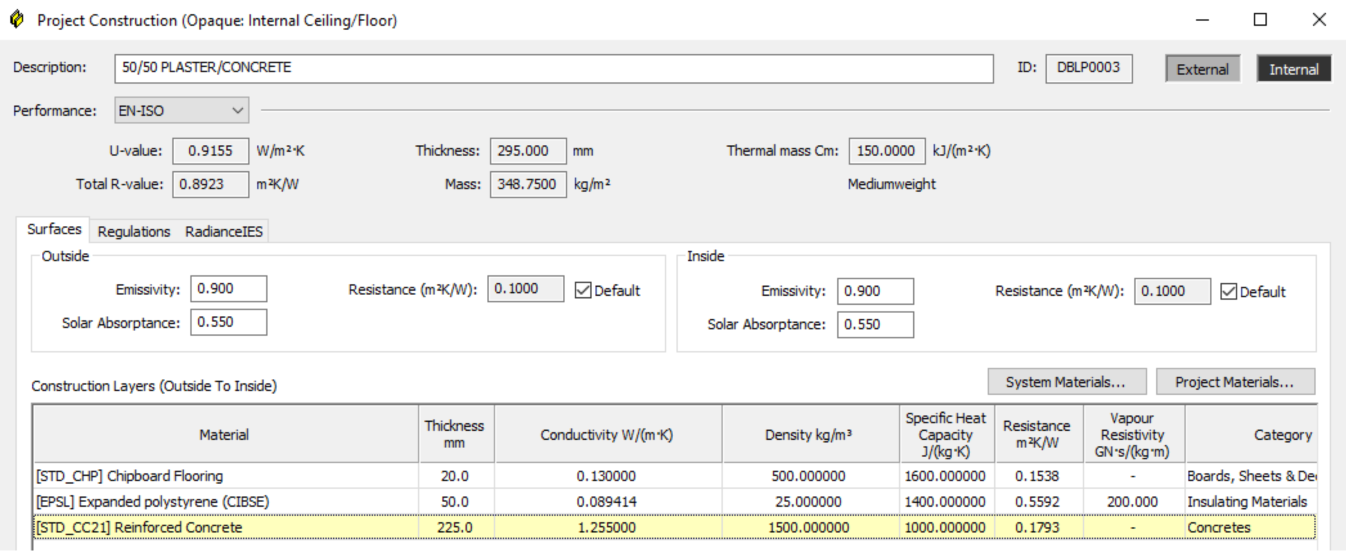
Then, proportion these values based on the ratio of plasterboard to concrete (in the example, 50/50 split is used):



			50%
			50%
	PLASTER	CONCRETE	50/50
Condutivity (W/(m.K))	0.21	2.3	1.255
Density (kg/m3)	700	2300	1500
Specific heat capacity (J/kg.K))	1000	1000	1000

Figure 2.4 Required parameters proportioned

Take a copy of the exposed concrete construction and assign the numbers:



Project Construction (Opaque: Internal Ceiling/Floor)

Description: 50/50 PLASTER/CONCRETE
ID: DBLP0003

Performance: EN-ISO

U-value: 0.9155 W/m²·K
Total R-value: 0.8923 m²K/W
Thickness: 295.000 mm
Mass: 348.7500 kg/m²
Thermal mass Cm: 150.0000 kJ/(m²·K)
Mediumweight

Outside
Emissivity: 0.900
Solar Absorptance: 0.550
Resistance (m²K/W): 0.1000 ☑ Default

Inside
Emissivity: 0.900
Solar Absorptance: 0.550
Resistance (m²K/W): 0.1000 ☑ Default

Construction Layers (Outside To Inside)

Material	Thickness mm	Conductivity W/(m·K)	Density kg/m³	Specific Heat Capacity J/(kg·K)	Resistance m²K/W	Vapour Resistivity GN·s/(kg·m)	Category
[STD_CHP] Chipboard Flooring	20.0	0.130000	500.000000	1600.000000	0.1538	-	Boards, Sheets & De
[EPSL] Expanded polystyrene (CIBSE)	50.0	0.089414	25.000000	1400.000000	0.5592	200.000	Insulating Materials
[STD_CC21] Reinforced Concrete	225.0	1.255000	1500.000000	1000.000000	0.1793	-	Concretes

Figure 2.5 Construction with proportioned parameters assigned

Also take note of the thermal mass parameter (Thermal mass Cm kJ/(m2.K)) in the top right corner and the thicknesses.

2.2 Testing

To confirm that this has been accurately represented, a box model has been created to represent a bedroom with the environmental strategy below.

Table 2.1 Model inputs

Element	Inputs		
Wall	0.12 U-value		
Glazing	1.0 U-value/0.28 g-value		
Internal Partition (adiabatic)	Default with plasterboard increased to 30mm		
Internal Ceiling (adiabatic)	1) 225mm exposed concrete	2) 30mm plasterboard surface	3) 50/50 concrete/plaster
Ground Floor	0.1 U-value		
Shading	200mm window reveals 500mm overhang		
Infiltration	0.01 ACH^{-1}		
Orientation	SW		
Daytime Ventilation	10:30am-9pm	When ta>to provide 15l/s from MVHR	When to>ta provide 6l/s from MVHR
Night-time Ventilation	9pm-10:30am	Provide 100l/s via separate acoustic induct fan	

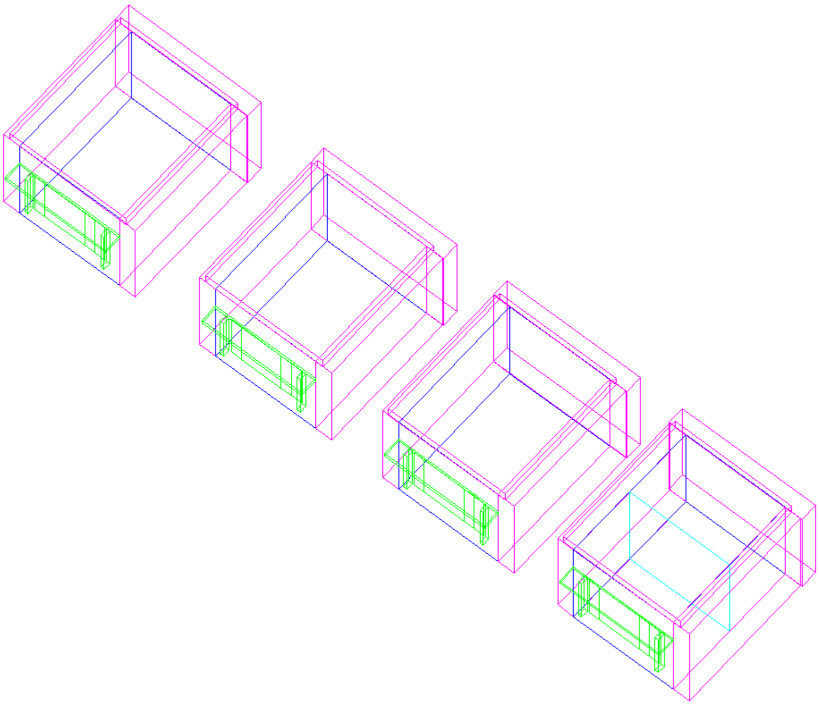


Figure 2.6 Four initial test spaces

1. 30mm plasterboard ceiling
2. 225mm exposed concrete ceiling
3. Combined 50/50 construction as described above
4. Space split manually with the two constructions assigned

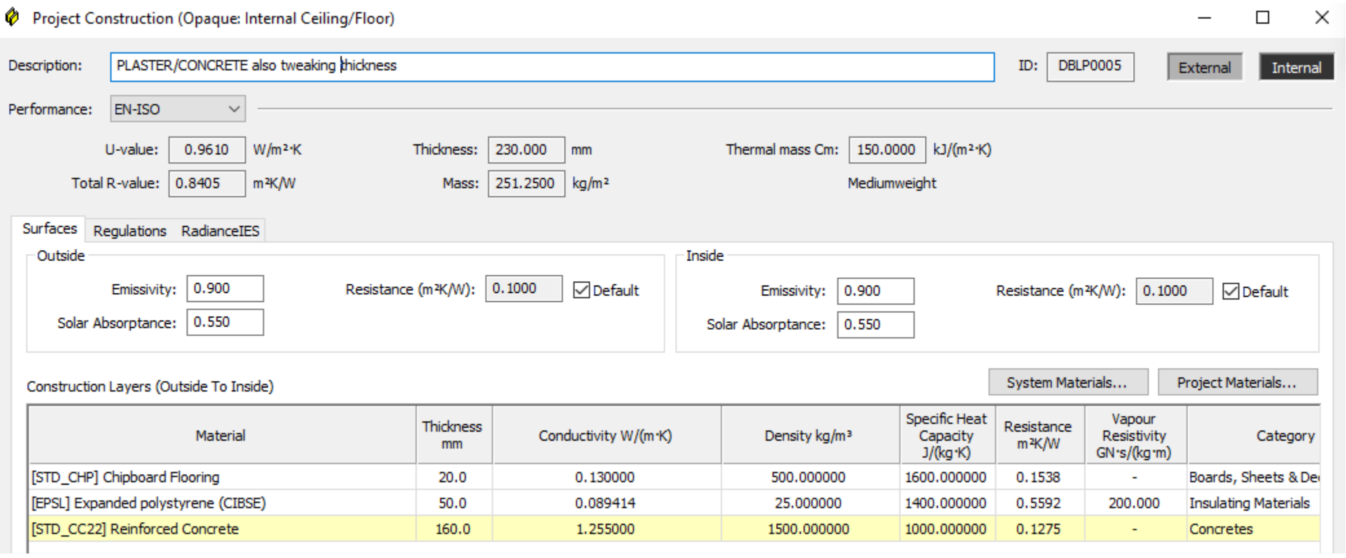
2.3 Testing Results

The accuracy of the results will be determined by the TM59 criterion b (sleeping hours to not exceed 32 hours above 26°C) and the peak temperatures.

Table 2.2 Initial results

Scenario	Peak Dry Resultant Temperature (°C)	Criterion b (hours)	Result
1. 30mm plasterboard ceiling	32.85	53	Fail
2. 225mm exposed concrete ceiling	30.98	28	Pass
3. Combined 50/50 construction as described above	31.90	36	Marginal Fail
4. Space split manually with the two constructions assigned	31.84	38	Marginal Fail

The combined construction is within 0.2% of the manual split for peak temperature and within 2 hours above 26°C from May to September. Because the criterion b hours are slightly less for the combined construction than the split construction, we can tweak the thickness to get the two numbers to match. Following iterations for thicknesses, the criterion b numbers match when the thickness of the combined construction is reduced to 160mm. This is 71% of the concrete thickness, meaning that for a margin of safety 70% of the concrete thickness could be assigned (this is still for a 50/50 plasterboard/concrete proportion.



Description: PLASTER/CONCRETE also tweaking thickness
ID: DBLP0005
Performance: EN-ISO
U-value: 0.9610 W/m^2·K
Total R-value: 0.8405 m^{2}K/W
Thickness: 230.000 mm
Mass: 251.2500 kg/m^2
Thermal mass Cm: 150.0000 kJ/(m^2·K)
Mediumweight

Outside
Emissivity: 0.900
Solar Absorptance: 0.550
Resistance (m^{2}K/W): 0.1000 ☑ Default

Inside
Emissivity: 0.900
Solar Absorptance: 0.550
Resistance (m^{2}K/W): 0.1000 ☑ Default

Construction Layers (Outside To Inside)

Material	Thickness mm	Conductivity W/(m·K)	Density kg/m^3	Specific Heat Capacity J/(kg·K)	Resistance m^{2}K/W	Vapour Resistivity GN·s/(kg·m)	Category
[STD_CHP] Chipboard Flooring	20.0	0.130000	500.000000	1600.000000	0.1538	-	Boards, Sheets & De
[EPSL] Expanded polystyrene (CIBSE)	50.0	0.089414	25.000000	1400.000000	0.5592	200.000	Insulating Materials
[STD_CC22] Reinforced Concrete	160.0	1.255000	1500.000000	1000.000000	0.1275	-	Concretes

Figure 2.7 Thickness of the concrete reduced to 160mm

Table 2.3 Results with decreased concrete thickness

Scenario	Peak Dry Resultant Temperature (°C)	Criterion b (hours)	Result
5. Combined 50/50 construction (thickness reduced from 225mm to 160mm)	31.97	38	Marginal Fail
6. Space split manually with the two constructions assigned	31.84	38	Marginal Fail

Results for reduced thickness of the concrete is within 0.4% of the peak temperature and the same number of criterion b hours.

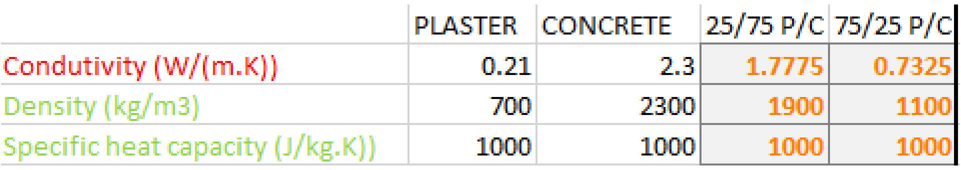
2.4 Testing Different Proportions

The same process can be tested for different proportions of concrete and plasterboard. When the space is split manually, the following results are achieved:

Table 2.4 Manually split 25/75 proportions

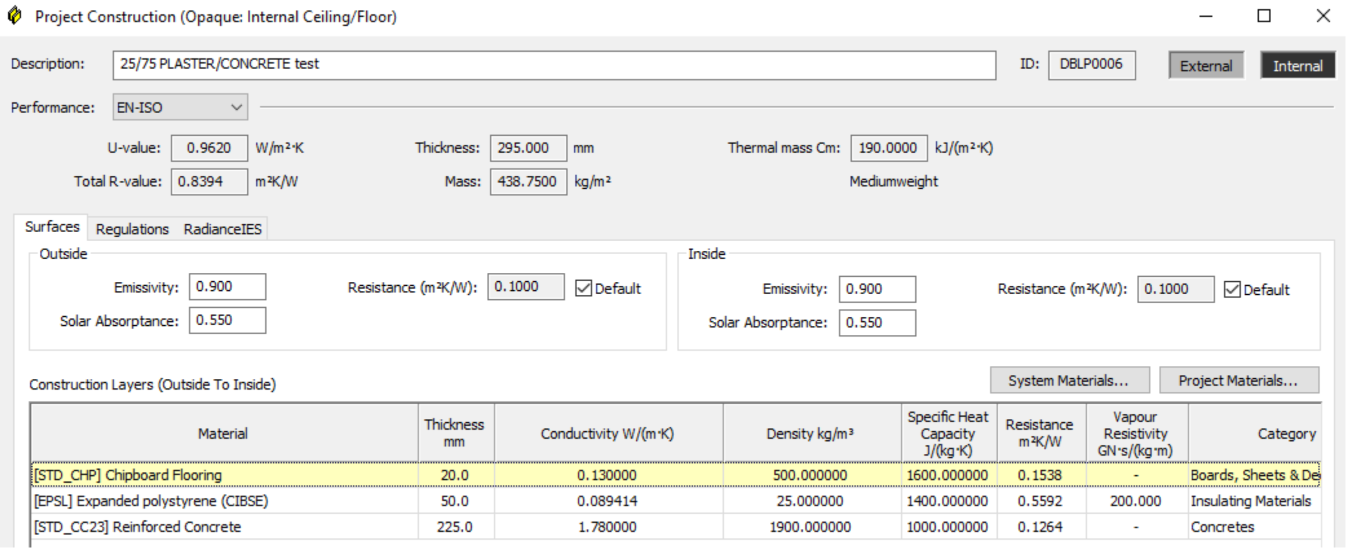
Scenario	Peak Dry Resultant Temperature (°C)	Criterion b (hours)	Result
7. 25/75 Plaster/Concrete manual split	31.39	32	Pass
8. 75/25 Plaster/Concrete manual split	32.32	44	Fail

Using the same method as before, the conductivity, density and specific heat capacity are proportioned:



	PLASTER	CONCRETE	25/75 P/C	75/25 P/C
Condutivity (W/(m.K))	0.21	2.3	1.7775	0.7325
Density (kg/m3)	700	2300	1900	1100
Specific heat capacity (J/kg.K))	1000	1000	1000	1000

Figure 2.8 Proportioned conductivity, density and specific heat capacity



Project Construction (Opaque: Internal Ceiling/Floor)

Description: 25/75 PLASTER/CONCRETE test
ID: DBLP0006
Performance: EN-ISO
U-value: 0.9620 W/m^2·K
Total R-value: 0.8394 m^{2}K/W
Thickness: 295.000 mm
Mass: 438.7500 kg/m^2
Thermal mass Cm: 190.0000 kJ/(m^2·K)
Mediumweight

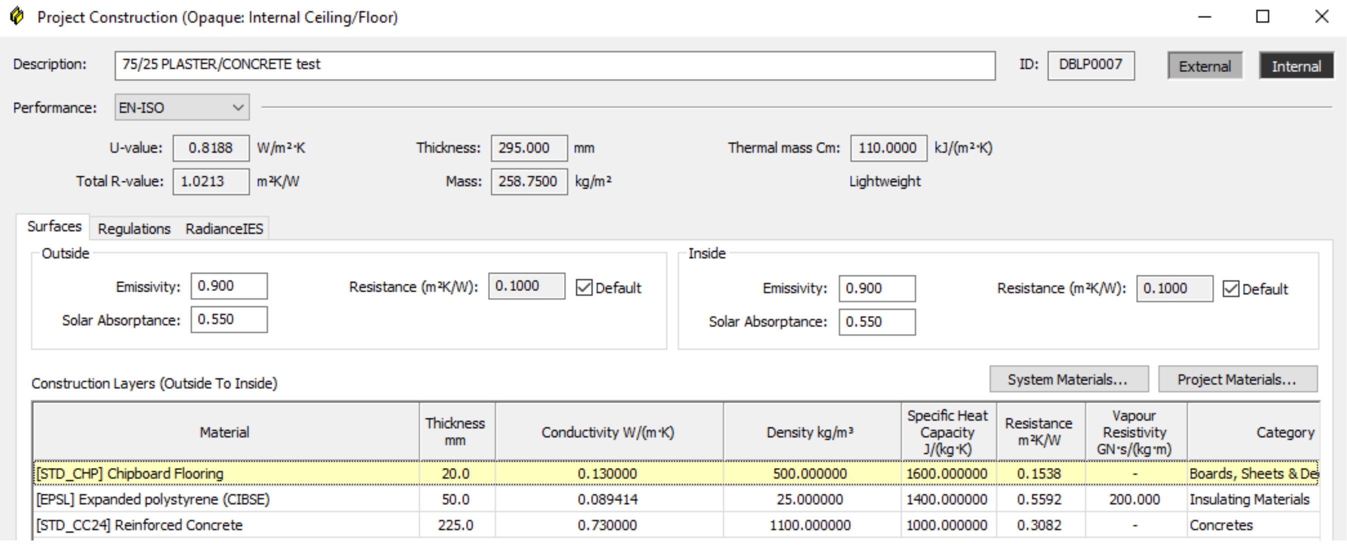
Outside
Emissivity: 0.900
Solar Absorptance: 0.550
Resistance (m^{2}K/W): 0.1000 ☑ Default

Inside
Emissivity: 0.900
Solar Absorptance: 0.550
Resistance (m^{2}K/W): 0.1000 ☑ Default

Construction Layers (Outside To Inside)

Material	Thickness mm	Conductivity W/(m·K)	Density kg/m^3	Specific Heat Capacity J/(kg·K)	Resistance m^{2}K/W	Vapour Resistivity GN·s/(kg·m)	Category
[STD_CHP] Chipboard Flooring	20.0	0.130000	500.000000	1600.000000	0.1538	-	Boards, Sheets & De
[EPSL] Expanded polystyrene (CIBSE)	50.0	0.089414	25.000000	1400.000000	0.5592	200.000	Insulating Materials
[STD_CC23] Reinforced Concrete	225.0	1.780000	1900.000000	1000.000000	0.1264	-	Concretes

Figure 2.9 Combined construction with 25% plaster and 75% concrete



Description: 75/25 PLASTER/CONCRETE test
ID: DBLP0007
Performance: EN-ISO

U-value: 0.8188 W/m²·K
Total R-value: 1.0213 m²K/W
Thickness: 295.000 mm
Mass: 258.7500 kg/m²
Thermal mass Cm: 110.0000 kJ/(m²·K)
Lightweight

Outside
Emissivity: 0.900
Solar Absorptance: 0.550
Resistance (m²K/W): 0.1000 ☑ Default

Inside
Emissivity: 0.900
Solar Absorptance: 0.550
Resistance (m²K/W): 0.1000 ☑ Default

Construction Layers (Outside To Inside)

Material	Thickness mm	Conductivity W/(m·K)	Density kg/m³	Specific Heat Capacity J/(kg·K)	Resistance m²K/W	Vapour Resistivity GN·s/(kg·m)	Category
[STD_CHP] Chipboard Flooring	20.0	0.130000	500.000000	1600.000000	0.1538	-	Boards, Sheets & De
[EPSL] Expanded polystyrene (CIBSE)	50.0	0.089414	25.000000	1400.000000	0.5592	200.000	Insulating Materials
[STD_CC24] Reinforced Concrete	225.0	0.730000	1100.000000	1000.000000	0.3082	-	Concretes

Figure 2.10 Combined construction with 75% plaster and 25% concrete

The results with these combined constructions can now be compared with the manually split spaces:

Table 2.5 Initial combined construction results

Scenario	Peak Dry Resultant Temperature (°C)	Criterion b (hours)	Result
9. 25/75 Plaster/Concrete manual split	31.39	32	Pass
10. 25/75 Plaster/Concrete combined construction	31.24	31	Pass
11. 75/25 Plaster/Concrete manual split	32.32	44	Fail
12. 75/25 Plaster/Concrete combined construction	31.99	43	Fail

As before, the thermal mass has been slightly overstated with the peak temperatures slightly lower and the hours >26°C are 1 hour lower for each of the combined constructions. Using the same method as previously, where the thickness of the construction was reduced so the thermal mass is not overstated, both thicknesses have been multiplied by 70% so see if this brings the results closer together.

Table 2.6 Combined construction results with thickness decreased to 70%

Scenario	Peak Dry Resultant Temperature (°C)	Criterion b (hours)	Result
13. 25/75 Plaster/Concrete manual split	31.39	32	Pass
14. 25/75 Plaster/Concrete combined construction	31.38	33	Marginal Fail
15. 75/25 Plaster/Concrete manual split	32.32	44	Fail
16. 75/25 Plaster/Concrete combined construction	31.97	45	Fail

For the construction with 75% concrete (scenario 13 & 14), the peak temperatures are now within 0.03% and hours >26°C are on the safe side with one hour more for the combined construction.

However, the 75% plasterboard peak temperature result is around 1% lower than with the manual split, even though the criterion b hours are on the safe side with one hour more for the combined construction. This indicates that thermal mass is overstated for the construction with 75% plasterboard and therefore the 70% thickness rule does not seem to work when the proportion of plasterboard is weighted more than the concrete. When analysed, the thermal mass parameter of the 75% plasterboard construction is 110kJ/(m2.K) but when the two individual thermal mass parameters for the purely concrete construction and the purely 30mm plasterboard construction are proportioned, this gives 107.75 kJ/(m2.K). When the thickness is reduced, the peak temperature does not move significantly but the hours >26°C increases significantly, indicating that this method does not work as well with higher plasterboard proportions.

Up until now, we have been taking a copy of the concrete construction and tweaking the values there. Where there is more plasterboard than concrete, it looks like a better method is to take a copy of the 30mm plasterboard construction and assign the proportioned conductivity, density and specific heat capacity. The below table shoes that this gives us a much closer peak temperature but has three extra hours above criterion 3.

Table 2.7 Combined construction results using the plasterboard construction (30mm)

Scenario	Peak Dry Resultant Temperature (°C)	Criterion b (hours)	Result
17. 75/25 Plaster/Concrete manual split	32.32	44	Fail
18. 75/25 Plaster/Concrete combined construction (30mm)	32.33	47	Fail
19. 30mm plasterboard ceiling (for comparison)	32.85	53	Fail

This brings the peak temperature slightly closer together but still has 3 extra criterion b hours. Therefore, the plasterboard thickness can be increased slightly to bring these numbers closer.

Table 2.8 Combined construction results using the plasterboard construction (varying thicknesses)

Scenario	Peak Dry Resultant Temperature (°C)	Criterion b (hours)	Result
20. 75/25 Plaster/Concrete manual split	32.32	44	Fail
21. 75/25 Plaster/Concrete combined construction (30mm)	32.33	47	Fail
22. 75/25 Plaster/Concrete combined construction (35mm)	32.28	47	Fail
23. 75/25 Plaster/Concrete combined construction (37mm)	32.26	47	Fail
24. 75/25 Plaster/Concrete combined construction (38mm)	32.25	47	Fail
25. 75/25 Plaster/Concrete combined construction (39mm)	32.24	46	Fail
26. 75/25 Plaster/Concrete combined construction (40mm)	32.23	46	Fail
27. 30mm plasterboard ceiling (for comparison)	32.85	53	Fail

Out of the options modelled above, the 39mm plasterboard gives a peak temperature 0.25% lower than the peak temperature of the manually split result and is 2 hours over the criterion b hours. As a rule, this is adding 30% to the thickness of the plasterboard after proportioning the density, conductivity and specific heat capacity while not overstating the thermal mass contribution.

3 Summary

Three different proportions of plasterboard vs thermal mass have been tested in an effort to produce some rules of thumb for how we can represent a plasterboard/concrete split in a modelled space without manually splitting up the room and assigning two different constructions.

- A 50/50 split between concrete and plasterboard
  - Copy the exposed concrete construction. Proportion density, conductivity and specific heat capacity. Reduce concrete thickness to 70% of actual thickness.
  - Results give peak temperature within 0.4% of the manually split space and the same number of hours over criterion b compared to the manually split space.
- 75% concrete and 25% plasterboard
  - Copy the exposed concrete construction. Proportion density, conductivity and specific heat capacity. Reduce concrete thickness to 70% of actual thickness.
  - Results give peak temperature within 0.03% of the manually split space and 1 extra hour over criterion b compared to the manually split space.
- 25% concrete and 75% plasterboard
  - Copy the plasterboard construction. Proportion density, conductivity and specific heat capacity. Increase plasterboard thickness by 30% of actual thickness.
  - Results give peak temperature within 0.25% of the manually split space and 2 extra hours over criterion b compared to the manually split space.

Some more proportions can be tested to assess the rules of thumb from, e.g., a 60/40 split, and also with different conditioning strategies to see if these rules hold true. As these constructions will mainly be used for Approved Document Part O overheating analyses, it is important that the criterion b hours are not understated as this is the most difficult CIBSE TM59 criterion to meet. Each of the three rules covered above either matches or exceeds the results for hours >26°C during sleeping hours.

Appendix E - Acoustic Report

Philip Dunbavin Acoustics Ltd
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WA13 0ER

ACOUSTIC
CONSULTANTS

ENVIRONMENTAL NOISE & VIBRATION ASSESSMENT

PROPOSED STUDENT AND RESIDENTIAL DEVELOPMENT, BATTERSEA PARK ROAD, LONDON

REPORT REFERENCE NO. J003701-5443-DH-05

MARCH 2023

Tel: 01925 759380 **Email: enquiries@pdaltd.com**

Registered Number 2302847 England
Registered Office: 3 Bridgewater Court, Barsbank Lane, Lymm WA13 0ER

Document Control Sheet

Details of Assessment	
Client	Watkin Jones
Document Title	Environmental Noise & Vibration Assessment – Battersea Park Road
Report Reference	J003701-5443-DH-04

Client Address:	**Company Address:**
Sub Contract Accounts Department Watkin Jones Group Llandygai Industrial Estate Bangor Gwynedd LL57 4YH	PDA Ltd 3 Bridgewater Court Barsbank Lane Lymm Cheshire WA13 0ER

Issue	**Date**	**Author**	**Remark**	**Status**
01	18/2/2022	David Hible	Initial	Issued
02	22/2/2022	David Hible	Revised Façade Envelope	Issued
03	19/04/2022	David Hible	Revised Façade Envelope – Updated Plans	Issued
04	28/04/2022	David Hible	Revised to BPR Comments	Issued
05	16/03/2023	David Hible	Revised to updated site layout	Current

	Name	**Position**
Prepared By	David Hible BA(Hons), AMIOA	Consultant
Checked By	Edmund Evenden BSc(Hons) MIOA	Director

This document has been prepared for the client only and solely for the purposes expressly defined herein. We owe no duty of care to any third parties in respect of its content. Therefore, unless expressly agreed by us in signed writing, we hereby exclude all liability to third parties, including liability for negligence, save only for liabilities that cannot be so excluded by operation of applicable law.

This report has been prepared based upon a scope of works and associated resources agreed between the client and Philip Dunbavin Acoustics Ltd (PDA). This report has been prepared with all reasonable skill, care and diligence and has been based upon the interpretation of data collected. This has been accepted in good faith as being accurate and valid at the time of the collection. This report has been based solely on the specific design assumptions and criteria stated herein.

CONTENTS

1.0 SUMMARY

PDA Ltd was commissioned by Watkin Jones to carry out an environmental noise and vibration assessment report for the proposed new build student and residential accommodation development at Battersea Park Road, London. This report is in support of the application for Phased Full Planning Permission for: Demolition of existing building and construction of three new buildings, together comprising Residential (Use Class C3) and Student Accommodation (Sui Generis) along with Commercial, Business and Service (Use Class E) and/or Local Community and Learning (Class F) floorspace. Associated works include hard and soft landscaping, car parking and new vehicular access / servicing, and other ancillary works.

The proposed development consists of 3 no. 11-21 storey blocks consisting of 762 no. student bedrooms along with 55 no. residential units, all with ancillary management facilities.

A noise level survey has been undertaken at the site representative of daytime and night-time hours. The local noise climate is dominated by road traffic noise from Battersea Park Road (A3205) and to a lesser extent 'A-road' throughout the day and night time. Contributions from surrounding local roads include cars, buses, lorries and motorbikes. Rail noise dominates the south of the site with regular pass-bys throughout the day and lesser in the night

Based upon the measured and predicted noise levels, supplemented with previous railway noise data, calculations have been undertaken for the Bedrooms and Living Spaces to evaluate the internal noise levels. Recommendations are given for glazing, ventilation and building façade elements to meet the internal noise level requirements of good practice guidance given in BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings. Calculations suggest that the noise level criteria of BS8233:2014 can be achieved within the proposed accommodation. Calculations have also been carried out to assess the external amenity spaces where it is noted that, a compromise in noise level is warranted when living in a highly developed urban area and therefore considered acceptable in the context of BS8233:2014. In addition, an assessment has been carried out in regards to Approved Document O, which concludes that an alternative means of ventilation is required rather than relying on open windows or open areas during night-time periods.

In addition a vibration survey has been undertaken running concurrently with the noise measurements. The measured and predicted vibration levels are well below the '*Low probability of adverse comment*' criterion of BS 6472 for both day and night time periods and as such, BS 6472 would suggest that for levels below the ranges, adverse comment is not expected.

2.0 SITE DESCRIPTION

The proposed development consists of 3 no. 11-21 storey blocks consisting of 751 no. student bedrooms along with 81 no. residential units, all with ancillary management facilities. The current site is currently shared by Booker's warehouse and a disused car servicing unit. Both are which are understood to be demolished to allow for the new proposed development.

The locality of the proposed site is a densely urban areas with multiple road networks and high rise buildings of residential and commercial use. Battersea Park Road (A3205) runs across the immediate north of the site with the 'A-road' running immediately to the east. The south of the site is bordered by the Vauxhall trainline. Construction sites are located directly to the west and approximately 120m to the east of site.

A site plan showing the location of the site and surrounding local area is shown in Figure 1 below.

Figure 1. Location with proposed site outlined.

3.0 NOISE ASSESSMENT CRITERIA

3.1 National Planning Policy Framework

National Planning Policy is guided by the National Planning Policy Framework (NPPF) updated in July 2021. With regard to Noise the Framework states the following;

Planning policies and decisions should contribute to and enhance the natural and local environment by:

- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.*

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

The terms '*significant adverse*' and '*adverse*' impacts are defined in the explanatory notes of the 'Noise Policy Statement for England (NPSE) which states;

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

<u>NOEL – No Observed Effect Level</u>

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

<u>LOAEL – Lowest Observed Adverse Effect Level</u>

This is the level above which adverse effects on health and quality of life can be detected.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

<u>SOAEL – Significant Observed Adverse Effect Level</u>

This is the level above which significant adverse effects on health and quality of life occur.

The notes also offer an explanation of the term 'adverse impacts' as follows;

… refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

Although no specific noise limits for LOAEL and SOAEL have been defined, in 2014 the UK Government published a planning practice guidance document for noise which indicates where these limits fall with relation to the perception of noise, updated in July 2019. A summary is reproduced in Section 4.2 below, and the full document is published at https://www.gov.uk/guidance/noise--2. It is considered that guidance from other acoustic standards may be employed to determine suitable levels within the overall principal of the National Planning Policy Framework.

3.2 Planning Practice Guidance – Noise

The UK Planning Practice Guidance on noise offers further guidance on the typical levels which constitute the NOEL, LOAEL and SOAEL, reproduced in the table below.

Table 1. Planning Practice noise level guidance

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not Present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

3.3 BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

Dwelling houses, flats and rooms in residential use

British Standard 8233:2014, *Guidance on Sound Insulation and noise reduction for buildings*, gives guidance on internal noise levels within dwellings, flats and rooms in residential use when unoccupied. The following criteria are for Living and Dining Rooms for daytime use and Bedrooms for night time.

Table 2. BS8233 recommended indoor ambient noise levels

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	–
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	–
Sleeping (daytime resting)	Bedrooms	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

It should however be stressed that the above criterion relates to steady noise, in this case from road traffic etc., excluding unusual noise events departing from the typical noise character of the area.

In addition BS 8233 suggests, '*regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or* $L_{Amax,F}$*, depending on the character and number of events per night. Sporadic noise events could require separate values'.*

With regard to external areas of residential developments BS8233:2014 states the following;

For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$*, with an upper guideline value of 55 dB* $L_{Aeq,T}$ *which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*

3.4 WHO Guidelines for Community Noise

In 1999, the WHO (World Health Organisation) published Guidelines for Community Noise, stating the following internal noise levels are applicable within dwellings.

Table 3. WHO Guidelines for Community Noise criteria

Specific Environment	Critical Health Effect(s)	L_{Aeq} dB	Time Base (hours)*
Dwelling, indoors	Speech intelligibility & moderate annoyance, daytime & evening	35	16
Inside bedrooms	Sleep disturbance, night time	30	8

* Typically taken to be daytime/evening - 07:00 – 23:00 hours and night time 23:00 – 07:00 hours.

In addition to the above continuous equivalent noise levels, WHO guidelines indicates that exceedances of 45 dB L_{Amax} for single sound events should be limited to no more than 10 – 15 times per night, when measured with a 'fast' time weighting.

3.5 BS6472:2008 Guide to Evaluation of human exposure to vibration in buildings

BS6472:2008 develops guideline limiting vibration criteria for residential and other premises. BS6472 uses the Vibration Dose Value (VDV) parameter to assess the probability of adverse comments when human subjects are exposed to vibration from typical environmental sources of vibration (e.g. rail traffic). BS6472 gives the following envelope limiting values to describe varying degrees of perception:

Table 4. BS6472 Guideline Vibration Limiting Criteria for residential use

VDV Period	VDV ms$^{-1.75}$		
	Low Probability of Adverse Comment	Adverse Comment Possible	Adverse Comment Probable
Residential Buildings 16hr day 07:00 – 23:00 hours	0.2 – 0.4	0.4 – 0.8	0.8 – 1.6
Residential Buildings 8hr night 07:00 – 23:00 hours	0.1 – 0.2	0.2 – 0.4	0.4 – 0.8

BS6472 states that for levels below the ranges in the table above adverse comment is not expected.

3.6 Re-radiated Structure Borne Noise

Re-radiated structure borne noise has the potential to cause disturbance if it is generated at a sufficiently loud level. In the absence of any local or national government guidance with regards to structure-borne noise due to subterranean rail movements, appropriate design criteria for structure-borne noise in this case would be that given in the American Public Transit Association (APTA) Guideline for Design of Rapid Transit Facilities, Section 2.7, Noise and Vibration, 1981. The guidelines are reproduced in the Table below:

Table 5: APTA Guidelines for Acceptable Ground-Borne Noise Within Residential Dwellings

Community Area	Maximum A-weighted Sound Pressure Level dB L_{ASMAX}	
	Single Family Dwelling	Multi-Family Dwelling
Low Density Residential	30	35
Average Density Residential	35	40
High Density Residential	35	40
Commercial	40	45
Industrial / Highway	40	45

3.7 Wandsworth Council's Local Development Framework, Core Strategy, Adopted March 2016

Wandsworth Council's Core Strategy adopted in March 2016 is the key development plan document within the Local Development Framework (LDF), setting out the spatial vision, strategy and policies to deliver the strategy and guiding change for the next fifteen years and beyond. In respect of noise, the Core Strategy contains a single policy, Policy IS 4.

3.7.1 Policy IS 4 – Protecting and Enhancing Environmental Quality

Policy IS 4 states the following in relation to noise:

"The Council will support measures to protect and enhance the environmental quality of the borough and work with partner agencies to help deliver this. In particular measures will be taken to:

c. Reduce the impact of noise, in line with the approach set out in London Plan 2015 Policy 7.15."

In the absence of specific guidance from the Local Planning Authority, current British Standard guidance is considered to be an appropriate base for assessment. As stated above, these standards are BS8233:2014 and BS6472:2008.

3.8 Approved Document O (ADO)

Approved Document O (ADO) 2021, provides guidance on meeting the requirements of the Building Regulations 2010, part 'O1 Overheating mitigation'. The aim of the Building Regulations part O1 is to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures.

Building Regulations part O1 requires that dwellings, institutions or any other buildings containing one or more rooms for residential purposes (other than a room in a hotel) to:

(a) Limit unwanted solar gains in summer:

(b) Provide an adequate means to remove heat from the indoor environment

However in meeting the obligations of ADO the buildings overheating mitigation strategy for use by occupants must consider 'Noise at night' in addition to other non-noise related considerations.

In regards to 'Noise at night', ADO stipulates the following.

In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

a. 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).

b. 55dB L_{AFmax}, more than 10 times a night (between 11pm and 7am)

It should be noted that the above noise limits are with reference to internal noise levels within a bedroom. BS 8233 advises that based on a partially opened window noise at the external façade of the building will reduced by approximately 15 dB. Therefore ADO infers that windows will be required to remain closed when the external noise climate exceeds the following external noise limits.

55dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am)

70dB L_{AFmax}, more than 10 times a night (between 11pm and 7am)

Subsequently, where windows are required to be closed at night (due to the above noise limits being exceeded), the overheating mitigation strategy as required by ADO must provide an alternative method to removing heat other than relying on windows remaining open.

4.0 SURVEY DETAILS AND RESULTS

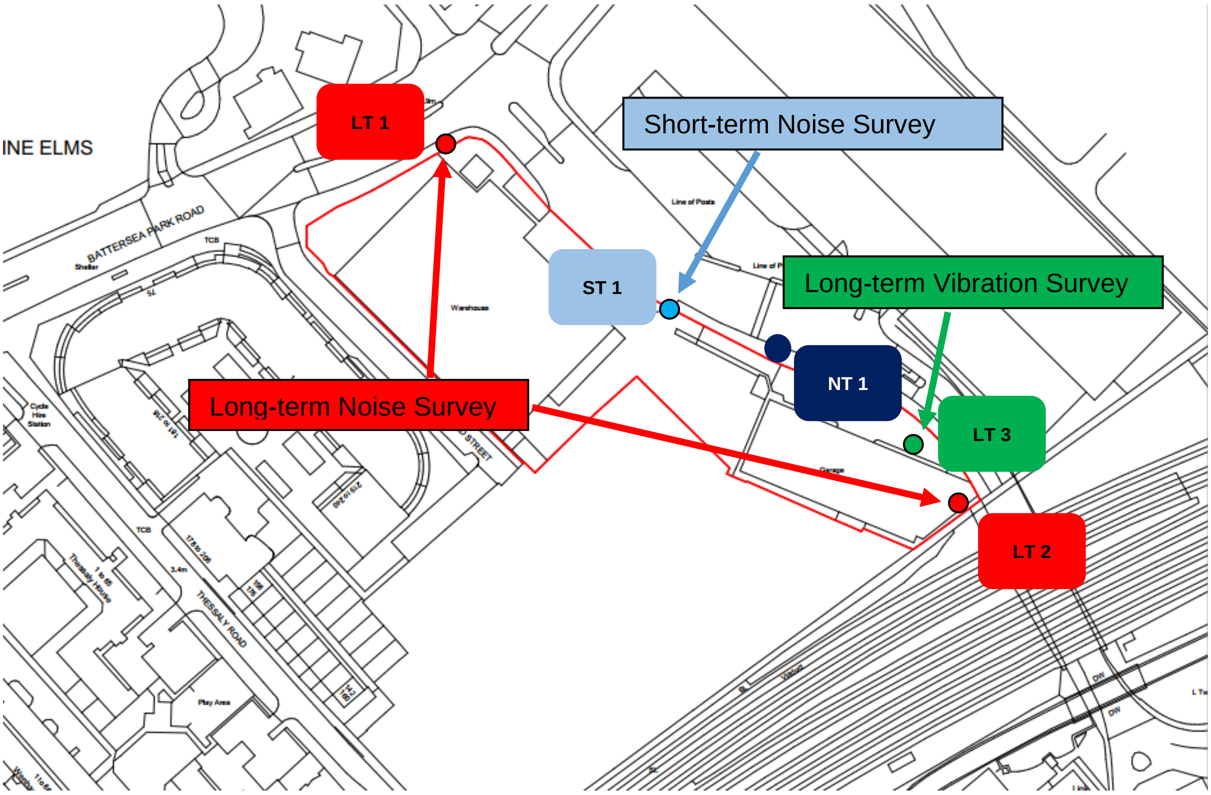
4.1 Environmental Noise Survey

A noise level survey was undertaken at the site between 12:15 hours on Tuesday 1st February and 13:10 hours on Wednesday 2nd February 2022; the noise level surveys were chosen to be representative of daytime and night time hours.

Long-term (LT) noise measurements were taken at two different locations on site and a short-term (ST) noise measurement was conducted at the east boundary of the site as can be seen in Figure 2. A long-term vibration survey was also carried out as indicated below.

An additional noise level survey was also conducted on Wednesday 6th April between 13:12 hours and 09:27 hours on Thursday 7th April 2022. The purpose of this survey was to further assess the night-time noise levels after updated comments on night-time activity from the New Covent Garden Market. This is indicated by NT1 below.

Figure 2. Noise and vibration survey locations.



The measurement positions are detailed as follows:

- LT 1 – microphone located on a mast approximately 3m above ground level at the northern boundary. This was deemed to have no reflective surfaces affecting the noise level measurements.
- LT 2 – microphone located on a mast approximately 10m above ground level at the southern boundary. This was deemed to have no reflective surfaces affecting the noise level measurements.
- ST 1 – Microphone located on a tripod approximately 1.5m above ground level at the eastern boundary. This was deemed to have no reflective surfaces affecting the noise level measurements.
- NT 1 – microphone located on a mast approximately 3m above ground level at the eastern boundary. This was deemed to have no reflective surfaces affecting the noise level measurements.

The 1st and 2nd February and 6th and 7th April measurements were made and partially attended by Mr David Hible of PDA Ltd. Measurements were of continuous 5 minute samples. The survey was conducted using 2x NTi XL2; one located at LT 2 and the second used for ST 1 and LT 1. An NTi XL2 was also used for NT 1. Calibration certificates for the sound level meters are held.

The NTi meters are Class 1 frequency response as per BS EN 61672-1:2003. For both surveys the sound level meters were field calibrated both before and after the measurement period, during which time no significant deviation from the calibrated level was observed. The sound level meters were fitted with a microphone windshield at all times.

The microphone of the sound level meter at each position was mounted on a mast/tripod at least 3m from surrounding structures and can be assumed to be a free field measurement. All measurements were undertaken with a fast time-weighting and broadband statistics were measured throughout. In addition, octave band frequency spectra were recorded.

The weather during the noise and vibration surveys of the 1st and 2nd February was dry, with wind speeds reported at 3-5m/s. Temperatures were between 8-12 degrees Celsius with mainly clear skies at approximately 10% coverage.

The weather during the noise survey on 6th and 7th April was dry, with wind speeds at 4-5m/s. Temperatures were between 10-13 degrees Celsius with mainly clear skies and approximately 20% cloud coverage.

Noise Sources

The local noise climate is dominated by road traffic noise from Battersea Park Road (A3205) and to a lesser extent ‘A-road’ throughout the day and night time. Contributions from surrounding local roads include cars, buses, lorries and motorbikes. Rail noise dominates the south of the site with regular pass-bys throughout the day and lesser in the night.

Other intermittent noises sources were from the surrounding construction sites, predominately to the east of site. Vehicles using the Booker’s carpark were also frequent throughout the day-time periods. Overhead aircraft were frequent throughout the day and night-time periods.

4.2 Vibration

The vibration survey was conducted using a Svan 958 vibration analyser. The Svan 958 vibration analyser is a continuous monitoring vibration analyser with a tri-axial accelerometer sensor. The Svan 958 was set-up at Position LT 3 on an area of tarmac ground surface at the closest point to the existing railway line. The location was judged to be representative of the proposed buildings. Vibration data was recorded between 12:11 hours on Tuesday 1st February and 12:14 hours on Wednesday 2nd February 2022. The vibration analyser was set to measure continuously and calculate VDV values over 10-minute periods throughout the measurement periods. The measured data has been processed to determine the 16-hour daytime period from 07:00 – 23:00 hours and 8-hour night-time period from 23:00 – 07:00 hours.

4.3 Measurement Results

Environmental Noise

Measurement positions on site are shown on Figure 2 section 5.1 of this report. A summary of the results is given below:

Table 5. Summary of environmental noise measurements – LT 1 – 1/2 February 2022.

Position	Time Period (hh:mm)	Duration (hh:mm)	$L_{Aeq,T}$ (dB)	Typical Night-time $L_{Amax,5mins}$ (dB)[1]
LT 1	Day 1/2/2022 14:10 – 23:00 2/2/2022 07:00 – 13:01	14:51	71	-
	Night 23:00 – 07:00	08:00	68	82

Notes:

1 Typical L_{Amax} noise levels are those not exceeded more than 10 times over the whole night-time period.

Table 6. Summary of environmental noise measurements – LT 2

Position	Time Period (hh:mm)	Duration (hh:mm)	$L_{Aeq,T}$ (dB)	Typical Night-time $L_{Amax,5mins}$ (dB)[1]
LT 2	Day 1/2/2022 12:15 – 23:00 2/2/2022 07:00 – 12:27	16:12	59	-
	Night 23:00 – 07:00	08:00	54	67

Table 7. Summary of environmental noise measurements – ST 1

Position	Time Period (hh:mm)	Duration (hh:mm)	$L_{Aeq,T}$ (dB)	Typical Night-time $L_{Amax,5mins}$ (dB)[1]
ST 1	1/2/2022 Day 12:40 – 13:40	1:00	64	-

Table 8. Summary of environmental noise measurements – NT 1

Position	Time Period (hh:mm)	Duration (hh:mm)	$L_{Aeq,T}$ (dB)	Typical Night-time $L_{Amax,5mins}$ (dB)[1]
NT 1	6/4/2022 – 7/4/2022 Night 23:00 – 07:00	8:00	62	82

4.4 Vibration Results

A summary of the vibration measurements in terms of VDV $ms^{-1.75}$ is given in the Table below. Note that the measurements are split into daytime [07:00 – 23:00] and night-time [23:00 – 07:00] periods. The 10 minute measurements were combined to calculate the overall VDV for both the daytime and the night-time periods.

$$VDV(T) = \sqrt[4]{\sum (VDV(dT))^4}$$

Table 9. Summary of Vibration Measurements VDV $ms^{-1.75}$

Measurement Location	Period	VDV $m/s^{1.75}$		
		X axis (horizontal)	**Y axis (horizontal)**	**Z axis (vertical)**
LT 3	Day 1/2/2022 12:11 – 23:00 2/2/2022 07:00 – 12:24	0.005	0.003	0.018
	Night 23:00 – 07:00	0.003	0.003	0.010

4.5 Railway Line Previous Measurement Data

It should be noted that the measurements at LT 2 were potential shielded from the rail traffic due to obstructions between rail tracks. In order to validate the accuracy of the measurement data for the impact of the trainline at LT 2, previous measurements taken by PDA of the same train line located at Miles St, Vauxhall on 15th June 2021 between 19:09 hours and 19:45 hours. Please note that this measurement location site is approximately 1km from the proposed site, but was monitoring the same train lines. The microphone was positioned at 5m from the train line out the window of a 6th floor development. The microphone was approximately 10m above the rail line with an uncompromised view. As summary of the results can be seen below:

Table 10. Previously measured Vauxhall rail line data.

Parameter	Octave Band Noise Level Data (dB[A])								Noise Level (dB[A])
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
L_{Aeq}	43	52	61	67	69	68	68	66	**75**
L_{Amax}	61	65	72	86	85	84	84	83	**91**

5.0 NOISE PROPAGTION AND IMPCT ASSESSMENT

Using the measured and predicted noise level data above, a 3-dimensional computer noise model has been constructed using SoundPlan noise modelling software to determine the noise level impact upon the proposed development. All calculations have followed the methodology contained within ISO 9613-2:1996 *Attenuation of sound during propagation outdoors - Part 2: General method of calculation*. The topographical data for the site and surrounding area is taken from Google Maps Terrain height data.

The model has been calibrated to the noise levels measured on-site. It is noted that despite the measurements being undertaken at LT2 on a 10m mast it is not known whether it had line of site from the railway line. Any potential shielding from walls or other obstructions could have an impact on the measured level. As the previously measured railway line data (15/06/21) had unobstructed view of the railway line and as it was measuring the same railway activity this data has been used to model the railway noise. This has been calibrated within the model by positioning a receiver at the same distances of that measured on 15/06/21.

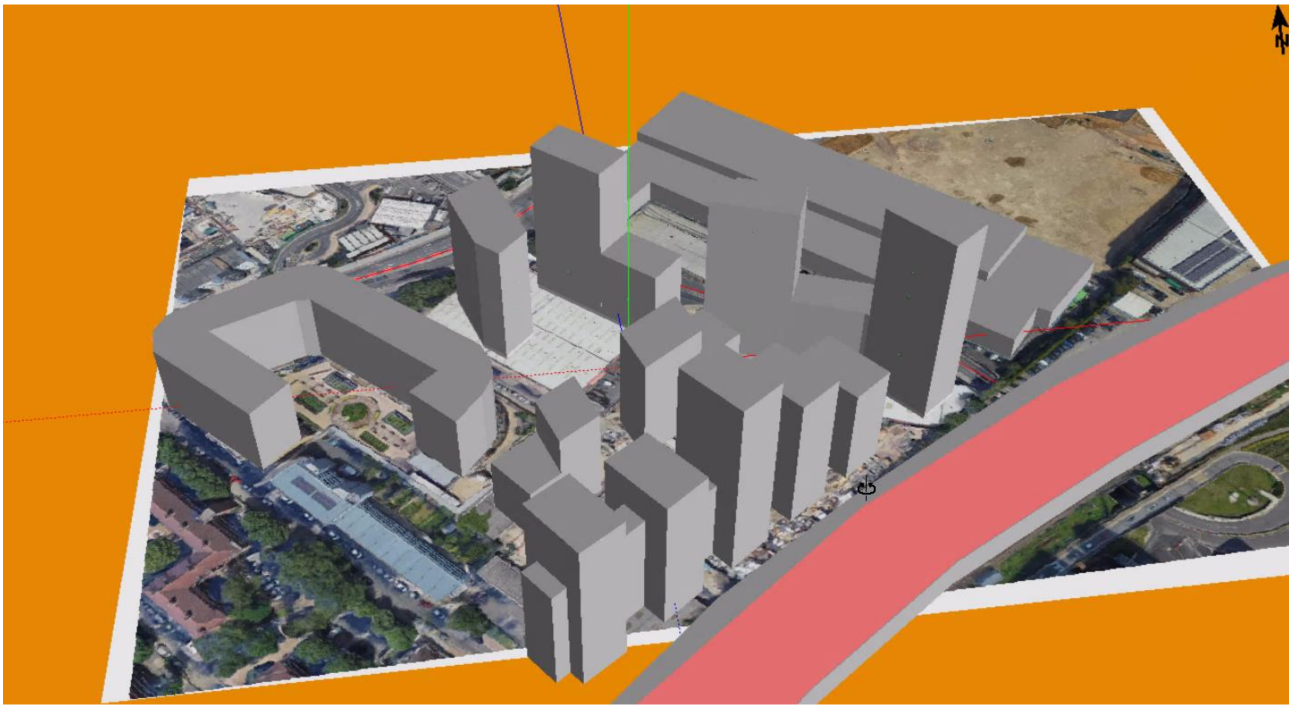
A ground absorption coefficient of 0 has been used to take into account the predominantly hard surfaces of roads, hard standing, etc. The noise map model shows reasonable correlation with the measured survey data.

Figure 3. SoundPlan noise model calibration map

NB. Noise Levels for each position are given as [Day L_{Aeq}][Night L_{Aeq}][-][Night L_{Amax}]

From this, the proposed layout of the new buildings has been added. Noise levels incident upon the proposed building are calculated at 1.5m above ground level and 3m for each additional floor for the 6-21 storey student accommodation. We have included for the current development elevations located at Sleaford Street to the south-west of the proposed site. The SoundPLAN model would suggest the following noise levels calculated at the façade of the proposed buildings.

Figure 4. SoundPLAN noise model with the proposed buildings



5.1 Discussion

It is PDA's experience that developments with the measured noise levels above are suitable for residential development provided that adequate acoustic attenuation is provided to habitable areas. Considering the acoustic weak points of a building façade, typically the glazing and the ventilation elements, calculations have been undertaken to determine specifications for these building elements and the internal noise levels. These levels are compared with the criteria detailed in Table 11 below, derived from the guidance in Section 4.

Table 11. Proposed internal noise level criteria

Space	$L_{Aeq,T}$ dB	Time Base (hours)
Living Rooms/Bedrooms, Daytime	35	16 (07:00 – 23:00 hours)
Bedrooms, Night time	30	8 (23:00 – 07:00 hours)

In addition for bedrooms at night time (23:00 – 07:00 hours) individual noise events should not normally exceed 45 dB L_{Amax}. when limited to no more than 10 – 15 times per night.

5.2 Vibration Assessment

Vibration was measured at Position LT3 on an area of concrete ground surface at the closest point to the existing railway line. The location was judged to be representative of the proposed buildings. No amplification has been applied to the x and y axes. These amplification factors are in accordance with Association of Noise Consultants guidelines for the assessment of ground-borne vibration.

The measured and predicted vibration levels are compared to the criteria of BS 6472 in Table 11 below.

Table 12. Comparison of measured vibration with BS 6472 criteria

Day	**Period**	**BS 6472 ‘Low probability of adverse comment’ criterion [VDV]**	**Maximum predicted vibration [VDV] ms$^{-1.75}$**		
			X	**Y**	**Z**
Tues/Weds 16/17 Nov	Residential Buildings 16hr day 07:00 – 23:00 hours	0.2 – 0.4	0.005	0.003	0.018
Tues/Weds 16/17 Nov	Residential Buildings 8hr night 07:00 – 23:00 hours	0.1 – 0.2	0.003	0.003	0.010

The measured and predicted vibration levels are well below the ‘*Low probability of adverse comment*’ criterion of BS 6472 for both day and night time periods and as such, BS 6472 would suggest that for levels below the ranges in the table, adverse comment is not expected.

5.3 Re-Radiated Noise Assessment

The ANC Guidelines describe various corrections and transfer functions with regards to propagation of structure borne vibration in buildings. These include but are not limited to attenuation/amplification within different foundation types, slab resonance and attenuation from floor to floor. The most onerous structural coupling and correction factors have been assumed such that our assessment is conservative. The corrections are as summarised below:

- Coupling attenuation (large masonry on piled foundations) = 5 – 10 dB
- Floor-to-Floor attenuation = 1 - 2 dB / 31 – 125 Hz
- Slab resonance = +6 dB / 20 – 30 Hz

Having accounted for the corrections above the following equation was used to predict the re-radiated noise into the 1st floor dwellings:

$$Lp = L_V - \ 32\ dB$$

Where:

L_p = The RMS sound pressure level during a train pass event

L_v = The RMS vibration velocity level in dB re: 1 x 10^{-9} ms^{-1}

The re-radiated noise have been predicted utilising the 10 highest measured L_{ASMax} velocity levels, the results suggest that the noise levels will be between 35-43 dB L_{ASMax} on the piled and raft foundations. It is noted that 43 dB exceeds the criteria in Section 4.6. However, as this level occurs only once and is significantly higher than the other measurements, we would consider that this is likely to be an anomaly due to extraneous sources and has been excluded from this assessment.

6.0 NOISE LEVEL PREDICTIONS

Based upon the measured noise levels in Section 5, calculations have been undertaken to determine internal noise levels for the proposed student accommodation. The proposed site and internal layouts are derived from the received Glenn Howells Architects drawings, ref. ‘*2278-230308-Battersea Park Road – Design Freeze Pack’* dated 8th March 2023 which encompasses all rooms across each block.

A night-time L_{max} value for the ‘A-road’, which was a short term day-time measurement, has been calculated by comparing the ninetieth percentile measured at both ST1 and LT1 for a similar day-time period and then assessing against the level difference between the day-time average L_{max} and the 10th loudest nigh-time at LT1. This resulted in a reduction of 4dB, therefore the night-time L_{max} for ‘A-road’ is 81.4dB(A). In order to verify this prediction, the 10th loudest night-time L_{max} has been calculated from measurements made on 6th to 7th April 2022 at NT 1. This results in 81.6dB(A) so we would therefore consider this level to be typical of night-time activity.

6.1 Glazing and Ventilation Attenuation Requirements

The dominant paths for noise transfer to the interior of buildings are generally the glazing and ventilation elements of the façade constructions. Due to the requirements of Approved Document O, it is our understanding that the development is to be mechanically ventilated and therefore trickle vents will not be required. Thus, we have not included for ventilation openings within our assessment though it should be ensured that any proposed fans for rapid ventilation should be assessed for their acoustic performance to ensure the sound reduction performance of the entire façade is not compromised.

The calculation of noise break-in to the residential rooms has been undertaken in accordance with the calculation methods of BS EN 12354-3:2000 *Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements. Part 3: Airborne sound insulation against outdoor sound*, in octave bands. Reverberation time is 0.5 seconds as per the BS EN 12354-3 reference time for dwellings.

Figure 5. General site layout for the proposed accommodation – Lower floors

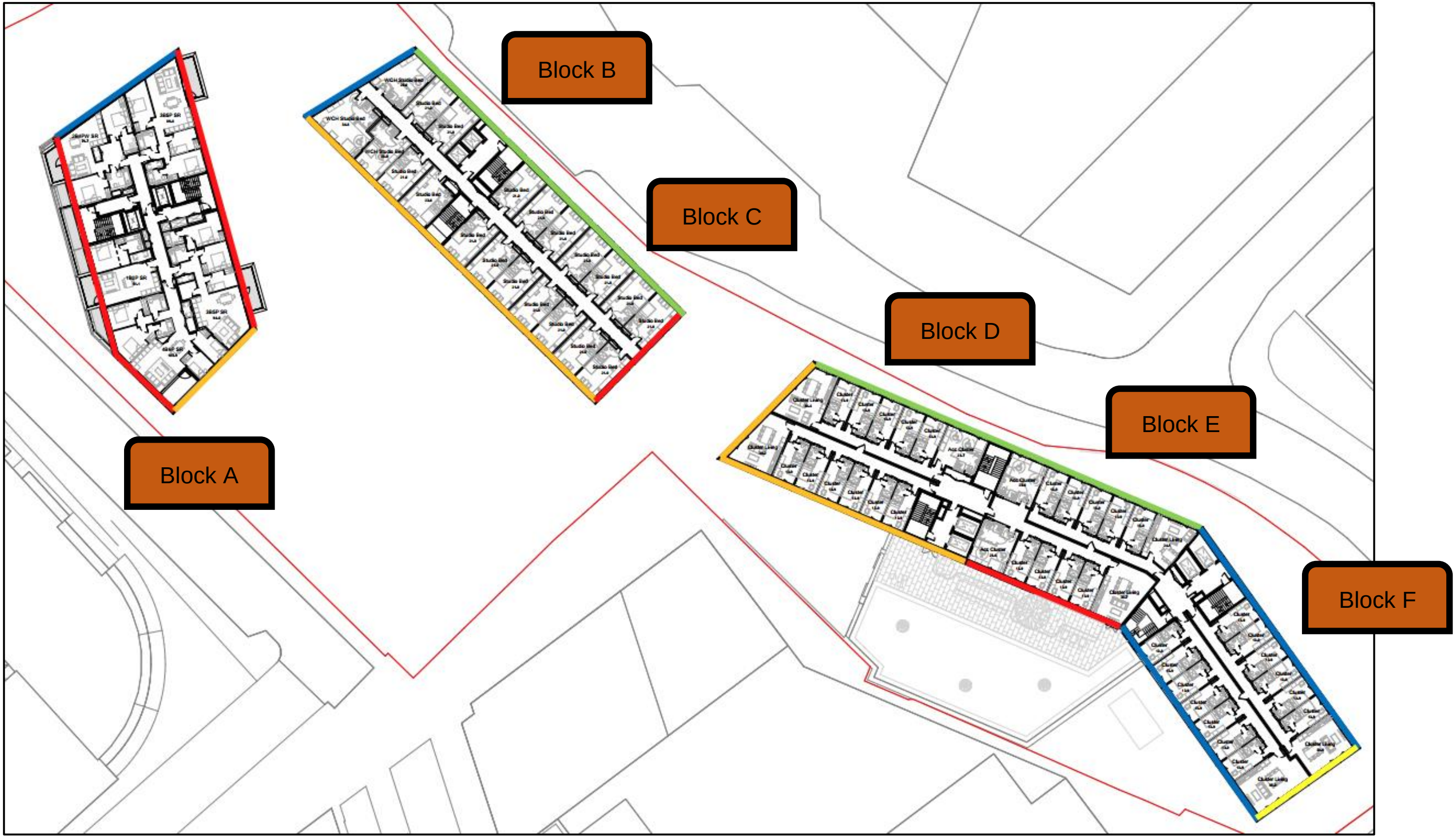


Figure 6. General site layout for the proposed accommodation – Upper floors

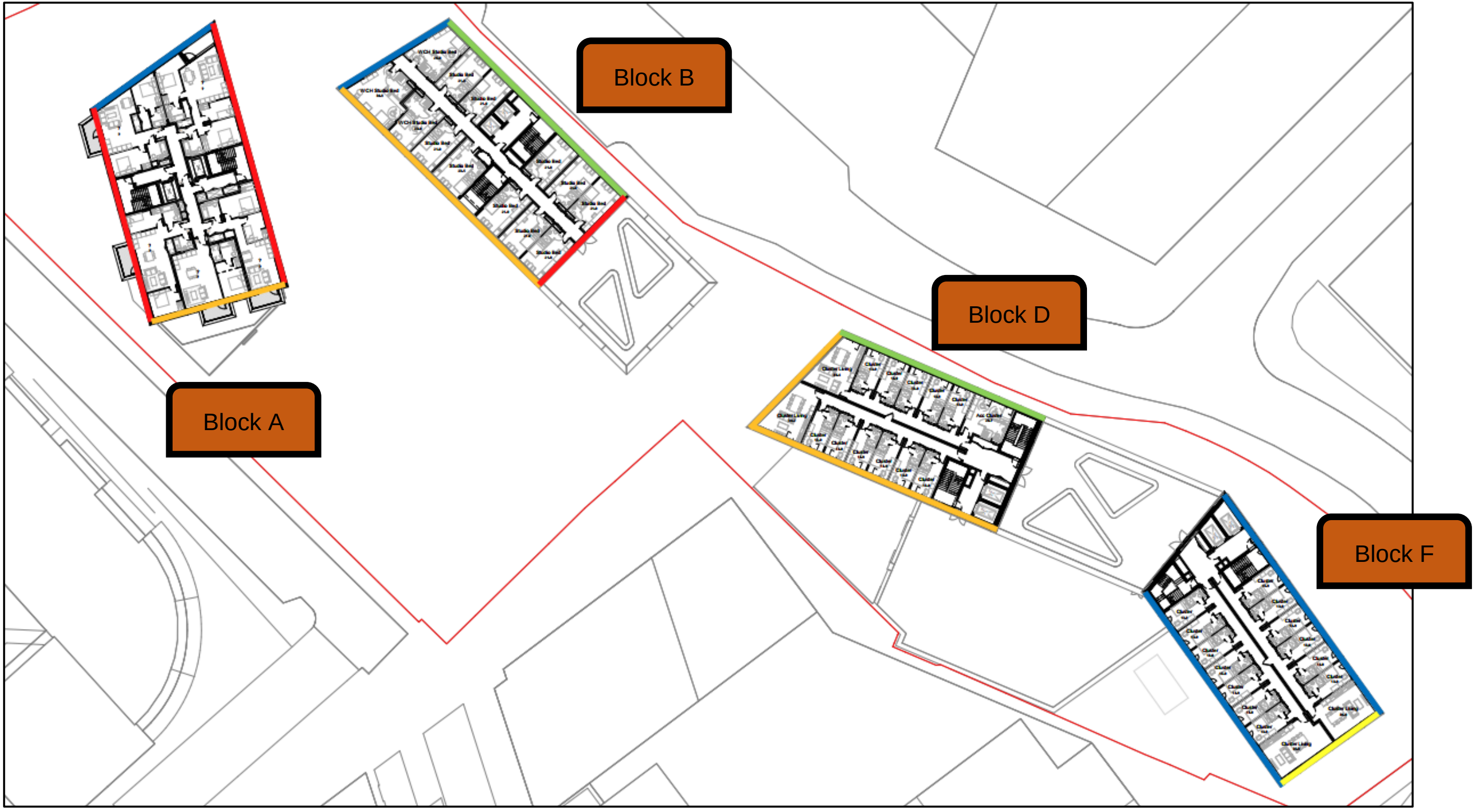


Table 13. Glazing Schedule

Colour	Floor	Room	Minimum Glazing Rating R_w dB	Internal Noise Level Target	Calculated Internal Noise Level	
				$L_{Aeq,T}$ dB Day/Night	$L_{Aeq,T}$ dB Day/Night	L_{Amax} Night
Orange	All	Studio	31	35/30	32/29	45
		Cluster			34/30	42
		Kitchen/Living		35/-	32/-	-
Green	GF - 06	Studio	40	35/30	31/28	45
		Cluster			31/28	45
	07 and above	Studio	35		31/28	39
		Cluster			33/29	41
Red	All	Apartments - Bed	35	35/30	32/29	41
		Studio			29/26	44
		Cluster			29/25	41
		Kitchen/ Living		35/-	30/-	-
Blue	Alll	Apartments - Bed	40	35/30	31/28	39
		Studio			32/29	42
		Cluster			32/28	41
		Kitchen/Living		35/-	32/-	-
Yellow	All	Kitchen/Living	45	35/-	33/-	-

With the glazing specifications proposed in Table 13 above, calculations suggest that the internal Day and Night time BS8233:2014/WHO noise level requirements can be achieved. Calculated internal noise levels are given on the worst-case internal receivers.

In addition to the above, calculations have been undertaken to determine L_{Amax} noise levels within the bedrooms at night time. Using the full night time L_{Amax} noise levels measured across site and previous rail measurements, with the glazing and ventilation specifications above, the calculated L_{Amax} values will not normally exceed 45 dB L_{Amax}.

6.1.1 Glazing Specification and Installation Notes

Notes on Glazing Installation

For the glazing specifications in Table 13, all sound insulation values quoted must be achieved by the overall combination of frame and glazing, and not just by the glazing alone. The frame should not reduce the performance of the system overall. Glazing framing systems must be fully sealed with any small gaps (<10mm nominal) around the perimeter to be stuffed with dense mineral wool to full frame depth and sealed both sides with acoustic non-setting mastic, with additional weathering protection to be applied additionally externally to this. No gaps should be left unsealed.

Minimum performance requirements for the combination of glazing and framing recommended in the above tables are as follows:

Table 14. Required Minimum Sound insulation of Combined Glazing and Framing

Typical Product	Minimum Sound Reduction Index R (dB) at Octave Band Centre Frequency (Hz)								R_w dB
	63	125	250	500	1k	2k	4k	8k	
4/12/4	16	22	19	25	36	42	36	35	**31**
6/12/8	23	23	21	33	40	37	48	48	**35**
8/12/8.8A	23	28	27	35	45	46	52	52	**40**
8.4A/16/10.4A	22	27	35	43	53	53	63	63	**45**

Figures stated in the table above are based on Saint Gobain manufacturer quoted data. Acoustic ratings should be checked with the manufacturer and supported by laboratory test reports where necessary. Any areas of aluminium panelling (if proposed) adjacent to the window glass should meet the same minimum specification as the glass to which they are adjacent.

6.2 Ventilation Requirements - Approved Document O (ADO), Method of Removing Heat

The new Building Regulations came into effect in June 2022 including for Approved Document O (ADO) which specifies internal noise limits for when windows will likely be required to be closed at night.

ADO provides a 10dB relaxation from the noise limits detailed within BS8233 with an internal limit of 40dB L_{Aeq} and 55dB L_{Amax}. However, open areas within the facade will dramatically compromise the acoustic performance. Based upon an open area of a louvre sized at 7.5% of the floor area we have calculated that this would attenuate the external noise level by 6 dB.

Our modelling results would suggest that the noise level across the different facades of the scheme would range between 50dB L_{Aeq} at the most shielded facades to 71dB L_{Aeq} for the most exposed facade. Applying the 6dB attenuation for the open louvre would result in an internal noise level that would range between 44dB – 65dB L_{Aeq}. Please note that similar exceedances are also noted for the L_{Amax} criteria. This would therefore indicate that all facades would exceed the requirements for an open window or open louvre.

Therefore in order to comply with the requirements of ADO, alternative means than an unattenuated opening within the façade would be required to control of overheating.

6.3 External Walls

It is assumed that the external wall construction will be brick with a structural metal frame inner leaf. Within our calculations it has been determined that the sound insulation performance of the façade should be greater than 64 dB R_w. Manufacturer's test data has been used based upon the example build-up below:

- 100mm facing brickwork. Inner leaf consists of minimum 10mm sheathing board (8kg/m^2 mass per unit area) on one side of a minimum 100mm Metsec frame/steel stud with a minimum 50mm mineral wool insulation (minimum 10kg/m^3 density) in the cavity and 2 no. layers of 12.5mm Wallboard plasterboard internal lining (total mass per unit area 16kg/m^2)

Please note that the external façade should have no unsealed penetrations, and any openings for ventilation should meet the specifications for ventilators above.

6.4 Roof

Within the calculations the roof has been assumed to be a concrete slab roof construction with insulation and plasterboard ceiling within the top floor rooms. It is considered that this is likely to be acceptable.

Insul sound prediction software would suggest the a typical minimum 150mm concrete slab structure has a laboratory sound insulation of at least 55 dB R_w, which is considered to be acceptable.

6.5 Ground Floor Spaces

It is proposed that there will be ancillary spaces on the ground floor of the building including Commercial, Laundry and Amenity areas. The required sound insulation performance of separating elements in residential buildings is governed by the Building Regulations Approved Document E, which sets out minimum sound reduction performance criteria that should be achieved between the spaces.

Clause 0.8 of Approved Document E would suggest that, '*the performance standards set out in Tables 1a and 1b (of the document) are appropriate for walls, floors and stairs that separate spaces used for normal domestic purposes. A higher standard of sound insulation may be required between spaces used for normal domestic purposes and communal or non-domestic purposes. In these situations the appropriate level of sound insulation will depend on the noise generated in the communal or non-domestic space. Specialist advice may be needed to establish if a higher standard of sound insulation is required and, if so, to determine the appropriate level.*'

Where the proposed use is to be low noise generation, e.g. offices, it is considered that meeting the minimum sound insulation criteria of Approved Document E for the separating walls/floors is likely to be sufficient. Where the use is likely to generate greater noise than that experienced in normal domestic uses then uprating works to the building structure may be required using enhanced ceilings or improved wall constructions/linings, etc. Assessment will be undertaken at detailed design stage to control internal noise levels to bedrooms to meet the requirements of BS8233:2014.

6.6 External Amenity Spaces

Using the 3-dimensional noise model created within SoundPLAN, as discussed within Section 5.0, noise level predictions have been made for the external amenity areas. These have been modelled as 1.5m from the ground in the public realm area and 1.0m off of the roof area for Level 7 terrace areas on Block B-C and Block D-F. For Level 1 Ground Floor terrace, the measurement data from ST1 has been used for calculation purposes. The noise levels in the amenity areas are as follows:

Table 16. Predicted Noise Levels in External Amenity Areas

Position	L_{Aeq} dB
Public Realm	55-73
Block D-F - Level 1 – Ground Floor Terrace	64
Block B-C – Level 7 – Terrace	58
Block D-F – Level 7 - Terrace	62

Within Section 3.3, it is discussed how an external noise level of 55dB L_{Aeq} is desirable in noisier environments as stated within BS8233:2014. However, it is also considered within the standard how:

> ‘*In higher noise areas, such as city centers or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted.’*

Therefore, we would consider that, given the location of development which is in a highly developed area of London surrounded by transportation links and industrial units, the predicted external amenity noise levels presented within table 16 may be warranted. It is understood that 2m high walls are surrounding the terraced areas and therefore enabling the amenity area to achieve the lowest practicable levels through design.

7.0 CONCLUSIONS

PDA Ltd was commissioned by Watkin Jones to carry out an environmental noise and vibration assessment report for the proposed new build student and residential accommodation development at Battersea Park Road, London. This report is in support of the application for Phased Full Planning Permission for: Demolition of existing building and construction of three new buildings, together comprising Residential (Use Class C3) and Student Accommodation (Sui Generis) along with Commercial, Business and Service (Use Class E) and/or Local Community and Learning (Class F) floorspace. Associated works include hard and soft landscaping, car parking and new vehicular access / servicing, and other ancillary works.

The proposed development consists of 3 no. 11-21 storey blocks consisting of 762 no. student bedrooms along with 55 no. residential units, all with ancillary management facilities.

Noise level surveys were undertaken at the site representative of daytime hours as well as a full night time. The local noise climate is dominated by road traffic noise from Battersea Park Road (A3205) and to a lesser extent ‘A-road’ throughout the day and night time. Contributions from surrounding local roads include cars, buses, lorries and motorbikes. Rail noise dominates the south of the site with regular pass-bys throughout the day and lesser in the night.

Based upon the measured and predicted noise levels, supplemented with previous railway noise data, calculations have been undertaken for the Bedrooms and Living Spaces to evaluate the internal noise levels. Recommendations are given for glazing, ventilation and building façade elements to meet the internal noise level requirements of good practice guidance given in BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings. Calculations suggest that the noise level criteria of BS8233:2014 can be achieved within the proposed accommodation. Calculations have also been carried out to assess the external amenity spaces where it is noted that, a compromise in noise level is warranted when living in a highly developed urban area and therefore considered acceptable in the context of BS8233:2014. In addition, an assessment has been carried out in regards to Approved Document O, which concludes that an alternative means of ventilation is required rather than relying on open windows during the night-time periods.

In addition a vibration survey has been undertaken running concurrently with the noise measurements. The measured and predicted vibration levels are well below the ‘*Low probability of adverse comment*’ criterion of BS 6472 for both day and night time periods and as such, BS 6472 would suggest that for levels below the ranges, adverse comment is not expected.

APPENDIX A – NOTES FOR QUALITY CONTROL

1. Blockwork

All blockwork is to be mortared to an almost fair faced standard both horizontally and vertically. Only perfect blocks may be used with no pitting or cracks. The blockwork must seal effectively to the underside of the soffit.

Where blockwork walls form a cavity wall, care should be taken to avoid rubble and snots from bridging the cavity. This is especially important where one or more of the leaves is floating.

2. Plasterboard

All plasterboard joints are to be butted tight. The rule of thumb is that the joint should be tight enough over its entire length to prevent a normal business card from being inserted. Multiple layers should be fitted with staggered joints.

Base details and deflection heads are to be as per the British Gypsum White Book unless otherwise stated, and copious amounts of mastic to be used when fitting to the walls, floor and ceiling respectively.

3. Mineral Fibre

Mineral fibre slabs are to be butted tightly together and to boundary structures, to form a homogeneous layer.

4. Windows

All window frames are to be a good tight fit into the building structure with any gaps to be filled both internally and externally with a non-setting mastic in addition to the usual weather proofing seal to the exterior. Any gaps between the frame and building that are greater than 5 mm are to packed with a dense mineral fibre prior to mastic sealing.

5. Electrical Sockets

Electrical sockets must not be fitted back to back and removed areas of blockwork and plasterboard should be kept to an absolute minimum.

6. Water Pipes

All water pipes (and any other pipework) are to be resiliently mounted to avoid “water hammer”. This is particularly important for plasterboard walls.

7. Penetrations

Penetrations are to be dealt with as described in this report. Details for specific services penetrations may be supplied upon request.

8. Approved Samples and Inspections

Samples of each individual acoustic element should be provided for inspection at the beginning of its installation. Once approved, the Clerk of Works must ensure that the same level of quality continues throughout construction.

APPENDIX B – DEFINITION OF ACOUSTIC TERMS

The decibel

This is the basic unit of noise, denoted dB.

A Weighting

This is a weighting process which simulates the human ear's different sensitivity at different frequencies. A weighting can be shown two typical ways, 50 dB(A) L_{eq} or 50 dB L_{Aeq}. Both mean the same thing. (See below for a definition of L_{eq}). The dB(A) level can be regarded as the overall level perceived by human beings.

L_{eq} and $L_{eq(s)}$

This is the equivalent continuous noise level which contains the same acoustic energy as the actual time-varying sound. In other words it is a kind of average noise level. It is denoted dB L_{eq} or, for A-weighted figures dB(A) L_{eq} or dB L_{Aeq}. It can also be expressed in terms of frequency analysis (see later). $L_{eq(s)}$ is the sample L_{eq} level.

L_n

This is the level exceeded for n% of the time. It is denoted dB L_n or, for A-weighted figures dB(A) L_n or dB L_{An}. It can be expressed in terms of frequency analysis (see later). L_{90} is the level exceeded for 90% of the time and is a measure of the lowest level typically reached. L_{10} is the level exceeded for 10% of the time and is the highest level typically reached. L_{50} is the level exceeded for 50% of the time and, mathematically, it is the median.

L_{max}

This is the maximum level reached during a measurement period. The "time constant", or the ability of the equipment to respond to impulses is usually expressed along with it, e.g. "Fast", "Slow", etc. It is denoted dB L_{max} or, for A-weighted figures dB(A) L_{max}, dB L_{Amax}, etc. It can also be expressed in terms of frequency analysis.

Frequency Analysis

Whereas dB(A) gives a very useful overall figure, it has its limitations in that it cannot be used to model or predict the effect of noise control and mitigation as this nearly always has radically different performance at different frequencies.

Frequency analysis expresses an overall noise level at each frequency or band of frequencies in the audible range. Octave band analysis divides the audible range into 10 bands from 31.5 Hz to 16 kHz and the noise level in each band can be expressed in any form e.g. L_{eq}, L_{90}, L_{max} etc. One third octave band analysis uses 30 bands.

Narrow band analysis takes the process to resolutions of less than 1 Hz. This is useful for identifying the existence of tones (whines, hums, etc.) and in pin-pointing the sources.

Appendix F - GLA Energy Memo Responses

Compliance Schedule - To be completed by the GLA Energy Officer

Policy	Policy Sub-Area	Required Data (In line with EAG)	Status	Policy Compliance	GLA Comment Reference
SI 1 - Improving Air Quality **(relating only to air quality impacts of energy systems; separate air quality officer consultation required)**	Measures/design features to reduce exposure to air pollution	Measures to minimise NOx emissions from energy systems	N/A	Compliant	
SI 2 - Minimising Greenhouse Gas Emissions **(excluding SI-2-F- WLC; separate WLC consultation required)**	Be Lean emissions reduction	Details of energy efficiency measures	Received but items still outstanding	Potential Compliance-Pending Information	**Detailed comment 3, 4**
		Alignment with Cooling and Overheating	Received but items still outstanding		**Detailed comment 6, 7**
		Be Lean 10% and/or 15% reduction achieved	Received but items still outstanding		**Detailed comment 2, 3, 4**
	Be Clean	SI 3 - Energy Infrastructure data provided (see below)	Not yet received - applicant to submit and provide reference --->		**Detailed comment 8**
	Be Green Renewable generation maximisation	Roof Layout detailing maximised PV proposal	Received and nothing further required		**Detailed comment 10**
		PV array metrics provided	Received and nothing further required		**Detailed comment 10**
		Heat Pump arrangement confirmed	Received but items still outstanding		**Detailed comment 9, 11**
	Total carbon reduction on-site	Confirmation of carbon emission factors used	Received; SAP 10 proposed and nothing further required		
		GLA carbon emission reporting spreadsheet v1.2	Not yet received - applicant to submit and provide reference --->		**Detailed comment 2**
		Supporting Modelling Ouputs (BRUKLs/DER Worksheets)	Received but items still outstanding		**Detailed comment 15**
		On-site minimum met	Received but items still outstanding		
	Carbon offset payment confirmed	Draft S106 wording of carbon offset (from borough)	Not yet received - applicant to submit and provide reference --->		**Detailed comment 14**
	Be Seen commitment provided	Written confirmation/understanding of data requirements	Not yet received - applicant to submit and provide reference --->		**Detailed comment 13**
		Confirmation of Planning Stage 1 submission	Not yet received - applicant to submit and provide reference --->		**Detailed comment 13**
SI 3 - Energy Infrastructure	Aligned with heating hierarchy	Applicant/Heat Network Stakeholder correspondence	Received but items still outstanding	Potential Compliance-Pending Information	**Detailed comment 8**
		Heating system details provided	Received but items still outstanding		**Detailed comment 9, 11**
	Acceptable Design	Futureproofed DHN connection drawings	Received but items still outstanding		**Detailed comment 9**
		Site heat network drawings	Not yet received - applicant to submit and provide reference --->		**Detailed comment 9**
		Details of management measures proposed	Received but items still outstanding		**Detailed comment 5, 9**
SI 4 - Managing Heat Risk	Aligned with cooling hierarchy	Completed GHA overheating tool	Received and nothing further required	Potential Compliance-Pending Information	**Detailed comment 16**
		CIBSE dynamic overheating analysis	Received but items still outstanding		**Detailed comment 6, 7**
		Confirmation that cooling criteria have been met	Received but items still outstanding		**Detailed comment 6, 7**

Application Metrics	Outline Value (if applicable)	Detailed Stage 1 Value	Detailed Final Value
Domestic carbon emissions		63%	
Non-domestic carbon emissions		33%	
Carbon offset payment amount		£180,975	
kWp renewable generation capacity		66	
kWh annual renewable energy generation		52780	
Sqm of proposed PV array		340	
Calculated SCOP of heat pumps		3.39 (resi+sa), 4.01 (commercial)	
Heat fraction provided by heat pumps		TBC	
Flow/Return temperatures proposed		TBC	
Distribution loss assumption		TBC	
Whole Life Carbon Assessment		Received and Under Separate Consultation	
Innovative Features			

Detailed Comments - Applicant MUST provide detailed responses to the below items

Comment No.	GLA Stage I Date: 20/06/22	Applicant's Stage I response Date:	GLA Post Stage I response Date: 28/05/2024	Applicant's Post Stage I response Date:	GLA Post Stage I response Date: 21/08/2024	
Documents to be secured						
	Energy Statement & Overheating Assessment (29/04/22 & 22/04/22)					
General compliance comments						
1	The energy strategy could be compliant with the London Plan 2021 policies however, the applicant is required to submit the additional information to demonstrate policy compliance which has been requested below. The applicant's response to GLA's energy comments should be provided directly within this Energy Memo. Any wider supporting material submitted should be referenced within the applicant's memo response.	**The applicant provided an update to the energy memo within their new energy strategy. In future, memo responses should be provided directly within this document to keep track of progress.**	-	Response provided within the updated energy statement.	As per previous GLA comment, the applicant has provided an update to the energy memo within their new energy statement report. **The applicant's response to GLA's energy comments should be provided directly within this Energy Memo to streamline the process and to keep track of the progress and the Energy Memo response should be submitted back in excel format.** Any wider supporting material submitted should be referenced within the applicant's memo response.	
2	The applicant should submit the GLA's Carbon Emission Reporting spreadsheet in excel format; this has been developed to allow the use of the updated SAP 10 emission factors alongside the SAP 2012 emission factors. [The link to the spreadsheet can be found here: https://www.london.gov.uk/what-we-do/planning/planning-applications-and-decisions/pre-planning-application-meeting-service-0] The applicant has included the reduction from air source heat pumps in the Be Clean stage. The heat pumps should be included at the Be Green stage of the energy hierarchy as per GLA's energy Assessment Guidance.	No response provided.	The applicant has provided the heat pump savings as part of the be green stage as requested. The applicant should provide the carbon reporting spreadsheet in excel format. This could not be located within the uploaded documents. **This item remains outstanding.**		The applicant has provided the GLA carbon emission spreadsheet in excel format, however on the residential element the baseline should be taken from the Be Green TER final proposed building specification rather than the Be Lean TER. Furthermore, on the non-domestic element the BRUKL displaced electricity column F is for the baseline notional building which appears to be 0 for the three Plot models. Furthermore, both residential and non-residential modelling and figures should be updated in line with comments below. **This item is outstanding.**	Be Green TERs used for baseline. See 6892 BPR Part_l_2021_gla_carbon_emission_reporting_spreadsheet_v2.0_0 REVS2G 2024.11.12 The BRUKL displaced electricity has been ameded. See 6892 BPR Part_l_2021_gla_carbon_emission_reporting_spreadsheet_v2.0_0 REVS2G 2024.11.12
Be Lean						
3	Based on the information provided, the domestic element of the proposed development is estimated to achieve a reduction of 14.5 tonnes per annum (17%) in regulated CO2 emissions compared to a 2013 Building Regulations compliant development. It is unclear whether the Energy Assessment Guidance methodology has been used for the Be Lean case that requires the heating to be provided by gas boilers and that any active cooling would be provided by electrically powered equipment. The applicant should clarify and submit supporting modelling outputs as per comments below.	Response provided within new energy statement.	Based on the information provided, the domestic element of the proposed development is estimated to achieve a reduction of 11 tonnes per annum (21%) in regulated CO2 emissions compared to a 2021 Building Regulations compliant development. This is welcomed. The applicant should submit the full SAP modelling sheets for all models, for both the be lean (TER and DER) and green (DER) stages of the enerhy heirarchy for the GLA to review. No pages should be left out from this submission and they should be provided in PDF format. **This item remains outstanding.**		Based on the information provided, the domestic element of the proposed development is estimated to achieve a reduction of 14.8 tonnes per annum (27%) in regulated CO2 emissions compared to a 2021 Building Regulations compliant development. The applicant is proposing an external wall U-Value of 0.13W/m2K. They should provide the construction detail that demonstrate that this performance is achievable and confirm this is coordinated with the design team. The applicant proposes a thermal bridging y-value of 0.04W/m2K which is considered to be low. The applicant should confirm the construction type proposed for the residential building and confirm that the y-value level assumed is achievable, detailing previous experience delivering the assumed level of thermal bridging performance for a similar construction type. **This item is outstanding.**	For external wall buildup achieving 0.12, see: 6892 Battersea Park Road Energy Statement 2024.11.12 RevS2G Appendix D At this stage, the 0.04 y-value was targeted based on LETI standards. As there is currently no way to demonstrate that this will be achieved, this value has been raised to 0.08. The value of 0.08 is a reasonable assumption for modern construction methods

4	Based on the information provided, the non-domestic element of the proposed development is estimated to achieve a reduction of 31.4 tonnes per annum (17%) in regulated CO_2 emissions compared to a 2013 Building Regulations compliant development. It is unclear whether the Energy Assessment Guidance methodology has been used for the Be Lean case that requires the heating to be provided by gas boilers and that any active cooling would be provided by electrically powered equipment. Furthermor the use class selected for the Student Accommodation is Residential Spaces rather than the C2 Residential Institutions use that should be used for Part L calculations. The applicant should clarify and submit supporting modelling outputs as per comments below.	Response provided within new energy statement.	Based on the information provided, the non-domestic element of the proposed development is estimated to achieve a reduction of 12.7 tonnes per annum (19%) in regulated CO2 emissions compared to a 2021 Building Regulations compliant development. This is welcomed. The applicant should submit the full BRUKLS modelling sheets for all models, for both the be lean and green stages of the enerhy heirarchy for the GLA to review. No pages should be left out from this submission and they should be provided in PDF format. **This item remains outstanding.**		The reduction will be changed considerably when the displaced electricity is correctly being input to zero. The applicant should note that the London Plan includes a target of a minimum 15% improvement on 2021 Building Regulations from energy efficiency which applicants should target. The applicant should therefore consider modelling additional energy efficiency measures to meet the EE target. From the Be Lean BRUKL it can be seen that the applicant has not followed the Energy Assessment Guidance June 2022 methodology as per paragraphs 7.9-7.11. The Heat SSEEF on the HVAC Systems performance table should be equal between actual and notional building. This should be amended. **This item is outstanding.**	All available passive measures have been explored at this stage; further changes will have negative impacts on architecture, daylighting, overheating or costs. The efficiencies in the updated Be Lean modelling have been corrected match the notional.
5	The applicant should consider and minimise the estimated energy costs to occupants and outline how they are committed to protecting the consumer from high prices. This should cover the parameters set out in the guidance and include a confirmation of the quality assurance mechanisms that will be considered as part of the strategy. See GLA Energy Assessment Guidance April 2020 paragraphs 7.13-7.16 for further details.	Response provided within new energy statement.	The applicant should consider and minimise the estimated energy costs to occupants and outline how they are committed to protecting the consumer from high prices. This should cover the parameters set out in the guidance and include a confirmation of the quality assurance mechanisms that will be considered as part of the strategy. See GLA Energy Assessment Guidance April 2020 paragraphs 7.13-7.16 for further details. **This item remains outstanding.**		The applicant has confirmed that CIBSE CP1 will be one of quality assurance mechanisms that will be considered as part of the strategy. They should confirm at least one more QA mechanism from paragraph 7.18 of GLA Energy Assessment Guidance June 2022. **This item is outstanding.**	Further quality assurance mechanisms have been included in the 6892 Battersea Park Road Energy Statement 2024.11.12 RevS2G (Be Seen section).
Overheating						
6	The results of the Dynamic Overheating Analysis, using the CIBSE TM59 methodology, demonstrate that all sample units comply with DSY1 assuming a g-value of 0.45 for the residential affordable housing part and 0.28 for student accommodation, natural ventilation and trim cooling. The applicant should submit the detailed results of the rooms rather than the percentage passing. The applicant should also investigate the risk of overheating using the DSY 2 & 3 weather files. The applicant has confirmed that blinds have not been modelled. They should also confirm the window opening assumption is aligned with recommendations of any air quality and acoustic reports. The applicant has proposed active cooling to the windows without clarifying the reason for active cooling needed and natural ventilation not being adequate. If windows are required to be assumed closed or restricted as part of the suggestions of air quality or noise reports, the applicant should present one version of overheating assessment with windows open (to demonstrate that the passive design could achieve compliance in the absence of external constraints which is the expectation for residential developments) and another with windows closed. The applicant is required to investigate and adopt further passive measures (in line with the Cooling Hierarchy) to avoid the risk of overheating now and under future climate scenarios.	Response provided within new overheating strategy.	The applicant has provided a new overheating assessment. They are proposing a purge fan system in the residential and student accomadation with no reliance on trim cooling assuming a g-value of 0.28 (N/E) and 0.35 (S/W). The results of the overheating assessment are however unclear. The applicant should detail weather a MVHR system is being provided alongside this system. The applicant has provided two sets of results one labelled natural ventilation overheating criteria and one mechanical ventilation overheating criteria. The applicant should explain what has been modelled in each of these scenarios. They should also confirm the window opening assumption is aligned with recommendations of any air quality and acoustic reports. If windows are required to be assumed closed or restricted as part of the suggestions of air quality or noise reports, the applicant should present one version of overheating assessment with windows open (to demonstrate that the passive design could achieve compliance in the absence of external constraints which is the expectation for residential developments) and another with windows closed. **This item remains outstanding.**		The applicant has provided an updated Overheating assessment. Within the document and as per the response tables 3.2, 4.2 and 5.2 indicate what has been modelled however only the final iteration detailed results seemed to have been shared at the moment. The applicant is proposing to use exposed thermal mass to all plots which is welcomed. The applicant has outlined that windows will not be relied upon for ventilation they should provide the exact excerpt of the overheating report that suggests this should affect all facades at all times. The openable window scenario should achieve full compliance to demonstrate that the passive design could achieve compliance in the absence of external constraints which is the expectation for residential developments. The applicant should outline what is required to achieve 100% pass rate under this 'openable window' scenario where natural ventilation assumed and should the measures be feasible then it is expected that these are adopted. A purge fan solution would only be accepted when it is clearly demonstrated that passive measures are sufficient to mitigate overheating in the absence of environmental constraints on the use of windows opened The analysis demonstrates that there are a significant number of failures under the DSY 2 and DSY 3 weather files. The applicant should commit to providing guidance to occupants on future minimising future dwelling overheating risk in line with the cooling hierarchy. **This item is outstanding.**	Full results for all cooling hierarchy iteratons are included in the supporting documents. See section 6.2 of the acoustic report contained in the appendix - "This would therefore indicate that all facades would exceed the requirements for an open window or open louvre. Therefore in order to comply with the requirements of ADO, alternative means than an unattenuated opening within the façade would be required to control of overheating." Full compliance with the natural ventilation scenario has been demonstrated by removing certain external constraints. The high internal gains and high temperatures in the weather files make it difficult to achieve TM59 compliance under climate change weather files. There is no change to these pass rates but further measures are due to be investigated at the next detailed design stage in parallel with daylighitng and energy.
7	For the mechanically controlled non residential element, the area weighted average (MJ/m2) and total (MJ/year) cooling demand for the actual and notional building should be provided and the applicant should demonstrate that the actual building's cooling demand is lower than the notional.	Response provided within new energy statement.	The area weighted average (MJ/m2) and total (MJ/year) cooling demand for the actual and notional building has been provided however the notional building demand is lower than the actual. The applicant should explore further measures at this stage to reduce the cooling demand to lower than that of the notional. **This item remains outstanding.**		The applicant should still seek to adopt further passive measures (in line with the Cooling Hierarchy) to reduce the actual cooling demand including reducing the g-value and the glazing ratio. In terms of the commercial viability and the active frontages analysis of how they will be impacted should be provided and other areas that is not on the ground floor could also be targeted. In terms of the daylight for the student accommodation, the applicant should reduce the glazed area where feasible to reduce the overheating risk and improve the energy efficiency. They should consider reducing glazing from areas which don't help with daylighting, such as in the corner of rooms and less than 700mm above the floor. **This item is outstanding.**	Active frontage was encouraged by the planners throughout a series of architectural meetings. Iterative modelling was carried out to decrease the solar gain in these areas as far as possible with the glazing ratios agreed. Similarly, the L07 amenity on Plots 2 & 3 were agreed with the local authority as they wanted a clear divide in the building and views out. g-values for these heavily glazed areas has now been dropped to 0.21.
Be Clean						
8	The applicant has carried out an investigation and there are no existing or planned district heating networks within the vicinity of the proposed development. The London Heat map shows the proposed VNEB DHN within the close proximity of the site. onnection to the network should continue to be prioritised and evidence of active two-way correspondence with the network operator should be provided. This must include confirmation or otherwise from the network operator that the network has the capacity to serve the new development, together with supporting estimates of the CO2 emission factor, installation cost and timescales for connection. They should also contact relevant stakeholders including the borough energy officer, local heat network operators and nearby developers and ask whether they know of any local heat network connection opportunities. Evidence of the correspondence should be submitted.	Response provided within new energy statement.	The applicant has provided evidence of correspondance with EQUANS. This is assumed to be referncing the Peabody heat network. It seems unlikely that connection will be possible in the short-term due to timescales and feasibility of connecting over the road. The applicant should continue to pursue this avenue as reccomended by EQUANS. Further correspondance should be provided. The application also appears to be nearby the proposed VNEB heat network. The applicant should explore future connection to this site. Connection to the network should continue to be prioritised and evidence of active two-way correspondence with the network operator should be provided. This must include confirmation or otherwise from the network operator that the network has the capacity to serve the new development, together with supporting estimates of the CO2 emission factor, installation cost and timescales for connection. **This item remains outstanding.**		It is unclear how Equans as a network operator is involved with the VNEB potential DHN. For clarity, the applicant should also contact the borough energy officer to discuss about the nearby DHN opportunities. The email correspondence in Appendix A.3 should be reprovided as some text appears to be missing. **This item is outstanding.**	Further correspondance has occurred which has been included in Appendix B of 6892 Battersea Park Road Energy Statement 2024.11.12 RevS2G

9	The applicant is proposing block-by-block heat networks supplied by energy centres in each block. The applicant should demonstrate that the number of energy centres has been minimised. It should be confirmed that all apartments and non-domestic building uses will be connected to the heat networks. The applicant is required to provide trenches and pipes between blocks to enable all block-level heat networks to ultimately be connected into a single site-wide network. A drawing showing the route of the heat networks linking all buildings/uses on the site should be provided alongside a drawing indicating the floor area, internal layout and location of the energy centres. The applicant has provided a commitment that the development is designed to allow future connection to a district heating network. This should include a single point of connection to the district heating network. Drawings should be provided demonstrating space for heat exchangers in the energy centre, and a safe-guarded pipe route to the site boundary, and sufficient space in cross section for primary district heating pipes where proposed routes are through utility corridors. This requirement is to be secured through a **suitable condition or legal wording.**	Response provided within new energy statement.	The applicant is suggesting they are now proposing a communal system. The applicant should confirm this and detail the design of this network. The drawing provided however seems to be suggesting a block by block network with energy centres in each block. The applicant should demonstrate that the number of energy centres has been minimised. It should be confirmed that all apartments and non-domestic building uses will be connected to the heat networks. The applicant has provied a drawing detailing trenches and pipes between blocks to enable all block-level heat networks to ultimately be connected into a single site-wide network. A drawing showing the route of the heat networks linking all buildings/uses on the site should be provided alongside a drawing indicating the floor area, internal layout and location of the energy centres. The applicant has provided a commitment that the development is designed to allow future connection to a district heating network. This should include a single point of connection to the district heating network. Drawings should be provided demonstrating space for heat exchangers in the energy centre, and a safe-guarded pipe route to the site boundary, and sufficient space in cross section for primary district heating pipes where proposed routes are through utility corridors. This requirement is to be secured through a suitable condition or legal wording. **This item remains outstanding.**		The applicant is proposing block-by-block heat networks supplied by energy centres in each block. The applicant has provided drawings showing the space for PHX on the three plots and the potential trench routes to interconnect the blocks together with a potential point of connection. This is welcomed. The applicant is required to provide these trenches and pipes between blocks to enable all block-level heat networks to ultimately be connected into a single site-wide network. **This item is outstanding.**	Separate energy centres have been provided to allow separate ownership – the residential block will be owned/managed by an RP and the student elements are large blocks that could easily be owned and operated separately. The client has agreed to provide these trenches and pipes to connect all blocks, see 6892 Battersea Park Road Energy Statement 2024.11.12 RevS2G Appendix E.
Be Green						
11	Heat pumps are being proposed in the form of a (centralised) ASHP system to deliver space heating, cooling and DHW. The applicant is proposing VRF served from ASHP Chillers for the Non-residential spaces.The DHW source for the non-domestic units should be confirmed. They should confirm the reason for the non-domestic uses not being served by the network. They should maximise the heat loads that are connected to the site-wide heat network and any divergences from policy should be robustly justified. Commercial units should be provided with capped-off connections from the communal heating distribution circuit to offer future tenant flexibility on heating source. Further information on the heat pumps should be provided including: a. An estimate of the heating and/or cooling energy (MWh/annum) the heat pumps would provide to the development and the percentage of contribution to the site's heat loads. They should demonstrate how the heat fraction from heat pump technologies has been maximised. b. Details of the Seasonal Coefficient of Performance (SCOP) and/or Seasonal Energy Efficiency ratio (SEER) and how these have been calculated. This should incorporate the expected heat source and heat distribution temperatures (for space heat and hot water)and the distribution loss factor, which should be calculated based on the above information and used for calculation purposes.	Response provided within new energy statement.	Heat pumps are being proposed in the form of a (centralised) ASHP system to deliver space heating, cooling and DHW. The applicant is proposing VRF served from ASHP Chillers for the Non-residential spaces. They should confirm the reason for the non-domestic uses not being served by the network. They should maximise the heat loads that are connected to the site-wide heat network and any divergences from policy should be robustly justified. Commercial units should be provided with capped-off connections from the communal heating distribution circuit to offer future tenant flexibility on heating source. The applicant has provided the relevent SCOP and SEER calculation sheets within the new submission. This is welcomed. The applicant should also provide: a) An estimate of the heating and/or cooling energy (MWh/annum) the heat pumps would provide to the development and the percentage of contribution to the site's heat loads. They should demonstrate how the heat fraction from heat pump technologies has been maximised. b)Explain how the SCOP and SEER calculations have included: the expected heat source and heat distribution temperatures (for space heat and hot water)and the distribution loss factor, which should be calculated based on the above information and used for calculation purposes. **This item remains outstanding.**		Clarifications and additional information is welcomed. The applicant has provided estimate of the heating and/or cooling energy (MWh/annum) the heat pumps. For the residential element the SCOP of 3.39 is considered considerably high and the applicant should provide detailed calculations of how this has been estimated including expected heat source and heat distribution temperatures (for space heat and hot water) including the manufacturer datasheet. The distribution loss factor of 1.10 also appears to be low. The applicant should robustly justify the use of this distribution loss factor with detailed calculations or use a more conservative value and update the energy modelling, CO2 emissions and carbon offset payment. **This item is outstanding.**	The ASHP data sheet has been provided in Appendix A showing that an SCoP of 3.39 is achived through distribution at 55°C. Distribution losses are now modelled at 85% for the student residential where WWHR is present and 90% for the lower floor commercial where the loop lengths are lower and WWHR is not present.
Whole Life-Cycle Carbon Assessment						
EUI and Space Heat Demand						
13	EUI and space heating demands have been provided. The applicant has used the SAP 10.2 + Part l2 DSM methodology for these calculations. The applicant should report the EUI and space heating demand against the reference values in Table 4 of GLA guidance. The applicant should provide commentary if the expected performance differs from the reference values.	Response provided within new energy statement.	EUI and space heating demands have been provided. The applicant has used the SAP 10.2 + Part l2 DSM methodology for these calculations. The applicant should report the EUI and space heating demand against the reference values in Table 4 of GLA guidance. The applicant should provide commentary if the expected performance differs from the reference values. **This item remains outstanding.**		The applicant has provided the EUI and SH values. Nothing further is required.	
Be Seen Energy Monitoring						
14	A commitment should be provided that the development will be designed to enable post construction monitoring and that the information set out in the 'Be Seen' guidance is submitted to the GLA's portal at the appropriate reporting stages. This will be secured through **suitable legal wording.** The 'Be Seen' reporting spreadsheet has been developed to enable development teams to capture all data offline before this is submitted via the webform. The applicant should confirm that the planning stage data has been submitted to GLA.	No response provided.	A commitment should be provided that the development will be designed to enable post construction monitoring and that the information set out in the 'Be Seen' guidance is submitted to the GLA's portal at the appropriate reporting stages. This will be secured through **suitable legal wording.** The 'Be Seen' reporting spreadsheet has been developed to enable development teams to capture all data offline before this is submitted via the webform. The applicant should confirm that the planning stage data has been submitted to GLA. **This item remains outstanding.**		This is welcomed, once the planning stage CO2 emissions have been agreed with GLA, the applicant should confirm / has confirmed that the planning stage data has been submitted to GLA. **This item is outstanding.**	Understood
Other points						
15	The applicant has confirmed the carbon shortfall in tonnes CO2 and the associated carbon offset payment that will be made to the borough. The **draft s106 agreement** should be submitted when available to evidence the carbon offset agreement with the borough.	No response provided.	The applicant has confirmed the carbon shortfall in tonnes CO2 and the associated carbon offset payment that will be made to the borough. The **draft s106 agreement** should be submitted when available to evidence the carbon offset agreement with the borough. **This item remains outstanding.**		The draft s106 agreement should be submitted when available for review. **This item is outstanding.**	Understood
16	The applicant should provide the full relevant modellings output sheets (i.e. TER, DER, BRUKL) for all the different stages of the energy hierarchy.	Response provided within new energy statement.	The applicant should provide the full relevant modellings output sheets (i.e. TER, DER, BRUKL) for all the different stages of the energy hierarchy as per above comments. **This item remains outstanding.**		Supporting modelling has been provided this should change in lien with comments above.	Understood
Move resolved comments under this section						

10	The applicant is proposing 66m² of PV which is consider low for the scale of the application. A detailed roof layout should be provided demonstrating that the roof's potential for a PV installation has been maximised and clearly outlining any constraints to the provision of further PV, such as plant space or solar insolation levels. The applicant is expected to situate PV on any green/brown roof areas using biosolar arrangement and should indicate how PV can be integrated with any amenity areas. The on-site savings from renewable energy technologies should be maximised regardless of the London Plan targets having been met. The applicant should provide the capacity (kWp), total net area (m2) and annual output (kWh) of the proposed PV array.	Response provided within new energy statement.	The drawing and upgraded PV is welcomed. The applicant appears to have maximised the roof space available. **Nothing further required.**
12	The applicant has submitted a WLC assessment which will be reviewed separately; comments will be provided. The WLC assessment should be presented separately in excel using the GLA's WLC assessment template and should follow the GLA WLC guidance. The template and guidance are available here: https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/london-plan-guidance/whole-life-cycle-carbon-assessments-guidance. Applicants will also be conditioned to submit a post-construction assessment to report on the development's actual WLC emissions.	-	**No further action required.**
17	The applicant should complete and submit the Good Homes Alliance Early Stage Overheating Risk Tool.	Response provided within new energy statement.	Received. **No further action required.**

Received; SAP 10 proposed and nothing further required
Received; SAP 2012 proposed and nothing further required
Received; SAP 10 proposed but items still outstanding
Received; SAP 2012 proposed but items still outstanding
Not yet received - applicant to submit and provide reference --->
N/A