SUV1.03 Energy Strategy

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Haringey
LONDON

SUV1.3 ENERGY STRATEGY

Produced by XCO2 on behalf of London Borough of Haringey

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EXECUTIVE SUMMARY

The energy strategy for the Selby Centre development (Application 1) has been developed in line with the energy policies of the London Plan and of the London Borough of Haringey's Local Plan. The three-step Energy Hierarchy has been implemented and the estimated regulated CO_2 savings on site are 91% for the domestic part and 55% for the non-domestic part of the development, against a Part L 2021 compliant scheme. Application 1 is part of a wider masterplan, combining a separate planning application (Application 2) for the construction of a community centre and sports pavilion on an adjacent plot located on the Bull Lane Playing Fields in the London Borough of Enfield. The estimated regulated CO_2 savings for the site-wide masterplan (combined Application 1 & 2) are 90%.

This report assesses the predicted energy performance and carbon dioxide emissions for the proposed development that comprises Application 1, located in the London Borough of Haringey.

The proposed development comprises the demolition of all existing buildings comprising Selby Centre and the erection of four buildings ranging from four to six storeys. New buildings to comprise: 20,014 sqm (GIA), 22,565 sqm (GEA) of residential accommodation (Class C3), 91 sqm (GIA), 98 sqm (GEA) of ancillary commercial accommodation (Class E (a,b,g), car and cycle parking, new vehicle/ pedestrian and cycle routes, new public, communal and private amenity space and landscaping and all associated plant and servicing infrastructure.

In line with London Plan policy SI2 and Haringey Local Plan policy SP4, both the residential and non-residential part of the development would need to achieve a 'zero carbon' target for regulated CO_2 emissions against a Building Regulations (Part L 2021) compliant scheme, with 35% reduction as a minimum to be achieved on site.

The energy strategy outlined in this report has been done using the latest Building Regulations Part L 2021 methodology and SAP 10.2 emissions factors as per current GLA Guidance. These carbon emission factors reflect the grid decarbonisation of recent years and ensure that the assessment of new developments better reflect the actual carbon emissions associated with their expected operation.

The methodology used to determine the expected operational CO_2 emissions for the development is in accordance with the London Plan's three-step Energy Hierarchy (Policy SI2) and the CO_2 savings achieved for each step are outlined below:

BE LEAN – USE LESS ENERGY

The first step addresses reduction in energy demand, through the adoption of passive and active design measures.

The proposed energy efficiency measures include levels of insulation beyond Building Regulation requirements, low air permeability levels, efficient lighting as well as energy saving controls for space conditioning and lighting.

By means of energy efficiency measures alone, regulated CO_2 emissions are shown to reduce by:

Regulated CO_2 Savings at Be Lean Stage (SAP10.2) Application 1		
	%	t/yr
Domestic	31	62.2
Non-domestic	27	0.1
Combined (Application 1)	31	62.3

At the 'Be Lean' stage, the proposed development exceeds the GLA target of 10% regulated CO_2 emission reductions for the residential portion of the scheme, and a 15% reduction for the non-domestic portion of the scheme.

BE CLEAN – SUPPLY ENERGY EFFICIENTLY

The application site is located within an area where a district heat network is currently in operation and expanding, referred to as the Energetik Meridian Heat Network.

A site-wide heat network served by a single substation is proposed for the Selby Centre development for easy connection to the district heat network.

Regulated CO_2 Savings at Be Clean Stage (SAP10.2) Application 1		
	%	t/yr
Domestic	63	126.7
Non-domestic	42	0.2
Combined (Application 1)	63	126.9

BE GREEN – USE RENEWABLE ENERGY

The feasibility study carried out for the development identified photovoltaics as a suitable technology for supplying onsite energy to the development.

The incorporation of renewable technologies will results in the following CO_2 emissions savings:

Regulated CO_2 Savings at Be Green Stage (SAP10.2) Application 1		
	%	t/yr
Domestic	-4	-7.8
Non-domestic	-13	-0.1
Combined (Application 1)	-4	-7.8

CUMULATIVE ON-SITE SAVINGS

The overall regulated CO_2 savings on-site against a Part L 2021 compliant scheme are therefore:

Cumulative Regulated CO_2 Savings (SAP10.2) Application 1		
	%	t/yr
Domestic	91	181.1
Non-domestic	55	0.2
Combined (Application 1)	91	181.3

CARBON OFF-SETTING

The proposed development complies with the London Plan CO_2 on-site savings target of 35% overall.

With the SAP10.2 carbon factors, to achieve 'zero carbon' for the residential portion of the scheme, 18.9 tonnes per annum of regulated CO_2, equivalent to 567.4 tonnes over 30 years, should be offset offsite. The domestic carbon offset payment is £53,900. The shortfall to a zero-carbon reduction from the baseline for the non-domestic portion of the scheme would be 0.2 tonnes per annum of regulated CO_2, equivalent to 5.0 tonnes over 30 years. The non-domestic carbon offset payment is £502, totalling £54,400 for the Application 1 proposal.

Any carbon offset contributions will be subject to viability discussions and detailed design stage calculations.

BE SEEN

Following the implementation of the three previous stages of the hierarchy, a monitoring strategy will be put in place to ensure that the actual energy performance of the development can be monitored and reported post-occupation.

The relevant parties will also be made aware of their responsibilities at subsequent reporting stages.

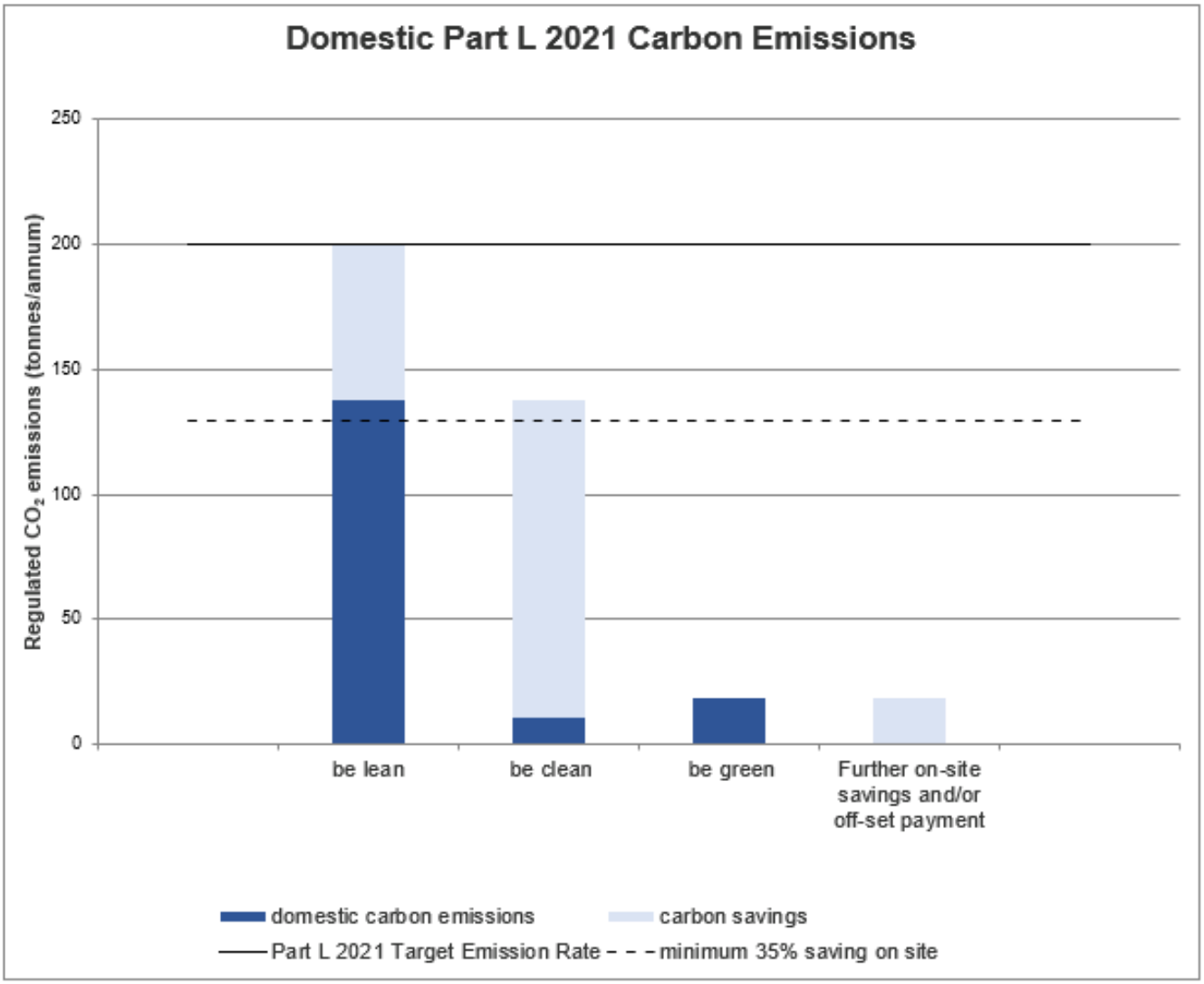


Figure 1: The Domestic Energy Hierarchy (SAP10.2 carbon factors) – Application 1.

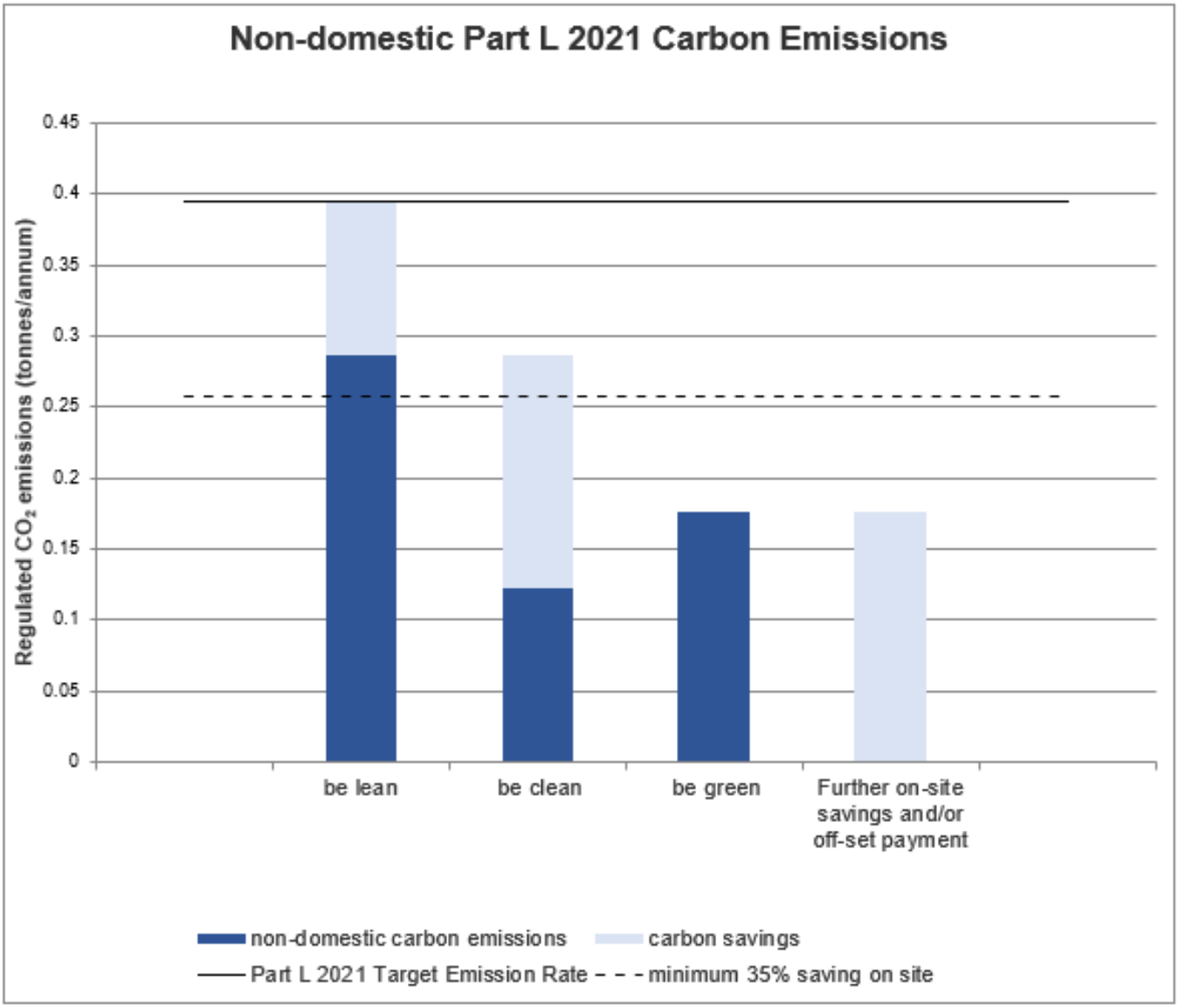


Figure 2: The Non-Domestic Energy Hierarchy (SAP10.2 carbon factors) – Application 1.

INTRODUCTION

This chapter presents the description of the site and of the development proposal, the energy policy framework and the methodology employed for the energy assessment.

SITE & PROPOSAL

The proposed Application 1 development is located at the existing Selby Centre in the London Borough of Haringey.

The project involves the demolition of all existing buildings comprising Selby Centre and the erection of four buildings ranging from four to six storeys. New buildings to comprise: 20,014 sqm (GIA), 22,565 sqm (GEA) of residential accommodation (Class C3), 91 sqm (GIA), 98 sqm (GEA) of ancillary commercial accommodation (Class E (a,b,g), car and cycle parking, new vehicle/ pedestrian and cycle routes, new public, communal and private amenity space and landscaping and all associated plant and servicing infrastructure.

The development is part of a wider masterplan, combining a separate planning application (Application 2) for the construction of a community centre and sports pavilion on an adjacent plot located on the Bull Lane Playing Fields in the London Borough of Enfield. A separate outline planning application (Application 3) has also been submitted for a sports centre adjacent to the sports pavilion.

The approximate location and boundary of the masterplan site is shown in 3 below.

Figure 3: Approximate location of SUV masterplan. Red boundary indicates Application 1 (London Borough of Haringey); Blue boundary indicates Application 2 (London Borough of Enfield).

POLICY FRAMEWORK

The proposal will seek to respond to the energy policies of the London Plan and of the policies within the London Borough of Haringey Local Plan.

The most relevant applicable energy policies in the context of the proposed development are presented below.

THE LONDON PLAN (2021)

The London Plan (2021) published 2nd March 2021 sets out the Mayor's overarching strategic spatial development strategy for greater London and underpins the planning framework from 2019 up to 2041. This document replaced the London Plan 2016.

The new Plan has a strong sustainability focus with many new policies addressing the concern to deliver a sustainable and zero carbon London, particularly addressed in chapter 9 Sustainable Infrastructure.

The following policies, related to Energy, are of relevance for the proposed development:

POLICY SI2 MINIMISING GREENHOUSE GAS EMISSIONS

This policy sets the requirements for all major developments to follow the energy hierarchy and achieve net-zero-carbon for both residential and non-residential schemes (via on-site carbon reductions and offset payments) and introduces new targets at Lean stage:

"...
This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:
1) be lean: use less energy and manage demand during operation
2) be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly
3) be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site
4) be seen: monitor, verify and report on energy performance.
..."

"...
A minimum on-site reduction of at least 35 per cent beyond Building Regulations is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:
1) through a cash in lieu contribution to the borough's carbon offset fund, or
2) off-site provided that an alternative proposal is identified and delivery is certain.
..."

This policy also sets the requirements to consider whole-life carbon emissions, including embodied carbon and unregulated emissions:

"...
Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.

Development proposals referable to the Mayor should calculate whole lifecycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.
..."

The policy supporting text provides additional clarifications on the requirements for major developments:

- Developments including major refurbishments should also aim to meet the net-zero carbon target.

- All developments should maximise opportunities for on-site electricity and heat production from solar technologies (photovoltaic and thermal), use innovative building materials and smart technologies.
- Recommendation to use SAP10 carbon factors as per GLA Energy Guidance.
- Recommended carbon offset price of £95 per tonne CO_2.
- Requirement for major developments to monitor and report operational energy performance to the GLA.

POLICY SI 3 ENERGY INFRASTRUCTURE

This policy requires all major developments within Heat Network Priority Areas will need to utilise a communal low-temperature heating system and follow the energy hierarchy to determine the most suitable system Where developments are utilising CHP this policy also requires them to demonstrate that 'the emissions relating to energy generation will be equivalent or lower than those of an ultra-low NOx gas boiler'. Any combustion on site should meet the requirements of part B of Policy SI1.

POLICY SI 4 MANAGING HEAT RISK

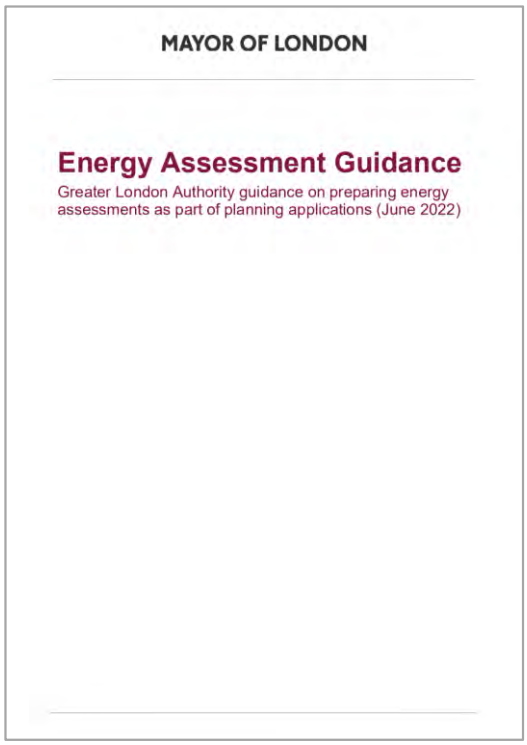
This policy requires:

A Development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.

B Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:
1) reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure
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) provide passive ventilation
5) provide mechanical ventilation
6) provide active cooling systems.

The London Plan also consists of a suite of guidance documents, such as the Energy Assessment Guidance: Greater London Authority guidance on preparing energy assessments as part of planning applications (June 2022)

GLA GUIDANCE ON PREPARING ENERGY ASSESSMENTS



This document (last updated in June 2022) provides guidance on preparing energy assessments to accompany strategic planning applications; it contains clarifications on Policy SI2, of the new London Plan, carbon reduction targets in the context of zero carbon policy, as well as detailed guidelines on the content of the Energy Assessments undertaken for planning.

The guidance document specifies the emission reduction targets the GLA will apply to applications as follows:

> *"Major developments are required to achieve net zero-carbon by following the energy hierarchy (Policy SI 2). This means that regulated carbon emissions should be reduced so they are as close as possible to zero. Once on-site reductions have been maximised, the residual emissions should be offset via a payment into the relevant borough's carbon offset fund.*
> *Major developments are required to achieve a minimum 35 per cent on-site carbon reduction over Part L 2021. ..."*
> *"... If the net zero-carbon target cannot be met on site and the GLA and the relevant borough is satisfied that on-site savings have been maximised, then the annual remaining carbon emissions figure is multiplied by the assumed lifetime of the development's services (e.g. 30 years) to give the cumulative shortfall. The cumulative shortfall is multiplied by the carbon dioxide offset price to determine the required cash-in-lieu contribution. ..."*

The new guidance also includes changes to technical requirements relating to the use of updated carbon factors, cost estimates, overheating risk analysis, the structure of the heating hierarchy and scrutiny over the performance of heat pumps. The guidance also provides information on how the new stage of the energy hierarchy 'be seen' is expected to be carried out in energy assessments, which includes calculating the unregulated carbon emissions.

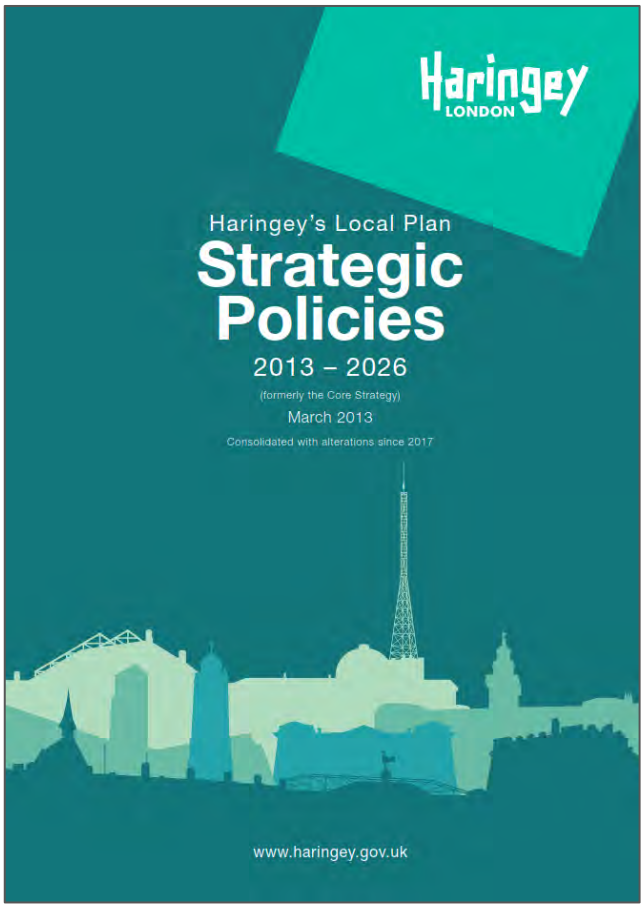
The structure of this report and the presentation of the carbon emission information for the development follows the guidance in this document.

HARINGEY'S LOCAL PLAN: STRATEGIC *POLICIES (2013)*

Policy SP4 Working Towards a Low Carbon Haringey

Over the life time of the Local Plan, reducing energy use in buildings and working towards a low carbon borough will be one of the key challenges facing Haringey. The Council will promote the measures outlined below to reduce carbon emissions from new and existing buildings.

1. In line with London Plan policy, the Council will promote and require all new developments to take measures to reduce energy use and carbon emissions during design, construction and occupation, by incorporating the following measures:
   a. From 2011 onwards, all new residential development will achieve a minimum 25% reduction in total (regulated) CO2 emissions in line with Code for Sustainable Homes Level 4 energy standards, and should aim to achieve Level 6. All new residential development shall be zero carbon from 2016 onwards; and
   b. From 2011 onwards all new non-residential development shall be built to at least BREEAM "very good" standard and should aim to achieve BREEAM "excellent" or the current nationally agreed standard. All new non-residential development shall be zero carbon from 2019.
2. The Council will promote low- and zero-carbon energy generation through the following measures:
   a. Requiring all developments to assess, identify and implement, where viable, site-wide and area-wide decentralised energy facilities including the potential to link into a wider network;
   b. Establishing local networks of decentralised heat and energy facilities by requiring developers to prioritise connection to existing or planned networks where feasible;
   c. Working with neighbouring boroughs and other partners to explore ways of implementing sub-regional decentralised energy networks including the potential in the Upper Lee Valley Opportunity Area; and
   d. All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from on site renewable energy regeneration, which can include connections to local sources of decentralised renewable energy.



HARINGEY'S LOCAL PLAN: *DEVELOPMENT MANAGEMENT DPD (2017)*

Policy DM21 Sustainable Design, Layout and Construction

A. All new development, including building and landscape works, will be expected to consider and implement sustainable design, layout and construction techniques. Proposals should:
   a. Apply the energy hierarchy to minimise energy use in order to meet, and if possible exceed, minimum carbon dioxide reduction requirements;

   b. Apply the cooling hierarchy to reduce the potential for overheating and limit reliance on mechanical air conditioning systems;
   c. Maximise opportunities to enhance biodiversity on-site, including through appropriate landscaping, Sustainable Drainage Systems, living roofs and green walls
   d. Wherever possible, use building materials with high environmental performance ratings; and
   e. Seek opportunities for locally sourced labour.

B. The Council will support appropriate measures to sustainably retrofit existing homes and non-residential buildings.
C. Proposals that fail to demonstrate adequate consideration for sustainable design, layout and construction techniques will be resisted.
D. Consideration will be given to the use of carbon offset payments, to be secured by planning obligations, where it can be demonstrated that proposals are unable to meet carbon dioxide emission reduction targets on-site.

Policy DM22 Decentralised Energy

A. Subject to other policy requirements, proposals that contribute to the provision and use of Decentralised Energy network infrastructure will be supported.

Communal energy systems

B. All development that incorporates site-wide communal energy systems should examine opportunities for extending such systems, irrespective of whether it is connected to a DE network.
C. All development that incorporates site-wide communal energy systems should optimise opportunities for extending such systems beyond the site boundary to supply energy to neighbouring existing and planned future developments.

Existing and planned future DE networks

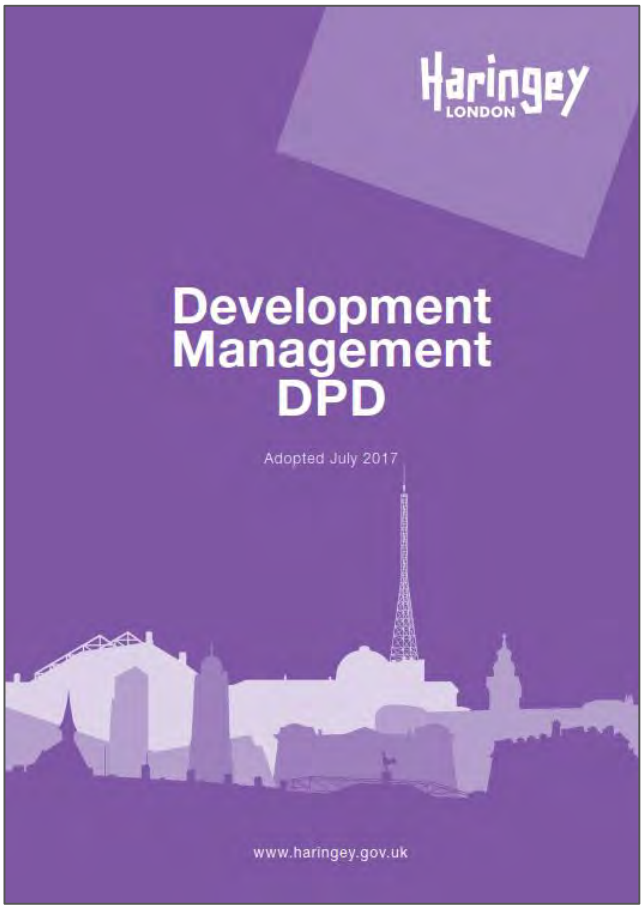
D. All development proposals should prioritise connection to existing or planned future DE networks.
E. All major development located within 500 metres of an existing DE Network, and minor new-build development located within 25 metres, will be expected to secure connection to that network subject to demonstration of technical feasibility and financial viability.
F. All major development located within 500 metres of a planned future DE Network, which is considered by the Council likely to be operational within 3 years of a grant of planning permission, will be expected to secure connection to that network subject to demonstration of technical feasibility and financial viability.

DE network 'connection zones'

G. All major development located within 500 metres of a DE network 'connection zone' should be designed for connection to a DE network.
H. All minor new-build development located within 25 metres of a DE network 'connection zone' should be designed for connection to a DE network.

Customer charters

I. Where site-wide communal and district heating systems are operational, the Council will strongly encourage heat and energy service providers to enter into customer charters with domestic and micro-business customers.



METHODOLOGY

The sections below present the methodology followed in determining the on-site and off-site carbon savings for the proposed scheme.

ON-SITE CARBON SAVINGS – THE ENERGY HIERARCHY

The methodology employed to develop the energy strategy for the scheme and achieve on-site carbon savings is in line with the GLA's *Guidance on preparing energy assessments* and is as follows:

The baseline CO_2 emissions are first established, i.e. the emissions of a scheme that is compliant with Part L 2021 of the Building Regulations.

The software used to model and calculate the energy performance and carbon emissions of the domestic element is Elmhurst Design SAP 10 and IES VE Compliance ApacheSim for the non-domestic element. The emissions of the domestic element are established by modelling representative dwelling types and multiplying the Target Emission Rate (TER) of each type with the cumulative floor area for that type to establish the total emissions for the domestic element of the proposal. Similarly, the TER for each non-domestic element is multiplied by its floor area to establish the total emissions.

The same approach is followed to determine the energy performance and CO_2 emissions of the proposed scheme for each of the steps of the Energy Hierarchy. The CO_2 emissions are estimated based on the SAP Dwelling Emission Rate (DER) and ApacheSim Building Emission Rate (BER) figures for the domestic and non-domestic elements respectively. The Energy Hierarchy aims at delivering significant carbon savings on-site.

The three consecutive steps of the Energy Hierarchy are:

- Be Lean whereby the demand for energy is reduced through a range of passive and active energy efficiency measures; as part of this step the Cooling Hierarchy (see Policy SI4) is implemented and measures are proposed to reduce the demand for active cooling;

- Be Clean whereby as much of the remaining energy demand is supplied as efficiently as possible (e.g. by connecting to a district energy network or developing a site-wide energy network), and,
- Be Green whereby renewable technologies are incorporated to offset part of the carbon emissions of the development. The uptake of renewable technologies is based on feasibility and viability considerations, including their compatibility with the energy system determined in the previous step.

The implementation of the Energy Hierarchy determines the total regulated carbon savings that can be feasibly and viably achieved on site.

The % improvement against the baseline emissions is compared to the relevant targets for each element and in case of a shortfall, savings through off-site measures should be achieved.

OFF-SITE CARBON SAVINGS – CARBON OFFSETTING

The GLA and the London Borough of Haringey have an established provision to ensure that the shortfall in carbon savings is met off-site; this comprises a carbon offset payment with a figure of £95/tonne for a period of 30 years.

The cash in lieu contribution for the domestic and non-domestic elements of the proposal is calculated and summed to provide the total carbon offset payment to be made to the Council.

The structure of the main body of the assessment follows the Methodology presented above and comprises the sections:

- Be Lean;
- Be Clean;
- Be Green.

The Conclusions section summarises the energy strategy and associated carbon savings for the proposed development.

BE LEAN – USE LESS ENERGY

The Application 1 proposals incorporate a range of passive and active design measures that will reduce the energy demand for space conditioning, hot water and lighting. Measures will also be put in place to reduce the risk of overheating. The regulated carbon saving achieved in this step of the Energy Hierarchy is 31% over the baseline level.

In line with GLA guidance (2022), for the 'Be Lean' stage SAP calculations gas-boilers with gross efficiency of 89.5% have been included for space heating and hot water for all residential spaces within the scheme.

For the non-domestic space, a district heat network has been assumed for space heating and hot water, with a carbon factor of 0.23 $kgCO_2/kWh$ and a primary energy factor of 1.05 kWh_{PE}/kWh, as per NCM modelling guidance for a new heat network.

PASSIVE DESIGN MEASURES

ENHANCED U-VALUES

The heat loss of different building fabric elements is dependent upon their U-value. A building with low U-values provides better levels of insulation and reduced heating demand during the cooler months.

The proposed development will incorporate high levels of insulation and high-performance glazing beyond Part L 2021 targets, in order to reduce the demand for space heating and cooling.

The tables to the right demonstrate the improved performance of the proposed building fabric beyond the Building Regulations requirements for both domestic and non-domestic uses.

Table 1: Thermal Envelope U-values

Domestic (U-values in $W/m^2.K$)			
Element	Building Regulations	Proposed	Improvement
Walls	0.26	0.15	42%
Floor	0.18	0.10	44%
Roof	0.16	0.10	38%
Windows	1.6; g-value 0.5	1.20; g-value 0.5	25%
Doors	1.6	1.0	38%

Non-domestic (U-values in $W/m^2.K$)			
Element	Building Regulations	Proposed	Improvement
Walls	0.26	0.15	42%
Floor	0.18	0.10	44%
Windows	1.6; g-value 0.4	1.20; g-value 0.4	25%
Doors	1.6	1.0	38%

AIR PERMEABILITY IMPROVEMENT

Heat loss may also occur due to air infiltration. Although this cannot be eliminated altogether, good construction detailing and the use of best practice construction techniques can minimise the amount of air infiltration.

The proposed development will aim to improve upon the Part L 2021 minimum standards for air permeability by targeting a rate of $3m^3/m^2.h$ at 50Pa for all new build residential units and $3m^3/m^2.h$ at 50Pa for the non-domestic unit.

THERMAL BRIDGING

Thermal bridging can cause significant heat loss within buildings, whereby junctions between insulated building fabric elements provide less thermal resistance than the surrounding envelope. While repeating thermal bridges such as timber studs, rafters and wall ties are accounted for within u-value calculations, linear thermal bridges such as floor junctions, corners, roof junctions and window reveals must be included separately within the SAP and SBEM calculations.

Heat loss from linear thermal bridges is known as the Psi-value (Ψ). Psi-values can be obtained through the modelling of specific junctions based on the proposed construction details, measured in W/mK. The cumulative impact of the total heat loss expected from all the thermal bridges combined is known as the y-value. The Building Regulations Part L 2021 uses a reference y-value of 0.08 for the notional building.

The proposed development will aim to exceed the Part L 2021 target by achieving a y-value of 0.04-0.08 for each dwelling on average, and this figure has been used within the calculations accordingly. The proposing of materials and elements that can significantly improve the Ψ value of junctions, such as hi-therm lintels and thermal breaks, will be investigated due to the impact they can have on the overall y-value.

As the technical design of the building fabric is developed, consideration will be given to thermal bridges, and detailed modelling of the junctions will be carried out early on to ensure that these targets can be achieved.

FABRIC ENERGY EFFICIENCY

The predicted performance of the dwellings was also assessed based on comfortable internal temperatures being maintained. The energy demand of the dwelling per square metre is represented by the Dwelling Fabric Energy Efficiency (DFEE) and in order to reach Part L1A compliance this must not exceed the Target Fabric Energy Efficiency (TFEE). In Table 2 below a summary of the findings from the assessment is presented and demonstrates that the DFEE does not exceed the TFEE.

Table 2: Area Averaged Target and Dwelling Fabric Energy Efficiency for the residential portion of the scheme

Fabric Energy Efficiency		
TFEE ($kWh/m^2.yr$)	DFEE ($kWh/m^2.yr$)	Improvement
33.20	29.93	12.9%

REDUCING THE NEED FOR ARTIFICIAL LIGHTING

The development has been designed to maximise daylight in all habitable spaces as a way of improving the health and wellbeing of its occupants.

All of the habitable areas will benefit from large areas of glazing to increase the amount of daylight within the internal spaces where possible. This is expected to reduce the need for artificial lighting whilst delivering pleasant, healthy spaces for occupants.

GLAZING PERCENTAGE

The glazing percentages for the development are as follows:

Table 3: Percentage of glazed area for each façade orientation for the proposed development

Glazed Area Percentage			
Orientation	Total Façade Area (m^2)	Glazed Area (m^2)	Glazed Area (%)
North	3942.8	905.8	23.0%
East	4323.9	835.1	19.3%
South	3899.1	783.0	20.1%
West	4202.1	713.1	17.0%

ACTIVE DESIGN MEASURES

HIGH EFFICACY LIGHTING

The development intends to incorporate low energy lighting fittings throughout the residential and non-residential spaces. All light fittings will be specified as low energy lighting, and will accommodate LED, compact fluorescent (CFLs) or fluorescent luminaires only.

HEAT RECOVERY VENTILATION

Mechanical ventilation with heat recovery (MVHR) is proposed for both the residential and non-residential portions of the development. The mechanical ventilation system will include heat recovery in order to achieve ventilation in the most energy-efficient way. The residential units include openable windows to provide occupants with the option to naturally ventilate spaces.

CONTROLS

Advanced lighting and space conditioning controls will be incorporated, specifically:

- For residential communal and non-residential areas of infrequent use, occupant sensors will be fitted for lighting, whereas day lit areas will incorporate daylight sensors where appropriate;
- Heating controls in dwellings will comprise of a charging system linked to the use of community heating and programmers; and,
- Space conditioning in the non-domestic areas will be controlled by local time control and local temperature control.

MONITORING

In addition to the above design measures, the development will incorporate monitoring equipment and systems to enable occupiers to monitor and reduce their energy use.

Smart meters will be installed to monitor the heat and electricity consumption of each dwelling; the display board will demonstrate real-time and historical energy use data and will be installed at an accessible location within the dwellings.

MINIMISING OVERHEATING

The potential risk of overheating will be mitigated by incorporating passive and active design measures, in line with the London Plan Policy SI4 and the Cooling Hierarchy, as follows.

THE COOLING HIERARCHY

REDUCING THE AMOUNT OF HEAT ENTERING THE BUILDING IN SUMMER

External shading elements, such as balconies and overhangs, integrated across the elevations shall significantly reduce solar gains into occupied spaces. The team has also incorporated increased recesses across all facades. Internal blinds may be included to further reduce the amount of heat entering the building.

MINIMISING INTERNAL HEAT GENERATION THROUGH ENERGY EFFICIENT DESIGN

The distribution of heat infrastructure within the residential parts of the development will be designed to reduce the lateral pipework lengths within the internal spaces to reduce heat loss. Heat sources and pipework will be sufficiently insulated (following CIBSE CoP1 guidelines).

USE OF THERMAL MASS AND HIGH CEILINGS TO MANAGE THE HEAT WITHIN THE BUILDING

During peak summer periods the thermal mass of the building will absorb and store excess heat. The building will release its heat in the cooler evenings to allow for cooler internal spaces dampening the peak diurnal weather conditions. This strategy is applicable to KDLs, but not on bedrooms.

PASSIVE VENTILATION

Passive ventilation will be employed as the main strategy for dissipating heat across the development, with the exception of areas deemed most likely to be exposed to excessive noise and solar gains.

MECHANICAL VENTILATION

Mechanical ventilation with heat recovery will be employed as the main strategy for providing fresh air across the development. The MVHR will be capable of operating in a summer bypass mode allowing for the dissipation of any heat build-up during peak summer conditions.

OVERHEATING RISK ASSESSMENT

An overheating assessment was undertaken for a representative sample of dwellings in line with Part O, CIBSE TM59/49 methodology and Haringey's Local Plan for the domestic portions of the development. Dynamic thermal modelling was conducted using three design weather years, also accounting for climate change scenarios.

All habitable residential rooms assessed at the proposed Selby Centre Development (Application 1) were found to meet the Part O overheating risk criteria for the London Weather Centre DSY1 weather data (2020 High 50 Percentile) when incorporating a combination of natural ventilation and solar control measures in the design. Due to noise restrictions, an analysis has also been undertaken assuming all windows are able to open to a maximum of 10% of the floor area, other than the windows to the eastern facade of Block 5 which must remain closed overnight. The design incorporates solar control glazing, external shading and efficient lighting to minimise the risk of overheating.

The Overheating Assessment can be seen in full in Appendix A – Overheating Risk Assessment.

ACTIVE COOLING PROPOSALS

Based on the above, active cooling is not proposed for the development. The trim cooling system is designed to reduce the need for active cooling.

BE LEAN CO_2 EMISSIONS

At the 'Be Lean' stage, the proposed development meets the GLA target of 10% regulated CO_2 emission reductions for the residential portion of the scheme, and 15% for the non-domestic portion of the scheme.

Table 4: Be Lean CO_2 Savings

Regulated CO_2 Savings at Be Lean Stage (SAP10.2)		
	%	t/yr
Domestic	31	62.2
Non-domestic	27	0.1
Combined (Application 1)	31	62.3

Energy cost to residents is also reduced through the implementation of energy efficiency measures outlined within this section.

BE CLEAN – SUPPLY ENERGY EFFICIENTLY

It is proposed for the development to connect to the Energetik Meridian Heat Network to supply all heating and hot water demand for the residential units. The regulated carbon saving achieved in this step of the Energy Hierarchy is 63% over the site-wide baseline level.

ENERGY SYSTEM HIERARCHY

The energy system for the development has been selected in accordance with the London Plan decentralised energy hierarchy. The hierarchy listed in Policy SI3 states that energy systems should consider:

1. Connection to existing heating and cooling networks;
2. Site-wide CHP network; and,
3. Communal heating and cooling.

Local heat and power sources minimise distribution losses and achieve greater efficiencies when compared to separate energy systems, thus reducing CO_2 emissions.

In a communal energy system, energy in the form of heat, cooling, and/or electricity is generated from a central source and distributed via a network of insulated pipes to surrounding residences.

CONNECTION TO AN EXISTING OR PROPOSED NETWORK

The London Heat Map identifies existing and potential opportunities for decentralised energy projects in London. It builds on the 2005 London Community Heating Development Study.

An excerpt from the London Heat Map can be seen on the following page which shows the energy demand for different areas. Darker shades of red signify areas where energy demand is high. The map also highlights any existing and proposed district heating networks within the vicinity of the development.

A review of the map shows that the Merdian Heat Network is in the vicinity of the development (within 600m). A sitewide district heating substation layout can be found in Appendix E – Energy Centre Layout and outline district heat network layout.

Following discussions with Energetik, and Haringey Council, for the purpose of carbon emission calculations, the heat network has been assumed as a new network. As the Merdian Heat Network is a low carbon network with energy generated from waste incineration, the carbon factor associated with the network is low (approx. 0.025 accounting for primary and secondary heat losses). If the network is assumed as existing in SAP and ApacheSim, the notional building will have the same low carbon factor, essentially penalising the low carbon Merdian Heat Network. Part L states *"... the notional building used to calculate the target primary energy rate and target emission rate can* [i.e. not must] *use the same primary energy and CO2 emission factors for the heat and hot water delivered to the dwelling...".* Additionally, SAP 10.2 states *"Assessors may optionally use the existing heat network approach as defined in section 1.7 of the Approved Document L 2021 edition if the heat network was in place before 15 June 2022. The option must be used consistently in all systems if selected. Minimum performance requirements from building regulations for existing heat networks apply.".* Both statements imply that heat networks being treated as 'existing' is optional; instead, networks such as the Merdian Heat Network can be treated as 'new' if done consistently throughout the assessment process.

CORRESPONDENCE WITH PROVIDER

The energy provider Energetik has confirmed that the proposed scheme would be able to connect to the network. Correspondence with Energetik has also confirmed that connection to the network would be realistically viable in line with the current programme of the proposed development. Energetik have provided a carbon factor and primary energy factor in line with SAP10.2 reference values for waste heat from a power station. The distribution loss factor has been calculated as 1.27. Please refer to Appendix G – Distribution Loss Factor for the full calculation.

Although the network provider has confirmed the Meridian Heat Network will provide heat to the site in-line with the proposed construction schedule, a temporary boiler strategy has been produced if connection to the heat network is not available when required. Please refer to Appendix H – Location of Temporary Boilers for a layout of the temporary boiler locations.

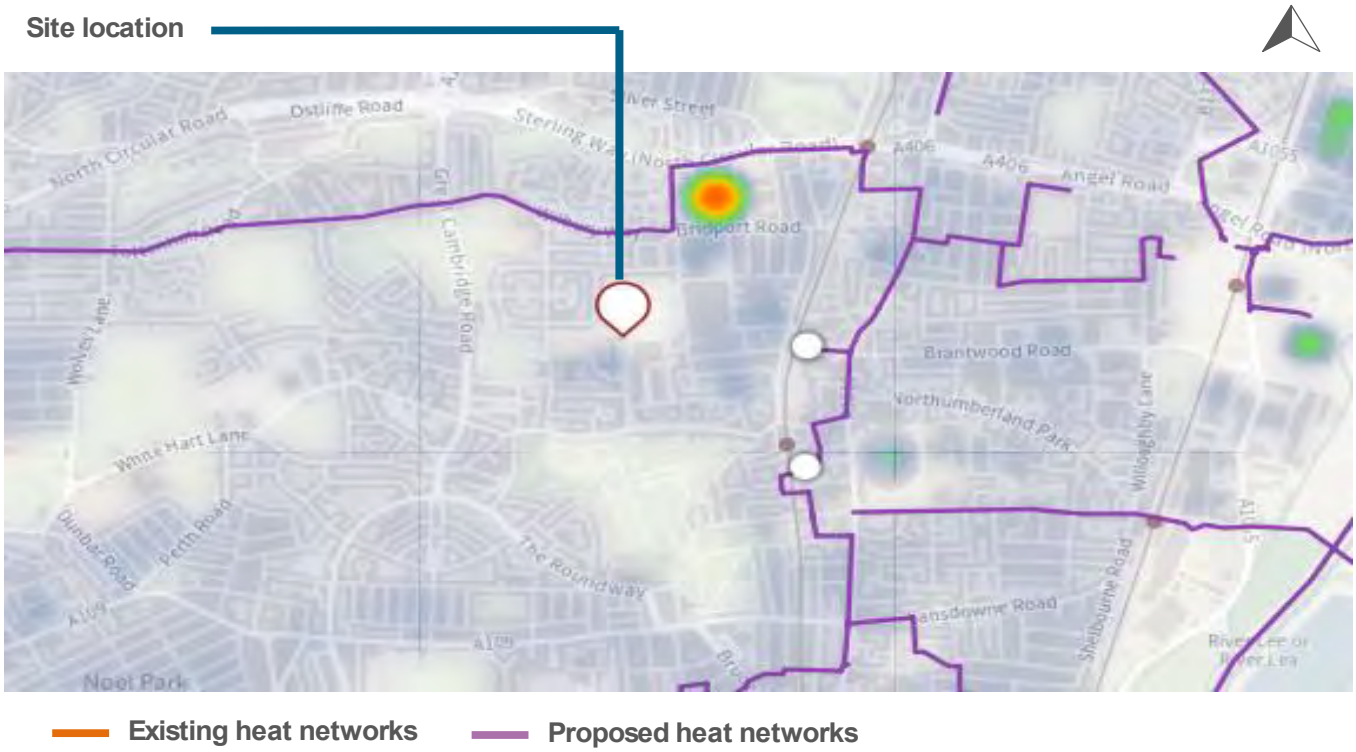


Figure 4: Excerpt from the London Heat Map.

BE CLEAN CO2 EMISSIONS

Through connection to the Meridian Heat Network, regulated CO_2 emissions for the proposed development will be further reduced over the Be Lean stage.

Table 5: Be Clean CO_2 Savings

Regulated CO_2 Savings at Be Clean Stage (SAP10.2)		
	%	t/yr
Domestic	63	126.7
Non-domestic	42	0.2
Combined (Application 1)	63	126.9

BE GREEN – USE RENEWABLE ENERGY

The renewable technologies feasibility study carried out for the development identified photovoltaics as a suitable technology for the development. The regulated carbon saving achieved in this step of the Energy Hierarchy is -3% over the Application 1 site-wide baseline level.

RENEWABLE TECHNOLOGIES FEASIBILITY STUDY

Methods of generating on-site renewable energy (Green) were assessed, once Lean and Clean measures were taken into account.

The development of the Selby Centre site will benefit from an energy efficient building fabric which will reduce the energy consumption of the proposed development in the first instance. Low carbon heating and hot water will be provided via connection to the Merdian Heat Network. A range of renewable technologies were subsequently considered including:

- Biomass;
- Ground/water source heat pumps;
- Air source heat pump;
- Wind energy;
- Photovoltaic panels, and,
- Solar thermal panels.

In determining the appropriate renewable technology for the site, the following factors were considered:

- CO_2 savings achieved;
- Site constraints;
- Any potential visual impacts, and,
- Compatibility with the 'Clean' stage proposals.

RENEWABLE ENERGY APPRAISAL SUMMARY

The table below summarises the factors taken into account in determining the appropriate renewable technologies for this project. This includes estimated capital cost, lifetime, level of maintenance and level of impact on external appearance. The final column indicates the feasibility of the technology in relation to the site conditions (10 being the most feasible and 0 being infeasible). It is important to note that the information provided is indicative and based upon early project stage estimates.

The feasibility study demonstrates that photovoltaics would be the most feasible renewable technology for the proposed Selby Centre development. Detailed assessments for the proposed technology can be found in the following sections.

Table 6: Summary of renewable technologies feasibility study.

		Comments	Lifetime	Maintenance	Impact on external appearance	Site feasibility
Biomass		Not adopted – burning of wood pellets releases high NOx emissions and there are limitations for their storage and delivery within an urban location.	20 yrs.	High	High	2
PV		Adopted. See detailed assessment in following section of report.	25 yrs.	Low	Med	10
Solar thermal		Not adopted – PV is deemed more feasible and roof space has been maximised to include PV. DHW provided by low carbon district heat network (DHN).	25 yrs.	Low	Med	4
GSHP		Not adopted – the installation of ground loops requires significant space, additional time at the beginning of the construction process and very high capital costs.	20 yrs.	Med	Low	3
ASHP		Not adopted – heating and hot water to be provided by connection to DHN.	20 yrs.	Med	Med	7
Wind		Not adopted – wind turbines located at the site will have a significant visual impact on the site and surroundings.	25 yrs.	Med	High	2

DETAILED ASSESSMENT OF PHOTOVOLTAIC PANELS

Four types of solar cells are available on the market at present and these are mono-crystalline, poly-crystalline, thin film and hybrid panels. Although mono-crystalline and hybrid cells are the most expensive, they are also the most efficient with an efficiency rate of 12-20%. Poly-crystalline cells are cheaper but they are less efficient (9-15%). Thin film cells are only 5-8% efficient but can be produced as thin and flexible sheets.

Photovoltaics are considered a suitable technology for this development for the following reasons:

- The development provides an extent of roof space for the installation of PV panels;
- PV arrays are relatively easy to install when compared to other renewable systems; and
- PV panels provide a significant amount of CO_2 savings.

The PV shall comprise 229kWp (approx. 1039m^2) of horizontal roof mounted arrays; 22% efficient modules. The PV array will be connected to the domestic part of the development (landlord areas).

Although ample PV has been provided, the savings are in comparison to a notional building which contains a greater provision of PV than the proposed development. A majority of the savings for the project generated at Be Clean stage, however the PV allocation has been maximised across the roofscape of the proposals within Application 1 of the Selby Urban Village Project. Although the site will realise benefits with respect to energy consumption reduction from PV, these are just not reflected in the regulated carbon savings for the reasons mentioned above.

An indicative area for the installation of the PV panels on the roof can be found on the following page.

The performance and output of the PV system will be monitored, in line with the Be Seen policy.

Table 7: Summary of technical/operational data and estimated CO_2 savings for PVs

Photovoltaics – Application 1		
Array area – domestic	1039	m^2
Module peak power	430	W
Collector orientation	South	
Carbon intensity of electricity	0.136	$kgCO_2/kWh$
Predicted site solar energy	912.0	$kWh/m^2.yr$
Losses	20	%
System peak power	229.0	kWp
Primary electricity offset by PV array	86,827	kWh/yr.
Total CO_2 savings	-	$tCO_2/yr.$
Regulated baseline CO_2 emissions	200.3	$tCO_2/yr.$
% Regulated CO_2 reduction from site-wide baseline	-	%

Figure 5: Monocrystalline PV arrays

Figure 6. Proposed PV layout for the Selby Centre development.

BE GREEN CO_2 EMISSIONS

Through the integrated performance of the proposed measures at each step in the Energy Hierarchy, the development exceeds the relevant London Plan and London Borough of Haringey policies. The figures at the Be Green stage are presented below:

Table 8: Be Green CO_2 Savings

Regulated CO_2 Savings at Be Green Stage (SAP10.2)		
	%	t/yr
Domestic	-4	-7.8
Non-domestic	-13	-0.1
Combined (Application 1)	-4	-7.8

It is worth noting that the negative savings presented for the Be Green stage are not in error. Although ample PV has been provided, the savings are in comparison to a notional building which contains a greater provision of PV than the proposed development.

Often air source heat pumps are introduced at Be Green stage and these contribute a majority proportion of the savings at this stage. The GLA and London Borough of Haringey prioritise a connection to DHN which the proposal is seeking to do, leading to a majority of the savings for the project generated at Be Clean stage.

In summary, the PV allocation has been maximised across the roofscape of the proposals within Application 1 of the Selby Urban Village Project. Although the site will realise benefits with respect to energy consumption reduction from PV, these are just not reflected in the regulated carbon savings for the reasons mentioned above.

PREDICTED ENERGY FIGURES

This section presents the metrics used to evaluate the predicted energy performance of the development: energy use intensity (EUI), space heating demand (SHD), and primary energy rate for the dwelling and notional buildings (DPER/TPER).

ENERGY USE INTENSITY (EUI) & SPACE HEATING DEMAND

The GLA Guidance on preparing energy assessments indicates that space heating demand and EUI should be reported. The target values for these metrics, found in the table below, have been developed by the Low Energy Transition Initiative (LETI), and are supported by other industry bodies (RIBA, UKGBC, CIBSE, CCC).

EUI and Space Heating Demand Targets		
Building type	Energy Use Intensity (kWh/m^2.yr)	Space Heating (kWh/m^2.yr)
Residential	35	15
Office	65	15
School	55	15
Hotel	55	15
All other non-residential	55	15

Space heating demand measures fabric efficiency, indicating the energy needed to heat a development, regardless of the heating system efficiency.

EUI is a measure of regulated and unregulated energy consumption of the proposed development, which considers the efficiencies of space conditioning technology, but excludes offset from PV. EUI can be defined as follows:

"Energy Use Intensity (EUI) is a measure of the total energy consumed in a building annually. It includes both regulated (fixed systems for lighting, heating, hot water, air conditioning and mechanical ventilation) and unregulated (cooking and all electrical appliances, and other small power) energy. It does not include energy use from electric vehicle charging or any reduction in EUI due to renewable energy generation on-site. EUI should be expressed using gross internal area (GIA)." (Energy Assessment Guidance, 2022, GLA).

The EUI and space heating demand figures for this assessment are calculated in accordance with the SAP and Part L methodologies.

The following table summarises the predicted EUI and space heating demand for the proposed development.

Residential Predicted EUI and Space Heating Demand		
Building type	Energy Use Intensity (kWh/m^2.yr)	Space Heating (kWh/m^2.yr)
Residential	85.6	11.1
Non-Domestic Predicted EUI and Space Heating Demand		
Building type	Energy Use Intensity (kWh/m^2.yr)	Space Heating (kWh/m^2.yr)
Commercial	45.9	8.4

The EUI for the residential units exceeds the target value. However, the EUI includes a significant amount of unregulated energy use, partly determined by occupant behaviour and appliance use, and is difficult to accurately predict. The current calculation of the unregulated energy use is based on simplistic assumptions used in the BREDEM methodology, which overestimates the energy usage, does not account for energy efficient white good and assumes long hours of usage which often does not match operation in reality. It is proposed that energy efficient white goods

are fitted in the units and occupants are provided with guidance on how to reduce energy consumption. Additionally, although the Meridian Heat Network has a low carbon factor resulting in low site-wide emissions, DHNs must be modelled with a system efficiency of 100%, much less than alternative low-carbon energy sources, impacting the associated energy consumption and EUI.

PRIMARY ENERGY RATE (DPER/TPER)

The Primary Energy Rating, equally to the EUI, encapsulates all of the estimated energy consumption for the development, but adds a factor to account for the primary source of that energy (e.g. power plant), and transmission from there to the building.

The DPER following all Be Lean, Be Clean, and Be Green measures for the proposed development, performs well against the target primary energy rate (TPER), with an improvement of 92%.

Primary Energy Rate		
TPER ($kWh_{PE}/m^2.yr$)	DPER ($kWh_{PE}/m^2.yr$)	Improvement
63.87	5.07	92%

ESTIMATION OF OPERATIONAL FUEL COSTS

This section provides an early-stage estimation of the operation costs of the development from an energy perspective.

OPERATIONAL COSTS

The annual estimated operational fuel cost predictions associated with the development as a whole using SAP and SBEM methodologies are outlined in the table below.

It should be appreciated that the operational fuel costs presented in this report are solely based on Building Regulations Part L compliance calculations carried out at early design stage. These estimations do not necessarily reflect the actual operational costs, and do not take into consideration occupant behaviour and account for costs associated with un-regulated energy use.

The site-wide unit cost of heat supplied by the Meridian Heat Network was previously confirmed as 0.085 £/kWh, although this figure was only applicable until 31st March 2024. Discussions on the pricing arrangement and unit cost of heat delivered to the site are on-going with the network provider.

Table 9. Estimated operational fuel cost for the Selby Centre development

		Unit
Space heating energy demand	177,863	kWh/year
Hot water energy demand	674,943	kWh/year
Other electricity consumption	79,540	kWh/year
Per unit cost – DHN heat	0.085	£/kWh
Per unit cost - electricity	0.180	£/kWh
Total annual operational energy fuel cost	86,806	£/year

FLEXIBILITY AND PEAK ENERGY DEMAND

The potential for demand side flexibility has been investigated for the proposed development, with an aim to reduce peak energy consumption.

The proposed development has applied demand side flexibility measures such as: installation of smart meters and minimising peak energy demand. Additionally, the installation of PV will directly supply the residential units with electricity, reducing the demand on the wider grid.

The following tables show a summary of site-wide peak demand, capacity and flexibility potential, and some description of the measures applied at the scheme.

Table 10: Summary of site-wide peak demand, capacity and flexibility potential

	Electrical	Heat	Enabled through:
Estimate peak demand (MW)	Block 8 = 250kVA Block 7 = 266kVA Block 6 = 563kVA Block 5 = 475kVA	0.867 MW Diversified Space Heat Demand = 304 kW Diversified Domestic Hot Water Demand = 528 kW Commercial heating load Plot 7 = 35kW	The estimated peak demand has been calculated based on the following approach and assumptions: • 202 residential dwellings • Varme Stabe Diversity factor of 0.622 applied to Space Heating Load • Danish DS439 diversity factor of 0.069 applied to Domestic Hot Water Load
Available capacity (MW)	-	>1 MW	Large capacity available in local Energetik heat network
Flexibility potential (MW)	-	0.423 MW	3000L Thermal Storage to be used to store 10mins of Peak DHW Water Demand. DHW load to be revised to 1hr reheat of 3000L store = 105kW Flexibility potential = 528kW – 105kW = 423kW
Revised peak demand (MW)	Block 8 = 188kVA Block 7 = 199kVA Block 6 = 292kVA Block 5 = 277kVA	0.488 MW	= (Diversified Heat Load + Revised DHW Load + Commercial Load) x 1.1 to allow for 10% safety margin
Percentage flexibility predicted (%)	-	100%	Revised peak demand of 488kW submitted and agreed with Energetik. Demand is not expected to exceed this figure

Table 11: Summary of interventions for achieving flexibility

Flexibility achieved through:	Yes/No	Details
Electrical energy storage (kWh) capacity	No	-
Heat energy storage (kWh) capacity	Yes 88 kWh	3000L Thermal Store to be used. Sized to meet 10mins of Peak DHW Load (528 kW) 10mins of 528 kW = 528 * 10/60 = 88 kWh 88kWh of Heat Stored
Renewable energy generation (load matching)	Yes	229kWp of PV
Gateway to enable automated demand response	No	-
Smart systems integration (e.g. smart charge points for EV, gateway etc)	Yes	EVC points / system with load balancing integrated into units
Other initiative	-	-

CONCLUSIONS

Following the implementation of the three-step Energy Hierarchy, the cumulative CO_2 savings on site are estimated at 91% for the domestic part and 55% for the non-domestic part of the development, against a Part L 2021 compliant scheme. The regulated CO_2 savings for the site are 91%.

ON SITE CO_2 SAVINGS

By implementing the three step Energy Hierarchy as detailed in the previous sections, the Regulated CO_2 emissions for the development have been reduced against a Part L 2021 compliant scheme through onsite measures alone by:

Application 1 Cumulative Regulated CO_2 Savings (SAP10.2)		
	%	t/yr
Domestic	91	181.1
Non-domestic	55	0.2
Combined (Application 1)	91	181.3

The combined masterplan Regulated CO_2 emissions are also shown to have been reduced by:

Masterplan Cumulative Regulated CO_2 Savings (SAP10.2)		
	%	t/yr
Domestic	91	181.1
Non-domestic	89	72.3
Combined (Application 1)	90	253.4

OFF SITE CO_2 SAVINGS: CARBON OFFSET PAYMENT

The proposed development complies with the London Plan CO_2 savings target of 35% overall.

With the SAP10.2 carbon factors, to achieve 'zero carbon' for the residential portion of the scheme, 18.9 tonnes per annum of regulated CO_2, equivalent to 5672.0 tonnes over 30 years, should be offset offsite. The domestic carbon offset payment is £53,390. The shortfall to a zero carbon reduction from the baseline for the non-domestic portion of the scheme would be 0.2 tonnes per annum of regulated CO_2, equivalent to 5.0 tonnes over 30 years. The non-domestic carbon offset payment is £502, totalling £53,900 for the Application 1 proposal.

The tables on the following pages summarise the implementation of the Energy Hierarchy for the proposed scheme and detail the CO_2 emissions and savings against the baseline scheme for each step of the hierarchy, as well as the savings achieved through carbon offset.

Separate tables are presented for the domestic and non-domestic parts of the development, and for the site as a whole. Additionally, the savings for the combined masterplan proposal have also been included.

Overall, the proposed development has been designed to meet energy policies set out by the GLA and the London Borough of Haringey, demonstrating the client and design team's commitment to enhancing sustainability within the scheme.

BE SEEN

Following the implementation of the three previous stages of the hierarchy, a monitoring strategy will be put in place to ensure that the actual energy performance of the development can be monitored

and reported post-occupation. The relevant parties will also be made aware of their responsibilities at subsequent reporting stages.

DOMESTIC CUMULATIVE SAVINGS (APPLICATION 1)

Table 12: CO_2 emissions after each step of the Energy Hierarchy for the domestic part of Application 1.

	Carbon dioxide emissions for domestic buildings (tonnes CO_2 per annum)
	Regulated
Baseline	199.9
After energy demand reduction	137.7
After heat network/CHP	10.9
After renewable energy	18.7

Table 13: Regulated CO_2 savings from each stage of the Energy Hierarchy for the domestic part of Application 1.

	Regulated domestic carbon dioxide savings	
	Tonnes CO_2 per annum	% over baseline
Savings from energy demand reduction	62.3	31
Savings from heat network/CHP	126.7	63
Savings from renewable energy	-7.8	-4
Cumulative on-site savings	181.1	91
Cumulative for offset payments	18.7 tCO2/year (562 tCO2 over 30 years; £53,397 carbon offset payment)	

NON-DOMESTIC CUMULATIVE SAVINGS (APPLICATION 1)

Table 14: CO_2 emissions after each step of the Energy Hierarchy for the non-domestic part of Application 1.

	Carbon dioxide emissions for non-domestic buildings (tonnes CO_2 per annum)
	Regulated
Baseline	0.4
After energy demand reduction	0.3
After heat network/CHP	0.1
After renewable energy	0.2

Table 15: Regulated CO2 savings from each stage of the Energy Hierarchy for the non-domestic part of Application 1.

	Regulated non-domestic carbon dioxide savings	
	Tonnes CO_2 per annum	% over baseline
Savings from energy demand reduction	0.1	27
Savings from heat network/CHP	0.2	42
Savings from renewable energy	-0.1	-13
Cumulative on-site savings	0.2	55
Cumulative for offset payments	5 tCO2/year (502 over 30 years; £502 carbon offset payment)	

APPLICATION 1 COMBINED CUMULATIVE SAVINGS

Table 16: Application 1 Combined regulated CO_2 emissions and savings

	Total regulated emissions (tonnes CO_2/year)	Regulated CO_2 savings (tonnes CO_2/year)	Percentage saving (%)
Baseline	200		
Be Lean	138.0	62.3	31
Be Clean	11.1	126.9	63
Be Green	18.9	-7.8	-4
Total	-	181.3	91
Offset to zero carbon		18.9 tCO2/year (567.4 tCO_2 over 30 years; £53,900 carbon offset payment)	

MASTERPLAN CUMULATIVE SAVINGS

Table 17: Masterplan regulated CO_2 emissions and savings

	Total regulated emissions (tonnes CO_2/year)	Regulated CO_2 savings (tonnes CO_2/year)	Percentage saving (%)
Baseline	280.7		
Be Lean	206.2	74.5	27%
Be Clean	19.7	186.5	66%
Be Green	27.3	-7.6	-3%
Total	27.3	253.4	90%
Offset to zero carbon		27.3 tCO_2/yr (818 tCO_2 over 30 years; £77,750 carbon offset payment)	

APPENDIX A – OVERHEATING RISK ASSESSMENT

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RESIDENTIAL OVERHEATING RISK ASSESSMENT

9.472 – SELBY CENTRE DEVELOPMENT (APPLICATION 1)

05/09/2024 *by RM, reviewed by JS*

All habitable residential rooms assessed at the proposed Selby Centre Development (Application 1) were found to meet the Part O overheating risk criteria for the London Weather Centre DSY1 weather data (2020 High 50 Percentile) when incorporating a combination of natural ventilation and solar control measures in the design. Due to noise restrictions, an analysis has also been undertaken assuming all windows are able to open to a maximum of 10% of the floor area, other than the windows to the eastern facade of Block 5 which must remain closed overnight. The design incorporates solar control glazing, external shading and efficient lighting to minimise the risk of overheating.

EXECUTIVE SUMMARY

An overheating analysis has been conducted for the proposed Selby Centre development (Application 1), located in the London Borough of Haringey (LBH). The purpose of this analysis is to test the design of the proposed scheme and ensure the mitigation of any overheating risk within the occupied zones across the development. This will prioritise the comfort of occupants as well as future-proof the scheme by accounting for projected increased ambient air temperatures from climate change.

In order to assess the thermal performance of the development, models were constructed within thermal simulation software. The internal temperature, lighting and ventilation conditions were estimated for all habitable internal spaces.

With the aim of giving the most robust consideration, the performance of the various occupied rooms was compared with CIBSE Technical Memorandum 59[1] (Noted as CIBSE TM59 from hereon in) performance recommendations. These are rigorous targets that determine the acceptability of overheating based on the temperature differential between the internal and the external environment (ΔT), considering the frequency of high temperature difference beyond which the level of overheating is considered unacceptable. Specifically, for bedrooms, the methodology aims to evaluate comfort during the sleeping hours by setting a maximum number of hours for which the operative temperature can exceed 26°C.

The restrictions outlined in Approved Document Part O[2] (AD O) were also applied within this assessment. AD O was first published on 15th December 2021 and came into effect in England on 15th June 2022, with transitional arrangements in place. This document was developed to provide guidance on compliance with Requirement O1 (2) (a) of Schedule 1 to the Building Regulations 2010 which notes that:

[1] CIBSE TM59:2017 – Design Methodology for the assessment of overheating risk in homes
[2] Approved Document O – Requirement O1: Overheating Mitigation, Regulations: 40B

"...

(1) Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes, other than a room in a hotel ("residences") to –
a. limit unwanted solar gains in summer;
b. provide an adequate means to remove heat from the indoor environment.
(2) In meeting the obligations in paragraph (1) –
a. account must be taken of the safety of any occupant, and their reasonable enjoyment of the residence; and
b. mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it.

..."

AD O covers the overheating mitigation requirements of the Building Regulations 2021 and is currently the most appropriate assessment methodology for assessing overheating risk in residential properties in the UK.

Compliance with AD O has been demonstrated through dynamic thermal modelling. The findings of the assessment have been outlined below.

- The proposed dwellings are predicted to satisfy the overheating risk criteria for the probabilistic Design Summer Year (DSY1) weather data for London Weather Centre through a combination of natural ventilation and solar control strategies such as a low g-value of 0.5 and external shading provided in the form of external balconies, columns and protruding lintels;
- The communal corridor assessed was not found to have a significant risk of overheating. The inclusion of mechanical ventilation providing a minimum airflow of 15l/s in the Block 7 corridors is recommended to allow for compliance with the CIBSE TM59 overheating risk criteria for corridors and generally improve the resilience of the building to overheating risk. The overheating risk within communal corridors is however dependent on the final heat distribution method, pipework specification and insulation levels, which will be confirmed at the next design stage.

Based on the method of assessment adopted, XCO2 recommend the design team consider incorporating the features detailed above that allow compliance with CIBSE TM59 and AD O under the London Weather Centre DSY1 weather file.

It should be noted that the findings of this assessment are related to planning stage design only and are based on a sample of units. Any changes to the ventilation strategy, façade opening areas, window operation and shading elements or other elements of the design that could impact the overheating risk, would impact the performance of the building and may void the results of the current assessment.

METHODOLOGY

Compliance with AD O Requirement O1 (2) can be demonstrated using one of two methods:

a. The simplified method.
b. The dynamic thermal modelling method.

The dynamic thermal modelling method was used to conduct the assessment presented in this note.

AD O outlines additional requirements to be applied to CIBSE's TM59 methodology in order to restrict the choices made by the modeller. To demonstrate compliance using the dynamic thermal modelling method, the following guidance was followed:

- CIBSE's TM59 methodology for predicting overheating risk.
- The limits on the use of CIBSE's TM59 methodology, as outlined in AD O.
- The acceptable strategies for reducing overheating risk set out in AD O.

3D thermal models of the apartments within the proposed scheme have been developed based on the planning architectural drawings. To give a fair representation of the residential development, 57 units including 116 kitchen/living/dining rooms (KLDs), 133 double bedrooms and 21 single bedrooms were analysed to provide a representative sample of the space and dwelling typologies within the development.

Shared communal rooms and common spaces of buildings containing more than one residential unit fall within the scope of AD O. A communal corridor was therefore analysed as part of this assessment.

The surrounding context was included within the model to account for the shading effects that adjacent buildings are likely to provide.

Axonometric views of the model from the Southwest and Northeast are presented in Figure 1 and Figure 2 overleaf.

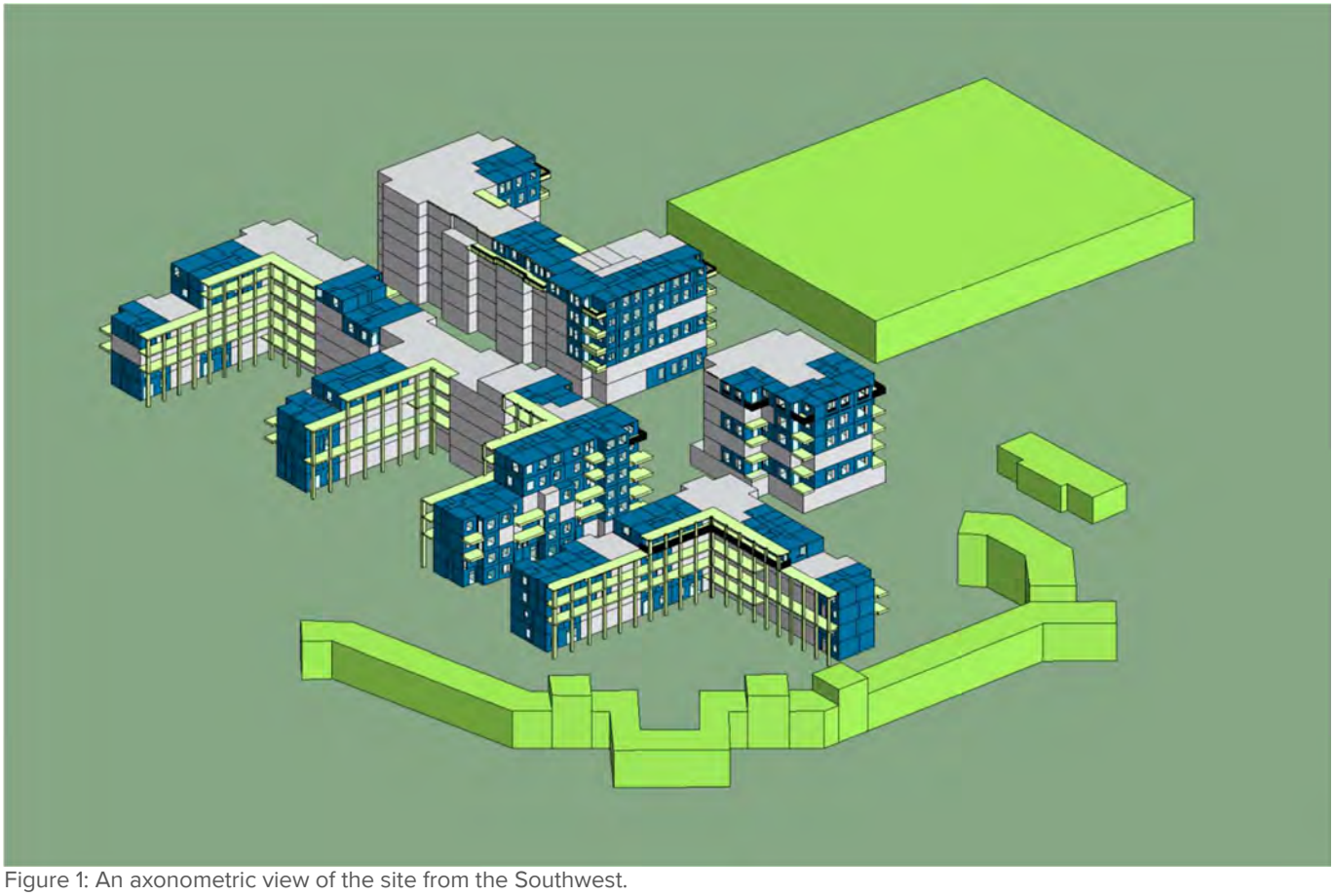


Figure 1: An axonometric view of the site from the Southwest.

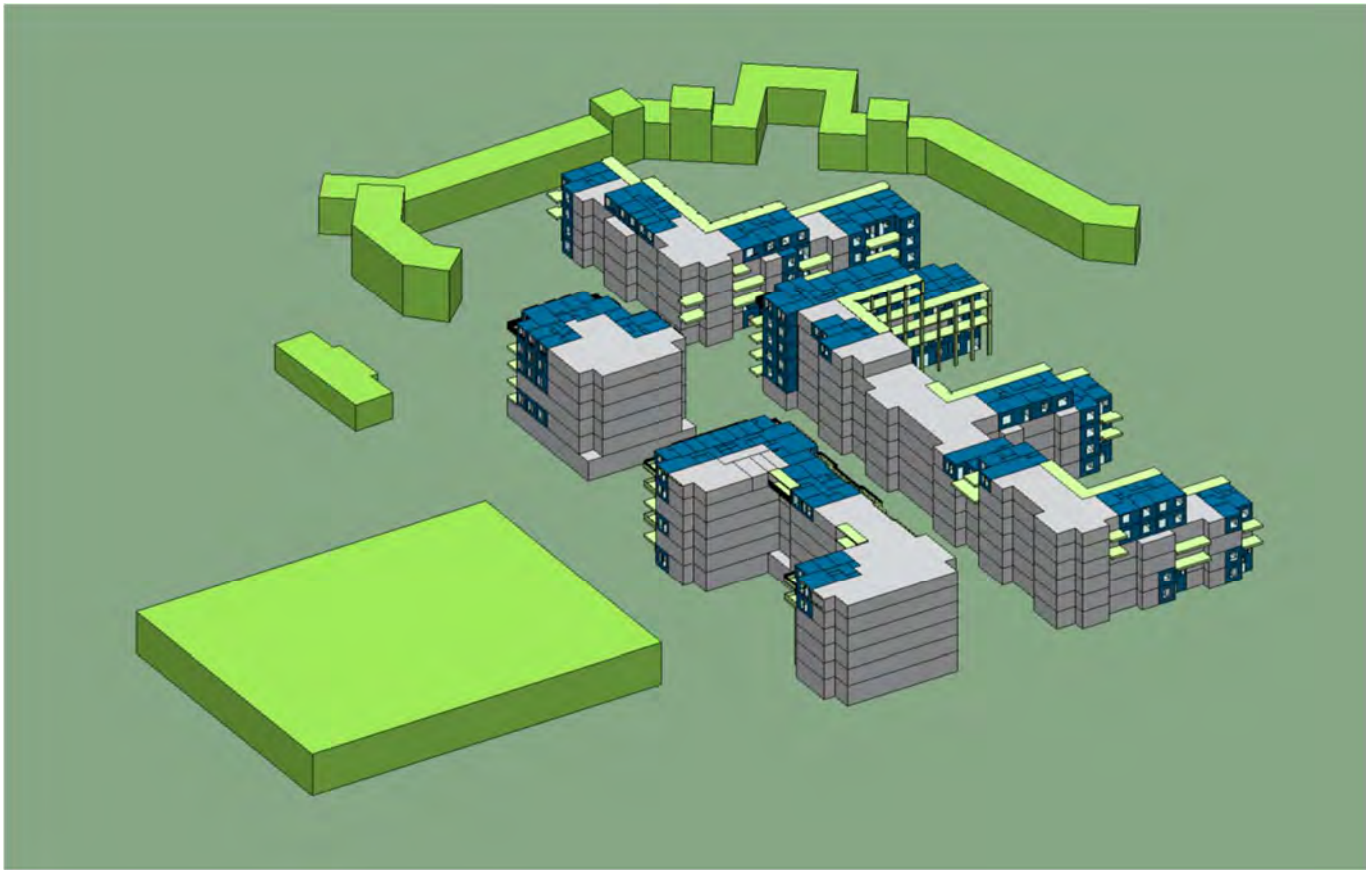


Figure 2: An axonometric view of the site from the Northeast.

The overheating risks of the spaces were assessed using the CIBSE DSY1 weather file which represents a moderately warm summer. The 2020s, high emissions, 50% percentile scenario was selected in line with methodology requirements. The 2020 period is of particular interest as this relates to the period 2011-2040, which is the period we are currently in; the 50% percentile scenario may be viewed as the 'best guess' level of change.

Further testing with DSY2 and DSY3 (2020s, high emissions, 50% percentile scenario) was also undertaken to test the development's robustness against more severe weather patterns, although compliance with these weather files is not a requirement.

The buildings have been modelled using dynamic thermal simulation software. The software can compute operative temperatures using weather data sets, building fabric specification, window areas and opening, all aspects of solar and internal gains as well as natural ventilation flows within buildings. Compliance of the design with the criteria outlined in CIBSE TM59 (with restrictions outlined in AD O) has been sought and recommendations formulated.

The Acoustic Assessment has highlighted that there may be a risk of excessive noise on all facades. As a result, all of the modelled occupied units will not be able to rely solely on fully openable windows as a means of mitigating overheating risk. Figure 3 overleaf identifies the pink, green and red facades as having an acceptable open area limited to 10% of the floor area during the day and night. The blue facades are at highest risk of excessive noise, and therefore will require the windows to be closed overnight.

Figure 3: Façade identification site plan from the acoustic assessment.

ASSESSMENT CRITERIA

The following two criteria were used:

1) **For living rooms, kitchens, communal rooms and bedrooms:**
   The number of hours during which ΔT (the difference between operative and threshold comfort temperatures) is greater than or equal to one degree (K), during the period of May to September inclusive, shall not be more than 3 per cent of occupied hours. (CIBSE TM52 Criterion 1: Hours of exceedance).
2) **For bedrooms only:**
   To evaluate comfort during sleeping hours, the operative temperature in the bedroom from 10 pm to 7 am 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 or more hours above 26°C will be recorded as a fail).

The first criterion is evaluated in terms of the ΔT, which is the difference between the operative temperature T_{op} and the limiting maximum temperature T_{max}, $\Delta T = T_{op}$[3] $- T_{max}$[4]. In order to estimate T_{op}, dynamic thermal modelling is carried out to compute the predicted temperature distribution in the different thermal zones of the building. The maximum acceptable temperature is a function of the outdoor temperature and the design limits, which are shown below. The table details the suggested acceptability in terms of the temperature range of naturally ventilated buildings. For the purpose of the assessment, we have used Category II limits, as recommended within CIBSE TM52.

Table 1: CIBSE TM52 – Suggested applicability of the category and the associated acceptable temperature range for a free running building

Category	Explanation	Acceptable Range (°C)
II	Normal expectation (for new buildings and renovations)	±3

CIBSE TM59 also recommends assessment criteria for overheating risk in corridors based on exceeding an operative temperature of 28°C. Whilst there is no mandatory target, corridors should aim to comply with the following criteria:

1) **For corridors:**
   If an operative temperature of 28°C is exceeded for more than 3% of total annual hours, this should be flagged as a significant risk within the report.

[3] Operative temperature models the combined effect of convective and radiant heat transfer. It accounts for the combined effect of the temperature of the air, the temperature of the surfaces and air speed.
[4] T_{max} is the maximum acceptable temperature and is dependent on the outdoor running mean temperature and the building category with each associated acceptability range.

MODELLING ASSUMPTIONS

FABRIC PERFORMANCE

The assumed fabric specification for the purposes of this assessment is aligned with the proposals at planning stage (see Table 2 below).

Table 2: Building fabric assumptions

Element	Specification	
	U-value [W/m².K]	
External Walls	0.15	
Ground Floor	0.10	
Roof	0.10	
	U-value [W/m².K]	**g-value**
Window	1.20	0.50 for all floors/facades
	Air permeability (@50Pa)	
	3.0 $m^3/m^2.h$	

OCCUPANCY

The CIBSE TM59 methodology specifies the hours during which spaces are anticipated to be occupied and these have been used within the overheating assessment calculations. The same occupancy assumptions apply in the dynamic thermal analysis method of AD O. Table 3 sets out the predicted occupancy patterns for the assessed rooms in line with the CIBSE TM59 requirements; these are programmed into the dynamic software model to calculate the relative occupancy gains for the designated spaces.

Table 3: Occupancy assumptions for the room types assessed

Area	Predicted Occupation Pattern
Single Bedroom	00:00 – 24:00, 7 days/week
Double Bedroom	00:00 – 24:00, 7 days/week
1–Bed Kitchen / Living / Dining Rooms	09:00 – 22:00, 7 days/week, 1 person
2–Bed Kitchen / Living / Dining Rooms	09:00 – 22:00, 7 days/week, 2 people
3/4–Bed Kitchen / Living / Dining Rooms	09:00 – 22:00, 7 days/week, 3 people

INTERNAL GAINS

For all residential units modelled, the predicted occupancy hours and internal gains (lighting, equipment, people) for occupied areas are incorporated within the model in line with the guidance set out in CIBSE TM59.

Table 4 sets out the various internal gains for the assessed rooms within the dwellings. Non-occupied spaces such as circulation, bathrooms and storage were modelled based on the typical internal gains specified within the CIBSE TM59 methodology.

Table 4: Internal gains modelled for each room type assessed

Area	Predicted Internal Gains		
	Lighting [W/m²]	People [peak W]	Equipment [peak W]
Double Bedroom	2.0 W/m²	150 W sensible, 110 W latent	80 W
Single Bedroom	2.0 W/m²	75 W sensible, 55 W latent	80 W
1–Bed Kitchen Living Dining	2.0 W/m²	75 W sensible, 55 W latent	450 W
1–Bed Living Room	2.0 W/m²	75 W sensible, 55 W latent	150 W
1–Bed Kitchen	2.0 W/m²	75 W sensible, 55 W latent	200 W
2–Bed Kitchen Living Dining	2.0 W/m²	150 W sensible, 110 W latent	450 W
2–Bed Living Room	2.0 W/m²	150 W sensible, 110 W latent	150 W
2–Bed Kitchen	2.0 W/m²	150 W sensible, 110 W latent	200 W
3/4–Bed Kitchen Living Dining	2.0 W/m²	225 W sensible, 165 W latent	450 W
3/4–Bed Living Room	2.0 W/m²	225 W sensible, 165 W latent	150 W
3/4–Bed Kitchen	2.0 W/m²	225 W sensible, 165 W latent	200 W

Under AD O, the inclusion of common spaces such as corridors in overheating analysis is required. As outlined in the Energy Statement, space heating and hot water to the domestic parts of the development will be provided by a district heat network system. Pipework connecting the communal system to the individual flats will run through communal corridors situated on each floor.

One fully enclosed sample corridor was tested at the top floor of Block 7 as a worst case scenario. In order to estimate the internal gains associated with the communal pipework, the estimated outside diameter of the flow and return pipes respectively was converted to a maximum heat loss per metre run of pipe (W/m) using a conversion table contained within the CIBSE TM59 guidance document. These figures were converted to a corridor pipework heat gain in watts using the estimated length of the flow and return pipes within each corridor. The internal gains for the internal corridors modelled are displayed in Table 5.

Table 5: Internal gains modelled for corridor areas

Area	Predicted Internal Gains		
	Lighting [W/m²]	People [peak W]	Pipework [peak W]
Corridor	2.0 W/m²	-	90 W

VENTILATION

The proposed ventilation strategy for the development entails the use of natural ventilation for the whole year, utilising mechanical extract ventilation in the kitchens and bathrooms and mechanical supply to the bedrooms and living rooms. Therefore, the estimated ventilation flow rates have been included in the model in line with Part F requirements for ventilation to provide a conservative baseline for assessment. All habitable rooms will have openable windows to provide passive natural ventilation for overheating mitigation.

The methodology outlined in Appendix D of AD O was used to calculate the equivalent area of each of the window types included within the architectural drawings received from Karakusevic Carson Architects on 26th July 2024, with

further minor amendments received on 16th August 2024. The level of exposure and associated coefficients of discharge are set up in accordance with the relative position of each window in relation to building massing.

The windows across the development have been grouped into nine different window types within Integrated Environmental Solutions Virtual Environment (IES VE) based on their effective free area, however the true dimensions of all window types have been modelled within the geometry. The equivalent areas of the different window types (with openable panes) modelled are outlined in Table 6.

Table 6: Equivalent areas for window types with openable panes as modelled in IES VE.

Window Reference	Recommended effective free area (EFA) for CIBSE TM59 compliance	Opening Pattern / Degree
W1	22.11%	Top hung / 90°
W2	34.09%	Top hung / 90°
W3	51.96%	Sliding Door
W4	58.36%	Top Hung / Sliding Door
W5	74.78%	Top hung / 90°
W6	79.97%	Side hung / 90°
W7	84.76%	Side hung / 90°
W8	87.91%	Side hung / 90°
W9	91.32%	Side hung / 90°

The corresponding window reference locations on the 3D models in IES VE can be found in Appendix A – Window Layout.

In line with the limits on CIBSE's TM59 methodology outlined in AD O, the assumed opening profiles differ for openings to rooms at ground floor level compared to those above ground floor level that are not deemed to be easily accessible.

Openings to rooms **above** ground floor level:

- Start to open when the internal temperature exceeds 22 ˚C
- Be fully open when the internal temperature exceeds 26 ˚C
- Start to close when the internal temperature falls below 26 ˚C
- Be fully closed when the internal temperature falls below 22 ˚C
- Be modelled as fully open if the internal temperature exceeds 23 ˚C at 11 pm

Openings to rooms **at** ground floor level, unoccupied at night

- Start to open when the internal temperature exceeds 22 ˚C
- Be fully open when the internal temperature exceeds 26 ˚C
- Start to close when the internal temperature falls below 26 ˚C
- Be fully closed when the internal temperature falls below 22 ˚C
- Be closed at night if the room is unoccupied and be modelled as fully open if the internal temperature exceeds 23 ˚C at 11 pm if the room is occupied

In order to ensure the overheating mitigation strategy is usable, AD O details further restrictions related to noise, pollution and protection from entrapment. A summary of the requirements and, where applicable, how compliance can be demonstrated for the proposed development at this stage, has been provided below.

Noise

The Acoustic Assessment developed by XCO2 and submitted in support of this planning application, indicates that there may be a risk of excessive noise on all facades. As a result, all the modelled occupied units will not be able to rely solely on fully openable windows as a means of mitigating overheating risk. Figure 3 identifies the pink, green and red facades as having an acceptable open area limited to 10% of the floor area during the day and night. The blue facades are at highest risk of excessive noise and will require the windows to be closed overnight. Therefore, additional modelling was undertaken limiting all windows to an openable area of 10% of the floor area during day and

night, in addition to rooms occupied overnight on the blue facades of Block 5 modelled with closed windows during sleeping hours.

Pollution

Buildings located near to significant local pollution sources should be designed to minimise the intake of external air pollutants. An Air Quality Assessment has been undertaken for the proposed development at planning stage by XCO2 which indicates that the air quality does not pose a constraint to the development.

Security

AD O outlines requirements related to security. During sleeping hours, AD O notes that only the proportion of windows that can be opened securely should be considered to provide useful ventilation. As outlined above, for rooms that are at ground floor or are easily accessible, windows and doors should only be used for ventilation during sleeping hours where they have been made secure, for example via the use of fixed or lockable louvred shutters or fixed or lockable window grilles or railings.

Protection from Falling

AD O outlines specific requirements to minimise the risk of falling associated with the use of a natural ventilation strategy. Requirements are based on the degree of opening possible and guarding heights. The proposed design comprises inward opening windows only and incorporates Juliet Balconies to all openable windows with a window sill below 1.1m. All remaining window sills are above 1.1m as per the AD O guidance.

Protection from Entrapment

Where window rails are specified in the form of Juliet Balconies or external shutters in a potential future retrofit (please see Appendix B – Future Retrofit Plan), these must comply with criteria to protect from entrapment related to the size of openings and the presence of child safety devices. These requirements will be considered by the design team at the next design stage, to ensure any security measures required as part of the overheating mitigation strategy comply with these requirements.

RESULTS

This section presents the results summary for each of the tests carried out for the proposed development. In total 270 habitable spaces were included in the assessment, consisting of 116 KLDs, 133 double bedrooms and 21 single bedrooms. Non-habitable spaces such as bathrooms, storage rooms and circulation areas have also been included in the assessment; and their internal gains have been accounted for in the model.

Table 7 shows the modelling iterations undertaken under London Weather Centre DSY1 weather data, the sequential improvement measures that are proposed to be incorporated for each iteration and the number of rooms that were not found to meet the CIBSE TM59 criteria at each stage. The purpose of the improvement measures proposed is to minimise the number of rooms that fail the CIBSE TM59 criteria to the greatest extent possible, taking into consideration viability, feasibility and other design constraints.

RESIDENTIAL UNITS

Natural Ventilation Assessment

Table 7: Overheating assessment results for London Weather Centre DSY1

ID	Design change	Bedrooms	KLDs	g-value	Internal Doors	Bedrooms TM59 night-time 26°C criterion	Bedrooms TM52 Criterion 1	KLDs TM52 Criterion 1
		Window opening degree and profile				No. of rooms not meeting criteria		
It_01	Baseline incl. external shading (balconies, external walkways, columns, protruding lintels)	As designed, 24hrs	As designed, daytime only	0.5	Open during day	154/154	129/154	109/116
It_02	As per It_01 plus KLD windows open 24hrs	As designed, 24hrs	As designed, 24hrs	0.5	Open during day	0/154	0/154	0/116
It_03	As per It_02 plus reduced KLD window EFA to allow for secure nighttime opening	As designed, 24hrs	All KLD windows limited to 50% of designed EFA to account for nighttime security measures, 24hrs	0.5	Open during day	0/154	0/154	0/116
It_04	As per It_03 plus acoustic restrictions	EFA limited to 10% of floor area, 24hrs	All window EFA limited to 10% of floor area, 24hrs	0.5	Open during day	0/154	0/154	0/116

The following observations can be made from the results:

- Increasing natural ventilation and allowing for nighttime cooling by assuming kitchen/living/dining room windows to be open 24hrs in all spaces assessed resulted in all habitable rooms passing the criteria.
- A 50% reduction in Effective Free Area to account for any required security measures to easily accessible KLD windows open at night (either at ground floor or opening onto external communal walkways) does not result in any units failing the criteria, and so can be assumed any rooms that require these measures will not be at risk of overheating when they are in place.

- The acoustic restrictions resulting in limited window opening degree does not result in any units failing the criteria.

It should be noted that the findings of this assessment are related to planning stage design only, and any changes to the ventilation strategy, façade opening areas and window operation, shading elements and other elements that influence the overheating risk will impact the performance of the building and may void the results of the current assessment. The detailed results for these iterations against DSY1 can be found in Appendix C – Detailed Results: CIBSE 2020s DSY1 Weather File.

Finally, the final iteration, It_04, was applied with DSY2 and DSY3 weather types, which are more severe weather types. The results for these years are shown in the table below.

Table 8: Overheating assessment results for the London Weather Centre DSY2 and DSY3 Weather File (2020s, High, 50)

ID	Design change	Bedrooms	Kitchen / living / dining rooms	g-value	Internal Doors	Bedrooms TM59 night-time 26°C criterion	Bedrooms TM52 Criterion 1	Kitchen / living / dining rooms TM52 Criterion 1
		Window opening degree and profile				No. of rooms not meeting criteria		
It_05	DSY2 Weather File	EFA limited to 10% of floor area, 24hrs		EFA limited to 10% of floor area, 24hrs	Open during day	154/154	1/154	104/116
It_06	DSY3 Weather File	EFA limited to 10% of floor area, 24hrs		EFA limited to 10% of floor area, 24hrs	Open during day	154/154	1/154	115/116

The nature of the DSY2 and DSY3 weather files are such that it becomes particularly difficult to fully mitigate overheating risk in accordance with CIBSE TM59 criteria owing to their onerous conditions. In essence, they are representative of a period where overheating is an intrinsic risk within the environment itself, rather than a risk imposed by inappropriate design.

Following assessment of the model with the DSY2 and DSY3 weather files, it can be observed in Table 8 that the criteria is not met, and the overheating risk is not sufficiently mitigated through the currently implemented passive measures alone given the onerous nature of the more severe weather.

Reducing the g-value could have a minor beneficial impact on mitigating the overheating risk against these more extreme weather files if the proposed scheme incorporated a g-value of 0.4. Further reductions to g-value are not recommended as they would compromise the energy strategy and savings achieved through efficient fabric design alone (Be Lean). A reduced g-value would also impact the daylight levels experienced within the occupied rooms due to reduced solar transmission. Additionally, the reduced solar gains as a result of this could impact the heating demand and subsequently the occupants fuel costs.

Please note that these results for DSY2 and DSY3 for 2020's period are for informative purpose only, as compliance with DSY2 and DSY3 is not a strict requirement for AD O. The scheme has sought to comply with DSY1 as per GLA's policy by including solar control glazing with g-value of 0.5 throughout as well as generous EFAs and has sought to go as far as feasible in terms of performance with 2020's DSY2 and DSY3 weather files. Openable panes have been maximised where glazed doors provide access to balconies while the remaining window assemblies have sought to incorporate side-hung windows where feasible which can provide sufficient EFAs for compliance with DSY1 2020's. A future retrofit plan for overheating mitigation with more onerous weather files could include the incorporation of movable external shutters. The detailed results for the assessment under DSY2 and DSY3 can be found in Appendix D – Detailed Results: CIBSE 2020S DSY2 and DSY3 Weather Files.

A detailed future retrofit plan analysis for the DSY1 2050s London Weather Centre can be seen in Appendix B – Future Retrofit Plan.

COMMON SPACES

An enclosed communal corridor was modelled to assess the overheating risk. Communal heating pipework distribution gains were estimated based on an assumed pipework layout.

Table 9: Communal corridor overheating assessment results for London Weather Centre DSY1, DSY2 and DSY3 Weather Files

ID	Design change	Internal Gains from Communal Corridor	Mechanical Ventilation	Weather File	% Annual Hours T_{op} > 28 ˚C	Criteria Met
1	Internal Gains in Communal Corridor	Y	Y (15 L/s)	DSY1	0.13%	Y
1	DSY2 Weather File	Y	Y (15 L/s)	DSY2	1.55%	Y
1	DSY3 Weather File	Y	Y (15 L/s)	DSY3	2.06%	Y

The following observations can be made from the results:

- The simulations conducted indicate that the operative temperature is not likely to exceed 28 ˚C for more than 3% of annual hours under the DSY1 weather file. Mechanical ventilation with a flow rate of 15 L/s was tested and found to be sufficient to reduce overheating risk to below this criterion.

It should be noted that the overheating risk within communal corridors will depend on the final heat distribution method as well as the pipework specification and insulation levels, which will be confirmed at the next design stage. It is therefore recommended that a full assessment is conducted once the relevant specifications are confirmed. The details and specification of these fans should be considered alongside the fire and ventilation strategy[5].

[5] Fire and ventilation guidance should be sought from the relevant specialist.

CONCLUSIONS AND RECOMMENDATIONS

The results show that all flats achieve compliance with CIBSE TM59 and AD O for London Weather Centre DSY1 weather data, provided that adequate design considerations are taken into account.

The results demonstrate that a combination of natural ventilation and solar control strategies such as low g-value and external shading in the form of balconies, external walkways, columns and protruding lintels are essential for compliance with the overheating risk criteria.

Generally, a g-value of 0.50 should be the preferred specification to avoid overly compromising the energy performance and compliance with CO_2 emissions targets.

Table 10 summarises the design recommendations that contribute to reducing overheating risk.

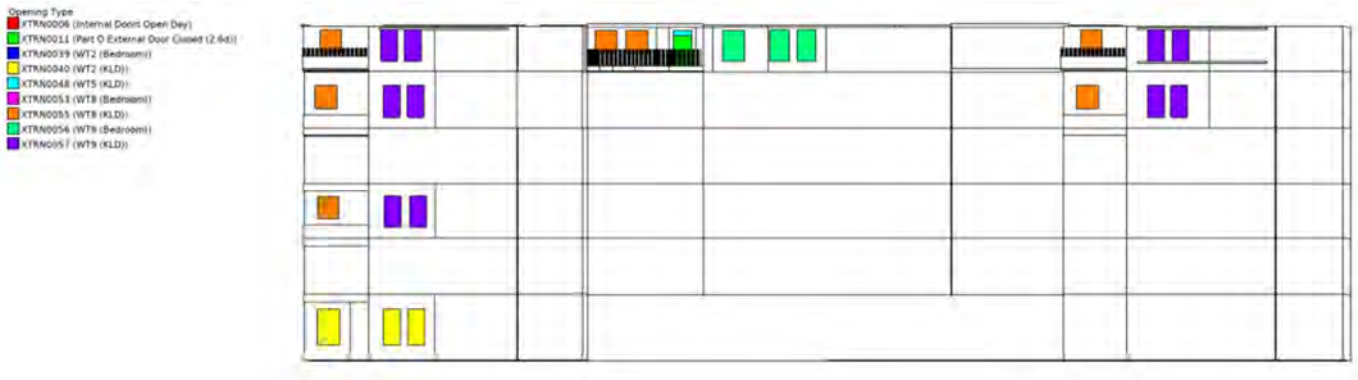
Table 10: Summary of recommendations for the proposed development.

Measure	Implementation
Minimise internal heat generation through energy efficient design	
High efficiency lighting installations (LED)	All residential spaces.
Low temperature hot water pipework design and installations (location, configuration and insulation) to minimise heat losses.	LTHW pipework running in corridors and circulation areas to be highly insulated across the whole length, including jackets for valves and junctions. Primary distribution within the 4 residential blocks to be vertical rather than horizontal to reduce pipe lengths.
Reduce the amount of heat entering the building	
External shade	Slight recesses included within windows across site and balconies where present, in addition to protruding lintels and external walkways and columns providing further shading.
Internal shading via opaque blinds	Whilst not included in compliance calculation in line with GLA guidance, internal shading via opaque blinds is recommended for lounges and bedrooms.
Solar control glazing	Solar control glazing on all windows to achieve a g-value of 0.50.
Use of thermal mass to manage heat within the building	
Thermal mass	Thermal mass will be utilised where exposed.
Passive ventilation	
Natural ventilation opening	Inward opening windows, with panes openable to at least 90° for natural ventilation. Ground floor windows to allow for the greatest degree of opening as is deemed feasible (Secure by Design compliant).

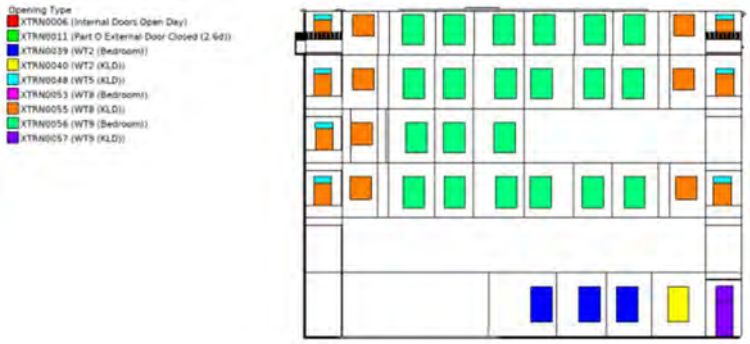
APPENDIX A – WINDOW LAYOUT

The following figures show the window types and locations for each block and orientation.

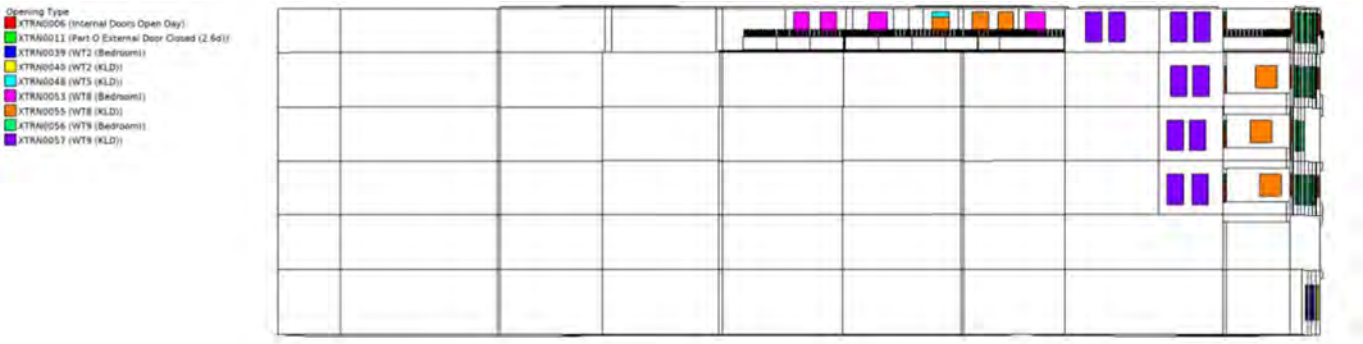
Block 5 – East



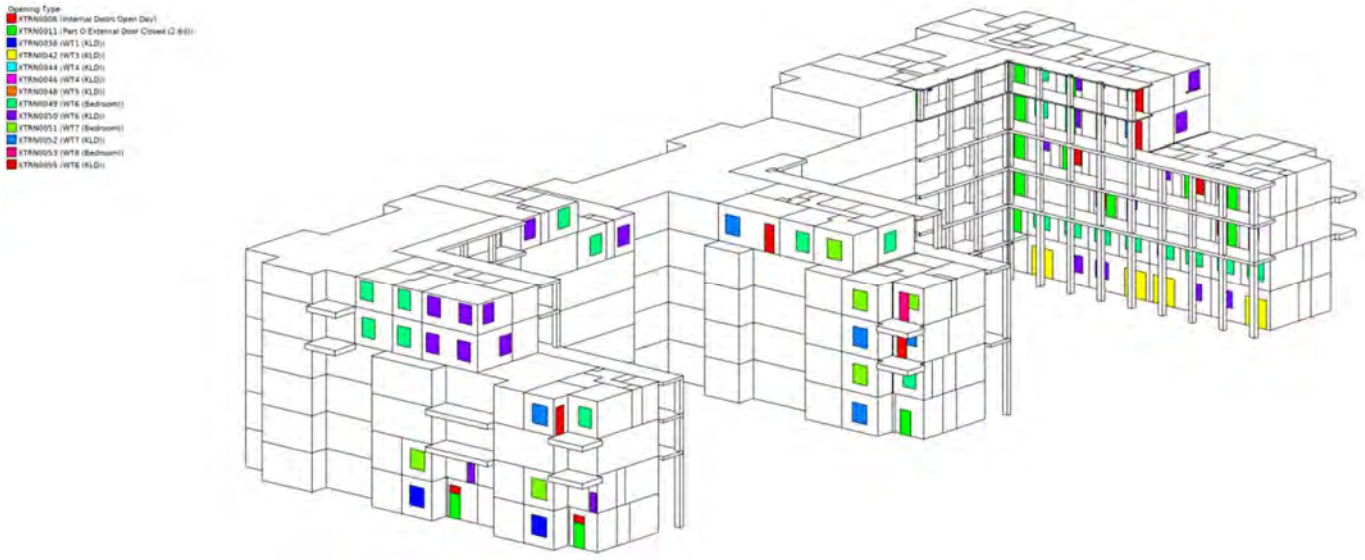
Block 5 – South



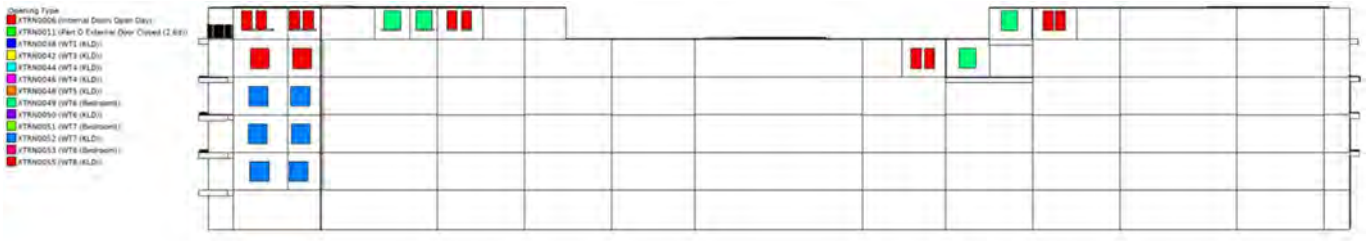
Block 5 – West



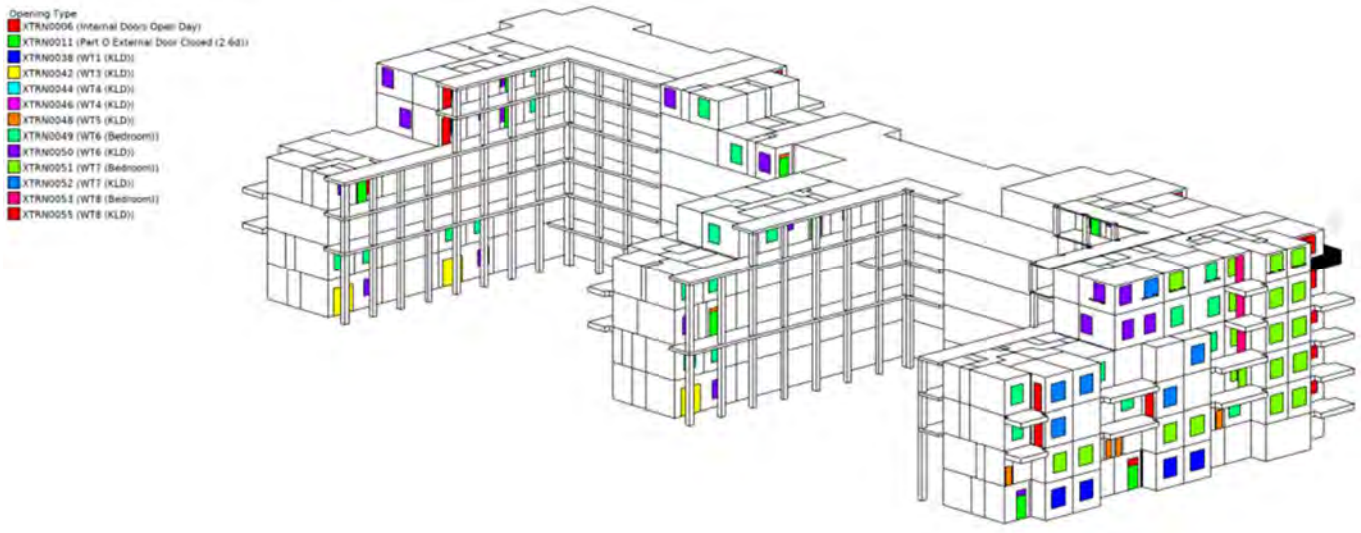
Block 6 – Northwest Axonometric



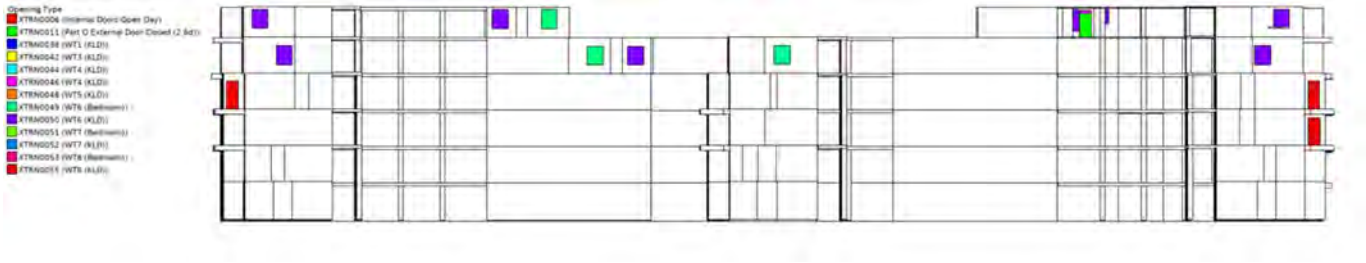
Block 6 – East



Block 6 – Southwest Axonometric



Block 6 – West



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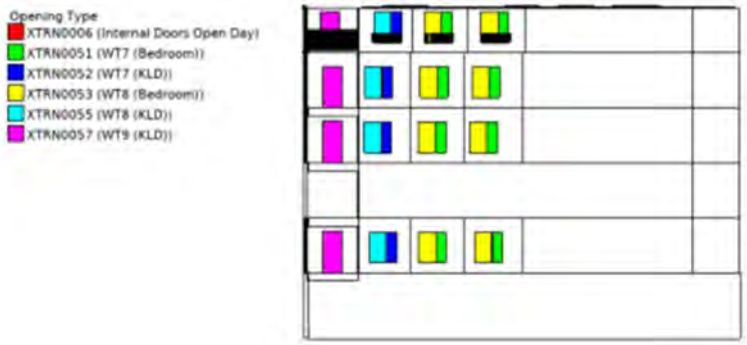
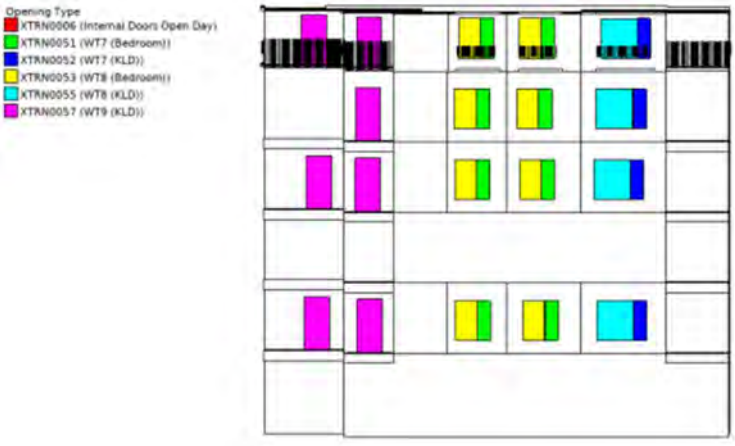


Block 7 – South



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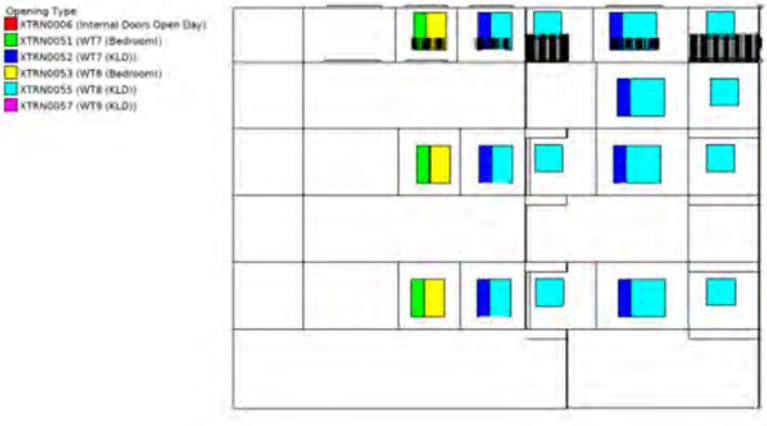
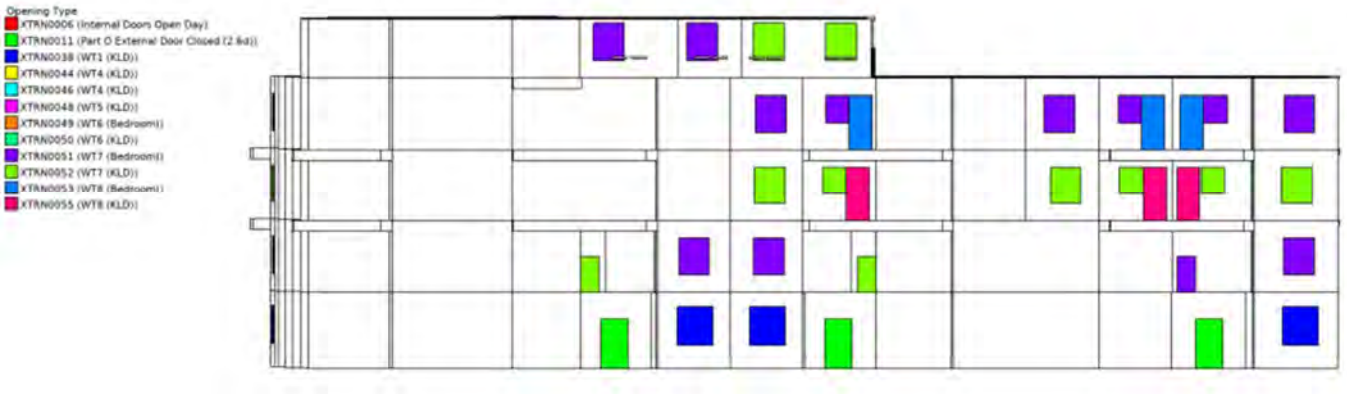


Block 8 – North



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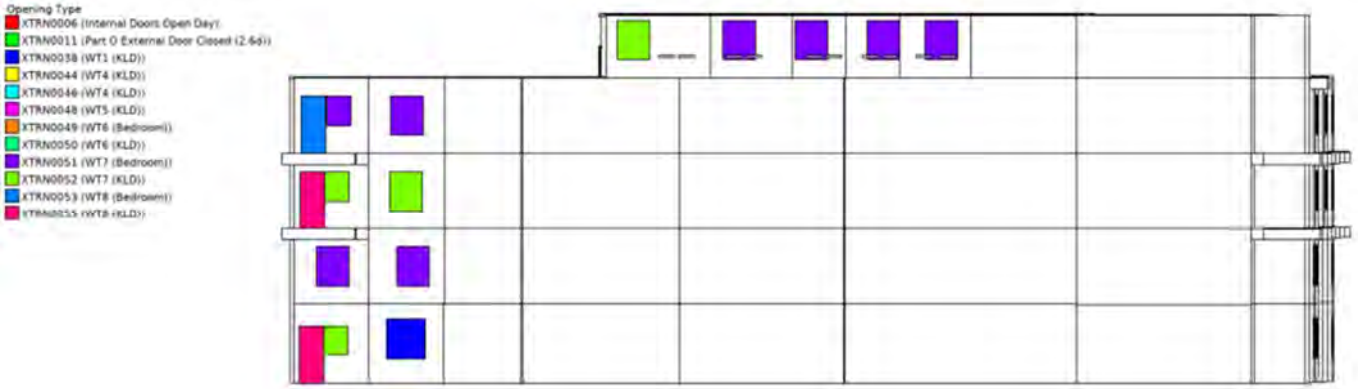
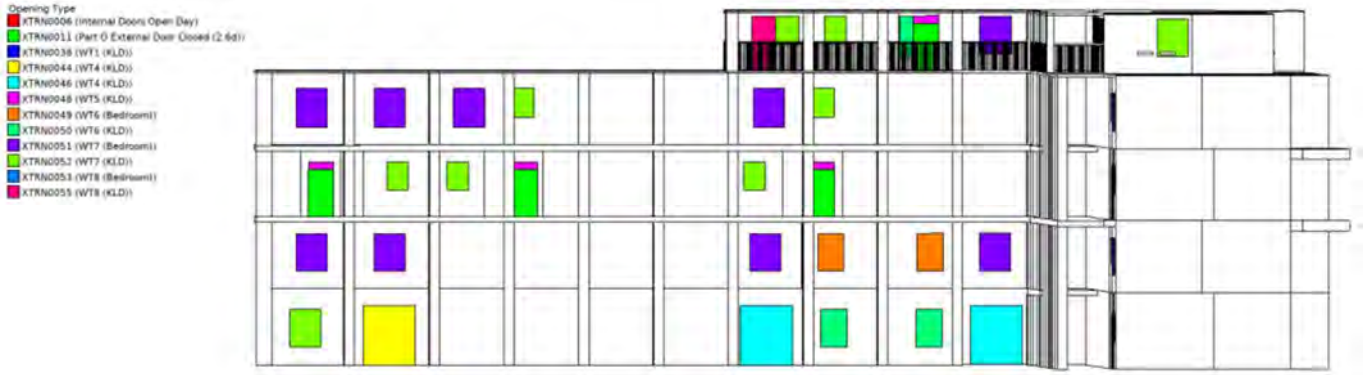
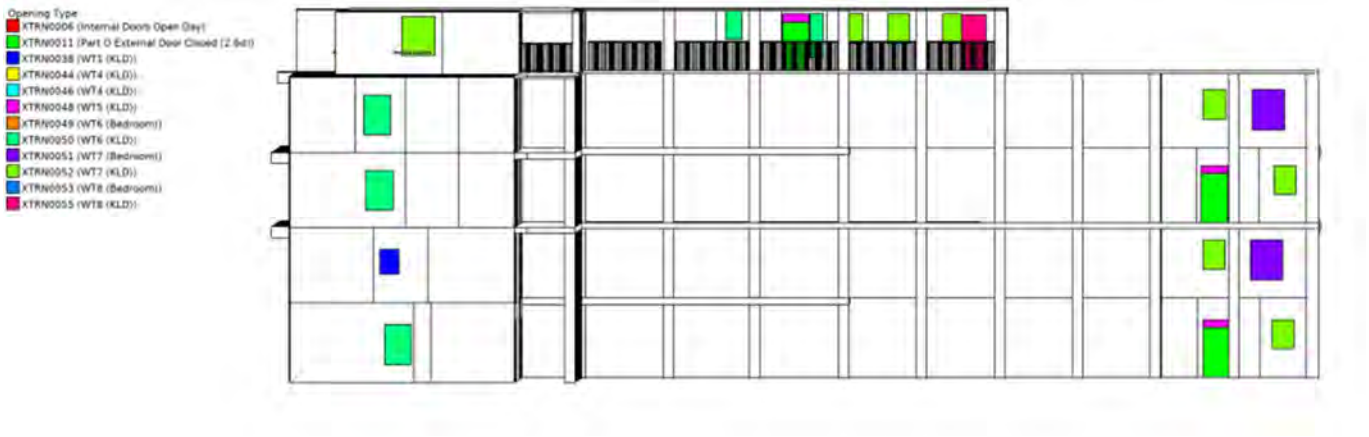


Block 8 – South



Block 8 – West


Opening Type
XTRN0006 (Internal Doors Open Day)
XTRN0011 (Part O External Door Closed (2 bd))
XTRN0038 (WT1 (KLD))
XTRN0044 (WT4 (KLD))
XTRN0046 (WT4 (KLD))
XTRN0048 (WT5 (KLD))
XTRN0049 (WT6 (Bedroom))
XTRN0050 (WT6 (KLD))
XTRN0051 (WT7 (Bedroom))
XTRN0052 (WT7 (KLD))
XTRN0053 (WT8 (Bedroom))
XTRN0055 (WT8 (KLD))

APPENDIX B – FUTURE RETROFIT PLAN

Future Weather Scenario and Retrofit Plan – DSY1 2050's weather data

Based on the results from the DSY1 2020's weather file (see Iteration 4 of Table 7), rooms were tested using the London Weather Centre DSY1 2050's weather file. The results, the improvement measure(s) that is proposed to be incorporated and recommendations are shown below.

Table 111: Overheating assessment results for dwellings for London Weather Centre DSY1 2050's.

Iteration	Glazing Equivalent Free Area %	g-value	External shading	Bedrooms TM59 night-time 26°C criterion	Bedrooms TM52 Criterion 1	Other rooms (KLDs) TM52 Criterion 1	Total rooms TM59 Compliance
				No. of rooms not meeting criteria			
It_07 (Based on It_04 – see Table 7)	As described in the Ventilation section.	0.5	Balconies, protruding lintels and columns	154/154	1/154	82/116	83/270
It_08 (Providing additional external shading)	As per above.	0.5	Additional shading in the form of movable external shutters to all windows	154/154	0/154	9/116	9/270
It_09 (Providing additional external shading plus cooling coils to the MVHR system)	As per above.	0.5	Additional shading in the form of movable external shutters to all windows	0/154	0/154	7/116	7/270

The measures incorporated as part of the proposed scheme (based on iteration 7 in the table above) are not seen to suffice for compliance with the 2050's weather file. While it is aspired to, but not a requirement that CIBSE TM59 risk criteria is met for future weather files, the below measures are being considered for future retrofit plans.

- For better overheating risk mitigation performance, movable external shutters could be considered to enable compliance in the future due to the rising temperatures. This provides solar shading at the control of the occupant, however, does of course have aesthetic and cost implications. Examples of these can be seen in Figure 4 overleaf.
- Provision of pre-tempered intake air from the MVHR with incorporated cooling coils would be required in bedrooms ad KLD areas. This does not amount to full comfort cooling, rather it is a 'trim cooling' provision, expected to be capable of reducing the incoming air temperature by approximately 14°C.

Although these measures did not result in all units meeting full compliance for the CIBSE TM59 / Part O criteria under the 2050 DSY1 weather file, the remaining seven units are marginally failing by 0.1-0.4% and therefore do not pose a significant additional risk to overheating. The detailed results can be seen in Appendix E.

The retrofit plan for more severe weather types such DSY2 and DSY3, or for more resilience to climate change could also include (in addition to the measures outline above for the 2050's retrofit plan):

- Reduced glazing g-value of 0.4 to reduce solar gains if this can be accommodated whilst also meeting light transmittance targets for the daylight analysis. It is expected such a reduction would reduce energy and carbon emission reductions slightly due to a loss of beneficial solar gains in winter.
- Under these severe climate scenarios, the dwellings are expected to require active cooling in order to meet CIBSE TM59 criteria. To reduce the energy consumption, the cooling system is recommended to be limited to providing trim cooling to a reasonable set reduction in temperature, rather than unlimited comfort cooling.

As it would be readily appreciated, DSY2 and DSY3 weather types for the 2050's period are more onerous scenarios to achieve full compliance with natural ventilation performance. Therefore, the proposed development will require of the provision of active cooling to mitigate the risk of overheating under these stricter weather' data.

Figure 4: Metal concertina shutters, Jean-Cristophe Quinton, Paris

APPENDIX C – DETAILED RESULTS: CIBSE 2020S DSY1 WEATHER FILE

The following tables present results in detail for each of the assessed rooms under the CIBSE 2020s DSY1 weather file, and in terms of percentage of occupied hours when the internal operative resultant temperature is within the comfort range given by both Part O criteria. Compliance for bedrooms requires passing both of the following two criteria, whereas compliance for KLDs, kitchens and living rooms requires compliance with the first criterion.

Iteration 01

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L00_01_3B5P_Dbl Bedroom	8.2	97	Fail
Block 5_L00_01_3B5P_Kitchen	3.5	N/A	Fail
Block 5_L00_01_3B5P_Living Room	3.8	N/A	Fail
Block 5_L00_01_3B5P_Sgl Bedroom_E	3.6	91	Fail
Block 5_L00_01_3B5P_Sgl Bedroom_W	6.7	87	Fail
Block 5_L02_01_3B5P_Dbl Bedroom_E	3.5	55	Fail
Block 5_L02_01_3B5P_Dbl Bedroom_W	3.8	54	Fail
Block 5_L02_01_3B5P_Kitchen	3.3	N/A	Fail
Block 5_L02_01_3B5P_Living Room	8.2	N/A	Fail
Block 5_L02_01_3B5P_Sgl Bedroom	3.4	50	Fail
Block 5_L02_02_3B5P_Dbl Bedroom_E	7.5	58	Fail
Block 5_L02_02_3B5P_Dbl Bedroom_W	3.8	54	Fail
Block 5_L02_02_3B5P_Kitchen	6.8	N/A	Fail
Block 5_L02_02_3B5P_Living Room	6.9	N/A	Fail
Block 5_L02_02_3B5P_Sgl Bedroom	3.8	50	Fail
Block 5_L02_03_2B3P_Dbl Bedroom	3.8	47	Fail
Block 5_L02_03_2B3P_Kitchen	3.5	N/A	Fail
Block 5_L02_03_2B3P_Living Room	6.9	N/A	Fail
Block 5_L02_03_2B3P_Sgl Bedroom	7	51	Fail
Block 5_L03_01_3B5P_Dbl Bedroom_E	3.8	55	Fail
Block 5_L03_01_3B5P_Dbl Bedroom_W	8.2	58	Fail
Block 5_L03_01_3B5P_Kitchen	7	N/A	Fail
Block 5_L03_01_3B5P_Living Room	3.5	N/A	Fail
Block 5_L03_01_3B5P_Sgl Bedroom	3.8	50	Fail
Block 5_L04_01_3B5P_Dbl Bedroom_E	6.8	55	Fail
Block 5_L04_01_3B5P_Dbl Bedroom_W	3.8	58	Fail
Block 5_L04_01_3B5P_Kitchen	3.8	N/A	Fail
Block 5_L04_01_3B5P_Living Room	8.3	N/A	Fail
Block 5_L04_01_3B5P_Sgl Bedroom	3.5	50	Fail
Block 5_L04_02_3B5P_Dbl Bedroom_E	7.5	57	Fail
Block 5_L04_02_3B5P_Dbl Bedroom_W	3.8	56	Fail
Block 5_L04_02_3B5P_Kitchen	6.8	N/A	Fail
Block 5_L04_02_3B5P_Living Room	7	N/A	Fail
Block 5_L04_02_3B5P_Sgl Bedroom	3.8	50	Fail
Block 5_L05_01_2B4P_Dbl Bedroom	3.5	43	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L05_01_2B4P_Kitchen	3.6	N/A	Fail
Block 5_L05_01_2B4P_Living Room	6.9	N/A	Fail
Block 5_L05_01_2B4P_Sgl Bedroom	3.7	49	Fail
Block 5_L05_02_4B7P_Dbl Bedroom_NE	3.4	43	Fail
Block 5_L05_02_4B7P_Dbl Bedroom_NW	7	47	Fail
Block 5_L05_02_4B7P_Dbl Bedroom_SE	3.7	52	Fail
Block 5_L05_02_4B7P_Kitchen	3.7	N/A	Fail
Block 5_L05_02_4B7P_Living Room	3.8	N/A	Fail
Block 5_L05_02_4B7P_Sgl Bedroom	3.2	49	Fail
Block 5_L05_03_1B2P_Dbl Bedroom	7.1	68	Fail
Block 5_L05_03_1B2P_KLD	7	N/A	Fail
Block 5_L05_04_3B5P_Dbl Bedroom_E	3.9	51	Fail
Block 5_L05_04_3B5P_Dbl Bedroom_W	3.6	54	Fail
Block 5_L05_04_3B5P_Kitchen	3.3	N/A	Fail
Block 5_L05_04_3B5P_Living Room	8.4	N/A	Fail
Block 5_L05_04_3B5P_Sgl Bedroom	3.8	48	Fail
Block 5_L05_05_3B5P_Dbl Bedroom_E	3.6	55	Fail
Block 5_L05_05_3B5P_Dbl Bedroom_W	3.9	51	Fail
Block 5_L05_05_3B5P_Kitchen	7.1	N/A	Fail
Block 5_L05_05_3B5P_Living Room	8	N/A	Fail
Block 5_L05_05_3B5P_Sgl Bedroom	3.8	48	Fail
Block 6N_L00_01_3B6P_Kitchen	7.2	N/A	Fail
Block 6N_L00_01_3B6P_Living Room	7.9	N/A	Fail
Block 6N_L00_02_3B6P_Dbl Bedroom_N	3.1	53	Fail
Block 6N_L00_02_3B6P_Dbl Bedroom_SE	3.1	55	Fail
Block 6N_L00_02_3B6P_Dbl Bedroom_SW	3.1	55	Fail
Block 6N_L00_02_3B6P_Kitchen	3.1	N/A	Fail
Block 6N_L00_02_3B6P_Living Room	7.9	N/A	Fail
Block 6N_L01_01_3B6P_Dbl Bedroom_N	3	53	Fail
Block 6N_L01_01_3B6P_Dbl Bedroom_SE	2.9	54	Fail
Block 6N_L01_01_3B6P_Dbl Bedroom_SW	2.8	54	Fail
Block 6N_L03_01_1B2P_Dbl Bedroom	3.1	65	Fail
Block 6N_L03_01_1B2P_Kitchen	3.7	N/A	Fail
Block 6N_L03_01_1B2P_Living Room	6.8	N/A	Fail
Block 6N_L04_01_3B6P_Dbl Bedroom_NE	3.1	58	Fail
Block 6N_L04_01_3B6P_Dbl Bedroom_NW	2.9	62	Fail
Block 6N_L04_01_3B6P_Dbl Bedroom_S	3.6	49	Fail
Block 6N_L04_01_3B6P_Kitchen	6.8	N/A	Fail
Block 6N_L04_01_3B6P_Living Room	7	N/A	Fail
Block 6N_L04_02_2B4P_Dbl Bedroom_E	6.8	55	Fail
Block 6N_L04_02_2B4P_Dbl Bedroom_W	3.3	60	Fail
Block 6N_L04_02_2B4P_KLD	2.9	N/A	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_NE	3.1	55	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6N_L05_01_3B6P_Dbl Bedroom_NW	3.1	55	Fail
Block 6N_L05_01_3B6P_Dbl Bedroom_S	7	47	Fail
Block 6N_L05_01_3B6P_Kitchen	6.9	N/A	Fail
Block 6N_L05_01_3B6P_Living Room	3.3	N/A	Fail
Block 6N_L05_02_2B4P_Dbl Bedroom_E	0.7	56	Fail
Block 6N_L05_02_2B4P_Dbl Bedroom_W	7.5	59	Fail
Block 6N_L05_02_2B4P_KLD	3.6	N/A	Fail
Block 6S_L00_01_4B7P_Kitchen	6.9	N/A	Fail
Block 6S_L00_01_4B7P_Living Room	6.4	N/A	Fail
Block 6S_L00_02_3B6P_Kitchen	3	N/A	Pass
Block 6S_L00_02_3B6P_Living Room	8.3	N/A	Fail
Block 6S_L00_03_3B6P_Kitchen	6.4	N/A	Fail
Block 6S_L00_03_3B6P_Living Room	8.9	N/A	Fail
Block 6S_L00_04_3B6P_Kitchen	6.2	N/A	Fail
Block 6S_L00_04_3B6P_Living Room	6.9	N/A	Fail
Block 6S_L00_05_3B6P_Kitchen	8.3	N/A	Fail
Block 6S_L00_05_3B6P_Living Room	8.8	N/A	Fail
Block 6S_L01_01_4B7P_Dbl Bedroom_N	3.1	56	Fail
Block 6S_L01_01_4B7P_Dbl Bedroom_SE	3.1	54	Fail
Block 6S_L01_01_4B7P_Dbl Bedroom_SW	3.2	54	Fail
Block 6S_L01_01_4B7P_Sgl Bedroom	3	51	Fail
Block 6S_L01_02_3B6P_Dbl Bedroom_NE	3.3	52	Fail
Block 6S_L01_02_3B6P_Dbl Bedroom_NW	3	51	Fail
Block 6S_L01_02_3B6P_Dbl Bedroom_S	6.6	48	Fail
Block 6S_L01_03_3B6P_Dbl Bedroom_NE	3.4	52	Fail
Block 6S_L01_03_3B6P_Dbl Bedroom_NW	3.1	52	Fail
Block 6S_L01_03_3B6P_Dbl Bedroom_S	3	50	Fail
Block 6S_L01_04_3B6P_Dbl Bedroom_NE	3.1	51	Fail
Block 6S_L01_04_3B6P_Dbl Bedroom_NW	3	51	Fail
Block 6S_L01_04_3B6P_Dbl Bedroom_S	3	48	Fail
Block 6S_L01_05_3B6P_Dbl Bedroom_NE	3.4	53	Fail
Block 6S_L01_05_3B6P_Dbl Bedroom_NW	3.1	53	Fail
Block 6S_L01_05_3B6P_Dbl Bedroom_S	3.3	50	Fail
Block 6S_L01_06_3B6P_Dbl Bedroom_S	3	55	Fail
Block 6S_L01_06_3B6P_Dbl Bedroom_SE	3.4	59	Fail
Block 6S_L01_06_3B6P_Dbl Bedroom_SW	3.5	58	Fail
Block 6S_L01_06_3B6P_Kitchen	6.6	N/A	Fail
Block 6S_L01_06_3B6P_Living Room	2.9	N/A	Pass
Block 6S_L02_01_4B7P_Dining	7.6	N/A	Fail
Block 6S_L02_01_4B7P_Kitchen	6.7	N/A	Fail
Block 6S_L02_01_4B7P_Living Room	3.5	N/A	Fail
Block 6S_L02_02_3B6P_Dbl Bedroom_S	6.7	56	Fail
Block 6S_L02_02_3B6P_Dbl Bedroom_SE	3.5	60	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L02_02_3B6P_Dbl Bedroom_SW	6.7	47	Fail
Block 6S_L02_02_3B6P_Kitchen	6	N/A	Fail
Block 6S_L02_02_3B6P_Living Room	3.6	N/A	Fail
Block 6S_L02_03_1B2P_Dbl Bedroom	3.1	65	Fail
Block 6S_L02_03_1B2P_Kitchen	7.1	N/A	Fail
Block 6S_L02_03_1B2P_Living Room	6.8	N/A	Fail
Block 6S_L02_04_1B2P_Dbl Bedroom	3.3	63	Fail
Block 6S_L02_04_1B2P_Kitchen	6.8	N/A	Fail
Block 6S_L02_04_1B2P_Living Room	7	N/A	Fail
Block 6S_L03_01_1B2P_Dbl Bedroom_NE	3.1	53	Fail
Block 6S_L03_01_1B2P_Dbl Bedroom_NW	2.9	46	Fail
Block 6S_L03_01_1B2P_Dbl Bedroom_S	2.8	52	Fail
Block 6S_L03_01_1B2P_Sgl Bedroom	2.9	47	Fail
Block 6S_L03_02_3B6P_Dbl Bedroom_S	3.5	54	Fail
Block 6S_L03_02_3B6P_Dbl Bedroom_SE	7.4	56	Fail
Block 6S_L03_02_3B6P_Dbl Bedroom_SW	6.8	44	Fail
Block 6S_L03_02_3B6P_Kitchen	6.8	N/A	Fail
Block 6S_L03_02_3B6P_Living Room	2.9	N/A	Pass
Block 6S_L03_03_1B2P_Dbl Bedroom	3.3	64	Fail
Block 6S_L03_03_1B2P_Kitchen	3.2	N/A	Fail
Block 6S_L03_03_1B2P_Living Room	7	N/A	Fail
Block 6S_L03_04_1B2P_Dbl Bedroom	3.7	67	Fail
Block 6S_L03_04_1B2P_Kitchen	6.9	N/A	Fail
Block 6S_L03_04_1B2P_Livinng Room	7.1	N/A	Fail
Block 6S_L03_05_1B2P_Dbl Bedroom	3.7	65	Fail
Block 6S_L03_05_1B2P_Kitchen	7.9	N/A	Fail
Block 6S_L03_05_1B2P_Living Room	7.2	N/A	Fail
Block 6S_L04_01_4B7P_Dbl Bedroom_NE	3.5	59	Fail
Block 6S_L04_01_4B7P_Dbl Bedroom_NW	6.4	54	Fail
Block 6S_L04_01_4B7P_Dbl Bedroom_S	3.2	55	Fail
Block 6S_L04_01_4B7P_Kitchen	7.2	N/A	Fail
Block 6S_L04_01_4B7P_Living Room	2.9	N/A	Pass
Block 6S_L04_01_4B7P_Sgl Bedroom	7	45	Fail
Block 6S_L04_02_3B6P_Dbl Bedroom_S	3.6	57	Fail
Block 6S_L04_02_3B6P_Dbl Bedroom_SE	6.9	60	Fail
Block 6S_L04_02_3B6P_Dbl Bedroom_SW	3.5	47	Fail
Block 6S_L04_02_3B6P_Kitchen	6.8	N/A	Fail
Block 6S_L04_02_3B6P_Living Room	3.1	N/A	Fail
Block 6S_L04_03_3B6P_Dbl Bedroom_E	7	57	Fail
Block 6S_L04_03_3B6P_Dbl Bedroom_N	3.3	62	Fail
Block 6S_L04_03_3B6P_Dbl Bedroom_W	7.2	57	Fail
Block 6S_L04_03_3B6P_Kitchen	3.3	N/A	Fail
Block 6S_L04_03_3B6P_Living Room	7.2	N/A	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L05_01_2B3P_Dbl Bedroom	7	57	Fail
Block 6S_L05_01_2B3P_Sgl Bedroom	3.3	52	Fail
Block 6S_L05_02_3B6P_Dbl Bedroom_S	7	52	Fail
Block 6S_L05_02_3B6P_Dbl Bedroom_SE	3.6	54	Fail
Block 6S_L05_02_3B6P_Dbl Bedroom_SW	3.3	44	Fail
Block 6S_L05_02_3B6P_Kitchen	7.5	N/A	Fail
Block 6S_L05_02_3B6P_Living Room	3.9	N/A	Fail
Block 6S_L05_03_2B3P_KLD	3.1	N/A	Fail
Block 6S_L05_03_3B6P_Dbl Bedroom_N	7.2	58	Fail
Block 6S_L05_03_3B6P_Dbl Bedroom_SE	3.7	53	Fail
Block 6S_L05_03_3B6P_Dbl Bedroom_SW	3.2	50	Fail
Block 6S_L05_03_3B6P_Kitchen	6.8	N/A	Fail
Block 6S_L05_03_3B6P_Living Room	7.3	N/A	Fail
Block 7_L01_04_2B4P_Dbl Bedroom_N	3.4	52	Fail
Block 7_L01_04_2B4P_Dbl Bedroom_S	2.9	54	Fail
Block 7_L01_04_2B4P_Kitchen	7.5	N/A	Fail
Block 7_L01_04_2B4P_Living Room	6.6	N/A	Fail
Block 7_L01_05_2B4P_Dbl Bedroom_E	3.1	54	Fail
Block 7_L01_05_2B4P_Dbl Bedroom_W	3.3	52	Fail
Block 7_L01_05_2B4P_Kitchen	6.7	N/A	Fail
Block 7_L01_05_2B4P_Living Room	6.6	N/A	Fail
Block 7_L01_06_1B2P_Dbl Bedroom	3.4	54	Fail
Block 7_L01_06_1B2P_Kitchen	6.8	N/A	Fail
Block 7_L01_06_1B2P_Living Room	6.9	N/A	Fail
Block 7_L03_04_2B4P_Dbl Bedroom_N	3.3	52	Fail
Block 7_L03_04_2B4P_Dbl Bedroom_S	2.9	54	Fail
Block 7_L03_04_2B4P_Kitchen	6.8	N/A	Fail
Block 7_L03_04_2B4P_Kitchen	7	N/A	Fail
Block 7_L03_04_2B4P_Living Room	6.6	N/A	Fail
Block 7_L03_04_2B4P_Living Room	6.6	N/A	Fail
Block 7_L03_05_2B4P_Dbl Bedroom_E	3.1	55	Fail
Block 7_L03_05_2B4P_Dbl Bedroom_W	3.3	52	Fail
Block 7_L03_06_1B2P_Dbl Bedroom	3.5	55	Fail
Block 7_L03_06_1B2P_Kitchen	7	N/A	Fail
Block 7_L03_06_1B2P_Living Room	6.9	N/A	Fail
Block 7_L04_04_2B4P_Dbl Bedroom_N	7.4	51	Fail
Block 7_L04_04_2B4P_Dbl Bedroom_S	2.9	54	Fail
Block 7_L04_04_2B4P_Kitchen	7	N/A	Fail
Block 7_L04_04_2B4P_Living Room	6.6	N/A	Fail
Block 7_L04_05_2B4P_Dbl Bedroom_E	3.6	52	Fail
Block 7_L04_05_2B4P_Dbl Bedroom_W	3.1	52	Fail
Block 7_L04_05_2B4P_Kitchen	6.8	N/A	Fail
Block 7_L04_05_2B4P_Living Room	6.8	N/A	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 7_L05_01_1B2P_Dbl Bedroom	3.3	52	Fail
Block 7_L05_01_1B2P_Kitchen	3.7	N/A	Fail
Block 7_L05_01_1B2P_Living Room	7.9	N/A	Fail
Block 7_L05_02_2B4P_Dbl Bedroom_E	3.6	51	Fail
Block 7_L05_02_2B4P_Dbl Bedroom_W	3	49	Fail
Block 7_L05_02_2B4P_Kitchen	6.9	N/A	Fail
Block 7_L05_02_2B4P_Living Room	7.2	N/A	Fail
Block 7_L05_03_2B4P_Dbl Bedroom_N	3.1	49	Fail
Block 7_L05_03_2B4P_Dbl Bedroom_S	7.2	50	Fail
Block 7_L05_03_2B4P_Kitchen	4	N/A	Fail
Block 7_L05_03_2B4P_Living Room	6.7	N/A	Fail
Block 8_L00_01_4B7P_Kitchen	7	N/A	Fail
Block 8_L00_01_4B7P_Living Room	7.1	N/A	Fail
Block 8_L00_02_3B6P_Kitchen	6.7	N/A	Fail
Block 8_L00_02_3B6P_Living Room	7.6	N/A	Fail
Block 8_L00_03_3B6P_Kitchen	11.6	N/A	Fail
Block 8_L00_03_3B6P_Living Room	7.5	N/A	Fail
Block 8_L00_04_3B6P_Kitchen	2.9	N/A	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_N	3.1	62	Fail
Block 8_L01_01_4B7P_Dbl Bedroom_SE	3	57	Fail
Block 8_L01_01_4B7P_Dbl Bedroom_SW	3.1	55	Fail
Block 8_L01_01_4B7P_Sgl Bedroom	3.2	64	Fail
Block 8_L01_02_3B6P_Dbl Bedroom_N	3.1	58	Fail
Block 8_L01_02_3B6P_Dbl Bedroom_SE	3.3	61	Fail
Block 8_L01_02_3B6P_Dbl Bedroom_SW	2.9	54	Fail
Block 8_L01_03_3B6P_Dbl Bedroom_N	3.5	58	Fail
Block 8_L01_03_3B6P_Dbl Bedroom_SE	2.9	53	Fail
Block 8_L01_03_3B6P_Dbl Bedroom_SW	2.8	61	Fail
Block 8_L01_04_3B6P_Dbl Bedroom_E	3.2	61	Fail
Block 8_L01_04_3B6P_Dbl Bedroom_NE	6.5	61	Fail
Block 8_L01_04_3B6P_Dbl Bedroom_W	7.4	63	Fail
Block 8_L02_01_4B7P_KLD	6.2	N/A	Fail
Block 8_L02_01_4B7P_Living Room	6.3	N/A	Fail
Block 8_L02_02_3B6P_Kitchen	5.9	N/A	Fail
Block 8_L02_02_3B6P_Kitchen	3.1	N/A	Fail
Block 8_L02_02_3B6P_Living Room	6.9	N/A	Fail
Block 8_L02_02_3B6P_Living Room	6.9	N/A	Fail
Block 8_L02_03_3B6P_Kitchen	6.4	N/A	Fail
Block 8_L02_03_3B6P_Living Room	6.6	N/A	Fail
Block 8_L03_01_4B7P_Dbl Bedroom_NE	3.1	45	Fail
Block 8_L03_01_4B7P_Dbl Bedroom_NW	3.1	58	Fail
Block 8_L03_01_4B7P_Dbl Bedroom_S	3.1	51	Fail
Block 8_L03_01_4B7P_Sgl Bedroom	2.9	46	Fail

Room		CIBSE 2020s DSY1		Part O Compliance
		Criterion 1	Criterion 2	
		≤ 3%	≤ 32hrs	
Block 8_L03_02_3B6P_Dbl Bedroom_NE		3.3	57	Fail
Block 8_L03_02_3B6P_Dbl Bedroom_NW		3.1	46	Fail
Block 8_L03_02_3B6P_Dbl Bedroom_S		2.8	48	Fail
Block 8_L03_03_3B6P_Dbl Bedorom_S		2.8	51	Fail
Block 8_L03_03_3B6P_Dbl Bedroom_NE		3.1	57	Fail
Block 8_L03_03_3B6P_Dbl Bedroom_NW		3.3	47	Fail
Block 8_L03_04_3B6P_Dbl Bedroom_NE		7.2	57	Fail
Block 8_L03_04_3B6P_Dbl Bedroom_SE		3.1	48	Fail
Block 8_L03_04_3B6P_Dbl Bedroom_SW		3.4	57	Fail
Block 8_L05_01_3B6P_Dbl Bedroom_N		6.9	53	Fail
Block 8_L05_01_3B6P_Dbl Bedroom_S		2.9	47	Fail
Block 8_L05_01_3B6P_Kitchen		6.8	N/A	Fail
Block 8_L05_01_3B6P_Living Room		3.6	N/A	Fail
Block 8_L05_01_3B6P_Sgl Bedroom		3.1	52	Fail
Block 8_L05_02_4B6P_Dbl Bedroom_N		3.1	57	Fail
Block 8_L05_02_4B6P_Dbl Bedroom_S		6.9	61	Fail
Block 8_L05_02_4B6P_Kitchen		3.8	N/A	Fail
Block 8_L05_02_4B6P_Living Room		3.3	N/A	Fail
Block 8_L05_02_4B6P_Sgl Bedroom_N		3.8	50	Fail
Block 8_L05_02_4B6P_Sgl Bedroom_S		3.6	50	Fail
Total No. Pass	Bedrooms	25 / 154	0 / 154	**0 / 154**
	Kitchen, Living, Dining (KLDs)	7 / 116	N/A	**7 / 116**
Overall compliance % Pass				**7 / 270** **2.59%**

Iteration 02

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L00_01_3B5P_Dbl Bedroom	0.5	32	Pass
Block 5_L00_01_3B5P_Kitchen	1.5	N/A	Pass
Block 5_L00_01_3B5P_Living Room	1.2	N/A	Pass
Block 5_L00_01_3B5P_Sgl Bedroom_E	0.6	32	Pass
Block 5_L00_01_3B5P_Sgl Bedroom_W	0.5	32	Pass
Block 5_L02_01_3B5P_Dbl Bedroom_E	0.7	20	Pass
Block 5_L02_01_3B5P_Dbl Bedroom_W	0.6	20	Pass
Block 5_L02_01_3B5P_Kitchen	1.6	N/A	Pass
Block 5_L02_01_3B5P_Living Room	1.5	N/A	Pass
Block 5_L02_01_3B5P_Sgl Bedroom	0.7	18	Pass
Block 5_L02_02_3B5P_Dbl Bedroom_E	0.7	20	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L02_02_3B5P_Dbl Bedroom_W	0.7	20	Pass
Block 5_L02_02_3B5P_Kitchen	1.5	N/A	Pass
Block 5_L02_02_3B5P_Living Room	1.3	N/A	Pass
Block 5_L02_02_3B5P_Sgl Bedroom	0.8	18	Pass
Block 5_L02_03_2B3P_Dbl Bedroom	0.7	16	Pass
Block 5_L02_03_2B3P_Kitchen	1.3	N/A	Pass
Block 5_L02_03_2B3P_Living Room	1.3	N/A	Pass
Block 5_L02_03_2B3P_Sgl Bedroom	0.7	17	Pass
Block 5_L03_01_3B5P_Dbl Bedroom_E	0.7	20	Pass
Block 5_L03_01_3B5P_Dbl Bedroom_W	0.7	20	Pass
Block 5_L03_01_3B5P_Kitchen	1.6	N/A	Pass
Block 5_L03_01_3B5P_Living Room	1.5	N/A	Pass
Block 5_L03_01_3B5P_Sgl Bedroom	0.7	18	Pass
Block 5_L04_01_3B5P_Dbl Bedroom_E	0.7	20	Pass
Block 5_L04_01_3B5P_Dbl Bedroom_W	0.7	19	Pass
Block 5_L04_01_3B5P_Kitchen	1.6	N/A	Pass
Block 5_L04_01_3B5P_Living Room	1.5	N/A	Pass
Block 5_L04_01_3B5P_Sgl Bedroom	0.7	18	Pass
Block 5_L04_02_3B5P_Dbl Bedroom_E	0.7	19	Pass
Block 5_L04_02_3B5P_Dbl Bedroom_W	0.7	20	Pass
Block 5_L04_02_3B5P_Kitchen	1.5	N/A	Pass
Block 5_L04_02_3B5P_Living Room	1.3	N/A	Pass
Block 5_L04_02_3B5P_Sgl Bedroom	0.8	18	Pass
Block 5_L05_01_2B4P_Dbl Bedroom	0.8	14	Pass
Block 5_L05_01_2B4P_Kitchen	1.3	N/A	Pass
Block 5_L05_01_2B4P_Living Room	1.3	N/A	Pass
Block 5_L05_01_2B4P_Sgl Bedroom	0.7	16	Pass
Block 5_L05_02_4B7P_Dbl Bedroom_NE	0.8	17	Pass
Block 5_L05_02_4B7P_Dbl Bedroom_NW	0.8	16	Pass
Block 5_L05_02_4B7P_Dbl Bedroom_SE	0.8	20	Pass
Block 5_L05_02_4B7P_Kitchen	1.4	N/A	Pass
Block 5_L05_02_4B7P_Living Room	1.4	N/A	Pass
Block 5_L05_02_4B7P_Sgl Bedroom	0.8	17	Pass
Block 5_L05_03_1B2P_Dbl Bedroom	0.7	21	Pass
Block 5_L05_03_1B2P_KLD	1	N/A	Pass
Block 5_L05_04_3B5P_Dbl Bedroom_E	0.7	18	Pass
Block 5_L05_04_3B5P_Dbl Bedroom_W	0.7	18	Pass
Block 5_L05_04_3B5P_Kitchen	1.6	N/A	Pass
Block 5_L05_04_3B5P_Living Room	1.5	N/A	Pass
Block 5_L05_04_3B5P_Sgl Bedroom	0.8	17	Pass
Block 5_L05_05_3B5P_Dbl Bedroom_E	0.8	18	Pass
Block 5_L05_05_3B5P_Dbl Bedroom_W	0.7	32	Pass
Block 5_L05_05_3B5P_Kitchen	1.7	N/A	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L05_05_3B5P_Living Room	1.4	N/A	Pass
Block 5_L05_05_3B5P_Sgl Bedroom	0.8	17	Pass
Block 6N_L00_01_3B6P_Kitchen	1.5	N/A	Pass
Block 6N_L00_01_3B6P_Living Room	1	N/A	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_N	0.7	18	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_SE	0.6	21	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_SW	0.6	21	Pass
Block 6N_L00_02_3B6P_Kitchen	1.5	N/A	Pass
Block 6N_L00_02_3B6P_Living Room	1	N/A	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_N	0.5	17	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_SE	0.7	20	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_SW	0.6	19	Pass
Block 6N_L03_01_1B2P_Dbl Bedroom	0.5	21	Pass
Block 6N_L03_01_1B2P_Kitchen	1.1	N/A	Pass
Block 6N_L03_01_1B2P_Living Room	1.4	N/A	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_NE	0.7	20	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_NW	0.7	19	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_S	0.5	19	Pass
Block 6N_L04_01_3B6P_Kitchen	1.4	N/A	Pass
Block 6N_L04_01_3B6P_Living Room	1.4	N/A	Pass
Block 6N_L04_02_2B4P_Dbl Bedroom_E	0.8	20	Pass
Block 6N_L04_02_2B4P_Dbl Bedroom_W	0.8	20	Pass
Block 6N_L04_02_2B4P_KLD	1.4	N/A	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_NE	0.7	19	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_NW	0.7	18	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_S	0.6	18	Pass
Block 6N_L05_01_3B6P_Kitchen	1.5	N/A	Pass
Block 6N_L05_01_3B6P_Living Room	1.5	N/A	Pass
Block 6N_L05_02_2B4P_Dbl Bedroom_E	0.7	19	Pass
Block 6N_L05_02_2B4P_Dbl Bedroom_W	0.7	20	Pass
Block 6N_L05_02_2B4P_KLD	1.4	N/A	Pass
Block 6S_L00_01_4B7P_Kitchen	1.2	N/A	Pass
Block 6S_L00_01_4B7P_Living Room	1	N/A	Pass
Block 6S_L00_02_3B6P_Kitchen	1.1	N/A	Pass
Block 6S_L00_02_3B6P_Living Room	0.8	N/A	Pass
Block 6S_L00_03_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L00_03_3B6P_Living Room	1.1	N/A	Pass
Block 6S_L00_04_3B6P_Kitchen	1	N/A	Pass
Block 6S_L00_04_3B6P_Living Room	0.8	N/A	Pass
Block 6S_L00_05_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L00_05_3B6P_Living Room	0.9	N/A	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_N	0.7	19	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_SE	0.6	20	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L01_01_4B7P_Dbl Bedroom_SW	0.6	20	Pass
Block 6S_L01_01_4B7P_Sgl Bedroom	0.7	17	Pass
Block 6S_L01_02_3B6P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L01_02_3B6P_Dbl Bedroom_NW	0.7	18	Pass
Block 6S_L01_02_3B6P_Dbl Bedroom_S	0.6	19	Pass
Block 6S_L01_03_3B6P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L01_03_3B6P_Dbl Bedroom_NW	0.7	17	Pass
Block 6S_L01_03_3B6P_Dbl Bedroom_S	0.6	19	Pass
Block 6S_L01_04_3B6P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L01_04_3B6P_Dbl Bedroom_NW	0.7	18	Pass
Block 6S_L01_04_3B6P_Dbl Bedroom_S	0.6	19	Pass
Block 6S_L01_05_3B6P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L01_05_3B6P_Dbl Bedroom_NW	0.6	17	Pass
Block 6S_L01_05_3B6P_Dbl Bedroom_S	0.6	19	Pass
Block 6S_L01_06_3B6P_Dbl Bedroom_S	0.6	20	Pass
Block 6S_L01_06_3B6P_Dbl Bedroom_SE	0.6	19	Pass
Block 6S_L01_06_3B6P_Dbl Bedroom_SW	0.6	21	Pass
Block 6S_L01_06_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L01_06_3B6P_Living Room	1.3	N/A	Pass
Block 6S_L02_01_4B7P_Dining	1.3	N/A	Pass
Block 6S_L02_01_4B7P_Kitchen	1.3	N/A	Pass
Block 6S_L02_01_4B7P_Living Room	1.2	N/A	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_S	0.7	20	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_SE	0.7	19	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_SW	0.7	16	Pass
Block 6S_L02_02_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L02_02_3B6P_Living Room	1.3	N/A	Pass
Block 6S_L02_03_1B2P_Dbl Bedroom	0.5	20	Pass
Block 6S_L02_03_1B2P_Kitchen	1.2	N/A	Pass
Block 6S_L02_03_1B2P_Living Room	1.3	N/A	Pass
Block 6S_L02_04_1B2P_Dbl Bedroom	0.5	21	Pass
Block 6S_L02_04_1B2P_Kitchen	1.2	N/A	Pass
Block 6S_L02_04_1B2P_Living Room	1.4	N/A	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_NW	0.7	14	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_S	0.5	20	Pass
Block 6S_L03_01_1B2P_Sgl Bedroom	0.6	17	Pass
Block 6S_L03_02_3B6P_Dbl Bedroom_S	0.7	20	Pass
Block 6S_L03_02_3B6P_Dbl Bedroom_SE	0.7	19	Pass
Block 6S_L03_02_3B6P_Dbl Bedroom_SW	0.7	15	Pass
Block 6S_L03_02_3B6P_Kitchen	1.4	N/A	Pass
Block 6S_L03_02_3B6P_Living Room	1.4	N/A	Pass
Block 6S_L03_03_1B2P_Dbl Bedroom	0.6	20	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L03_03_1B2P_Kitchen	1.3	N/A	Pass
Block 6S_L03_03_1B2P_Living Room	1.4	N/A	Pass
Block 6S_L03_04_1B2P_Dbl Bedroom	0.6	20	Pass
Block 6S_L03_04_1B2P_Kitchen	1.2	N/A	Pass
Block 6S_L03_04_1B2P_Livinng Room	1.4	N/A	Pass
Block 6S_L03_05_1B2P_Dbl Bedroom	0.4	21	Pass
Block 6S_L03_05_1B2P_Kitchen	1.2	N/A	Pass
Block 6S_L03_05_1B2P_Living Room	1.4	N/A	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_NE	0.7	20	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_NW	0.7	19	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_S	0.6	21	Pass
Block 6S_L04_01_4B7P_Kitchen	1.2	N/A	Pass
Block 6S_L04_01_4B7P_Living Room	1.2	N/A	Pass
Block 6S_L04_01_4B7P_Sgl Bedroom	0.6	15	Pass
Block 6S_L04_02_3B6P_Dbl Bedroom_S	0.7	20	Pass
Block 6S_L04_02_3B6P_Dbl Bedroom_SE	0.7	19	Pass
Block 6S_L04_02_3B6P_Dbl Bedroom_SW	0.7	16	Pass
Block 6S_L04_02_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L04_02_3B6P_Living Room	1.4	N/A	Pass
Block 6S_L04_03_3B6P_Dbl Bedroom_E	0.6	21	Pass
Block 6S_L04_03_3B6P_Dbl Bedroom_N	0.7	20	Pass
Block 6S_L04_03_3B6P_Dbl Bedroom_W	0.6	20	Pass
Block 6S_L04_03_3B6P_Kitchen	1.5	N/A	Pass
Block 6S_L04_03_3B6P_Living Room	1.5	N/A	Pass
Block 6S_L05_01_2B3P_Dbl Bedroom	0.7	20	Pass
Block 6S_L05_01_2B3P_Sgl Bedroom	0.7	17	Pass
Block 6S_L05_02_3B6P_Dbl Bedroom_S	0.7	18	Pass
Block 6S_L05_02_3B6P_Dbl Bedroom_SE	0.7	18	Pass
Block 6S_L05_02_3B6P_Dbl Bedroom_SW	0.7	16	Pass
Block 6S_L05_02_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L05_02_3B6P_Living Room	1.6	N/A	Pass
Block 6S_L05_03_2B3P_KLD	1.3	N/A	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_N	0.8	20	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_SE	0.6	21	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_SW	0.7	18	Pass
Block 6S_L05_03_3B6P_Kitchen	1.6	N/A	Pass
Block 6S_L05_03_3B6P_Living Room	1.6	N/A	Pass
Block 7_L01_04_2B4P_Dbl Bedroom_N	0.6	19	Pass
Block 7_L01_04_2B4P_Dbl Bedroom_S	0.7	19	Pass
Block 7_L01_04_2B4P_Kitchen	1.3	N/A	Pass
Block 7_L01_04_2B4P_Living Room	1.3	N/A	Pass
Block 7_L01_05_2B4P_Dbl Bedroom_E	0.7	18	Pass
Block 7_L01_05_2B4P_Dbl Bedroom_W	0.7	18	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 7_L01_05_2B4P_Kitchen	1.3	N/A	Pass
Block 7_L01_05_2B4P_Living Room	1.4	N/A	Pass
Block 7_L01_06_1B2P_Dbl Bedroom	0.8	18	Pass
Block 7_L01_06_1B2P_Kitchen	1.3	N/A	Pass
Block 7_L01_06_1B2P_Living Room	1.3	N/A	Pass
Block 7_L03_04_2B4P_Dbl Bedroom_N	0.6	19	Pass
Block 7_L03_04_2B4P_Dbl Bedroom_S	0.7	19	Pass
Block 7_L03_04_2B4P_Kitchen	1.3	N/A	Pass
Block 7_L03_04_2B4P_Kitchen	1.3	N/A	Pass
Block 7_L03_04_2B4P_Living Room	1.4	N/A	Pass
Block 7_L03_04_2B4P_Living Room	1.3	N/A	Pass
Block 7_L03_05_2B4P_Dbl Bedroom_E	0.7	18	Pass
Block 7_L03_05_2B4P_Dbl Bedroom_W	0.7	18	Pass
Block 7_L03_06_1B2P_Dbl Bedroom	0.8	19	Pass
Block 7_L03_06_1B2P_Kitchen	1.3	N/A	Pass
Block 7_L03_06_1B2P_Living Room	1.4	N/A	Pass
Block 7_L04_04_2B4P_Dbl Bedroom_N	0.6	19	Pass
Block 7_L04_04_2B4P_Dbl Bedroom_S	0.7	18	Pass
Block 7_L04_04_2B4P_Kitchen	1.3	N/A	Pass
Block 7_L04_04_2B4P_Living Room	1.3	N/A	Pass
Block 7_L04_05_2B4P_Dbl Bedroom_E	0.7	18	Pass
Block 7_L04_05_2B4P_Dbl Bedroom_W	0.7	18	Pass
Block 7_L04_05_2B4P_Kitchen	1.3	N/A	Pass
Block 7_L04_05_2B4P_Living Room	1.4	N/A	Pass
Block 7_L05_01_1B2P_Dbl Bedroom	0.8	18	Pass
Block 7_L05_01_1B2P_Kitchen	1.5	N/A	Pass
Block 7_L05_01_1B2P_Living Room	1.4	N/A	Pass
Block 7_L05_02_2B4P_Dbl Bedroom_E	0.7	16	Pass
Block 7_L05_02_2B4P_Dbl Bedroom_W	0.7	17	Pass
Block 7_L05_02_2B4P_Kitchen	1.4	N/A	Pass
Block 7_L05_02_2B4P_Living Room	1.5	N/A	Pass
Block 7_L05_03_2B4P_Dbl Bedroom_N	0.6	16	Pass
Block 7_L05_03_2B4P_Dbl Bedroom_S	0.7	17	Pass
Block 7_L05_03_2B4P_Kitchen	1.3	N/A	Pass
Block 7_L05_03_2B4P_Living Room	1.4	N/A	Pass
Block 8_L00_01_4B7P_Kitchen	1.3	N/A	Pass
Block 8_L00_01_4B7P_Living Room	1	N/A	Pass
Block 8_L00_02_3B6P_Kitchen	1.4	N/A	Pass
Block 8_L00_02_3B6P_Living Room	1.1	N/A	Pass
Block 8_L00_03_3B6P_Kitchen	1.4	N/A	Pass
Block 8_L00_03_3B6P_Living Room	1.1	N/A	Pass
Block 8_L00_04_3B6P_Kitchen	0.9	N/A	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_N	0.6	20	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 8_L01_01_4B7P_Dbl Bedroom_SE	0.6	20	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_SW	0.4	20	Pass
Block 8_L01_01_4B7P_Sgl Bedroom	0.7	21	Pass
Block 8_L01_02_3B6P_Dbl Bedroom_N	0.7	20	Pass
Block 8_L01_02_3B6P_Dbl Bedroom_SE	0.4	22	Pass
Block 8_L01_02_3B6P_Dbl Bedroom_SW	0.5	20	Pass
Block 8_L01_03_3B6P_Dbl Bedroom_N	0.7	20	Pass
Block 8_L01_03_3B6P_Dbl Bedroom_SE	0.5	20	Pass
Block 8_L01_03_3B6P_Dbl Bedroom_SW	0.4	22	Pass
Block 8_L01_04_3B6P_Dbl Bedroom_E	0.6	20	Pass
Block 8_L01_04_3B6P_Dbl Bedroom_NE	0.7	20	Pass
Block 8_L01_04_3B6P_Dbl Bedroom_W	0.6	21	Pass
Block 8_L02_01_4B7P_KLD	1.2	N/A	Pass
Block 8_L02_01_4B7P_Living Room	1.3	N/A	Pass
Block 8_L02_02_3B6P_Kitchen	1.1	N/A	Pass
Block 8_L02_02_3B6P_Kitchen	1.3	N/A	Pass
Block 8_L02_02_3B6P_Living Room	1.2	N/A	Pass
Block 8_L02_02_3B6P_Living Room	1.2	N/A	Pass
Block 8_L02_03_3B6P_Kitchen	1.1	N/A	Pass
Block 8_L02_03_3B6P_Living Room	1.2	N/A	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_NE	0.8	15	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_NW	0.6	20	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_S	0.6	20	Pass
Block 8_L03_01_4B7P_Sgl Bedroom	0.6	16	Pass
Block 8_L03_02_3B6P_Dbl Bedroom_NE	0.6	20	Pass
Block 8_L03_02_3B6P_Dbl Bedroom_NW	0.8	16	Pass
Block 8_L03_02_3B6P_Dbl Bedroom_S	0.5	32	Pass
Block 8_L03_03_3B6P_Dbl Bedorom_S	0.5	19	Pass
Block 8_L03_03_3B6P_Dbl Bedroom_NE	0.6	20	Pass
Block 8_L03_03_3B6P_Dbl Bedroom_NW	0.8	16	Pass
Block 8_L03_04_3B6P_Dbl Bedroom_NE	0.7	20	Pass
Block 8_L03_04_3B6P_Dbl Bedroom_SE	0.7	16	Pass
Block 8_L03_04_3B6P_Dbl Bedroom_SW	0.7	20	Pass
Block 8_L05_01_3B6P_Dbl Bedroom_N	0.7	19	Pass
Block 8_L05_01_3B6P_Dbl Bedroom_S	0.6	18	Pass
Block 8_L05_01_3B6P_Kitchen	1.5	N/A	Pass
Block 8_L05_01_3B6P_Living Room	1.5	N/A	Pass
Block 8_L05_01_3B6P_Sgl Bedroom	0.7	17	Pass
Block 8_L05_02_4B6P_Dbl Bedroom_N	0.7	20	Pass
Block 8_L05_02_4B6P_Dbl Bedroom_S	0.7	20	Pass
Block 8_L05_02_4B6P_Kitchen	1.4	N/A	Pass
Block 8_L05_02_4B6P_Living Room	1.2	N/A	Pass
Block 8_L05_02_4B6P_Sgl Bedroom_N	0.8	17	Pass

Room		CIBSE 2020s DSY1		Part O Compliance
		Criterion 1	Criterion 2	
		≤ 3%	≤ 32hrs	
Block 8_L05_02_4B6P_Sgl Bedroom_S		0.8	17	Pass
Total No. Pass	Bedrooms	154 / 154	154 / 154	**154 / 154**
	Kitchen, Living, Dining (KLDs)	116 / 116	N/A	**116 / 116**
Overall compliance % Pass				**270 / 270** **100%**

Iteration 03

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L00_01_3B5P_Dbl Bedroom	0.5	32	Pass
Block 5_L00_01_3B5P_Kitchen	1.6	N/A	Pass
Block 5_L00_01_3B5P_Living Room	1.1	N/A	Pass
Block 5_L00_01_3B5P_Sgl Bedroom_E	0.5	32	Pass
Block 5_L00_01_3B5P_Sgl Bedroom_W	0.5	32	Pass
Block 5_L02_01_3B5P_Dbl Bedroom_E	0.7	20	Pass
Block 5_L02_01_3B5P_Dbl Bedroom_W	0.6	20	Pass
Block 5_L02_01_3B5P_Kitchen	1.8	N/A	Pass
Block 5_L02_01_3B5P_Living Room	1.4	N/A	Pass
Block 5_L02_01_3B5P_Sgl Bedroom	0.7	18	Pass
Block 5_L02_02_3B5P_Dbl Bedroom_E	0.7	20	Pass
Block 5_L02_02_3B5P_Dbl Bedroom_W	0.7	20	Pass
Block 5_L02_02_3B5P_Kitchen	1.5	N/A	Pass
Block 5_L02_02_3B5P_Living Room	1.2	N/A	Pass
Block 5_L02_02_3B5P_Sgl Bedroom	0.7	18	Pass
Block 5_L02_03_2B3P_Dbl Bedroom	0.7	16	Pass
Block 5_L02_03_2B3P_Kitchen	1.2	N/A	Pass
Block 5_L02_03_2B3P_Living Room	1.1	N/A	Pass
Block 5_L02_03_2B3P_Sgl Bedroom	0.7	17	Pass
Block 5_L03_01_3B5P_Dbl Bedroom_E	0.7	20	Pass
Block 5_L03_01_3B5P_Dbl Bedroom_W	0.7	20	Pass
Block 5_L03_01_3B5P_Kitchen	1.7	N/A	Pass
Block 5_L03_01_3B5P_Living Room	1.5	N/A	Pass
Block 5_L03_01_3B5P_Sgl Bedroom	0.7	18	Pass
Block 5_L04_01_3B5P_Dbl Bedroom_E	0.7	20	Pass
Block 5_L04_01_3B5P_Dbl Bedroom_W	0.7	20	Pass
Block 5_L04_01_3B5P_Kitchen	1.8	N/A	Pass
Block 5_L04_01_3B5P_Living Room	1.5	N/A	Pass
Block 5_L04_01_3B5P_Sgl Bedroom	0.7	18	Pass
Block 5_L04_02_3B5P_Dbl Bedroom_E	0.7	20	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L04_02_3B5P_Dbl Bedroom_W	0.7	20	Pass
Block 5_L04_02_3B5P_Kitchen	1.5	N/A	Pass
Block 5_L04_02_3B5P_Living Room	1.3	N/A	Pass
Block 5_L04_02_3B5P_Sgl Bedroom	0.8	18	Pass
Block 5_L05_01_2B4P_Dbl Bedroom	0.7	15	Pass
Block 5_L05_01_2B4P_Kitchen	1.2	N/A	Pass
Block 5_L05_01_2B4P_Living Room	1.2	N/A	Pass
Block 5_L05_01_2B4P_Sgl Bedroom	0.7	16	Pass
Block 5_L05_02_4B7P_Dbl Bedroom_NE	0.8	17	Pass
Block 5_L05_02_4B7P_Dbl Bedroom_NW	0.8	16	Pass
Block 5_L05_02_4B7P_Dbl Bedroom_SE	0.8	20	Pass
Block 5_L05_02_4B7P_Kitchen	1.4	N/A	Pass
Block 5_L05_02_4B7P_Living Room	1.4	N/A	Pass
Block 5_L05_02_4B7P_Sgl Bedroom	0.8	17	Pass
Block 5_L05_03_1B2P_Dbl Bedroom	0.6	21	Pass
Block 5_L05_03_1B2P_KLD	0.9	N/A	Pass
Block 5_L05_04_3B5P_Dbl Bedroom_E	0.7	18	Pass
Block 5_L05_04_3B5P_Dbl Bedroom_W	0.7	18	Pass
Block 5_L05_04_3B5P_Kitchen	2.1	N/A	Pass
Block 5_L05_04_3B5P_Living Room	1.5	N/A	Pass
Block 5_L05_04_3B5P_Sgl Bedroom	0.8	17	Pass
Block 5_L05_05_3B5P_Dbl Bedroom_E	0.7	18	Pass
Block 5_L05_05_3B5P_Dbl Bedroom_W	0.7	32	Pass
Block 5_L05_05_3B5P_Kitchen	1.8	N/A	Pass
Block 5_L05_05_3B5P_Living Room	1.3	N/A	Pass
Block 5_L05_05_3B5P_Sgl Bedroom	0.8	17	Pass
Block 6N_L00_01_3B6P_Kitchen	1.9	N/A	Pass
Block 6N_L00_01_3B6P_Living Room	0.9	N/A	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_N	0.7	19	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_SE	0.6	21	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_SW	0.6	21	Pass
Block 6N_L00_02_3B6P_Kitchen	1.9	N/A	Pass
Block 6N_L00_02_3B6P_Living Room	1	N/A	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_N	0.5	18	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_SE	0.7	20	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_SW	0.6	19	Pass
Block 6N_L03_01_1B2P_Dbl Bedroom	0.5	21	Pass
Block 6N_L03_01_1B2P_Kitchen	1	N/A	Pass
Block 6N_L03_01_1B2P_Living Room	1.3	N/A	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_NE	0.7	20	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_NW	0.7	19	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_S	0.5	20	Pass
Block 6N_L04_01_3B6P_Kitchen	1.3	N/A	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6N_L04_01_3B6P_Living Room	1.3	N/A	Pass
Block 6N_L04_02_2B4P_Dbl Bedroom_E	0.8	20	Pass
Block 6N_L04_02_2B4P_Dbl Bedroom_W	0.8	21	Pass
Block 6N_L04_02_2B4P_KLD	1.4	N/A	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_NE	0.7	19	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_NW	0.7	18	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_S	0.6	18	Pass
Block 6N_L05_01_3B6P_Kitchen	1.4	N/A	Pass
Block 6N_L05_01_3B6P_Living Room	1.3	N/A	Pass
Block 6N_L05_02_2B4P_Dbl Bedroom_E	0.7	20	Pass
Block 6N_L05_02_2B4P_Dbl Bedroom_W	0.8	20	Pass
Block 6N_L05_02_2B4P_KLD	1.3	N/A	Pass
Block 6S_L00_01_4B7P_Kitchen	1.2	N/A	Pass
Block 6S_L00_01_4B7P_Living Room	0.9	N/A	Pass
Block 6S_L00_02_3B6P_Kitchen	1.2	N/A	Pass
Block 6S_L00_02_3B6P_Living Room	0.8	N/A	Pass
Block 6S_L00_03_3B6P_Kitchen	1.8	N/A	Pass
Block 6S_L00_03_3B6P_Living Room	0.9	N/A	Pass
Block 6S_L00_04_3B6P_Kitchen	1.1	N/A	Pass
Block 6S_L00_04_3B6P_Living Room	0.8	N/A	Pass
Block 6S_L00_05_3B6P_Kitchen	1.7	N/A	Pass
Block 6S_L00_05_3B6P_Living Room	0.8	N/A	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_N	0.7	19	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_SE	0.6	20	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_SW	0.6	20	Pass
Block 6S_L01_01_4B7P_Sgl Bedroom	0.7	18	Pass
Block 6S_L01_02_3B6P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L01_02_3B6P_Dbl Bedroom_NW	0.7	18	Pass
Block 6S_L01_02_3B6P_Dbl Bedroom_S	0.6	19	Pass
Block 6S_L01_03_3B6P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L01_03_3B6P_Dbl Bedroom_NW	0.7	18	Pass
Block 6S_L01_03_3B6P_Dbl Bedroom_S	0.6	19	Pass
Block 6S_L01_04_3B6P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L01_04_3B6P_Dbl Bedroom_NW	0.7	18	Pass
Block 6S_L01_04_3B6P_Dbl Bedroom_S	0.6	19	Pass
Block 6S_L01_05_3B6P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L01_05_3B6P_Dbl Bedroom_NW	0.7	18	Pass
Block 6S_L01_05_3B6P_Dbl Bedroom_S	0.6	19	Pass
Block 6S_L01_06_3B6P_Dbl Bedroom_S	0.6	20	Pass
Block 6S_L01_06_3B6P_Dbl Bedroom_SE	0.6	20	Pass
Block 6S_L01_06_3B6P_Dbl Bedroom_SW	0.5	21	Pass
Block 6S_L01_06_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L01_06_3B6P_Living Room	1.2	N/A	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L02_01_4B7P_Dining	1.3	N/A	Pass
Block 6S_L02_01_4B7P_Kitchen	1	N/A	Pass
Block 6S_L02_01_4B7P_Living Room	1	N/A	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_S	0.6	20	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_SE	0.7	20	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_SW	0.7	16	Pass
Block 6S_L02_02_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L02_02_3B6P_Living Room	1.2	N/A	Pass
Block 6S_L02_03_1B2P_Dbl Bedroom	0.5	20	Pass
Block 6S_L02_03_1B2P_Kitchen	1.1	N/A	Pass
Block 6S_L02_03_1B2P_Living Room	1.3	N/A	Pass
Block 6S_L02_04_1B2P_Dbl Bedroom	0.4	21	Pass
Block 6S_L02_04_1B2P_Kitchen	1.2	N/A	Pass
Block 6S_L02_04_1B2P_Living Room	1.3	N/A	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_NE	0.7	19	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_NW	0.7	14	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_S	0.6	20	Pass
Block 6S_L03_01_1B2P_Sgl Bedroom	0.6	17	Pass
Block 6S_L03_02_3B6P_Dbl Bedroom_S	0.7	20	Pass
Block 6S_L03_02_3B6P_Dbl Bedroom_SE	0.7	19	Pass
Block 6S_L03_02_3B6P_Dbl Bedroom_SW	0.7	16	Pass
Block 6S_L03_02_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L03_02_3B6P_Living Room	1.3	N/A	Pass
Block 6S_L03_03_1B2P_Dbl Bedroom	0.6	21	Pass
Block 6S_L03_03_1B2P_Kitchen	1.3	N/A	Pass
Block 6S_L03_03_1B2P_Living Room	1.3	N/A	Pass
Block 6S_L03_04_1B2P_Dbl Bedroom	0.6	21	Pass
Block 6S_L03_04_1B2P_Kitchen	1.2	N/A	Pass
Block 6S_L03_04_1B2P_Livinng Room	1.3	N/A	Pass
Block 6S_L03_05_1B2P_Dbl Bedroom	0.5	21	Pass
Block 6S_L03_05_1B2P_Kitchen	1.2	N/A	Pass
Block 6S_L03_05_1B2P_Living Room	1.4	N/A	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_NE	0.7	20	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_NW	0.7	19	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_S	0.6	21	Pass
Block 6S_L04_01_4B7P_Kitchen	1.1	N/A	Pass
Block 6S_L04_01_4B7P_Living Room	1.2	N/A	Pass
Block 6S_L04_01_4B7P_Sgl Bedroom	0.6	16	Pass
Block 6S_L04_02_3B6P_Dbl Bedroom_S	0.7	20	Pass
Block 6S_L04_02_3B6P_Dbl Bedroom_SE	0.7	20	Pass
Block 6S_L04_02_3B6P_Dbl Bedroom_SW	0.7	17	Pass
Block 6S_L04_02_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L04_02_3B6P_Living Room	1.3	N/A	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L04_03_3B6P_Dbl Bedroom_E	0.6	21	Pass
Block 6S_L04_03_3B6P_Dbl Bedroom_N	0.7	20	Pass
Block 6S_L04_03_3B6P_Dbl Bedroom_W	0.6	21	Pass
Block 6S_L04_03_3B6P_Kitchen	1.5	N/A	Pass
Block 6S_L04_03_3B6P_Living Room	1.5	N/A	Pass
Block 6S_L05_01_2B3P_Dbl Bedroom	0.7	20	Pass
Block 6S_L05_01_2B3P_Sgl Bedroom	0.7	17	Pass
Block 6S_L05_02_3B6P_Dbl Bedroom_S	0.7	18	Pass
Block 6S_L05_02_3B6P_Dbl Bedroom_SE	0.7	18	Pass
Block 6S_L05_02_3B6P_Dbl Bedroom_SW	0.7	16	Pass
Block 6S_L05_02_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L05_02_3B6P_Living Room	1.5	N/A	Pass
Block 6S_L05_03_2B3P_KLD	1.2	N/A	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_N	0.8	20	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_SE	0.6	21	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_SW	0.7	18	Pass
Block 6S_L05_03_3B6P_Kitchen	1.6	N/A	Pass
Block 6S_L05_03_3B6P_Living Room	1.6	N/A	Pass
Block 7_L01_04_2B4P_Dbl Bedroom_N	0.6	19	Pass
Block 7_L01_04_2B4P_Dbl Bedroom_S	0.6	19	Pass
Block 7_L01_04_2B4P_Kitchen	1.1	N/A	Pass
Block 7_L01_04_2B4P_Living Room	1.2	N/A	Pass
Block 7_L01_05_2B4P_Dbl Bedroom_E	0.7	18	Pass
Block 7_L01_05_2B4P_Dbl Bedroom_W	0.7	18	Pass
Block 7_L01_05_2B4P_Kitchen	1.2	N/A	Pass
Block 7_L01_05_2B4P_Living Room	1.4	N/A	Pass
Block 7_L01_06_1B2P_Dbl Bedroom	0.8	19	Pass
Block 7_L01_06_1B2P_Kitchen	1.3	N/A	Pass
Block 7_L01_06_1B2P_Living Room	1.2	N/A	Pass
Block 7_L03_04_2B4P_Dbl Bedroom_N	0.6	19	Pass
Block 7_L03_04_2B4P_Dbl Bedroom_S	0.6	19	Pass
Block 7_L03_04_2B4P_Kitchen	1.2	N/A	Pass
Block 7_L03_04_2B4P_Kitchen	1.1	N/A	Pass
Block 7_L03_04_2B4P_Living Room	1.4	N/A	Pass
Block 7_L03_04_2B4P_Living Room	1.2	N/A	Pass
Block 7_L03_05_2B4P_Dbl Bedroom_E	0.7	18	Pass
Block 7_L03_05_2B4P_Dbl Bedroom_W	0.7	18	Pass
Block 7_L03_06_1B2P_Dbl Bedroom	0.8	19	Pass
Block 7_L03_06_1B2P_Kitchen	1.3	N/A	Pass
Block 7_L03_06_1B2P_Living Room	1.2	N/A	Pass
Block 7_L04_04_2B4P_Dbl Bedroom_N	0.6	19	Pass
Block 7_L04_04_2B4P_Dbl Bedroom_S	0.6	19	Pass
Block 7_L04_04_2B4P_Kitchen	1.1	N/A	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 7_L04_04_2B4P_Living Room	1.2	N/A	Pass
Block 7_L04_05_2B4P_Dbl Bedroom_E	0.7	18	Pass
Block 7_L04_05_2B4P_Dbl Bedroom_W	0.7	18	Pass
Block 7_L04_05_2B4P_Kitchen	1.3	N/A	Pass
Block 7_L04_05_2B4P_Living Room	1.4	N/A	Pass
Block 7_L05_01_1B2P_Dbl Bedroom	0.8	18	Pass
Block 7_L05_01_1B2P_Kitchen	1.6	N/A	Pass
Block 7_L05_01_1B2P_Living Room	1.4	N/A	Pass
Block 7_L05_02_2B4P_Dbl Bedroom_E	0.7	16	Pass
Block 7_L05_02_2B4P_Dbl Bedroom_W	0.7	17	Pass
Block 7_L05_02_2B4P_Kitchen	1.5	N/A	Pass
Block 7_L05_02_2B4P_Living Room	1.4	N/A	Pass
Block 7_L05_03_2B4P_Dbl Bedroom_N	0.7	16	Pass
Block 7_L05_03_2B4P_Dbl Bedroom_S	0.7	16	Pass
Block 7_L05_03_2B4P_Kitchen	1.2	N/A	Pass
Block 7_L05_03_2B4P_Living Room	1.2	N/A	Pass
Block 8_L00_01_4B7P_Kitchen	1.2	N/A	Pass
Block 8_L00_01_4B7P_Living Room	0.9	N/A	Pass
Block 8_L00_02_3B6P_Kitchen	1.9	N/A	Pass
Block 8_L00_02_3B6P_Living Room	1	N/A	Pass
Block 8_L00_03_3B6P_Kitchen	1.8	N/A	Pass
Block 8_L00_03_3B6P_Living Room	1	N/A	Pass
Block 8_L00_04_3B6P_Kitchen	1.2	N/A	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_N	0.6	20	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_SE	0.6	20	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_SW	0.5	20	Pass
Block 8_L01_01_4B7P_Sgl Bedroom	0.7	22	Pass
Block 8_L01_02_3B6P_Dbl Bedroom_N	0.7	20	Pass
Block 8_L01_02_3B6P_Dbl Bedroom_SE	0.4	22	Pass
Block 8_L01_02_3B6P_Dbl Bedroom_SW	0.6	20	Pass
Block 8_L01_03_3B6P_Dbl Bedroom_N	0.7	20	Pass
Block 8_L01_03_3B6P_Dbl Bedroom_SE	0.5	20	Pass
Block 8_L01_03_3B6P_Dbl Bedroom_SW	0.4	22	Pass
Block 8_L01_04_3B6P_Dbl Bedroom_E	0.7	20	Pass
Block 8_L01_04_3B6P_Dbl Bedroom_NE	0.7	20	Pass
Block 8_L01_04_3B6P_Dbl Bedroom_W	0.6	21	Pass
Block 8_L02_01_4B7P_KLD	1	N/A	Pass
Block 8_L02_01_4B7P_Living Room	1	N/A	Pass
Block 8_L02_02_3B6P_Kitchen	1	N/A	Pass
Block 8_L02_02_3B6P_Kitchen	1.2	N/A	Pass
Block 8_L02_02_3B6P_Living Room	1.1	N/A	Pass
Block 8_L02_02_3B6P_Living Room	1.1	N/A	Pass
Block 8_L02_03_3B6P_Kitchen	1	N/A	Pass

Room		CIBSE 2020s DSY1		Part O Compliance
		Criterion 1	Criterion 2	
		≤ 3%	≤ 32hrs	
Block 8_L02_03_3B6P_Living Room		1.1	N/A	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_NE		0.8	16	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_NW		0.6	20	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_S		0.6	20	Pass
Block 8_L03_01_4B7P_Sgl Bedroom		0.6	16	Pass
Block 8_L03_02_3B6P_Dbl Bedroom_NE		0.6	20	Pass
Block 8_L03_02_3B6P_Dbl Bedroom_NW		0.8	16	Pass
Block 8_L03_02_3B6P_Dbl Bedroom_S		0.5	32	Pass
Block 8_L03_03_3B6P_Dbl Bedorom_S		0.5	19	Pass
Block 8_L03_03_3B6P_Dbl Bedroom_NE		0.6	20	Pass
Block 8_L03_03_3B6P_Dbl Bedroom_NW		0.8	16	Pass
Block 8_L03_04_3B6P_Dbl Bedroom_NE		0.7	20	Pass
Block 8_L03_04_3B6P_Dbl Bedroom_SE		0.7	16	Pass
Block 8_L03_04_3B6P_Dbl Bedroom_SW		0.7	21	Pass
Block 8_L05_01_3B6P_Dbl Bedroom_N		0.7	19	Pass
Block 8_L05_01_3B6P_Dbl Bedroom_S		0.6	18	Pass
Block 8_L05_01_3B6P_Kitchen		1.4	N/A	Pass
Block 8_L05_01_3B6P_Living Room		1.4	N/A	Pass
Block 8_L05_01_3B6P_Sgl Bedroom		0.7	17	Pass
Block 8_L05_02_4B6P_Dbl Bedroom_N		0.7	20	Pass
Block 8_L05_02_4B6P_Dbl Bedroom_S		0.7	20	Pass
Block 8_L05_02_4B6P_Kitchen		1.4	N/A	Pass
Block 8_L05_02_4B6P_Living Room		1.1	N/A	Pass
Block 8_L05_02_4B6P_Sgl Bedroom_N		0.8	17	Pass
Block 8_L05_02_4B6P_Sgl Bedroom_S		0.8	17	Pass
Total No. Pass	Bedrooms	154 / 154	154 / 154	**154 / 154**
	Kitchen, Living, Dining (KLDs)	116 / 116	N/A	**116 / 116**
Overall compliance % Pass				**270 / 270** **100%**

Iteration 04

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L00_01_3B5P_Dbl Bedroom	0.5	32	Pass
Block 5_L00_01_3B5P_Kitchen	1.5	N/A	Pass
Block 5_L00_01_3B5P_Living Room	1.1	N/A	Pass
Block 5_L00_01_3B5P_Sgl Bedroom_E	0.6	31	Pass
Block 5_L00_01_3B5P_Sgl Bedroom_W	0.6	32	Pass
Block 5_L02_01_3B5P_Dbl Bedroom_E	0.6	30	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L02_01_3B5P_Dbl Bedroom_W	0.5	28	Pass
Block 5_L02_01_3B5P_Kitchen	1.7	N/A	Pass
Block 5_L02_01_3B5P_Living Room	1.5	N/A	Pass
Block 5_L02_01_3B5P_Sgl Bedroom	0.6	24	Pass
Block 5_L02_02_3B5P_Dbl Bedroom_E	0.7	31	Pass
Block 5_L02_02_3B5P_Dbl Bedroom_W	0.6	30	Pass
Block 5_L02_02_3B5P_Kitchen	1.5	N/A	Pass
Block 5_L02_02_3B5P_Living Room	1.2	N/A	Pass
Block 5_L02_02_3B5P_Sgl Bedroom	0.7	23	Pass
Block 5_L02_03_2B3P_Dbl Bedroom	0.6	21	Pass
Block 5_L02_03_2B3P_Kitchen	1.2	N/A	Pass
Block 5_L02_03_2B3P_Living Room	1.1	N/A	Pass
Block 5_L02_03_2B3P_Sgl Bedroom	0.7	23	Pass
Block 5_L03_01_3B5P_Dbl Bedroom_E	0.6	30	Pass
Block 5_L03_01_3B5P_Dbl Bedroom_W	0.6	31	Pass
Block 5_L03_01_3B5P_Kitchen	1.6	N/A	Pass
Block 5_L03_01_3B5P_Living Room	1.5	N/A	Pass
Block 5_L03_01_3B5P_Sgl Bedroom	0.7	24	Pass
Block 5_L04_01_3B5P_Dbl Bedroom_E	0.6	30	Pass
Block 5_L04_01_3B5P_Dbl Bedroom_W	0.6	30	Pass
Block 5_L04_01_3B5P_Kitchen	1.7	N/A	Pass
Block 5_L04_01_3B5P_Living Room	1.5	N/A	Pass
Block 5_L04_01_3B5P_Sgl Bedroom	0.7	24	Pass
Block 5_L04_02_3B5P_Dbl Bedroom_E	0.7	29	Pass
Block 5_L04_02_3B5P_Dbl Bedroom_W	0.6	30	Pass
Block 5_L04_02_3B5P_Kitchen	1.5	N/A	Pass
Block 5_L04_02_3B5P_Living Room	1.3	N/A	Pass
Block 5_L04_02_3B5P_Sgl Bedroom	0.7	23	Pass
Block 5_L05_01_2B4P_Dbl Bedroom	0.8	20	Pass
Block 5_L05_01_2B4P_Kitchen	1.2	N/A	Pass
Block 5_L05_01_2B4P_Living Room	1.2	N/A	Pass
Block 5_L05_01_2B4P_Sgl Bedroom	0.7	21	Pass
Block 5_L05_02_4B7P_Dbl Bedroom_NE	0.9	20	Pass
Block 5_L05_02_4B7P_Dbl Bedroom_NW	0.8	22	Pass
Block 5_L05_02_4B7P_Dbl Bedroom_SE	0.8	26	Pass
Block 5_L05_02_4B7P_Kitchen	1.4	N/A	Pass
Block 5_L05_02_4B7P_Living Room	1.4	N/A	Pass
Block 5_L05_02_4B7P_Sgl Bedroom	0.8	22	Pass
Block 5_L05_03_1B2P_Dbl Bedroom	0.6	32	Pass
Block 5_L05_03_1B2P_KLD	0.9	N/A	Pass
Block 5_L05_04_3B5P_Dbl Bedroom_E	0.6	25	Pass
Block 5_L05_04_3B5P_Dbl Bedroom_W	0.7	25	Pass
Block 5_L05_04_3B5P_Kitchen	1.9	N/A	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L05_04_3B5P_Living Room	1.5	N/A	Pass
Block 5_L05_04_3B5P_Sgl Bedroom	0.7	22	Pass
Block 5_L05_05_3B5P_Dbl Bedroom_E	0.7	24	Pass
Block 5_L05_05_3B5P_Dbl Bedroom_W	0.7	32	Pass
Block 5_L05_05_3B5P_Kitchen	1.8	N/A	Pass
Block 5_L05_05_3B5P_Living Room	1.3	N/A	Pass
Block 5_L05_05_3B5P_Sgl Bedroom	0.7	23	Pass
Block 6N_L00_01_3B6P_Kitchen	1.6	N/A	Pass
Block 6N_L00_01_3B6P_Living Room	1	N/A	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_N	0.7	21	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_SE	0.5	21	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_SW	0.5	21	Pass
Block 6N_L00_02_3B6P_Kitchen	1.5	N/A	Pass
Block 6N_L00_02_3B6P_Living Room	1	N/A	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_N	0.5	21	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_SE	0.7	20	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_SW	0.6	19	Pass
Block 6N_L03_01_1B2P_Dbl Bedroom	0.4	20	Pass
Block 6N_L03_01_1B2P_Kitchen	1	N/A	Pass
Block 6N_L03_01_1B2P_Living Room	1.3	N/A	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_NE	0.7	20	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_NW	0.7	19	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_S	0.5	20	Pass
Block 6N_L04_01_3B6P_Kitchen	1.4	N/A	Pass
Block 6N_L04_01_3B6P_Living Room	1.4	N/A	Pass
Block 6N_L04_02_2B4P_Dbl Bedroom_E	0.8	20	Pass
Block 6N_L04_02_2B4P_Dbl Bedroom_W	0.8	21	Pass
Block 6N_L04_02_2B4P_KLD	1.4	N/A	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_NE	0.7	19	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_NW	0.7	18	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_S	0.6	18	Pass
Block 6N_L05_01_3B6P_Kitchen	1.5	N/A	Pass
Block 6N_L05_01_3B6P_Living Room	1.5	N/A	Pass
Block 6N_L05_02_2B4P_Dbl Bedroom_E	0.7	20	Pass
Block 6N_L05_02_2B4P_Dbl Bedroom_W	0.8	20	Pass
Block 6N_L05_02_2B4P_KLD	1.3	N/A	Pass
Block 6S_L00_01_4B7P_Kitchen	1.2	N/A	Pass
Block 6S_L00_01_4B7P_Living Room	0.9	N/A	Pass
Block 6S_L00_02_3B6P_Kitchen	1	N/A	Pass
Block 6S_L00_02_3B6P_Living Room	0.8	N/A	Pass
Block 6S_L00_03_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L00_03_3B6P_Living Room	1	N/A	Pass
Block 6S_L00_04_3B6P_Kitchen	1	N/A	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L00_04_3B6P_Living Room	0.8	N/A	Pass
Block 6S_L00_05_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L00_05_3B6P_Living Room	0.9	N/A	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_N	0.7	21	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_SE	0.6	20	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_SW	0.6	20	Pass
Block 6S_L01_01_4B7P_Sgl Bedroom	0.7	18	Pass
Block 6S_L01_02_3B6P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L01_02_3B6P_Dbl Bedroom_NW	0.7	18	Pass
Block 6S_L01_02_3B6P_Dbl Bedroom_S	0.6	21	Pass
Block 6S_L01_03_3B6P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L01_03_3B6P_Dbl Bedroom_NW	0.7	17	Pass
Block 6S_L01_03_3B6P_Dbl Bedroom_S	0.6	21	Pass
Block 6S_L01_04_3B6P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L01_04_3B6P_Dbl Bedroom_NW	0.7	18	Pass
Block 6S_L01_04_3B6P_Dbl Bedroom_S	0.6	20	Pass
Block 6S_L01_05_3B6P_Dbl Bedroom_NE	0.7	18	Pass
Block 6S_L01_05_3B6P_Dbl Bedroom_NW	0.6	18	Pass
Block 6S_L01_05_3B6P_Dbl Bedroom_S	0.6	21	Pass
Block 6S_L01_06_3B6P_Dbl Bedroom_S	0.6	22	Pass
Block 6S_L01_06_3B6P_Dbl Bedroom_SE	0.6	21	Pass
Block 6S_L01_06_3B6P_Dbl Bedroom_SW	0.5	21	Pass
Block 6S_L01_06_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L01_06_3B6P_Living Room	1.2	N/A	Pass
Block 6S_L02_01_4B7P_Dining	1.3	N/A	Pass
Block 6S_L02_01_4B7P_Kitchen	1.2	N/A	Pass
Block 6S_L02_01_4B7P_Living Room	1.2	N/A	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_S	0.6	22	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_SE	0.6	21	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_SW	0.7	18	Pass
Block 6S_L02_02_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L02_02_3B6P_Living Room	1.2	N/A	Pass
Block 6S_L02_03_1B2P_Dbl Bedroom	0.5	20	Pass
Block 6S_L02_03_1B2P_Kitchen	1.1	N/A	Pass
Block 6S_L02_03_1B2P_Living Room	1.3	N/A	Pass
Block 6S_L02_04_1B2P_Dbl Bedroom	0.4	21	Pass
Block 6S_L02_04_1B2P_Kitchen	1.2	N/A	Pass
Block 6S_L02_04_1B2P_Living Room	1.3	N/A	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_NE	0.7	21	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_NW	0.7	18	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_S	0.5	20	Pass
Block 6S_L03_01_1B2P_Sgl Bedroom	0.6	17	Pass
Block 6S_L03_02_3B6P_Dbl Bedroom_S	0.6	22	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L03_02_3B6P_Dbl Bedroom_SE	0.7	21	Pass
Block 6S_L03_02_3B6P_Dbl Bedroom_SW	0.7	20	Pass
Block 6S_L03_02_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L03_02_3B6P_Living Room	1.3	N/A	Pass
Block 6S_L03_03_1B2P_Dbl Bedroom	0.6	21	Pass
Block 6S_L03_03_1B2P_Kitchen	1.2	N/A	Pass
Block 6S_L03_03_1B2P_Living Room	1.3	N/A	Pass
Block 6S_L03_04_1B2P_Dbl Bedroom	0.6	21	Pass
Block 6S_L03_04_1B2P_Kitchen	1.2	N/A	Pass
Block 6S_L03_04_1B2P_Livinng Room	1.3	N/A	Pass
Block 6S_L03_05_1B2P_Dbl Bedroom	0.4	21	Pass
Block 6S_L03_05_1B2P_Kitchen	1.2	N/A	Pass
Block 6S_L03_05_1B2P_Living Room	1.4	N/A	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_NE	0.7	20	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_NW	0.6	21	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_S	0.6	21	Pass
Block 6S_L04_01_4B7P_Kitchen	1.2	N/A	Pass
Block 6S_L04_01_4B7P_Living Room	1.2	N/A	Pass
Block 6S_L04_01_4B7P_Sgl Bedroom	0.6	15	Pass
Block 6S_L04_02_3B6P_Dbl Bedroom_S	0.6	22	Pass
Block 6S_L04_02_3B6P_Dbl Bedroom_SE	0.6	21	Pass
Block 6S_L04_02_3B6P_Dbl Bedroom_SW	0.7	20	Pass
Block 6S_L04_02_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L04_02_3B6P_Living Room	1.3	N/A	Pass
Block 6S_L04_03_3B6P_Dbl Bedroom_E	0.6	21	Pass
Block 6S_L04_03_3B6P_Dbl Bedroom_N	0.7	20	Pass
Block 6S_L04_03_3B6P_Dbl Bedroom_W	0.6	20	Pass
Block 6S_L04_03_3B6P_Kitchen	1.5	N/A	Pass
Block 6S_L04_03_3B6P_Living Room	1.5	N/A	Pass
Block 6S_L05_01_2B3P_Dbl Bedroom	0.7	20	Pass
Block 6S_L05_01_2B3P_Sgl Bedroom	0.7	17	Pass
Block 6S_L05_02_3B6P_Dbl Bedroom_S	0.7	21	Pass
Block 6S_L05_02_3B6P_Dbl Bedroom_SE	0.7	21	Pass
Block 6S_L05_02_3B6P_Dbl Bedroom_SW	0.8	20	Pass
Block 6S_L05_02_3B6P_Kitchen	1.3	N/A	Pass
Block 6S_L05_02_3B6P_Living Room	1.5	N/A	Pass
Block 6S_L05_03_2B3P_KLD	1.2	N/A	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_N	0.8	20	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_SE	0.6	21	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_SW	0.7	20	Pass
Block 6S_L05_03_3B6P_Kitchen	1.6	N/A	Pass
Block 6S_L05_03_3B6P_Living Room	1.6	N/A	Pass
Block 7_L01_04_2B4P_Dbl Bedroom_N	0.6	22	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 7_L01_04_2B4P_Dbl Bedroom_S	0.6	22	Pass
Block 7_L01_04_2B4P_Kitchen	1.2	N/A	Pass
Block 7_L01_04_2B4P_Living Room	1.2	N/A	Pass
Block 7_L01_05_2B4P_Dbl Bedroom_E	0.6	22	Pass
Block 7_L01_05_2B4P_Dbl Bedroom_W	0.6	21	Pass
Block 7_L01_05_2B4P_Kitchen	1.2	N/A	Pass
Block 7_L01_05_2B4P_Living Room	1.4	N/A	Pass
Block 7_L01_06_1B2P_Dbl Bedroom	0.7	22	Pass
Block 7_L01_06_1B2P_Kitchen	1.2	N/A	Pass
Block 7_L01_06_1B2P_Living Room	1.2	N/A	Pass
Block 7_L03_04_2B4P_Dbl Bedroom_N	0.6	22	Pass
Block 7_L03_04_2B4P_Dbl Bedroom_S	0.6	23	Pass
Block 7_L03_04_2B4P_Kitchen	1.2	N/A	Pass
Block 7_L03_04_2B4P_Kitchen	1.2	N/A	Pass
Block 7_L03_04_2B4P_Living Room	1.4	N/A	Pass
Block 7_L03_04_2B4P_Living Room	1.2	N/A	Pass
Block 7_L03_05_2B4P_Dbl Bedroom_E	0.6	22	Pass
Block 7_L03_05_2B4P_Dbl Bedroom_W	0.6	21	Pass
Block 7_L03_06_1B2P_Dbl Bedroom	0.7	22	Pass
Block 7_L03_06_1B2P_Kitchen	1.3	N/A	Pass
Block 7_L03_06_1B2P_Living Room	1.2	N/A	Pass
Block 7_L04_04_2B4P_Dbl Bedroom_N	0.6	22	Pass
Block 7_L04_04_2B4P_Dbl Bedroom_S	0.6	22	Pass
Block 7_L04_04_2B4P_Kitchen	1.2	N/A	Pass
Block 7_L04_04_2B4P_Living Room	1.2	N/A	Pass
Block 7_L04_05_2B4P_Dbl Bedroom_E	0.6	21	Pass
Block 7_L04_05_2B4P_Dbl Bedroom_W	0.7	21	Pass
Block 7_L04_05_2B4P_Kitchen	1.2	N/A	Pass
Block 7_L04_05_2B4P_Living Room	1.4	N/A	Pass
Block 7_L05_01_1B2P_Dbl Bedroom	0.8	21	Pass
Block 7_L05_01_1B2P_Kitchen	1.6	N/A	Pass
Block 7_L05_01_1B2P_Living Room	1.4	N/A	Pass
Block 7_L05_02_2B4P_Dbl Bedroom_E	0.7	21	Pass
Block 7_L05_02_2B4P_Dbl Bedroom_W	0.7	21	Pass
Block 7_L05_02_2B4P_Kitchen	1.5	N/A	Pass
Block 7_L05_02_2B4P_Living Room	1.5	N/A	Pass
Block 7_L05_03_2B4P_Dbl Bedroom_N	0.6	21	Pass
Block 7_L05_03_2B4P_Dbl Bedroom_S	0.7	21	Pass
Block 7_L05_03_2B4P_Kitchen	1.2	N/A	Pass
Block 7_L05_03_2B4P_Living Room	1.2	N/A	Pass
Block 8_L00_01_4B7P_Kitchen	1.3	N/A	Pass
Block 8_L00_01_4B7P_Living Room	1	N/A	Pass
Block 8_L00_02_3B6P_Kitchen	1.4	N/A	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 8_L00_02_3B6P_Living Room	1.1	N/A	Pass
Block 8_L00_03_3B6P_Kitchen	1.4	N/A	Pass
Block 8_L00_03_3B6P_Living Room	1	N/A	Pass
Block 8_L00_04_3B6P_Kitchen	1.1	N/A	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_N	0.6	22	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_SE	0.5	22	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_SW	0.4	21	Pass
Block 8_L01_01_4B7P_Sgl Bedroom	0.7	24	Pass
Block 8_L01_02_3B6P_Dbl Bedroom_N	0.7	21	Pass
Block 8_L01_02_3B6P_Dbl Bedroom_SE	0.4	22	Pass
Block 8_L01_02_3B6P_Dbl Bedroom_SW	0.5	22	Pass
Block 8_L01_03_3B6P_Dbl Bedroom_N	0.7	21	Pass
Block 8_L01_03_3B6P_Dbl Bedroom_SE	0.5	22	Pass
Block 8_L01_03_3B6P_Dbl Bedroom_SW	0.4	22	Pass
Block 8_L01_04_3B6P_Dbl Bedroom_E	0.6	21	Pass
Block 8_L01_04_3B6P_Dbl Bedroom_NE	0.6	21	Pass
Block 8_L01_04_3B6P_Dbl Bedroom_W	0.6	23	Pass
Block 8_L02_01_4B7P_KLD	1.1	N/A	Pass
Block 8_L02_01_4B7P_Living Room	1.2	N/A	Pass
Block 8_L02_02_3B6P_Kitchen	1	N/A	Pass
Block 8_L02_02_3B6P_Kitchen	1.3	N/A	Pass
Block 8_L02_02_3B6P_Living Room	1.1	N/A	Pass
Block 8_L02_02_3B6P_Living Room	1.2	N/A	Pass
Block 8_L02_03_3B6P_Kitchen	1	N/A	Pass
Block 8_L02_03_3B6P_Living Room	1.1	N/A	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_NE	0.8	18	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_NW	0.6	21	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_S	0.6	21	Pass
Block 8_L03_01_4B7P_Sgl Bedroom	0.6	20	Pass
Block 8_L03_02_3B6P_Dbl Bedroom_NE	0.6	22	Pass
Block 8_L03_02_3B6P_Dbl Bedroom_NW	0.7	18	Pass
Block 8_L03_02_3B6P_Dbl Bedroom_S	0.4	20	Pass
Block 8_L03_03_3B6P_Dbl Bedorom_S	0.4	21	Pass
Block 8_L03_03_3B6P_Dbl Bedroom_NE	0.6	22	Pass
Block 8_L03_03_3B6P_Dbl Bedroom_NW	0.8	18	Pass
Block 8_L03_04_3B6P_Dbl Bedroom_NE	0.6	22	Pass
Block 8_L03_04_3B6P_Dbl Bedroom_SE	0.7	20	Pass
Block 8_L03_04_3B6P_Dbl Bedroom_SW	0.6	22	Pass
Block 8_L05_01_3B6P_Dbl Bedroom_N	0.6	21	Pass
Block 8_L05_01_3B6P_Dbl Bedroom_S	0.5	20	Pass
Block 8_L05_01_3B6P_Kitchen	1.4	N/A	Pass
Block 8_L05_01_3B6P_Living Room	1.4	N/A	Pass
Block 8_L05_01_3B6P_Sgl Bedroom	0.7	18	Pass

Room		CIBSE 2020s DSY1		Part O Compliance
		Criterion 1	Criterion 2	
		≤ 3%	≤ 32hrs	
Block 8_L05_02_4B6P_Dbl Bedroom_N		0.6	22	Pass
Block 8_L05_02_4B6P_Dbl Bedroom_S		0.7	22	Pass
Block 8_L05_02_4B6P_Kitchen		1.4	N/A	Pass
Block 8_L05_02_4B6P_Living Room		1.1	N/A	Pass
Block 8_L05_02_4B6P_Sgl Bedroom_N		0.7	19	Pass
Block 8_L05_02_4B6P_Sgl Bedroom_S		0.7	19	Pass
Total No. Pass	Bedrooms	154 / 154	154 / 154	**154 / 154**
	Kitchen, Living, Dining (KLDs)	116 / 116	N/A	**116 / 116**
Overall compliance % Pass				**270 / 270** **100%**

APPENDIX D – DETAILED RESULTS: CIBSE 2020S DSY2 AND DSY3 WEATHER FILES

In line with the Part O methodology, the proposed development is required to be assessed against and pass the various criteria using the CIBSE 2020s DSY1 weather file. The Results section of the report demonstrates that all assessed units comply with both TM59 criteria. Both TM59 and GLA guidance recommend that in addition to DSY1 the following two additional TM49 design weather years for 2020s should be used to further test the design, even though, a pass against these is not mandatory:

- 1976: a year with a prolonged period of sustained warmth (DSY3);
- 2003: a year with a very intense single warm spell (DSY2).

The final iteration after the acoustic measures incorporated (Iteration 04) has been assessed against the more extreme DSY2 and DSY3 weather files for 2020s and results are presented below.

Room	CIBSE 2020s DSY2		Part O Compliance	CIBSE 2020s DSY3		Part O Compliance
	Criterion 1	Criterion 2		Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs		≤ 3%	≤ 32hrs	
Block 5_L00_01_3B5P_Dbl Bedroom	1.7	80	Fail	2.2	84	Fail
Block 5_L00_01_3B5P_Kitchen	4.1	N/A	Fail	5	N/A	Fail
Block 5_L00_01_3B5P_Living Room	3	N/A	Pass	3.9	N/A	Fail
Block 5_L00_01_3B5P_Sgl Bedroom_E	2.1	69	Fail	2.5	67	Fail
Block 5_L00_01_3B5P_Sgl Bedroom_W	2.1	72	Fail	2.5	71	Fail
Block 5_L02_01_3B5P_Dbl Bedroom_E	2.1	68	Fail	2.6	67	Fail
Block 5_L02_01_3B5P_Dbl Bedroom_W	2.1	67	Fail	2.4	65	Fail
Block 5_L02_01_3B5P_Kitchen	4.4	N/A	Fail	5.3	N/A	Fail
Block 5_L02_01_3B5P_Living Room	3.7	N/A	Fail	4.5	N/A	Fail
Block 5_L02_01_3B5P_Sgl Bedroom	2.3	58	Fail	2.7	58	Fail
Block 5_L02_02_3B5P_Dbl Bedroom_E	2.2	66	Fail	2.6	64	Fail
Block 5_L02_02_3B5P_Dbl Bedroom_W	2.1	69	Fail	2.5	66	Fail
Block 5_L02_02_3B5P_Kitchen	4.2	N/A	Fail	5	N/A	Fail
Block 5_L02_02_3B5P_Living Room	3.4	N/A	Fail	4.3	N/A	Fail
Block 5_L02_02_3B5P_Sgl Bedroom	2.3	61	Fail	2.7	55	Fail
Block 5_L02_03_2B3P_Dbl Bedroom	2	52	Fail	2.4	50	Fail
Block 5_L02_03_2B3P_Kitchen	3.3	N/A	Fail	4.2	N/A	Fail
Block 5_L02_03_2B3P_Living Room	3.2	N/A	Fail	4.2	N/A	Fail
Block 5_L02_03_2B3P_Sgl Bedroom	2.1	55	Fail	2.4	53	Fail
Block 5_L03_01_3B5P_Dbl Bedroom_E	2.2	68	Fail	2.6	67	Fail
Block 5_L03_01_3B5P_Dbl Bedroom_W	2.2	65	Fail	2.8	65	Fail
Block 5_L03_01_3B5P_Kitchen	4.4	N/A	Fail	5.3	N/A	Fail
Block 5_L03_01_3B5P_Living Room	3.7	N/A	Fail	4.6	N/A	Fail
Block 5_L03_01_3B5P_Sgl Bedroom	2.3	58	Fail	2.8	58	Fail
Block 5_L04_01_3B5P_Dbl Bedroom_E	2.2	68	Fail	2.6	67	Fail

Room	CIBSE 2020s DSY2		Part O Compliance	CIBSE 2020s DSY3		Part O Compliance
	Criterion 1	Criterion 2		Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs		≤ 3%	≤ 32hrs	
Block 5_L04_01_3B5P_Dbl Bedroom_W	2.2	66	Fail	2.8	65	Fail
Block 5_L04_01_3B5P_Kitchen	4.6	N/A	Fail	5.5	N/A	Fail
Block 5_L04_01_3B5P_Living Room	3.7	N/A	Fail	4.6	N/A	Fail
Block 5_L04_01_3B5P_Sgl Bedroom	2.3	58	Fail	2.7	57	Fail
Block 5_L04_02_3B5P_Dbl Bedroom_E	2.2	65	Fail	2.6	62	Fail
Block 5_L04_02_3B5P_Dbl Bedroom_W	2.1	68	Fail	2.5	65	Fail
Block 5_L04_02_3B5P_Kitchen	4.2	N/A	Fail	5	N/A	Fail
Block 5_L04_02_3B5P_Living Room	3.4	N/A	Fail	4.4	N/A	Fail
Block 5_L04_02_3B5P_Sgl Bedroom	2.3	60	Fail	2.7	54	Fail
Block 5_L05_01_2B4P_Dbl Bedroom	2.2	48	Fail	2.6	46	Fail
Block 5_L05_01_2B4P_Kitchen	3.3	N/A	Fail	4.3	N/A	Fail
Block 5_L05_01_2B4P_Living Room	3.3	N/A	Fail	4.2	N/A	Fail
Block 5_L05_01_2B4P_Sgl Bedroom	2.1	53	Fail	2.5	50	Fail
Block 5_L05_02_4B7P_Dbl Bedroom_NE	2.2	49	Fail	2.8	46	Fail
Block 5_L05_02_4B7P_Dbl Bedroom_NW	2.3	51	Fail	2.8	48	Fail
Block 5_L05_02_4B7P_Dbl Bedroom_SE	2	65	Fail	2.7	60	Fail
Block 5_L05_02_4B7P_Kitchen	3.7	N/A	Fail	4.7	N/A	Fail
Block 5_L05_02_4B7P_Living Room	3.8	N/A	Fail	4.8	N/A	Fail
Block 5_L05_02_4B7P_Sgl Bedroom	2.3	54	Fail	2.8	49	Fail
Block 5_L05_03_1B2P_Dbl Bedroom	2	66	Fail	2.4	66	Fail
Block 5_L05_03_1B2P_KLD	2.8	N/A	Pass	3.6	N/A	Fail
Block 5_L05_04_3B5P_Dbl Bedroom_E	2.2	60	Fail	2.6	61	Fail
Block 5_L05_04_3B5P_Dbl Bedroom_W	2.4	61	Fail	2.7	61	Fail
Block 5_L05_04_3B5P_Kitchen	4.8	N/A	Fail	5.6	N/A	Fail
Block 5_L05_04_3B5P_Living Room	3.9	N/A	Fail	4.9	N/A	Fail
Block 5_L05_04_3B5P_Sgl Bedroom	2.4	55	Fail	2.9	52	Fail
Block 5_L05_05_3B5P_Dbl Bedroom_E	2.3	60	Fail	2.6	55	Fail
Block 5_L05_05_3B5P_Dbl Bedroom_W	2.1	62	Fail	2.5	59	Fail
Block 5_L05_05_3B5P_Kitchen	4.3	N/A	Fail	5.2	N/A	Fail
Block 5_L05_05_3B5P_Living Room	3.6	N/A	Fail	4.5	N/A	Fail
Block 5_L05_05_3B5P_Sgl Bedroom	2.3	56	Fail	2.8	51	Fail
Block 6N_L00_01_3B6P_Kitchen	3.8	N/A	Fail	4.5	N/A	Fail
Block 6N_L00_01_3B6P_Living Room	3.5	N/A	Fail	3.8	N/A	Fail
Block 6N_L00_02_3B6P_Dbl Bedroom_N	1.6	49	Fail	2.1	48	Fail
Block 6N_L00_02_3B6P_Dbl Bedroom_SE	1.7	49	Fail	2.3	47	Fail

Room	CIBSE 2020s DSY2		Part O Compliance	CIBSE 2020s DSY3		Part O Compliance
	Criterion 1	Criterion 2		Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs		≤ 3%	≤ 32hrs	
Block 6N_L00_02_3B6P_Dbl Bedroom_SW	1.7	49	Fail	2.3	47	Fail
Block 6N_L00_02_3B6P_Kitchen	3.9	N/A	Fail	4.5	N/A	Fail
Block 6N_L00_02_3B6P_Living Room	3.6	N/A	Fail	3.9	N/A	Fail
Block 6N_L01_01_3B6P_Dbl Bedroom_N	1.4	50	Fail	2	50	Fail
Block 6N_L01_01_3B6P_Dbl Bedroom_SE	1.7	48	Fail	2.2	45	Fail
Block 6N_L01_01_3B6P_Dbl Bedroom_SW	1.6	49	Fail	2.1	47	Fail
Block 6N_L03_01_1B2P_Dbl Bedroom	1.2	49	Fail	1.9	51	Fail
Block 6N_L03_01_1B2P_Kitchen	3.2	N/A	Fail	3.7	N/A	Fail
Block 6N_L03_01_1B2P_Living Room	3.7	N/A	Fail	4.7	N/A	Fail
Block 6N_L04_01_3B6P_Dbl Bedroom_NE	1.6	49	Fail	2.2	48	Fail
Block 6N_L04_01_3B6P_Dbl Bedroom_NW	1.6	47	Fail	2.2	45	Fail
Block 6N_L04_01_3B6P_Dbl Bedroom_S	1.7	49	Fail	2.4	49	Fail
Block 6N_L04_01_3B6P_Kitchen	3.6	N/A	Fail	4.6	N/A	Fail
Block 6N_L04_01_3B6P_Living Room	3.5	N/A	Fail	4.4	N/A	Fail
Block 6N_L04_02_2B4P_Dbl Bedroom_E	1.8	47	Fail	2.5	44	Fail
Block 6N_L04_02_2B4P_Dbl Bedroom_W	2	47	Fail	2.5	48	Fail
Block 6N_L04_02_2B4P_KLD	3.5	N/A	Fail	4.5	N/A	Fail
Block 6N_L05_01_3B6P_Dbl Bedroom_NE	1.6	48	Fail	2.2	45	Fail
Block 6N_L05_01_3B6P_Dbl Bedroom_NW	1.7	46	Fail	2.3	44	Fail
Block 6N_L05_01_3B6P_Dbl Bedroom_S	1.8	46	Fail	2.4	45	Fail
Block 6N_L05_01_3B6P_Kitchen	3.8	N/A	Fail	4.7	N/A	Fail
Block 6N_L05_01_3B6P_Living Room	3.5	N/A	Fail	4.6	N/A	Fail
Block 6N_L05_02_2B4P_Dbl Bedroom_E	1.8	46	Fail	2.4	45	Fail
Block 6N_L05_02_2B4P_Dbl Bedroom_W	1.9	48	Fail	2.4	46	Fail
Block 6N_L05_02_2B4P_KLD	3.4	N/A	Fail	4.4	N/A	Fail
Block 6S_L00_01_4B7P_Kitchen	3.1	N/A	Fail	3.8	N/A	Fail
Block 6S_L00_01_4B7P_Living Room	3.7	N/A	Fail	4.2	N/A	Fail
Block 6S_L00_02_3B6P_Kitchen	4.1	N/A	Fail	4.5	N/A	Fail
Block 6S_L00_02_3B6P_Living Room	2.5	N/A	Pass	3.3	N/A	Fail
Block 6S_L00_03_3B6P_Kitchen	4.6	N/A	Fail	5.3	N/A	Fail
Block 6S_L00_03_3B6P_Living Room	3.1	N/A	Fail	3.8	N/A	Fail
Block 6S_L00_04_3B6P_Kitchen	4.2	N/A	Fail	4.6	N/A	Fail
Block 6S_L00_04_3B6P_Living Room	2.4	N/A	Pass	3.3	N/A	Fail

Room	CIBSE 2020s DSY2		Part O Compliance	CIBSE 2020s DSY3		Part O Compliance
	Criterion 1	Criterion 2		Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs		≤ 3%	≤ 32hrs	
Block 6S_L00_05_3B6P_Kitchen	4.5	N/A	Fail	5.2	N/A	Fail
Block 6S_L00_05_3B6P_Living Room	3	N/A	Pass	3.6	N/A	Fail
Block 6S_L01_01_4B7P_Dbl Bedroom_N	1.6	52	Fail	2.2	48	Fail
Block 6S_L01_01_4B7P_Dbl Bedroom_SE	1.8	49	Fail	2.3	47	Fail
Block 6S_L01_01_4B7P_Dbl Bedroom_SW	1.7	50	Fail	2.2	47	Fail
Block 6S_L01_01_4B7P_Sgl Bedroom	1.7	44	Fail	2.2	44	Fail
Block 6S_L01_02_3B6P_Dbl Bedroom_NE	1.7	46	Fail	2.2	44	Fail
Block 6S_L01_02_3B6P_Dbl Bedroom_NW	1.7	45	Fail	2.2	44	Fail
Block 6S_L01_02_3B6P_Dbl Bedroom_S	1.9	52	Fail	2.3	48	Fail
Block 6S_L01_03_3B6P_Dbl Bedroom_NE	1.7	45	Fail	2.2	44	Fail
Block 6S_L01_03_3B6P_Dbl Bedroom_NW	1.7	45	Fail	2.2	43	Fail
Block 6S_L01_03_3B6P_Dbl Bedroom_S	1.9	52	Fail	2.3	48	Fail
Block 6S_L01_04_3B6P_Dbl Bedroom_NE	1.7	45	Fail	2.3	43	Fail
Block 6S_L01_04_3B6P_Dbl Bedroom_NW	1.7	45	Fail	2.3	44	Fail
Block 6S_L01_04_3B6P_Dbl Bedroom_S	1.9	51	Fail	2.3	48	Fail
Block 6S_L01_05_3B6P_Dbl Bedroom_NE	1.7	45	Fail	2.2	44	Fail
Block 6S_L01_05_3B6P_Dbl Bedroom_NW	1.6	47	Fail	2.1	44	Fail
Block 6S_L01_05_3B6P_Dbl Bedroom_S	1.9	52	Fail	2.3	48	Fail
Block 6S_L01_06_3B6P_Dbl Bedroom_S	1.9	54	Fail	2.3	52	Fail
Block 6S_L01_06_3B6P_Dbl Bedroom_SE	1.9	52	Fail	2.4	51	Fail
Block 6S_L01_06_3B6P_Dbl Bedroom_SW	1.6	49	Fail	2.1	50	Fail
Block 6S_L01_06_3B6P_Kitchen	3.3	N/A	Fail	4.4	N/A	Fail
Block 6S_L01_06_3B6P_Living Room	3.2	N/A	Fail	4.4	N/A	Fail
Block 6S_L02_01_4B7P_Dining	3.5	N/A	Fail	4.4	N/A	Fail
Block 6S_L02_01_4B7P_Kitchen	3.5	N/A	Fail	4.4	N/A	Fail
Block 6S_L02_01_4B7P_Living Room	3.1	N/A	Fail	3.6	N/A	Fail
Block 6S_L02_02_3B6P_Dbl Bedroom_S	1.9	54	Fail	2.4	51	Fail
Block 6S_L02_02_3B6P_Dbl Bedroom_SE	1.9	52	Fail	2.4	51	Fail
Block 6S_L02_02_3B6P_Dbl Bedroom_SW	1.8	45	Fail	2.3	44	Fail
Block 6S_L02_02_3B6P_Kitchen	3.4	N/A	Fail	4.5	N/A	Fail
Block 6S_L02_02_3B6P_Living Room	3.3	N/A	Fail	4.5	N/A	Fail

Room	CIBSE 2020s DSY2		Part O Compliance	CIBSE 2020s DSY3		Part O Compliance
	Criterion 1	Criterion 2		Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs		≤ 3%	≤ 32hrs	
Block 6S_L02_03_1B2P_Dbl Bedroom	1.7	50	Fail	2.2	48	Fail
Block 6S_L02_03_1B2P_Kitchen	3.2	N/A	Fail	3.7	N/A	Fail
Block 6S_L02_03_1B2P_Living Room	3.7	N/A	Fail	4.2	N/A	Fail
Block 6S_L02_04_1B2P_Dbl Bedroom	1.7	50	Fail	2	49	Fail
Block 6S_L02_04_1B2P_Kitchen	3.3	N/A	Fail	3.8	N/A	Fail
Block 6S_L02_04_1B2P_Living Room	3.9	N/A	Fail	4.4	N/A	Fail
Block 6S_L03_01_1B2P_Dbl Bedroom_NE	1.6	51	Fail	2.1	48	Fail
Block 6S_L03_01_1B2P_Dbl Bedroom_NW	1.6	45	Fail	2.2	43	Fail
Block 6S_L03_01_1B2P_Dbl Bedroom_S	1.7	50	Fail	2.2	48	Fail
Block 6S_L03_01_1B2P_Sgl Bedroom	1.8	45	Fail	2.4	42	Fail
Block 6S_L03_02_3B6P_Dbl Bedroom_S	1.9	54	Fail	2.3	51	Fail
Block 6S_L03_02_3B6P_Dbl Bedroom_SE	1.8	51	Fail	2.5	48	Fail
Block 6S_L03_02_3B6P_Dbl Bedroom_SW	1.8	46	Fail	2.4	44	Fail
Block 6S_L03_02_3B6P_Kitchen	3.4	N/A	Fail	4.5	N/A	Fail
Block 6S_L03_02_3B6P_Living Room	3.3	N/A	Fail	4.5	N/A	Fail
Block 6S_L03_03_1B2P_Dbl Bedroom	1.9	50	Fail	2.4	50	Fail
Block 6S_L03_03_1B2P_Kitchen	3.5	N/A	Fail	4.1	N/A	Fail
Block 6S_L03_03_1B2P_Living Room	3.7	N/A	Fail	4.7	N/A	Fail
Block 6S_L03_04_1B2P_Dbl Bedroom	1.8	50	Fail	2.3	49	Fail
Block 6S_L03_04_1B2P_Kitchen	3.5	N/A	Fail	4	N/A	Fail
Block 6S_L03_04_1B2P_Livinng Room	3.6	N/A	Fail	4.6	N/A	Fail
Block 6S_L03_05_1B2P_Dbl Bedroom	1.9	50	Fail	2.2	51	Fail
Block 6S_L03_05_1B2P_Kitchen	3.3	N/A	Fail	3.9	N/A	Fail
Block 6S_L03_05_1B2P_Living Room	3.9	N/A	Fail	4.8	N/A	Fail
Block 6S_L04_01_4B7P_Dbl Bedroom_NE	1.6	49	Fail	2.2	46	Fail
Block 6S_L04_01_4B7P_Dbl Bedroom_NW	1.5	52	Fail	2	49	Fail
Block 6S_L04_01_4B7P_Dbl Bedroom_S	1.7	48	Fail	2.4	50	Fail
Block 6S_L04_01_4B7P_Kitchen	3.7	N/A	Fail	4.3	N/A	Fail
Block 6S_L04_01_4B7P_Living Room	3	N/A	Pass	4	N/A	Fail
Block 6S_L04_01_4B7P_Sgl Bedroom	1.8	45	Fail	2.4	39	Fail
Block 6S_L04_02_3B6P_Dbl Bedroom_S	1.9	54	Fail	2.4	51	Fail
Block 6S_L04_02_3B6P_Dbl Bedroom_SE	1.9	53	Fail	2.4	51	Fail

Room	CIBSE 2020s DSY2		Part O Compliance	CIBSE 2020s DSY3		Part O Compliance
	Criterion 1	Criterion 2		Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs		≤ 3%	≤ 32hrs	
Block 6S_L04_02_3B6P_Dbl Bedroom_SW	1.9	48	Fail	2.4	45	Fail
Block 6S_L04_02_3B6P_Kitchen	3.4	N/A	Fail	4.5	N/A	Fail
Block 6S_L04_02_3B6P_Living Room	3.4	N/A	Fail	4.5	N/A	Fail
Block 6S_L04_03_3B6P_Dbl Bedroom_E	1.9	51	Fail	2.5	50	Fail
Block 6S_L04_03_3B6P_Dbl Bedroom_N	1.7	48	Fail	2.3	47	Fail
Block 6S_L04_03_3B6P_Dbl Bedroom_W	1.9	49	Fail	2.5	48	Fail
Block 6S_L04_03_3B6P_Kitchen	3.7	N/A	Fail	4.7	N/A	Fail
Block 6S_L04_03_3B6P_Living Room	3.8	N/A	Fail	4.7	N/A	Fail
Block 6S_L05_01_2B3P_Dbl Bedroom	1.7	50	Fail	2.3	46	Fail
Block 6S_L05_01_2B3P_Sgl Bedroom	2	40	Fail	2.7	41	Fail
Block 6S_L05_02_3B6P_Dbl Bedroom_S	2.1	51	Fail	2.5	49	Fail
Block 6S_L05_02_3B6P_Dbl Bedroom_SE	2	50	Fail	2.4	49	Fail
Block 6S_L05_02_3B6P_Dbl Bedroom_SW	2.3	47	Fail	2.7	45	Fail
Block 6S_L05_02_3B6P_Kitchen	3.7	N/A	Fail	4.6	N/A	Fail
Block 6S_L05_02_3B6P_Living Room	4	N/A	Fail	5.1	N/A	Fail
Block 6S_L05_03_2B3P_KLD	3.5	N/A	Fail	4.3	N/A	Fail
Block 6S_L05_03_3B6P_Dbl Bedroom_N	1.9	47	Fail	2.4	46	Fail
Block 6S_L05_03_3B6P_Dbl Bedroom_SE	1.9	49	Fail	2.4	47	Fail
Block 6S_L05_03_3B6P_Dbl Bedroom_SW	2.1	48	Fail	2.6	46	Fail
Block 6S_L05_03_3B6P_Kitchen	3.7	N/A	Fail	4.7	N/A	Fail
Block 6S_L05_03_3B6P_Living Room	3.9	N/A	Fail	4.7	N/A	Fail
Block 7_L01_04_2B4P_Dbl Bedroom_N	1.6	54	Fail	2.1	51	Fail
Block 7_L01_04_2B4P_Dbl Bedroom_S	1.7	53	Fail	2.3	50	Fail
Block 7_L01_04_2B4P_Kitchen	3.3	N/A	Fail	4.3	N/A	Fail
Block 7_L01_04_2B4P_Living Room	3.5	N/A	Fail	4.3	N/A	Fail
Block 7_L01_05_2B4P_Dbl Bedroom_E	2	53	Fail	2.4	52	Fail
Block 7_L01_05_2B4P_Dbl Bedroom_W	2	54	Fail	2.5	51	Fail
Block 7_L01_05_2B4P_Kitchen	3.2	N/A	Fail	3.9	N/A	Fail
Block 7_L01_05_2B4P_Living Room	3.6	N/A	Fail	4.4	N/A	Fail
Block 7_L01_06_1B2P_Dbl Bedroom	1.8	54	Fail	2.2	52	Fail
Block 7_L01_06_1B2P_Kitchen	3.9	N/A	Fail	4.4	N/A	Fail
Block 7_L01_06_1B2P_Living Room	3.6	N/A	Fail	4.5	N/A	Fail
Block 7_L03_04_2B4P_Dbl Bedroom_N	1.6	54	Fail	2.1	51	Fail
Block 7_L03_04_2B4P_Dbl Bedroom_S	1.7	53	Fail	2.3	51	Fail

Room	CIBSE 2020s DSY2		Part O Compliance	CIBSE 2020s DSY3		Part O Compliance
	Criterion 1	Criterion 2		Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs		≤ 3%	≤ 32hrs	
Block 7_L03_04_2B4P_Kitchen	3.3	N/A	Fail	3.9	N/A	Fail
Block 7_L03_04_2B4P_Kitchen	3.3	N/A	Fail	4.3	N/A	Fail
Block 7_L03_04_2B4P_Living Room	3.7	N/A	Fail	4.4	N/A	Fail
Block 7_L03_04_2B4P_Living Room	3.5	N/A	Fail	4.3	N/A	Fail
Block 7_L03_05_2B4P_Dbl Bedroom_E	2	54	Fail	2.4	52	Fail
Block 7_L03_05_2B4P_Dbl Bedroom_W	2	54	Fail	2.5	51	Fail
Block 7_L03_06_1B2P_Dbl Bedroom	1.8	54	Fail	2.4	52	Fail
Block 7_L03_06_1B2P_Kitchen	3.9	N/A	Fail	4.4	N/A	Fail
Block 7_L03_06_1B2P_Living Room	3.6	N/A	Fail	4.5	N/A	Fail
Block 7_L04_04_2B4P_Dbl Bedroom_N	1.6	54	Fail	2.2	51	Fail
Block 7_L04_04_2B4P_Dbl Bedroom_S	1.7	53	Fail	2.4	50	Fail
Block 7_L04_04_2B4P_Kitchen	3.3	N/A	Fail	4.3	N/A	Fail
Block 7_L04_04_2B4P_Living Room	3.5	N/A	Fail	4.4	N/A	Fail
Block 7_L04_05_2B4P_Dbl Bedroom_E	1.9	53	Fail	2.5	51	Fail
Block 7_L04_05_2B4P_Dbl Bedroom_W	2	53	Fail	2.6	50	Fail
Block 7_L04_05_2B4P_Kitchen	3.4	N/A	Fail	4.1	N/A	Fail
Block 7_L04_05_2B4P_Living Room	3.8	N/A	Fail	4.6	N/A	Fail
Block 7_L05_01_1B2P_Dbl Bedroom	1.9	51	Fail	2.4	50	Fail
Block 7_L05_01_1B2P_Kitchen	4.3	N/A	Fail	5.1	N/A	Fail
Block 7_L05_01_1B2P_Living Room	3.7	N/A	Fail	4.9	N/A	Fail
Block 7_L05_02_2B4P_Dbl Bedroom_E	2	50	Fail	2.5	49	Fail
Block 7_L05_02_2B4P_Dbl Bedroom_W	2	50	Fail	2.6	48	Fail
Block 7_L05_02_2B4P_Kitchen	3.6	N/A	Fail	4.5	N/A	Fail
Block 7_L05_02_2B4P_Living Room	3.7	N/A	Fail	4.8	N/A	Fail
Block 7_L05_03_2B4P_Dbl Bedroom_N	1.7	50	Fail	2.3	48	Fail
Block 7_L05_03_2B4P_Dbl Bedroom_S	1.8	50	Fail	2.3	47	Fail
Block 7_L05_03_2B4P_Kitchen	3.3	N/A	Fail	4.3	N/A	Fail
Block 7_L05_03_2B4P_Living Room	3.5	N/A	Fail	4.4	N/A	Fail
Block 8_L00_01_4B7P_Kitchen	3.2	N/A	Fail	4	N/A	Fail
Block 8_L00_01_4B7P_Living Room	3.7	N/A	Fail	4.3	N/A	Fail
Block 8_L00_02_3B6P_Kitchen	3.8	N/A	Fail	4.5	N/A	Fail
Block 8_L00_02_3B6P_Living Room	3.5	N/A	Fail	4.1	N/A	Fail
Block 8_L00_03_3B6P_Kitchen	3.7	N/A	Fail	4.4	N/A	Fail
Block 8_L00_03_3B6P_Living Room	3.4	N/A	Fail	3.9	N/A	Fail
Block 8_L00_04_3B6P_Kitchen	3	N/A	Pass	3.4	N/A	Fail
Block 8_L01_01_4B7P_Dbl Bedroom_N	1.5	56	Fail	2	48	Fail
Block 8_L01_01_4B7P_Dbl Bedroom_SE	1.9	54	Fail	2.4	51	Fail
Block 8_L01_01_4B7P_Dbl Bedroom_SW	1.7	56	Fail	2.2	51	Fail
Block 8_L01_01_4B7P_Sgl Bedroom	1.7	59	Fail	2.3	59	Fail
Block 8_L01_02_3B6P_Dbl Bedroom_N	1.5	53	Fail	2	49	Fail

Room	CIBSE 2020s DSY2		Part O Compliance	CIBSE 2020s DSY3		Part O Compliance
	Criterion 1	Criterion 2		Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs		≤ 3%	≤ 32hrs	
Block 8_L01_02_3B6P_Dbl Bedroom_SE	1.7	54	Fail	2.2	52	Fail
Block 8_L01_02_3B6P_Dbl Bedroom_SW	1.8	52	Fail	2.4	52	Fail
Block 8_L01_03_3B6P_Dbl Bedroom_N	1.5	53	Fail	2	49	Fail
Block 8_L01_03_3B6P_Dbl Bedroom_SE	1.8	52	Fail	2.4	51	Fail
Block 8_L01_03_3B6P_Dbl Bedroom_SW	1.6	53	Fail	2.2	52	Fail
Block 8_L01_04_3B6P_Dbl Bedroom_E	1.5	54	Fail	2.2	50	Fail
Block 8_L01_04_3B6P_Dbl Bedroom_NE	1.6	54	Fail	2.4	51	Fail
Block 8_L01_04_3B6P_Dbl Bedroom_W	1.7	54	Fail	2.2	51	Fail
Block 8_L02_01_4B7P_KLD	3	N/A	Pass	4	N/A	Fail
Block 8_L02_01_4B7P_Living Room	2.8	N/A	Pass	3.7	N/A	Fail
Block 8_L02_02_3B6P_Kitchen	3.7	N/A	Fail	4.3	N/A	Fail
Block 8_L02_02_3B6P_Kitchen	3.6	N/A	Fail	4	N/A	Fail
Block 8_L02_02_3B6P_Living Room	2.7	N/A	Pass	3.6	N/A	Fail
Block 8_L02_02_3B6P_Living Room	3.1	N/A	Fail	3.9	N/A	Fail
Block 8_L02_03_3B6P_Kitchen	3.8	N/A	Fail	4.4	N/A	Fail
Block 8_L02_03_3B6P_Living Room	2.7	N/A	Pass	3.6	N/A	Fail
Block 8_L03_01_4B7P_Dbl Bedroom_NE	1.9	44	Fail	2.3	44	Fail
Block 8_L03_01_4B7P_Dbl Bedroom_NW	1.6	54	Fail	2.1	48	Fail
Block 8_L03_01_4B7P_Dbl Bedroom_S	1.8	54	Fail	2.4	50	Fail
Block 8_L03_01_4B7P_Sgl Bedroom	1.8	48	Fail	2.3	47	Fail
Block 8_L03_02_3B6P_Dbl Bedroom_NE	1.5	54	Fail	2	49	Fail
Block 8_L03_02_3B6P_Dbl Bedroom_NW	1.7	45	Fail	2.3	44	Fail
Block 8_L03_02_3B6P_Dbl Bedroom_S	1.8	52	Fail	2.4	51	Fail
Block 8_L03_03_3B6P_Dbl Bedorom_S	1.8	52	Fail	2.4	51	Fail
Block 8_L03_03_3B6P_Dbl Bedroom_NE	1.5	52	Fail	2	50	Fail
Block 8_L03_03_3B6P_Dbl Bedroom_NW	1.8	45	Fail	2.3	44	Fail
Block 8_L03_04_3B6P_Dbl Bedroom_NE	1.6	56	Fail	2.3	52	Fail
Block 8_L03_04_3B6P_Dbl Bedroom_SE	1.8	48	Fail	2.5	47	Fail
Block 8_L03_04_3B6P_Dbl Bedroom_SW	1.7	54	Fail	2.2	51	Fail
Block 8_L05_01_3B6P_Dbl Bedroom_N	1.6	52	Fail	2.1	49	Fail
Block 8_L05_01_3B6P_Dbl Bedroom_S	1.8	52	Fail	2.4	50	Fail
Block 8_L05_01_3B6P_Kitchen	3.8	N/A	Fail	4.7	N/A	Fail
Block 8_L05_01_3B6P_Living Room	3.6	N/A	Fail	4.6	N/A	Fail

Room		CIBSE 2020s DSY2		Part O Compliance	CIBSE 2020s DSY3		Part O Compliance
		Criterion 1	Criterion 2		Criterion 1	Criterion 2	
		≤ 3%	≤ 32hrs		≤ 3%	≤ 32hrs	
Block 8_L05_01_3B6P_Sgl Bedroom		1.7	46	Fail	2.3	44	Fail
Block 8_L05_02_4B6P_Dbl Bedroom_N		1.8	55	Fail	2.4	52	Fail
Block 8_L05_02_4B6P_Dbl Bedroom_S		1.9	54	Fail	2.5	51	Fail
Block 8_L05_02_4B6P_Kitchen		3.8	N/A	Fail	4.5	N/A	Fail
Block 8_L05_02_4B6P_Living Room		3.3	N/A	Fail	3.7	N/A	Fail
Block 8_L05_02_4B6P_Sgl Bedroom_N		2.1	49	Fail	2.8	46	Fail
Block 8_L05_02_4B6P_Sgl Bedroom_S		2.1	49	Fail	2.8	46	Fail
Total No. Pass	Bedrooms	153 / 154	0 / 154	**0 / 154**	153 / 154	0 / 154	**0 / 154**
	Kitchen, Living, Dining (KLDs)	12 / 116	N/A	**12 / 116**	/ 116	N/A	**1 / 116**
Overall compliance				**12 / 270**			**1 / 270**
% Pass				**4.44%**			**0.37%**

APPENDIX E – DETAILED RESULTS: CIBSE 2050S DSY1 WEATHER FILE

The proposed development has been assessed under the 2050s future weather data to test how the design will perform in a future weather scenario.

The final iteration after the acoustic measures incorporated (Iteration 04) has been assessed against the 2050s DSY1 weather data and results are presented below, in addition to the results where potential retrofit measures to mitigate the overheating risk in the future scenario have been incorporated.

Iteration 07

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L00_01_3B5P_Dbl Bedroom	1.2	109	Fail
Block 5_L00_01_3B5P_Kitchen	4.4	N/A	Fail
Block 5_L00_01_3B5P_Living Room	2.8	N/A	Pass
Block 5_L00_01_3B5P_Sgl Bedroom_E	1.6	92	Fail
Block 5_L00_01_3B5P_Sgl Bedroom_W	1.5	98	Fail
Block 5_L02_01_3B5P_Dbl Bedroom_E	1.7	89	Fail
Block 5_L02_01_3B5P_Dbl Bedroom_W	1.6	86	Fail
Block 5_L02_01_3B5P_Kitchen	5.4	N/A	Fail
Block 5_L02_01_3B5P_Living Room	4.1	N/A	Fail
Block 5_L02_01_3B5P_Sgl Bedroom	2	78	Fail
Block 5_L02_02_3B5P_Dbl Bedroom_E	1.7	87	Fail
Block 5_L02_02_3B5P_Dbl Bedroom_W	1.6	87	Fail
Block 5_L02_02_3B5P_Kitchen	4.4	N/A	Fail
Block 5_L02_02_3B5P_Living Room	3.2	N/A	Fail
Block 5_L02_02_3B5P_Sgl Bedroom	2	77	Fail
Block 5_L02_03_2B3P_Dbl Bedroom	1.7	68	Fail
Block 5_L02_03_2B3P_Kitchen	3.1	N/A	Fail
Block 5_L02_03_2B3P_Living Room	3.1	N/A	Fail
Block 5_L02_03_2B3P_Sgl Bedroom	1.7	73	Fail
Block 5_L03_01_3B5P_Dbl Bedroom_E	1.8	90	Fail
Block 5_L03_01_3B5P_Dbl Bedroom_W	2	89	Fail
Block 5_L03_01_3B5P_Kitchen	5.5	N/A	Fail
Block 5_L03_01_3B5P_Living Room	4.4	N/A	Fail
Block 5_L03_01_3B5P_Sgl Bedroom	2.1	78	Fail
Block 5_L04_01_3B5P_Dbl Bedroom_E	1.8	88	Fail
Block 5_L04_01_3B5P_Dbl Bedroom_W	2	90	Fail
Block 5_L04_01_3B5P_Kitchen	5.8	N/A	Fail
Block 5_L04_01_3B5P_Living Room	4.4	N/A	Fail
Block 5_L04_01_3B5P_Sgl Bedroom	2.1	78	Fail
Block 5_L04_02_3B5P_Dbl Bedroom_E	1.7	86	Fail
Block 5_L04_02_3B5P_Dbl Bedroom_W	1.6	86	Fail
Block 5_L04_02_3B5P_Kitchen	4.5	N/A	Fail
Block 5_L04_02_3B5P_Living Room	3.3	N/A	Fail
Block 5_L04_02_3B5P_Sgl Bedroom	2	77	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L05_01_2B4P_Dbl Bedroom	2	65	Fail
Block 5_L05_01_2B4P_Kitchen	3.1	N/A	Fail
Block 5_L05_01_2B4P_Living Room	3	N/A	Pass
Block 5_L05_01_2B4P_Sgl Bedroom	1.8	68	Fail
Block 5_L05_02_4B7P_Dbl Bedroom_NE	2.3	65	Fail
Block 5_L05_02_4B7P_Dbl Bedroom_NW	2.6	65	Fail
Block 5_L05_02_4B7P_Dbl Bedroom_SE	2	82	Fail
Block 5_L05_02_4B7P_Kitchen	4	N/A	Fail
Block 5_L05_02_4B7P_Living Room	4.4	N/A	Fail
Block 5_L05_02_4B7P_Sgl Bedroom	2.6	65	Fail
Block 5_L05_03_1B2P_Dbl Bedroom	1.8	95	Fail
Block 5_L05_03_1B2P_KLD	2.6	N/A	Pass
Block 5_L05_04_3B5P_Dbl Bedroom_E	1.8	84	Fail
Block 5_L05_04_3B5P_Dbl Bedroom_W	2	84	Fail
Block 5_L05_04_3B5P_Kitchen	5.7	N/A	Fail
Block 5_L05_04_3B5P_Living Room	4.3	N/A	Fail
Block 5_L05_04_3B5P_Sgl Bedroom	2.3	75	Fail
Block 5_L05_05_3B5P_Dbl Bedroom_E	2	80	Fail
Block 5_L05_05_3B5P_Dbl Bedroom_W	1.7	84	Fail
Block 5_L05_05_3B5P_Kitchen	4.6	N/A	Fail
Block 5_L05_05_3B5P_Living Room	3.5	N/A	Fail
Block 5_L05_05_3B5P_Sgl Bedroom	2.1	76	Fail
Block 6N_L00_01_3B6P_Kitchen	4.1	N/A	Fail
Block 6N_L00_01_3B6P_Living Room	2.7	N/A	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_N	1.4	62	Fail
Block 6N_L00_02_3B6P_Dbl Bedroom_SE	1.4	61	Fail
Block 6N_L00_02_3B6P_Dbl Bedroom_SW	1.4	61	Fail
Block 6N_L00_02_3B6P_Kitchen	4.2	N/A	Fail
Block 6N_L00_02_3B6P_Living Room	2.7	N/A	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_N	1.3	66	Fail
Block 6N_L01_01_3B6P_Dbl Bedroom_SE	1.5	59	Fail
Block 6N_L01_01_3B6P_Dbl Bedroom_SW	1.3	59	Fail
Block 6N_L03_01_1B2P_Dbl Bedroom	1.3	63	Fail
Block 6N_L03_01_1B2P_Kitchen	2.9	N/A	Pass
Block 6N_L03_01_1B2P_Living Room	4	N/A	Fail
Block 6N_L04_01_3B6P_Dbl Bedroom_NE	1.4	60	Fail
Block 6N_L04_01_3B6P_Dbl Bedroom_NW	1.5	59	Fail
Block 6N_L04_01_3B6P_Dbl Bedroom_S	1.6	60	Fail
Block 6N_L04_01_3B6P_Kitchen	3.8	N/A	Fail
Block 6N_L04_01_3B6P_Living Room	3.5	N/A	Fail
Block 6N_L04_02_2B4P_Dbl Bedroom_E	1.9	59	Fail
Block 6N_L04_02_2B4P_Dbl Bedroom_W	2.1	62	Fail
Block 6N_L04_02_2B4P_KLD	3.5	N/A	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6N_L05_01_3B6P_Dbl Bedroom_NE	1.4	59	Fail
Block 6N_L05_01_3B6P_Dbl Bedroom_NW	1.6	57	Fail
Block 6N_L05_01_3B6P_Dbl Bedroom_S	1.6	60	Fail
Block 6N_L05_01_3B6P_Kitchen	3.9	N/A	Fail
Block 6N_L05_01_3B6P_Living Room	3.6	N/A	Fail
Block 6N_L05_02_2B4P_Dbl Bedroom_E	1.8	60	Fail
Block 6N_L05_02_2B4P_Dbl Bedroom_W	1.9	61	Fail
Block 6N_L05_02_2B4P_KLD	3.4	N/A	Fail
Block 6S_L00_01_4B7P_Kitchen	2.9	N/A	Pass
Block 6S_L00_01_4B7P_Living Room	2.9	N/A	Pass
Block 6S_L00_02_3B6P_Kitchen	3.7	N/A	Fail
Block 6S_L00_02_3B6P_Living Room	2	N/A	Pass
Block 6S_L00_03_3B6P_Kitchen	4.7	N/A	Fail
Block 6S_L00_03_3B6P_Living Room	2.4	N/A	Pass
Block 6S_L00_04_3B6P_Kitchen	3.6	N/A	Fail
Block 6S_L00_04_3B6P_Living Room	1.8	N/A	Pass
Block 6S_L00_05_3B6P_Kitchen	4.6	N/A	Fail
Block 6S_L00_05_3B6P_Living Room	2.3	N/A	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_N	1.4	64	Fail
Block 6S_L01_01_4B7P_Dbl Bedroom_SE	1.5	61	Fail
Block 6S_L01_01_4B7P_Dbl Bedroom_SW	1.4	61	Fail
Block 6S_L01_01_4B7P_Sgl Bedroom	1.6	56	Fail
Block 6S_L01_02_3B6P_Dbl Bedroom_NE	1.6	58	Fail
Block 6S_L01_02_3B6P_Dbl Bedroom_NW	1.6	56	Fail
Block 6S_L01_02_3B6P_Dbl Bedroom_S	1.6	63	Fail
Block 6S_L01_03_3B6P_Dbl Bedroom_NE	1.5	56	Fail
Block 6S_L01_03_3B6P_Dbl Bedroom_NW	1.6	56	Fail
Block 6S_L01_03_3B6P_Dbl Bedroom_S	1.6	63	Fail
Block 6S_L01_04_3B6P_Dbl Bedroom_NE	1.6	56	Fail
Block 6S_L01_04_3B6P_Dbl Bedroom_NW	1.6	56	Fail
Block 6S_L01_04_3B6P_Dbl Bedroom_S	1.6	63	Fail
Block 6S_L01_05_3B6P_Dbl Bedroom_NE	1.6	56	Fail
Block 6S_L01_05_3B6P_Dbl Bedroom_NW	1.3	56	Fail
Block 6S_L01_05_3B6P_Dbl Bedroom_S	1.6	63	Fail
Block 6S_L01_06_3B6P_Dbl Bedroom_S	1.5	69	Fail
Block 6S_L01_06_3B6P_Dbl Bedroom_SE	1.6	68	Fail
Block 6S_L01_06_3B6P_Dbl Bedroom_SW	1.3	64	Fail
Block 6S_L01_06_3B6P_Kitchen	3.5	N/A	Fail
Block 6S_L01_06_3B6P_Living Room	3.2	N/A	Fail
Block 6S_L02_01_4B7P_Dining	3.1	N/A	Fail
Block 6S_L02_01_4B7P_Kitchen	3.1	N/A	Fail
Block 6S_L02_01_4B7P_Living Room	2.5	N/A	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_S	1.6	71	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L02_02_3B6P_Dbl Bedroom_SE	1.6	69	Fail
Block 6S_L02_02_3B6P_Dbl Bedroom_SW	1.5	59	Fail
Block 6S_L02_02_3B6P_Kitchen	3.6	N/A	Fail
Block 6S_L02_02_3B6P_Living Room	3.3	N/A	Fail
Block 6S_L02_03_1B2P_Dbl Bedroom	1.2	64	Fail
Block 6S_L02_03_1B2P_Kitchen	2.9	N/A	Pass
Block 6S_L02_03_1B2P_Living Room	3.5	N/A	Fail
Block 6S_L02_04_1B2P_Dbl Bedroom	1	63	Fail
Block 6S_L02_04_1B2P_Kitchen	3.2	N/A	Fail
Block 6S_L02_04_1B2P_Living Room	4	N/A	Fail
Block 6S_L03_01_1B2P_Dbl Bedroom_NE	1.4	61	Fail
Block 6S_L03_01_1B2P_Dbl Bedroom_NW	1.5	58	Fail
Block 6S_L03_01_1B2P_Dbl Bedroom_S	1.4	61	Fail
Block 6S_L03_01_1B2P_Sgl Bedroom	1.6	53	Fail
Block 6S_L03_02_3B6P_Dbl Bedroom_S	1.5	70	Fail
Block 6S_L03_02_3B6P_Dbl Bedroom_SE	1.7	62	Fail
Block 6S_L03_02_3B6P_Dbl Bedroom_SW	1.7	58	Fail
Block 6S_L03_02_3B6P_Kitchen	3.6	N/A	Fail
Block 6S_L03_02_3B6P_Living Room	3.4	N/A	Fail
Block 6S_L03_03_1B2P_Dbl Bedroom	1.5	68	Fail
Block 6S_L03_03_1B2P_Kitchen	3.1	N/A	Fail
Block 6S_L03_03_1B2P_Living Room	3.7	N/A	Fail
Block 6S_L03_04_1B2P_Dbl Bedroom	1.4	67	Fail
Block 6S_L03_04_1B2P_Kitchen	3.1	N/A	Fail
Block 6S_L03_04_1B2P_Livinng Room	3.5	N/A	Fail
Block 6S_L03_05_1B2P_Dbl Bedroom	1.1	67	Fail
Block 6S_L03_05_1B2P_Kitchen	3.1	N/A	Fail
Block 6S_L03_05_1B2P_Living Room	4.4	N/A	Fail
Block 6S_L04_01_4B7P_Dbl Bedroom_NE	1.4	60	Fail
Block 6S_L04_01_4B7P_Dbl Bedroom_NW	1.4	62	Fail
Block 6S_L04_01_4B7P_Dbl Bedroom_S	1.9	61	Fail
Block 6S_L04_01_4B7P_Kitchen	3.3	N/A	Fail
Block 6S_L04_01_4B7P_Living Room	2.7	N/A	Pass
Block 6S_L04_01_4B7P_Sgl Bedroom	1.6	53	Fail
Block 6S_L04_02_3B6P_Dbl Bedroom_S	1.6	72	Fail
Block 6S_L04_02_3B6P_Dbl Bedroom_SE	1.6	70	Fail
Block 6S_L04_02_3B6P_Dbl Bedroom_SW	1.7	63	Fail
Block 6S_L04_02_3B6P_Kitchen	3.6	N/A	Fail
Block 6S_L04_02_3B6P_Living Room	3.4	N/A	Fail
Block 6S_L04_03_3B6P_Dbl Bedroom_E	1.6	63	Fail
Block 6S_L04_03_3B6P_Dbl Bedroom_N	1.6	61	Fail
Block 6S_L04_03_3B6P_Dbl Bedroom_W	1.8	61	Fail
Block 6S_L04_03_3B6P_Kitchen	4	N/A	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L04_03_3B6P_Living Room	4	N/A	Fail
Block 6S_L05_01_2B3P_Dbl Bedroom	1.7	64	Fail
Block 6S_L05_01_2B3P_Sgl Bedroom	2.1	56	Fail
Block 6S_L05_02_3B6P_Dbl Bedroom_S	1.7	68	Fail
Block 6S_L05_02_3B6P_Dbl Bedroom_SE	1.7	66	Fail
Block 6S_L05_02_3B6P_Dbl Bedroom_SW	2.1	61	Fail
Block 6S_L05_02_3B6P_Kitchen	3.9	N/A	Fail
Block 6S_L05_02_3B6P_Living Room	4.1	N/A	Fail
Block 6S_L05_03_2B3P_KLD	2.8	N/A	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_N	1.7	61	Fail
Block 6S_L05_03_3B6P_Dbl Bedroom_SE	1.7	60	Fail
Block 6S_L05_03_3B6P_Dbl Bedroom_SW	1.9	60	Fail
Block 6S_L05_03_3B6P_Kitchen	4	N/A	Fail
Block 6S_L05_03_3B6P_Living Room	4.1	N/A	Fail
Block 7_L01_04_2B4P_Dbl Bedroom_N	1.4	72	Fail
Block 7_L01_04_2B4P_Dbl Bedroom_S	1.6	71	Fail
Block 7_L01_04_2B4P_Kitchen	2.9	N/A	Pass
Block 7_L01_04_2B4P_Living Room	3.1	N/A	Fail
Block 7_L01_05_2B4P_Dbl Bedroom_E	1.5	72	Fail
Block 7_L01_05_2B4P_Dbl Bedroom_W	1.8	73	Fail
Block 7_L01_05_2B4P_Kitchen	2.6	N/A	Pass
Block 7_L01_05_2B4P_Living Room	3.8	N/A	Fail
Block 7_L01_06_1B2P_Dbl Bedroom	1.7	72	Fail
Block 7_L01_06_1B2P_Kitchen	3.7	N/A	Fail
Block 7_L01_06_1B2P_Living Room	3.5	N/A	Fail
Block 7_L03_04_2B4P_Dbl Bedroom_N	1.4	72	Fail
Block 7_L03_04_2B4P_Dbl Bedroom_S	1.6	71	Fail
Block 7_L03_04_2B4P_Kitchen	2.6	N/A	Pass
Block 7_L03_04_2B4P_Kitchen	2.9	N/A	Pass
Block 7_L03_04_2B4P_Living Room	3.9	N/A	Fail
Block 7_L03_04_2B4P_Living Room	3.1	N/A	Fail
Block 7_L03_05_2B4P_Dbl Bedroom_E	1.5	73	Fail
Block 7_L03_05_2B4P_Dbl Bedroom_W	1.8	73	Fail
Block 7_L03_06_1B2P_Dbl Bedroom	1.9	73	Fail
Block 7_L03_06_1B2P_Kitchen	3.8	N/A	Fail
Block 7_L03_06_1B2P_Living Room	3.8	N/A	Fail
Block 7_L04_04_2B4P_Dbl Bedroom_N	1.4	72	Fail
Block 7_L04_04_2B4P_Dbl Bedroom_S	1.6	70	Fail
Block 7_L04_04_2B4P_Kitchen	2.9	N/A	Pass
Block 7_L04_04_2B4P_Living Room	3.1	N/A	Fail
Block 7_L04_05_2B4P_Dbl Bedroom_E	1.6	69	Fail
Block 7_L04_05_2B4P_Dbl Bedroom_W	1.8	72	Fail
Block 7_L04_05_2B4P_Kitchen	3.3	N/A	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 7_L04_05_2B4P_Living Room	4.2	N/A	Fail
Block 7_L05_01_1B2P_Dbl Bedroom	2.1	69	Fail
Block 7_L05_01_1B2P_Kitchen	5.3	N/A	Fail
Block 7_L05_01_1B2P_Living Room	4.2	N/A	Fail
Block 7_L05_02_2B4P_Dbl Bedroom_E	1.6	65	Fail
Block 7_L05_02_2B4P_Dbl Bedroom_W	1.9	66	Fail
Block 7_L05_02_2B4P_Kitchen	4.2	N/A	Fail
Block 7_L05_02_2B4P_Living Room	4.3	N/A	Fail
Block 7_L05_03_2B4P_Dbl Bedroom_N	1.6	66	Fail
Block 7_L05_03_2B4P_Dbl Bedroom_S	1.7	66	Fail
Block 7_L05_03_2B4P_Kitchen	3	N/A	Pass
Block 7_L05_03_2B4P_Living Room	2.9	N/A	Pass
Block 8_L00_01_4B7P_Kitchen	3.2	N/A	Fail
Block 8_L00_01_4B7P_Living Room	2.8	N/A	Pass
Block 8_L00_02_3B6P_Kitchen	4.1	N/A	Fail
Block 8_L00_02_3B6P_Living Room	2.9	N/A	Pass
Block 8_L00_03_3B6P_Kitchen	3.9	N/A	Fail
Block 8_L00_03_3B6P_Living Room	2.7	N/A	Pass
Block 8_L00_04_3B6P_Kitchen	2.6	N/A	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_N	1.3	65	Fail
Block 8_L01_01_4B7P_Dbl Bedroom_SE	1.5	66	Fail
Block 8_L01_01_4B7P_Dbl Bedroom_SW	1.3	66	Fail
Block 8_L01_01_4B7P_Sgl Bedroom	1.5	68	Fail
Block 8_L01_02_3B6P_Dbl Bedroom_N	1.4	65	Fail
Block 8_L01_02_3B6P_Dbl Bedroom_SE	1.3	68	Fail
Block 8_L01_02_3B6P_Dbl Bedroom_SW	1.5	68	Fail
Block 8_L01_03_3B6P_Dbl Bedroom_N	1.3	65	Fail
Block 8_L01_03_3B6P_Dbl Bedroom_SE	1.5	66	Fail
Block 8_L01_03_3B6P_Dbl Bedroom_SW	1.2	66	Fail
Block 8_L01_04_3B6P_Dbl Bedroom_E	1.3	67	Fail
Block 8_L01_04_3B6P_Dbl Bedroom_NE	1.6	68	Fail
Block 8_L01_04_3B6P_Dbl Bedroom_W	1.6	66	Fail
Block 8_L02_01_4B7P_KLD	2.5	N/A	Pass
Block 8_L02_01_4B7P_Living Room	2.7	N/A	Pass
Block 8_L02_02_3B6P_Kitchen	3.3	N/A	Fail
Block 8_L02_02_3B6P_Kitchen	3.2	N/A	Fail
Block 8_L02_02_3B6P_Living Room	2.3	N/A	Pass
Block 8_L02_02_3B6P_Living Room	2.7	N/A	Pass
Block 8_L02_03_3B6P_Kitchen	3.3	N/A	Fail
Block 8_L02_03_3B6P_Living Room	2.3	N/A	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_NE	1.8	57	Fail
Block 8_L03_01_4B7P_Dbl Bedroom_NW	1.3	65	Fail
Block 8_L03_01_4B7P_Dbl Bedroom_S	1.4	65	Fail

Room		CIBSE 2020s DSY1		Part O Compliance
		Criterion 1	Criterion 2	
		≤ 3%	≤ 32hrs	
Block 8_L03_01_4B7P_Sgl Bedroom		1.5	57	Fail
Block 8_L03_02_3B6P_Dbl Bedroom_NE		1.3	65	Fail
Block 8_L03_02_3B6P_Dbl Bedroom_NW		1.7	57	Fail
Block 8_L03_02_3B6P_Dbl Bedroom_S		1.4	63	Fail
Block 8_L03_03_3B6P_Dbl Bedorom_S		1.5	64	Fail
Block 8_L03_03_3B6P_Dbl Bedroom_NE		1.3	65	Fail
Block 8_L03_03_3B6P_Dbl Bedroom_NW		1.7	57	Fail
Block 8_L03_04_3B6P_Dbl Bedroom_NE		1.6	67	Fail
Block 8_L03_04_3B6P_Dbl Bedroom_SE		1.8	63	Fail
Block 8_L03_04_3B6P_Dbl Bedroom_SW		1.6	66	Fail
Block 8_L05_01_3B6P_Dbl Bedroom_N		1.4	65	Fail
Block 8_L05_01_3B6P_Dbl Bedroom_S		1.5	62	Fail
Block 8_L05_01_3B6P_Kitchen		3.9	N/A	Fail
Block 8_L05_01_3B6P_Living Room		3.6	N/A	Fail
Block 8_L05_01_3B6P_Sgl Bedroom		1.5	57	Fail
Block 8_L05_02_4B6P_Dbl Bedroom_N		1.8	72	Fail
Block 8_L05_02_4B6P_Dbl Bedroom_S		1.8	72	Fail
Block 8_L05_02_4B6P_Kitchen		3.7	N/A	Fail
Block 8_L05_02_4B6P_Living Room		2.7	N/A	Pass
Block 8_L05_02_4B6P_Sgl Bedroom_N		2.2	64	Fail
Block 8_L05_02_4B6P_Sgl Bedroom_S		2.3	64	Fail
Total No. Pass	Bedrooms	153 / 154	0 / 154	**0 / 154**
	Kitchen, Living, Dining (KLDs)	34 / 116	N/A	**34 / 116**
Overall compliance % Pass				**34 / 270** **12.6%**

Iteration 08

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L00_01_3B5P_Dbl Bedroom	0.7	93	Fail
Block 5_L00_01_3B5P_Kitchen	2.5	N/A	Pass
Block 5_L00_01_3B5P_Living Room	1.8	N/A	Pass
Block 5_L00_01_3B5P_Sgl Bedroom_E	0.9	79	Fail
Block 5_L00_01_3B5P_Sgl Bedroom_W	0.9	81	Fail
Block 5_L02_01_3B5P_Dbl Bedroom_E	0.9	77	Fail
Block 5_L02_01_3B5P_Dbl Bedroom_W	0.8	74	Fail
Block 5_L02_01_3B5P_Kitchen	3	N/A	Pass
Block 5_L02_01_3B5P_Living Room	1.9	N/A	Pass
Block 5_L02_01_3B5P_Sgl Bedroom	1.1	70	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L02_02_3B5P_Dbl Bedroom_E	1.1	77	Fail
Block 5_L02_02_3B5P_Dbl Bedroom_W	1	76	Fail
Block 5_L02_02_3B5P_Kitchen	3.1	N/A	Fail
Block 5_L02_02_3B5P_Living Room	2.2	N/A	Pass
Block 5_L02_02_3B5P_Sgl Bedroom	1.1	71	Fail
Block 5_L02_03_2B3P_Dbl Bedroom	1	61	Fail
Block 5_L02_03_2B3P_Kitchen	1.8	N/A	Pass
Block 5_L02_03_2B3P_Living Room	2	N/A	Pass
Block 5_L02_03_2B3P_Sgl Bedroom	1.1	65	Fail
Block 5_L03_01_3B5P_Dbl Bedroom_E	0.9	77	Fail
Block 5_L03_01_3B5P_Dbl Bedroom_W	1	76	Fail
Block 5_L03_01_3B5P_Kitchen	3.1	N/A	Fail
Block 5_L03_01_3B5P_Living Room	1.8	N/A	Pass
Block 5_L03_01_3B5P_Sgl Bedroom	1.1	72	Fail
Block 5_L04_01_3B5P_Dbl Bedroom_E	0.9	77	Fail
Block 5_L04_01_3B5P_Dbl Bedroom_W	1	77	Fail
Block 5_L04_01_3B5P_Kitchen	3.1	N/A	Fail
Block 5_L04_01_3B5P_Living Room	1.9	N/A	Pass
Block 5_L04_01_3B5P_Sgl Bedroom	1.1	70	Fail
Block 5_L04_02_3B5P_Dbl Bedroom_E	1.1	76	Fail
Block 5_L04_02_3B5P_Dbl Bedroom_W	1	76	Fail
Block 5_L04_02_3B5P_Kitchen	3.1	N/A	Fail
Block 5_L04_02_3B5P_Living Room	2.3	N/A	Pass
Block 5_L04_02_3B5P_Sgl Bedroom	1.1	69	Fail
Block 5_L05_01_2B4P_Dbl Bedroom	1.2	56	Fail
Block 5_L05_01_2B4P_Kitchen	2	N/A	Pass
Block 5_L05_01_2B4P_Living Room	2	N/A	Pass
Block 5_L05_01_2B4P_Sgl Bedroom	1.1	62	Fail
Block 5_L05_02_4B7P_Dbl Bedroom_NE	1.6	59	Fail
Block 5_L05_02_4B7P_Dbl Bedroom_NW	1.4	59	Fail
Block 5_L05_02_4B7P_Dbl Bedroom_SE	1.5	70	Fail
Block 5_L05_02_4B7P_Kitchen	3.1	N/A	Fail
Block 5_L05_02_4B7P_Living Room	2.2	N/A	Pass
Block 5_L05_02_4B7P_Sgl Bedroom	1.6	60	Fail
Block 5_L05_03_1B2P_Dbl Bedroom	0.8	76	Fail
Block 5_L05_03_1B2P_KLD	1	N/A	Pass
Block 5_L05_04_3B5P_Dbl Bedroom_E	1	73	Fail
Block 5_L05_04_3B5P_Dbl Bedroom_W	1.1	75	Fail
Block 5_L05_04_3B5P_Kitchen	3.6	N/A	Fail
Block 5_L05_04_3B5P_Living Room	2.2	N/A	Pass
Block 5_L05_04_3B5P_Sgl Bedroom	1.1	66	Fail
Block 5_L05_05_3B5P_Dbl Bedroom_E	1.2	74	Fail
Block 5_L05_05_3B5P_Dbl Bedroom_W	1	73	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L05_05_3B5P_Kitchen	3.3	N/A	Fail
Block 5_L05_05_3B5P_Living Room	2.3	N/A	Pass
Block 5_L05_05_3B5P_Sgl Bedroom	1.3	65	Fail
Block 6N_L00_01_3B6P_Kitchen	2.8	N/A	Pass
Block 6N_L00_01_3B6P_Living Room	1.3	N/A	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_N	1.1	59	Fail
Block 6N_L00_02_3B6P_Dbl Bedroom_SE	1.2	60	Fail
Block 6N_L00_02_3B6P_Dbl Bedroom_SW	1.2	60	Fail
Block 6N_L00_02_3B6P_Kitchen	3	N/A	Pass
Block 6N_L00_02_3B6P_Living Room	1.4	N/A	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_N	0.8	59	Fail
Block 6N_L01_01_3B6P_Dbl Bedroom_SE	1.3	58	Fail
Block 6N_L01_01_3B6P_Dbl Bedroom_SW	1.1	58	Fail
Block 6N_L03_01_1B2P_Dbl Bedroom	0.9	57	Fail
Block 6N_L03_01_1B2P_Kitchen	1.9	N/A	Pass
Block 6N_L03_01_1B2P_Living Room	2.2	N/A	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_NE	1.2	59	Fail
Block 6N_L04_01_3B6P_Dbl Bedroom_NW	1.3	59	Fail
Block 6N_L04_01_3B6P_Dbl Bedroom_S	1.2	59	Fail
Block 6N_L04_01_3B6P_Kitchen	2.9	N/A	Pass
Block 6N_L04_01_3B6P_Living Room	2.3	N/A	Pass
Block 6N_L04_02_2B4P_Dbl Bedroom_E	1.5	57	Fail
Block 6N_L04_02_2B4P_Dbl Bedroom_W	1.2	57	Fail
Block 6N_L04_02_2B4P_KLD	2.3	N/A	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_NE	1.2	57	Fail
Block 6N_L05_01_3B6P_Dbl Bedroom_NW	1.3	55	Fail
Block 6N_L05_01_3B6P_Dbl Bedroom_S	1.3	58	Fail
Block 6N_L05_01_3B6P_Kitchen	2.9	N/A	Pass
Block 6N_L05_01_3B6P_Living Room	2.4	N/A	Pass
Block 6N_L05_02_2B4P_Dbl Bedroom_E	1.2	54	Fail
Block 6N_L05_02_2B4P_Dbl Bedroom_W	1.2	54	Fail
Block 6N_L05_02_2B4P_KLD	2.1	N/A	Pass
Block 6S_L00_01_4B7P_Kitchen	2.3	N/A	Pass
Block 6S_L00_01_4B7P_Living Room	1.3	N/A	Pass
Block 6S_L00_02_3B6P_Kitchen	1.8	N/A	Pass
Block 6S_L00_02_3B6P_Living Room	1.2	N/A	Pass
Block 6S_L00_03_3B6P_Kitchen	2.7	N/A	Pass
Block 6S_L00_03_3B6P_Living Room	1.6	N/A	Pass
Block 6S_L00_04_3B6P_Kitchen	1.8	N/A	Pass
Block 6S_L00_04_3B6P_Living Room	1.2	N/A	Pass
Block 6S_L00_05_3B6P_Kitchen	2.6	N/A	Pass
Block 6S_L00_05_3B6P_Living Room	1.3	N/A	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_N	1.1	60	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L01_01_4B7P_Dbl Bedroom_SE	1.3	60	Fail
Block 6S_L01_01_4B7P_Dbl Bedroom_SW	1.2	58	Fail
Block 6S_L01_01_4B7P_Sgl Bedroom	1.4	52	Fail
Block 6S_L01_02_3B6P_Dbl Bedroom_NE	1.2	56	Fail
Block 6S_L01_02_3B6P_Dbl Bedroom_NW	1.2	55	Fail
Block 6S_L01_02_3B6P_Dbl Bedroom_S	1.2	58	Fail
Block 6S_L01_03_3B6P_Dbl Bedroom_NE	1.2	54	Fail
Block 6S_L01_03_3B6P_Dbl Bedroom_NW	1.2	54	Fail
Block 6S_L01_03_3B6P_Dbl Bedroom_S	1.2	58	Fail
Block 6S_L01_04_3B6P_Dbl Bedroom_NE	1.2	55	Fail
Block 6S_L01_04_3B6P_Dbl Bedroom_NW	1.2	55	Fail
Block 6S_L01_04_3B6P_Dbl Bedroom_S	1.2	58	Fail
Block 6S_L01_05_3B6P_Dbl Bedroom_NE	1.2	54	Fail
Block 6S_L01_05_3B6P_Dbl Bedroom_NW	1.1	52	Fail
Block 6S_L01_05_3B6P_Dbl Bedroom_S	1.1	58	Fail
Block 6S_L01_06_3B6P_Dbl Bedroom_S	1.1	63	Fail
Block 6S_L01_06_3B6P_Dbl Bedroom_SE	1.1	62	Fail
Block 6S_L01_06_3B6P_Dbl Bedroom_SW	1	60	Fail
Block 6S_L01_06_3B6P_Kitchen	2.7	N/A	Pass
Block 6S_L01_06_3B6P_Living Room	2.3	N/A	Pass
Block 6S_L02_01_4B7P_Dining	2.5	N/A	Pass
Block 6S_L02_01_4B7P_Kitchen	2.4	N/A	Pass
Block 6S_L02_01_4B7P_Living Room	2	N/A	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_S	1.1	64	Fail
Block 6S_L02_02_3B6P_Dbl Bedroom_SE	1.1	63	Fail
Block 6S_L02_02_3B6P_Dbl Bedroom_SW	1.2	56	Fail
Block 6S_L02_02_3B6P_Kitchen	2.7	N/A	Pass
Block 6S_L02_02_3B6P_Living Room	2.3	N/A	Pass
Block 6S_L02_03_1B2P_Dbl Bedroom	0.8	60	Fail
Block 6S_L02_03_1B2P_Kitchen	2.1	N/A	Pass
Block 6S_L02_03_1B2P_Living Room	2.1	N/A	Pass
Block 6S_L02_04_1B2P_Dbl Bedroom	0.7	58	Fail
Block 6S_L02_04_1B2P_Kitchen	2	N/A	Pass
Block 6S_L02_04_1B2P_Living Room	2.1	N/A	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_NE	1.1	59	Fail
Block 6S_L03_01_1B2P_Dbl Bedroom_NW	1.1	54	Fail
Block 6S_L03_01_1B2P_Dbl Bedroom_S	1.1	58	Fail
Block 6S_L03_01_1B2P_Sgl Bedroom	1.4	51	Fail
Block 6S_L03_02_3B6P_Dbl Bedroom_S	0.9	64	Fail
Block 6S_L03_02_3B6P_Dbl Bedroom_SE	1.1	59	Fail
Block 6S_L03_02_3B6P_Dbl Bedroom_SW	1.2	56	Fail
Block 6S_L03_02_3B6P_Kitchen	2.9	N/A	Pass
Block 6S_L03_02_3B6P_Living Room	2.5	N/A	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L03_03_1B2P_Dbl Bedroom	1	61	Fail
Block 6S_L03_03_1B2P_Kitchen	2.2	N/A	Pass
Block 6S_L03_03_1B2P_Living Room	2.3	N/A	Pass
Block 6S_L03_04_1B2P_Dbl Bedroom	1	60	Fail
Block 6S_L03_04_1B2P_Kitchen	1.9	N/A	Pass
Block 6S_L03_04_1B2P_Livinng Room	2.2	N/A	Pass
Block 6S_L03_05_1B2P_Dbl Bedroom	0.7	57	Fail
Block 6S_L03_05_1B2P_Kitchen	2	N/A	Pass
Block 6S_L03_05_1B2P_Living Room	2	N/A	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_NE	1.2	60	Fail
Block 6S_L04_01_4B7P_Dbl Bedroom_NW	1.1	61	Fail
Block 6S_L04_01_4B7P_Dbl Bedroom_S	1.1	57	Fail
Block 6S_L04_01_4B7P_Kitchen	2.9	N/A	Pass
Block 6S_L04_01_4B7P_Living Room	2.1	N/A	Pass
Block 6S_L04_01_4B7P_Sgl Bedroom	1.3	49	Fail
Block 6S_L04_02_3B6P_Dbl Bedroom_S	1	64	Fail
Block 6S_L04_02_3B6P_Dbl Bedroom_SE	1.1	62	Fail
Block 6S_L04_02_3B6P_Dbl Bedroom_SW	1.1	59	Fail
Block 6S_L04_02_3B6P_Kitchen	2.7	N/A	Pass
Block 6S_L04_02_3B6P_Living Room	2.3	N/A	Pass
Block 6S_L04_03_3B6P_Dbl Bedroom_E	1.1	60	Fail
Block 6S_L04_03_3B6P_Dbl Bedroom_N	1.3	59	Fail
Block 6S_L04_03_3B6P_Dbl Bedroom_W	1.1	60	Fail
Block 6S_L04_03_3B6P_Kitchen	2.8	N/A	Pass
Block 6S_L04_03_3B6P_Living Room	2.3	N/A	Pass
Block 6S_L05_01_2B3P_Dbl Bedroom	1.1	61	Fail
Block 6S_L05_01_2B3P_Sgl Bedroom	1.4	50	Fail
Block 6S_L05_02_3B6P_Dbl Bedroom_S	1	61	Fail
Block 6S_L05_02_3B6P_Dbl Bedroom_SE	1	60	Fail
Block 6S_L05_02_3B6P_Dbl Bedroom_SW	1.1	55	Fail
Block 6S_L05_02_3B6P_Kitchen	2.7	N/A	Pass
Block 6S_L05_02_3B6P_Living Room	2.5	N/A	Pass
Block 6S_L05_03_2B3P_KLD	1.8	N/A	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_N	1.4	59	Fail
Block 6S_L05_03_3B6P_Dbl Bedroom_SE	1.2	60	Fail
Block 6S_L05_03_3B6P_Dbl Bedroom_SW	1.2	58	Fail
Block 6S_L05_03_3B6P_Kitchen	2.9	N/A	Pass
Block 6S_L05_03_3B6P_Living Room	2.4	N/A	Pass
Block 7_L01_04_2B4P_Dbl Bedroom_N	1.1	66	Fail
Block 7_L01_04_2B4P_Dbl Bedroom_S	1.1	66	Fail
Block 7_L01_04_2B4P_Kitchen	2.1	N/A	Pass
Block 7_L01_04_2B4P_Living Room	2.1	N/A	Pass
Block 7_L01_05_2B4P_Dbl Bedroom_E	1	65	Fail

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 7_L01_05_2B4P_Dbl Bedroom_W	1.2	66	Fail
Block 7_L01_05_2B4P_Kitchen	1.9	N/A	Pass
Block 7_L01_05_2B4P_Living Room	1.9	N/A	Pass
Block 7_L01_06_1B2P_Dbl Bedroom	1	66	Fail
Block 7_L01_06_1B2P_Kitchen	2.5	N/A	Pass
Block 7_L01_06_1B2P_Living Room	2.1	N/A	Pass
Block 7_L03_04_2B4P_Dbl Bedroom_N	1.1	66	Fail
Block 7_L03_04_2B4P_Dbl Bedroom_S	1.1	66	Fail
Block 7_L03_04_2B4P_Kitchen	1.9	N/A	Pass
Block 7_L03_04_2B4P_Kitchen	2.1	N/A	Pass
Block 7_L03_04_2B4P_Living Room	1.9	N/A	Pass
Block 7_L03_04_2B4P_Living Room	2.1	N/A	Pass
Block 7_L03_05_2B4P_Dbl Bedroom_E	1	65	Fail
Block 7_L03_05_2B4P_Dbl Bedroom_W	1.2	66	Fail
Block 7_L03_06_1B2P_Dbl Bedroom	1	67	Fail
Block 7_L03_06_1B2P_Kitchen	2.5	N/A	Pass
Block 7_L03_06_1B2P_Living Room	2.1	N/A	Pass
Block 7_L04_04_2B4P_Dbl Bedroom_N	1.1	66	Fail
Block 7_L04_04_2B4P_Dbl Bedroom_S	1.1	66	Fail
Block 7_L04_04_2B4P_Kitchen	2.1	N/A	Pass
Block 7_L04_04_2B4P_Living Room	2.1	N/A	Pass
Block 7_L04_05_2B4P_Dbl Bedroom_E	1	63	Fail
Block 7_L04_05_2B4P_Dbl Bedroom_W	1.2	63	Fail
Block 7_L04_05_2B4P_Kitchen	1.9	N/A	Pass
Block 7_L04_05_2B4P_Living Room	2	N/A	Pass
Block 7_L05_01_1B2P_Dbl Bedroom	1	64	Fail
Block 7_L05_01_1B2P_Kitchen	2.6	N/A	Pass
Block 7_L05_01_1B2P_Living Room	2.2	N/A	Pass
Block 7_L05_02_2B4P_Dbl Bedroom_E	1	60	Fail
Block 7_L05_02_2B4P_Dbl Bedroom_W	1.3	60	Fail
Block 7_L05_02_2B4P_Kitchen	2	N/A	Pass
Block 7_L05_02_2B4P_Living Room	2.2	N/A	Pass
Block 7_L05_03_2B4P_Dbl Bedroom_N	1.1	63	Fail
Block 7_L05_03_2B4P_Dbl Bedroom_S	1.2	63	Fail
Block 7_L05_03_2B4P_Kitchen	2.1	N/A	Pass
Block 7_L05_03_2B4P_Living Room	2.3	N/A	Pass
Block 8_L00_01_4B7P_Kitchen	2	N/A	Pass
Block 8_L00_01_4B7P_Living Room	1.3	N/A	Pass
Block 8_L00_02_3B6P_Kitchen	3.1	N/A	Fail
Block 8_L00_02_3B6P_Living Room	1.6	N/A	Pass
Block 8_L00_03_3B6P_Kitchen	3.1	N/A	Fail
Block 8_L00_03_3B6P_Living Room	1.6	N/A	Pass
Block 8_L00_04_3B6P_Kitchen	1	N/A	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 8_L01_01_4B7P_Dbl Bedroom_N	1.1	59	Fail
Block 8_L01_01_4B7P_Dbl Bedroom_SE	1.2	63	Fail
Block 8_L01_01_4B7P_Dbl Bedroom_SW	1	61	Fail
Block 8_L01_01_4B7P_Sgl Bedroom	1.3	66	Fail
Block 8_L01_02_3B6P_Dbl Bedroom_N	1.1	65	Fail
Block 8_L01_02_3B6P_Dbl Bedroom_SE	1	63	Fail
Block 8_L01_02_3B6P_Dbl Bedroom_SW	1.1	62	Fail
Block 8_L01_03_3B6P_Dbl Bedroom_N	1.1	65	Fail
Block 8_L01_03_3B6P_Dbl Bedroom_SE	1.1	61	Fail
Block 8_L01_03_3B6P_Dbl Bedroom_SW	1	63	Fail
Block 8_L01_04_3B6P_Dbl Bedroom_E	1	60	Fail
Block 8_L01_04_3B6P_Dbl Bedroom_NE	1	64	Fail
Block 8_L01_04_3B6P_Dbl Bedroom_W	1.1	63	Fail
Block 8_L02_01_4B7P_KLD	2.2	N/A	Pass
Block 8_L02_01_4B7P_Living Room	1.9	N/A	Pass
Block 8_L02_02_3B6P_Kitchen	2.8	N/A	Pass
Block 8_L02_02_3B6P_Kitchen	2.5	N/A	Pass
Block 8_L02_02_3B6P_Living Room	1.9	N/A	Pass
Block 8_L02_02_3B6P_Living Room	1.8	N/A	Pass
Block 8_L02_03_3B6P_Kitchen	2.8	N/A	Pass
Block 8_L02_03_3B6P_Living Room	1.9	N/A	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_NE	1.3	55	Fail
Block 8_L03_01_4B7P_Dbl Bedroom_NW	1.1	59	Fail
Block 8_L03_01_4B7P_Dbl Bedroom_S	1.2	63	Fail
Block 8_L03_01_4B7P_Sgl Bedroom	1.2	55	Fail
Block 8_L03_02_3B6P_Dbl Bedroom_NE	1.1	62	Fail
Block 8_L03_02_3B6P_Dbl Bedroom_NW	1.2	55	Fail
Block 8_L03_02_3B6P_Dbl Bedroom_S	1.1	61	Fail
Block 8_L03_03_3B6P_Dbl Bedorom_S	1.1	61	Fail
Block 8_L03_03_3B6P_Dbl Bedroom_NE	1.1	61	Fail
Block 8_L03_03_3B6P_Dbl Bedroom_NW	1.2	56	Fail
Block 8_L03_04_3B6P_Dbl Bedroom_NE	1.1	65	Fail
Block 8_L03_04_3B6P_Dbl Bedroom_SE	1.1	60	Fail
Block 8_L03_04_3B6P_Dbl Bedroom_SW	1.1	60	Fail
Block 8_L05_01_3B6P_Dbl Bedroom_N	1.2	61	Fail
Block 8_L05_01_3B6P_Dbl Bedroom_S	1.3	61	Fail
Block 8_L05_01_3B6P_Kitchen	2.9	N/A	Pass
Block 8_L05_01_3B6P_Living Room	2.4	N/A	Pass
Block 8_L05_01_3B6P_Sgl Bedroom	1.3	55	Fail
Block 8_L05_02_4B6P_Dbl Bedroom_N	1.1	66	Fail
Block 8_L05_02_4B6P_Dbl Bedroom_S	1.2	65	Fail
Block 8_L05_02_4B6P_Kitchen	2.4	N/A	Pass
Block 8_L05_02_4B6P_Living Room	1.9	N/A	Pass

Room		CIBSE 2020s DSY1		Part O Compliance
		Criterion 1	Criterion 2	
		≤ 3%	≤ 32hrs	
Block 8_L05_02_4B6P_Sgl Bedroom_N		1.5	60	Fail
Block 8_L05_02_4B6P_Sgl Bedroom_S		1.6	60	Fail
Total No. Pass	Bedrooms	154 / 154	0 / 154	**0 / 154**
	Kitchen, Living, Dining (KLDs)	107 / 116	N/A	**107 / 116**
Overall compliance % Pass				**107 / 270** **39.6%**

Iteration 09

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L00_01_3B5P_Dbl Bedroom	0.4	22	Pass
Block 5_L00_01_3B5P_Kitchen	2.4	N/A	Pass
Block 5_L00_01_3B5P_Living Room	1.7	N/A	Pass
Block 5_L00_01_3B5P_Sgl Bedroom_E	0.5	22	Pass
Block 5_L00_01_3B5P_Sgl Bedroom_W	0.5	22	Pass
Block 5_L02_01_3B5P_Dbl Bedroom_E	0.5	25	Pass
Block 5_L02_01_3B5P_Dbl Bedroom_W	0.4	25	Pass
Block 5_L02_01_3B5P_Kitchen	2.3	N/A	Pass
Block 5_L02_01_3B5P_Living Room	2.3	N/A	Pass
Block 5_L02_01_3B5P_Sgl Bedroom	0.5	22	Pass
Block 5_L02_02_3B5P_Dbl Bedroom_E	0.6	24	Pass
Block 5_L02_02_3B5P_Dbl Bedroom_W	0.6	24	Pass
Block 5_L02_02_3B5P_Kitchen	2.3	N/A	Pass
Block 5_L02_02_3B5P_Living Room	1.9	N/A	Pass
Block 5_L02_02_3B5P_Sgl Bedroom	0.7	21	Pass
Block 5_L02_03_2B3P_Dbl Bedroom	0.7	26	Pass
Block 5_L02_03_2B3P_Kitchen	1.6	N/A	Pass
Block 5_L02_03_2B3P_Living Room	1.8	N/A	Pass
Block 5_L02_03_2B3P_Sgl Bedroom	0.6	22	Pass
Block 5_L03_01_3B5P_Dbl Bedroom_E	0.5	26	Pass
Block 5_L03_01_3B5P_Dbl Bedroom_W	0.5	26	Pass
Block 5_L03_01_3B5P_Kitchen	2.3	N/A	Pass
Block 5_L03_01_3B5P_Living Room	2.4	N/A	Pass
Block 5_L03_01_3B5P_Sgl Bedroom	0.5	22	Pass
Block 5_L04_01_3B5P_Dbl Bedroom_E	0.5	26	Pass
Block 5_L04_01_3B5P_Dbl Bedroom_W	0.6	26	Pass
Block 5_L04_01_3B5P_Kitchen	2.6	N/A	Pass
Block 5_L04_01_3B5P_Living Room	2.4	N/A	Pass
Block 5_L04_01_3B5P_Sgl Bedroom	0.6	25	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 5_L04_02_3B5P_Dbl Bedroom_E	0.7	24	Pass
Block 5_L04_02_3B5P_Dbl Bedroom_W	0.6	24	Pass
Block 5_L04_02_3B5P_Kitchen	2.5	N/A	Pass
Block 5_L04_02_3B5P_Living Room	2.1	N/A	Pass
Block 5_L04_02_3B5P_Sgl Bedroom	0.7	21	Pass
Block 5_L05_01_2B4P_Dbl Bedroom	0.9	24	Pass
Block 5_L05_01_2B4P_Kitchen	1.7	N/A	Pass
Block 5_L05_01_2B4P_Living Room	2	N/A	Pass
Block 5_L05_01_2B4P_Sgl Bedroom	0.7	21	Pass
Block 5_L05_02_4B7P_Dbl Bedroom_NE	1.4	25	Pass
Block 5_L05_02_4B7P_Dbl Bedroom_NW	1.4	27	Pass
Block 5_L05_02_4B7P_Dbl Bedroom_SE	1.1	27	Pass
Block 5_L05_02_4B7P_Kitchen	2.4	N/A	Pass
Block 5_L05_02_4B7P_Living Room	2.6	N/A	Pass
Block 5_L05_02_4B7P_Sgl Bedroom	1.3	24	Pass
Block 5_L05_03_1B2P_Dbl Bedroom	0.4	22	Pass
Block 5_L05_03_1B2P_KLD	0.9	N/A	Pass
Block 5_L05_04_3B5P_Dbl Bedroom_E	0.5	22	Pass
Block 5_L05_04_3B5P_Dbl Bedroom_W	0.6	23	Pass
Block 5_L05_04_3B5P_Kitchen	1.6	N/A	Pass
Block 5_L05_04_3B5P_Living Room	2.3	N/A	Pass
Block 5_L05_04_3B5P_Sgl Bedroom	0.5	22	Pass
Block 5_L05_05_3B5P_Dbl Bedroom_E	0.7	22	Pass
Block 5_L05_05_3B5P_Dbl Bedroom_W	0.6	22	Pass
Block 5_L05_05_3B5P_Kitchen	2.9	N/A	Pass
Block 5_L05_05_3B5P_Living Room	2.2	N/A	Pass
Block 5_L05_05_3B5P_Sgl Bedroom	0.7	21	Pass
Block 6N_L00_01_3B6P_Kitchen	1.9	N/A	Pass
Block 6N_L00_01_3B6P_Living Room	1.1	N/A	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_N	1.1	25	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_SE	0.7	25	Pass
Block 6N_L00_02_3B6P_Dbl Bedroom_SW	0.7	25	Pass
Block 6N_L00_02_3B6P_Kitchen	1.9	N/A	Pass
Block 6N_L00_02_3B6P_Living Room	1.1	N/A	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_N	0.5	21	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_SE	0.9	26	Pass
Block 6N_L01_01_3B6P_Dbl Bedroom_SW	0.9	27	Pass
Block 6N_L03_01_1B2P_Dbl Bedroom	0.5	25	Pass
Block 6N_L03_01_1B2P_Kitchen	1.1	N/A	Pass
Block 6N_L03_01_1B2P_Living Room	2.1	N/A	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_NE	1	27	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_NW	1	26	Pass
Block 6N_L04_01_3B6P_Dbl Bedroom_S	0.8	28	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6N_L04_01_3B6P_Kitchen	2.9	N/A	Pass
Block 6N_L04_01_3B6P_Living Room	3.1	N/A	Fail
Block 6N_L04_02_2B4P_Dbl Bedroom_E	1.2	26	Pass
Block 6N_L04_02_2B4P_Dbl Bedroom_W	1.3	27	Pass
Block 6N_L04_02_2B4P_KLD	3	N/A	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_NE	1	26	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_NW	1.1	26	Pass
Block 6N_L05_01_3B6P_Dbl Bedroom_S	0.9	27	Pass
Block 6N_L05_01_3B6P_Kitchen	3.1	N/A	Fail
Block 6N_L05_01_3B6P_Living Room	3.1	N/A	Fail
Block 6N_L05_02_2B4P_Dbl Bedroom_E	1	28	Pass
Block 6N_L05_02_2B4P_Dbl Bedroom_W	1.2	28	Pass
Block 6N_L05_02_2B4P_KLD	2.8	N/A	Pass
Block 6S_L00_01_4B7P_Kitchen	1.9	N/A	Pass
Block 6S_L00_01_4B7P_Living Room	1.5	N/A	Pass
Block 6S_L00_02_3B6P_Kitchen	0.9	N/A	Pass
Block 6S_L00_02_3B6P_Living Room	1.1	N/A	Pass
Block 6S_L00_03_3B6P_Kitchen	1.6	N/A	Pass
Block 6S_L00_03_3B6P_Living Room	1.4	N/A	Pass
Block 6S_L00_04_3B6P_Kitchen	0.9	N/A	Pass
Block 6S_L00_04_3B6P_Living Room	1.1	N/A	Pass
Block 6S_L00_05_3B6P_Kitchen	1.6	N/A	Pass
Block 6S_L00_05_3B6P_Living Room	1.4	N/A	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_N	1	28	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_SE	0.7	27	Pass
Block 6S_L01_01_4B7P_Dbl Bedroom_SW	0.7	27	Pass
Block 6S_L01_01_4B7P_Sgl Bedroom	1.1	27	Pass
Block 6S_L01_02_3B6P_Dbl Bedroom_NE	0.9	27	Pass
Block 6S_L01_02_3B6P_Dbl Bedroom_NW	0.9	27	Pass
Block 6S_L01_02_3B6P_Dbl Bedroom_S	0.8	28	Pass
Block 6S_L01_03_3B6P_Dbl Bedroom_NE	0.9	27	Pass
Block 6S_L01_03_3B6P_Dbl Bedroom_NW	0.9	27	Pass
Block 6S_L01_03_3B6P_Dbl Bedroom_S	0.8	28	Pass
Block 6S_L01_04_3B6P_Dbl Bedroom_NE	0.9	27	Pass
Block 6S_L01_04_3B6P_Dbl Bedroom_NW	0.9	27	Pass
Block 6S_L01_04_3B6P_Dbl Bedroom_S	0.8	27	Pass
Block 6S_L01_05_3B6P_Dbl Bedroom_NE	0.9	27	Pass
Block 6S_L01_05_3B6P_Dbl Bedroom_NW	0.8	27	Pass
Block 6S_L01_05_3B6P_Dbl Bedroom_S	0.8	28	Pass
Block 6S_L01_06_3B6P_Dbl Bedroom_S	0.7	28	Pass
Block 6S_L01_06_3B6P_Dbl Bedroom_SE	0.7	28	Pass
Block 6S_L01_06_3B6P_Dbl Bedroom_SW	0.7	28	Pass
Block 6S_L01_06_3B6P_Kitchen	2.2	N/A	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L01_06_3B6P_Living Room	2.1	N/A	Pass
Block 6S_L02_01_4B7P_Dining	1.9	N/A	Pass
Block 6S_L02_01_4B7P_Kitchen	1.8	N/A	Pass
Block 6S_L02_01_4B7P_Living Room	1.7	N/A	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_S	0.7	28	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_SE	0.7	28	Pass
Block 6S_L02_02_3B6P_Dbl Bedroom_SW	0.8	27	Pass
Block 6S_L02_02_3B6P_Kitchen	2.2	N/A	Pass
Block 6S_L02_02_3B6P_Living Room	2.1	N/A	Pass
Block 6S_L02_03_1B2P_Dbl Bedroom	0.5	26	Pass
Block 6S_L02_03_1B2P_Kitchen	1.2	N/A	Pass
Block 6S_L02_03_1B2P_Living Room	1.8	N/A	Pass
Block 6S_L02_04_1B2P_Dbl Bedroom	0.4	26	Pass
Block 6S_L02_04_1B2P_Kitchen	1.4	N/A	Pass
Block 6S_L02_04_1B2P_Living Room	2	N/A	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_NE	1	28	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_NW	1.1	27	Pass
Block 6S_L03_01_1B2P_Dbl Bedroom_S	0.6	28	Pass
Block 6S_L03_01_1B2P_Sgl Bedroom	0.9	27	Pass
Block 6S_L03_02_3B6P_Dbl Bedroom_S	0.6	26	Pass
Block 6S_L03_02_3B6P_Dbl Bedroom_SE	0.9	29	Pass
Block 6S_L03_02_3B6P_Dbl Bedroom_SW	0.9	28	Pass
Block 6S_L03_02_3B6P_Kitchen	2.2	N/A	Pass
Block 6S_L03_02_3B6P_Living Room	2.4	N/A	Pass
Block 6S_L03_03_1B2P_Dbl Bedroom	0.6	27	Pass
Block 6S_L03_03_1B2P_Kitchen	1.5	N/A	Pass
Block 6S_L03_03_1B2P_Living Room	1.9	N/A	Pass
Block 6S_L03_04_1B2P_Dbl Bedroom	0.5	25	Pass
Block 6S_L03_04_1B2P_Kitchen	1.4	N/A	Pass
Block 6S_L03_04_1B2P_Livinng Room	1.9	N/A	Pass
Block 6S_L03_05_1B2P_Dbl Bedroom	0.4	25	Pass
Block 6S_L03_05_1B2P_Kitchen	1.5	N/A	Pass
Block 6S_L03_05_1B2P_Living Room	2.1	N/A	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_NE	1	27	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_NW	0.9	27	Pass
Block 6S_L04_01_4B7P_Dbl Bedroom_S	1	28	Pass
Block 6S_L04_01_4B7P_Kitchen	1.4	N/A	Pass
Block 6S_L04_01_4B7P_Living Room	1.8	N/A	Pass
Block 6S_L04_01_4B7P_Sgl Bedroom	0.9	27	Pass
Block 6S_L04_02_3B6P_Dbl Bedroom_S	0.7	28	Pass
Block 6S_L04_02_3B6P_Dbl Bedroom_SE	0.7	28	Pass
Block 6S_L04_02_3B6P_Dbl Bedroom_SW	0.7	28	Pass
Block 6S_L04_02_3B6P_Kitchen	2.1	N/A	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 6S_L04_02_3B6P_Living Room	2.1	N/A	Pass
Block 6S_L04_03_3B6P_Dbl Bedroom_E	0.7	29	Pass
Block 6S_L04_03_3B6P_Dbl Bedroom_N	1.1	27	Pass
Block 6S_L04_03_3B6P_Dbl Bedroom_W	0.9	30	Pass
Block 6S_L04_03_3B6P_Kitchen	3	N/A	Pass
Block 6S_L04_03_3B6P_Living Room	3.4	N/A	Fail
Block 6S_L05_01_2B3P_Dbl Bedroom	0.8	26	Pass
Block 6S_L05_01_2B3P_Sgl Bedroom	0.9	25	Pass
Block 6S_L05_02_3B6P_Dbl Bedroom_S	0.7	27	Pass
Block 6S_L05_02_3B6P_Dbl Bedroom_SE	0.7	27	Pass
Block 6S_L05_02_3B6P_Dbl Bedroom_SW	0.9	27	Pass
Block 6S_L05_02_3B6P_Kitchen	2.4	N/A	Pass
Block 6S_L05_02_3B6P_Living Room	3.1	N/A	Fail
Block 6S_L05_03_2B3P_KLD	1.7	N/A	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_N	1.1	27	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_SE	0.8	29	Pass
Block 6S_L05_03_3B6P_Dbl Bedroom_SW	0.9	28	Pass
Block 6S_L05_03_3B6P_Kitchen	3.2	N/A	Fail
Block 6S_L05_03_3B6P_Living Room	3.6	N/A	Fail
Block 7_L01_04_2B4P_Dbl Bedroom_N	0.7	27	Pass
Block 7_L01_04_2B4P_Dbl Bedroom_S	0.7	27	Pass
Block 7_L01_04_2B4P_Kitchen	1.6	N/A	Pass
Block 7_L01_04_2B4P_Living Room	1.7	N/A	Pass
Block 7_L01_05_2B4P_Dbl Bedroom_E	0.7	28	Pass
Block 7_L01_05_2B4P_Dbl Bedroom_W	0.7	27	Pass
Block 7_L01_05_2B4P_Kitchen	1.5	N/A	Pass
Block 7_L01_05_2B4P_Living Room	2.3	N/A	Pass
Block 7_L01_06_1B2P_Dbl Bedroom	0.8	28	Pass
Block 7_L01_06_1B2P_Kitchen	1.2	N/A	Pass
Block 7_L01_06_1B2P_Living Room	1.9	N/A	Pass
Block 7_L03_04_2B4P_Dbl Bedroom_N	0.7	27	Pass
Block 7_L03_04_2B4P_Dbl Bedroom_S	0.7	27	Pass
Block 7_L03_04_2B4P_Kitchen	1.5	N/A	Pass
Block 7_L03_04_2B4P_Kitchen	1.6	N/A	Pass
Block 7_L03_04_2B4P_Living Room	2.2	N/A	Pass
Block 7_L03_04_2B4P_Living Room	1.7	N/A	Pass
Block 7_L03_05_2B4P_Dbl Bedroom_E	0.7	28	Pass
Block 7_L03_05_2B4P_Dbl Bedroom_W	0.7	27	Pass
Block 7_L03_06_1B2P_Dbl Bedroom	0.8	28	Pass
Block 7_L03_06_1B2P_Kitchen	1.2	N/A	Pass
Block 7_L03_06_1B2P_Living Room	2	N/A	Pass
Block 7_L04_04_2B4P_Dbl Bedroom_N	0.7	27	Pass
Block 7_L04_04_2B4P_Dbl Bedroom_S	0.7	27	Pass

Room	CIBSE 2020s DSY1		Part O Compliance
	Criterion 1	Criterion 2	
	≤ 3%	≤ 32hrs	
Block 7_L04_04_2B4P_Kitchen	1.7	N/A	Pass
Block 7_L04_04_2B4P_Living Room	1.7	N/A	Pass
Block 7_L04_05_2B4P_Dbl Bedroom_E	0.7	28	Pass
Block 7_L04_05_2B4P_Dbl Bedroom_W	0.7	27	Pass
Block 7_L04_05_2B4P_Kitchen	1.6	N/A	Pass
Block 7_L04_05_2B4P_Living Room	2.4	N/A	Pass
Block 7_L05_01_1B2P_Dbl Bedroom	0.9	27	Pass
Block 7_L05_01_1B2P_Kitchen	1.9	N/A	Pass
Block 7_L05_01_1B2P_Living Room	2.3	N/A	Pass
Block 7_L05_02_2B4P_Dbl Bedroom_E	0.7	27	Pass
Block 7_L05_02_2B4P_Dbl Bedroom_W	0.7	27	Pass
Block 7_L05_02_2B4P_Kitchen	1.9	N/A	Pass
Block 7_L05_02_2B4P_Living Room	2.5	N/A	Pass
Block 7_L05_03_2B4P_Dbl Bedroom_N	0.8	26	Pass
Block 7_L05_03_2B4P_Dbl Bedroom_S	0.8	26	Pass
Block 7_L05_03_2B4P_Kitchen	1.7	N/A	Pass
Block 7_L05_03_2B4P_Living Room	1.9	N/A	Pass
Block 8_L00_01_4B7P_Kitchen	1.9	N/A	Pass
Block 8_L00_01_4B7P_Living Room	1.5	N/A	Pass
Block 8_L00_02_3B6P_Kitchen	1.9	N/A	Pass
Block 8_L00_02_3B6P_Living Room	1.3	N/A	Pass
Block 8_L00_03_3B6P_Kitchen	1.9	N/A	Pass
Block 8_L00_03_3B6P_Living Room	1.2	N/A	Pass
Block 8_L00_04_3B6P_Kitchen	0.5	N/A	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_N	0.9	28	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_SE	0.6	28	Pass
Block 8_L01_01_4B7P_Dbl Bedroom_SW	0.5	29	Pass
Block 8_L01_01_4B7P_Sgl Bedroom	0.9	27	Pass
Block 8_L01_02_3B6P_Dbl Bedroom_N	1	29	Pass
Block 8_L01_02_3B6P_Dbl Bedroom_SE	0.5	29	Pass
Block 8_L01_02_3B6P_Dbl Bedroom_SW	0.6	28	Pass
Block 8_L01_03_3B6P_Dbl Bedroom_N	1	29	Pass
Block 8_L01_03_3B6P_Dbl Bedroom_SE	0.6	28	Pass
Block 8_L01_03_3B6P_Dbl Bedroom_SW	0.5	29	Pass
Block 8_L01_04_3B6P_Dbl Bedroom_E	0.7	30	Pass
Block 8_L01_04_3B6P_Dbl Bedroom_NE	0.8	30	Pass
Block 8_L01_04_3B6P_Dbl Bedroom_W	0.8	29	Pass
Block 8_L02_01_4B7P_KLD	1.8	N/A	Pass
Block 8_L02_01_4B7P_Living Room	1.9	N/A	Pass
Block 8_L02_02_3B6P_Kitchen	1.2	N/A	Pass
Block 8_L02_02_3B6P_Kitchen	1.8	N/A	Pass
Block 8_L02_02_3B6P_Living Room	1.6	N/A	Pass
Block 8_L02_02_3B6P_Living Room	1.5	N/A	Pass

Room		CIBSE 2020s DSY1		Part O Compliance
		Criterion 1	Criterion 2	
		≤ 3%	≤ 32hrs	
Block 8_L02_03_3B6P_Kitchen		1.2	N/A	Pass
Block 8_L02_03_3B6P_Living Room		1.6	N/A	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_NE		1.1	28	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_NW		0.9	29	Pass
Block 8_L03_01_4B7P_Dbl Bedroom_S		0.6	30	Pass
Block 8_L03_01_4B7P_Sgl Bedroom		0.6	26	Pass
Block 8_L03_02_3B6P_Dbl Bedroom_NE		0.8	28	Pass
Block 8_L03_02_3B6P_Dbl Bedroom_NW		1	28	Pass
Block 8_L03_02_3B6P_Dbl Bedroom_S		0.7	29	Pass
Block 8_L03_03_3B6P_Dbl Bedorom_S		0.7	29	Pass
Block 8_L03_03_3B6P_Dbl Bedroom_NE		0.8	28	Pass
Block 8_L03_03_3B6P_Dbl Bedroom_NW		1	28	Pass
Block 8_L03_04_3B6P_Dbl Bedroom_NE		0.8	30	Pass
Block 8_L03_04_3B6P_Dbl Bedroom_SE		0.9	30	Pass
Block 8_L03_04_3B6P_Dbl Bedroom_SW		0.9	29	Pass
Block 8_L05_01_3B6P_Dbl Bedroom_N		0.9	28	Pass
Block 8_L05_01_3B6P_Dbl Bedroom_S		0.7	29	Pass
Block 8_L05_01_3B6P_Kitchen		3	N/A	Pass
Block 8_L05_01_3B6P_Living Room		3	N/A	Pass
Block 8_L05_01_3B6P_Sgl Bedroom		1.1	28	Pass
Block 8_L05_02_4B6P_Dbl Bedroom_N		0.7	28	Pass
Block 8_L05_02_4B6P_Dbl Bedroom_S		0.8	28	Pass
Block 8_L05_02_4B6P_Kitchen		2.5	N/A	Pass
Block 8_L05_02_4B6P_Living Room		1.2	N/A	Pass
Block 8_L05_02_4B6P_Sgl Bedroom_N		0.9	26	Pass
Block 8_L05_02_4B6P_Sgl Bedroom_S		0.9	27	Pass
Total No. Pass	Bedrooms	154 / 154	154 / 154	**154 / 154**
	Kitchen, Living, Dining (KLDs)	109 / 116	N/A	**109 / 116**
Overall compliance % Pass				**263 / 270** **97.4%**

APPENDIX B – SAP RESULTS

The table below lists a sample of the typical flats that were modelled using SAP methodology, the TER and DER outputs and the % CO_2 reduction achieved after the Be Lean, Be Clean and Be Green measures have been applied.

The results from these 23 flats were extrapolated over the entire development, in order to predict the energy consumption and carbon dioxide emissions for the domestic spaces of the development. The % CO_2 reductions have been manually calculated accounting for the notional PV at the Be Lean stage.

The following pages show the DER/TER SAP2021 worksheets for a sample flat at the Be Lean, Be Clean and Be Green stages. The SAP outputs for all sample flats are available on request.

SAP Ref No.	TER ($kgCO_2/m^2/yr$)	Be Lean		Be Clean		Be Green	
		DER ($kgCO_2/m^2/yr$)	% CO_2 reduction	DER ($kgCO_2/m^2/yr$)	% CO_2 reduction	DER ($kgCO_2/m^2/yr$)	% CO_2 reduction
P5.00.01	16.10	12.53	28.8%	2.30	85.7%	1.49	90.7%
P5.00.02	16.24	12.14	31.8%	2.27	86.0%	1.45	91.1%
P5.03.01	14.04	11.69	24.4%	2.22	84.2%	1.38	90.2%
P5.03.02	12.16	9.60	29.9%	1.86	84.7%	1.05	91.4%
P5.05.01	16.33	11.61	35.5%	2.24	86.3%	1.40	91.4%
P5.05.02	12.59	9.20	35.4%	1.77	85.9%	0.99	92.1%
P6.00.01N	16.57	13.01	27.9%	2.38	85.6%	1.59	90.4%
P6.00.02S	14.17	10.89	32.2%	2.06	85.5%	1.28	91.0%
P6.00.03S	11.37	8.88	33.2%	1.78	84.3%	1.02	91.0%
P6.02.01N	12.14	9.33	36.3%	1.82	85.0%	1.08	91.1%
P6.02.02S	12.29	10.81	25.1%	2.11	82.8%	1.32	89.3%
P6.03.01S	10.98	9.13	28.5%	1.83	83.3%	1.06	90.3%
P6.03.02S	16.64	12.81	32.7%	2.35	85.9%	1.56	90.6%
P6.05.01N	13.26	9.64	35.4%	1.86	86.0%	1.11	91.6%
P6.05.02N	15.67	12.06	29.9%	2.21	85.9%	1.43	90.9%
P6.05.03S	16.21	11.46	35.9%	2.12	86.9%	1.34	91.7%
P7.01.01	15.76	11.57	33.4%	2.14	86.4%	1.50	90.5%
P7.03.01	11.11	8.70	31.3%	1.72	84.5%	1.10	90.1%
P7.03.02	14.08	11.50	25.9%	2.20	84.4%	1.56	88.9%
P7.05.01	14.66	10.90	32.9%	2.06	85.9%	1.42	90.3%
P8.00.01	10.69	8.73	33.3%	1.76	83.5%	1.14	89.3%
P8.02.01	13.08	10.66	28.3%	2.04	84.4%	1.40	89.3%
P8.04.01	13.63	10.05	35.7%	1.90	86.1%	1.28	90.6%

APPENDIX C – SBEM RESULTS

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

240822_9_472_Selby Commercial_Be Lean

As designed

Date: Thu Aug 22 12:31:47 2024

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.26

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.26

BRUKL compliance module version: v6.1.e.1

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Foundation area [m^2]: 12.56

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	5.25	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	4.52	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	35.67	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	33.52	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.15	0.15	SP000002:Surf[5]
Floors	0.18	0.1	0.1	SP000002:Surf[12]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	-	-	No flat roofs in building
Windows** and roof windows	1.6	1.2	1.2	SP000002:Surf[1]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	1.2	1.2	SP000002:Surf[0]

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	3

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- DHN Heating MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.5	-	0.85
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

"No HWS in project, or hot water is provided by HVAC system"

1- District heating network

	Emission factor [$kgCO_2/kWh$]	Primary energy factor [kWh_{PE}/kWh]
This building	0.23	1.05
Standard value	0.35	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
00_01_Commercial	-	-	-	1.2	-	-	-	-	-	-	N/A
00_02_WC	-	-	-	1.2	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m^2]**
Standard value	95	80	0.3
00_01_Commercial	120	80	1.875
00_02_WC	120	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00_01_Commercial	NO (-9.1%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	75.3	75.3
External area [m^2]	145.4	145.4
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	3	3
Average conductance [W/K]	40.61	57.82
Average U-value [W/m^2K]	0.28	0.4
Alpha value* [%]	25	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
100	**Retail/Financial and Professional Services**
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	8.93	12.71
Cooling	0	0
Auxiliary	4.47	3.64
Lighting	10.61	15.67
Hot water	1.7	1.79
Equipment*	20.22	20.22
TOTAL**	**25.71**	**33.81**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	5.48
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*5.48*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	30.2	41.42
Primary energy [kWh_{PE}/m^2]	33.52	35.67
Total emissions [kg/m^2]	4.52	5.25

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: floor heating, [HS] District heating, [HFT] District Heating, [CFT] Electricity										
	Actual	30.2	0	8.9	0	4.5	0.94	0	1	0
	Notional	41.4	0	12.7	0	3.6	0.91	0	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

240822_9_472_Selby Commercial_Be Clean Be Green

As designed

Date: Thu Aug 22 12:33:57 2024

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.26

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.26

BRUKL compliance module version: v6.1.e.1

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Foundation area [m^2]: 12.56

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	5.25	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	2.34	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	35.67	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	23.02	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.15	0.15	SP000002:Surf[5]
Floors	0.18	0.1	0.1	SP000002:Surf[12]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	-	-	No flat roofs in building
Windows** and roof windows	1.6	1.2	1.2	SP000002:Surf[1]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	1.2	1.2	SP000002:Surf[0]

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	3

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- DHN Heating MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.5	-	0.85
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

"No HWS in project, or hot water is provided by HVAC system"

1- District heating network

	Emission factor [$kgCO_2/kWh$]	Primary energy factor [kWh_{PE}/kWh]
This building	0.025	0.063
Standard value	0.35	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
00_01_Commercial	-	-	-	1.2	-	-	-	-	-	-	N/A
00_02_WC	-	-	-	1.2	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m^2]**
Standard value	95	80	0.3
00_01_Commercial	120	80	1.875
00_02_WC	120	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00_01_Commercial	NO (-9.1%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	75.3	75.3
External area [m^2]	145.4	145.4
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	3	3
Average conductance [W/K]	40.61	57.82
Average U-value [W/m^2K]	0.28	0.4
Alpha value* [%]	25	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
100	**Retail/Financial and Professional Services**
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	8.93	12.71
Cooling	0	0
Auxiliary	4.47	3.64
Lighting	10.61	15.67
Hot water	1.7	1.79
Equipment*	20.22	20.22
TOTAL**	**25.71**	**33.81**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	5.48
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*5.48*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	30.2	41.42
Primary energy [kWh_{PE}/m^2]	23.02	35.67
Total emissions [kg/m^2]	2.34	5.25

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: floor heating, [HS] District heating, [HFT] District Heating, [CFT] Electricity										
	Actual	30.2	0	8.9	0	4.5	0.94	0	1	0
	Notional	41.4	0	12.7	0	3.6	0.91	0	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type

APPENDIX D – SAP AND SBEM MODELLING INPUTS

General SAP Calculation Assumptions

Project - Selby Centre

23/08/2024

The figures listed below are assumptions only, based on best judgement using beta software at design stage. Throughout the design stage the systems and size of renewable systems are likely to change whilst the building designs are being finalised. All information detailed in this design note is a basic recommendation at the Planning Stage Part L pre-assessment. It should be noted that this document is not exhaustive and the contractor should allow for flexibility on site where necessary.

Opaque Elements

U-Values new elements

Floors			
Ground and exposed floors	0.10	$W/m^2.K$	Based on best judgement on Planning Stage
Floor to unheated corridors	0.10	$W/m^2.K$	Based on best judgement on Planning Stage
Floor to unheated stores	0.10	$W/m^2.K$	Based on best judgement on Planning Stage
Walls			
External walls	0.15	$W/m^2.K$	Based on best judgement on Planning Stage
Walls to unheated corridors, stairs & lifts	0.15	$W/m^2.K$	Based on best judgement on Planning Stage
Party walls - unit to unit	Zero heat loss - fully filled & sealed cavity		Based on best judgement on Planning Stage
Roofs / Ceilings			
Flat roofs	0.10	$W/m^2.K$	Based on best judgement on Planning Stage
Ceiling to balconies and terraces where present	0.10	$W/m^2.K$	Based on best judgement on Planning Stage

Thermal Bridging — All junctions to target better than default values; will require thermal bridging modelling at detailed design stage.

Junction	Default PSI (Ψ) value (W/m.K)	Targeted PSI (Ψ) value (W/m.K)
E1/E2 – Lintels	1	0.05
E3 – Sills	0.1	0.04
E4 – Jambs	0.1	0.04
E5 – Ground floors	0.32	0.08
E20/21 – Exposed floors (normal/ inverted)	0.32	0.1
E6 – Intermediate floor within dwelling	0.14	0.03
E7 – Intermediate floor between dwellings	0.28	0.04
E23 – Balcony where support penetrates wall insulation	1	0.05
E24 – Eaves (ceiling/ rafter)	0.15	0.15
E14 – Flat roof	0.16	0.05
E15 – Flat roof with parapet	0.3	0.1
E16 – Corner (normal)	0.18	0.045
E17 - Corner (inverted)	0	-0.045
E18/E25 – Party wall (standard/ staggered)	0.24	0.06
P1 – Ground floors (party)	0.32	0.08
P7/P8 – Exposed floors (party)	0.48	0.1

Thermal bridging overall target Y-value — 0.04>Y<0.08 $W/m^2.K$

Openings

Flat doors to external or corridors	< 1.2	$W/m^2.K$	Based on best judgement on Planning Stage
Windows (pane and frame)	< 1.2	$W/m^2.K$	Based on best judgement on Planning Stage
Transmittance Factor (g value)	50%	%	Based on best judgement on Planning Stage
Frame Factor	0.7		Based on best judgement on Planning Stage
Glazing type	double-glazed		Based on best judgement on Planning Stage
Ventilation Panels	<1.2		Based on best judgement on Planning Stage
Frame Factor	0.7		Based on best judgement on Planning Stage

Ventilation

Ventilation	Natural and Mechanical		Based on best judgement on Planning Stage
MVHR	MVHR (efficiency above 85%)		Based on best judgement on Planning Stage
Extract fans assumed in kitchens and bathrooms	Yes		Based on best judgement on Planning Stage
Balanced with heat recovery	Yes		Based on best judgement on Planning Stage
No. of wet rooms (excluding kitchen)	Varies according to unit		
Insulated ridged ductwork	Rigid		Dependant on dwelling layout- minimise lengths
Product name modelled	Nuaire MRXBOXAB-ECO3		Based on best judgement on Planning Stage
Air permeability			
Design air permeability rate (max) for new build	3	m^3/hm^3	Based on best judgement on Planning Stage

Heating and cooling

Primary Heating - DHN

Heat source 1	Waste heat		Based on best judgement on Planning Stage
Overall efficiency	100	%	Based on best judgement on Planning Stage
Percentage of heat	97	%	
Heat source 2	Gas boilers		Based on best judgement on Planning Stage
Overall efficiency	85	%	Based on best judgement on Planning Stage
Percentage of heat	3	%	
Distribution loss factor	1.27		Based on best judgement on Planning Stage
Water Heating			
From main heating system	Yes		Based on best judgement on Planning Stage
Storage type	HIU		Based on best judgement on Planning Stage

Renewable Technologies

Total PV output	229	kWp	Based on initital PV layouts - 1039m^2 of PV, 430W PV panels
PV efficiency	22	%	
Tilt of Collector/ orientation	30	°	Based on best judgement on Planning Stage
Overshading	Modest		Based on best judgement on Planning Stage
Orientation	South		Based on best judgement on Planning Stage

Lighting

Low energy lights	110% LED		Based on best judgement on Planning Stage
Equipment	Best energy rating		Based on best judgement on Planning Stage
Power	15	W	
Efficacy	100	lm/W	

Domestic water consumption

Water consumption in dwellings to be less than 105 litres/person/day (maximum)	Yes	London Plan/Part G compliance requirement

DSM Calculation RFI - Level 5

23/08/2024

The figures listed below are to be filled in with predicted or known values. Where information is unknown, assumptions will be made according to required energy performance targets; these values will be shared with the wider team and confirmation they are achievable will be requested.
Throughout the design stage, the systems and size of renewable systems are likely to change whilst the building designs are being finalised. All information detailed in this design note is a basic recommendation at the BREEAM and Planning Stage Part L pre-assessment. It should be noted that this document is not exhaustive.

Opaque Elements				Comments
U-Values				
Ground floor	0.1	$W/m^2.K$		Based on best judgement at planning stage
External walls	0.15	$W/m^2.K$		Based on best judgement at planning stage
Roofs	0.1	$W/m^2.K$		Based on best judgement at planning stage
Thermal Bridging Psi (W/m.K)	**Junctions involving metal cladding**		**Junctions NOT involving metal cladding**	
Roof-wall	0.420		0.180	Based on best judgement at planning stage
Wall-ground floor	1.730		0.240	Based on best judgement at planning stage
Wall-wall (corner)	0.380		0.140	Based on best judgement at planning stage
Wall-floor (not ground)	0.040		0.110	Based on best judgement at planning stage
Lintel above window/door	1.910		0.450	Based on best judgement at planning stage
Sill below window	1.910		0.080	Based on best judgement at planning stage
Jamb at window/door	1.910		0.090	Based on best judgement at planning stage

Openings			Comments
Doors			
U-Value	1.2	$W/m^2.K$	Based on best judgement at planning stage
g-value if glazed	0.4	%	Based on best judgement at planning stage
Windows			
U-Value	1.2	$W/m^2.K$	Based on best judgement at planning stage
Transmittance Factor (g value)	0.4	%	Based on best judgement at planning stage
Frame Factor	0.85		Based on best judgement at planning stage
Blinds	No		Based on best judgement at planning stage

Ventilation			Comments
System 1: Supply and extract			
MVHR assumed	Yes		Based on best judgement at planning stage
Is HR local or centralised?	Centralised		Based on best judgement at planning stage
Type	Plate heat exchanger		Based on best judgement at planning stage
HR Efficiency	0.85	%	Based on best judgement at planning stage
Specific Fan Power	1.2	W/l/s	Based on best judgement at planning stage
Demand control:	Based on gas sensors		Based on best judgement at planning stage
If demand control, Airflow Regulation by:	Speed control		Based on best judgement at planning stage
Air permeability			
Design air permeability rate	3	$m^3/h.m^2$	Based on best judgement at planning stage

Heating / DHW			Comments
Heating			
DHN			
Primary System			
HVAC system type	Centralised mech vent system		Based on best judgement at planning stage
Pump type	Variable speed multiple pressure sensors		Based on best judgement at planning stage
Carbon factor from DHN (incl. primary and secondary losses	0.025		Confirmed by DHN operator; Be Lean 0.23
Primary energy factor from DHN	0.063		Confirmed by DHN operator; Be Lean 1.05
System Controls (proposed)			
Central time control	Yes		Based on best judgement at planning stage
Optimum start/stop control	No		Based on best judgement at planning stage
Local time control (i.e. room by room)	No		Based on best judgement at planning stage
Local temperature control (i.e. room by room)	Yes		Based on best judgement at planning stage
Weather compensation control	No		Based on best judgement at planning stage
Hot Water			
From Main system	DHN		Based on best judgement at planning stage

Ductwork and metering (proposed)			Comments
Ductwork and AHU leakage			
Has ducktwork been leakage tested?	Yes		Based on best judgement at planning stage
CEN classification	Class D		Based on best judgement at planning stage
Does the AHU meets CEN leakage standards?	Yes		Based on best judgement at planning stage
CEN classification	Class L1		Based on best judgement at planning stage
Metering provision			
The system has provision for metering	Yes		Based on best judgement at planning stage
The metering warns "out of range" values	Yes		Based on best judgement at planning stage

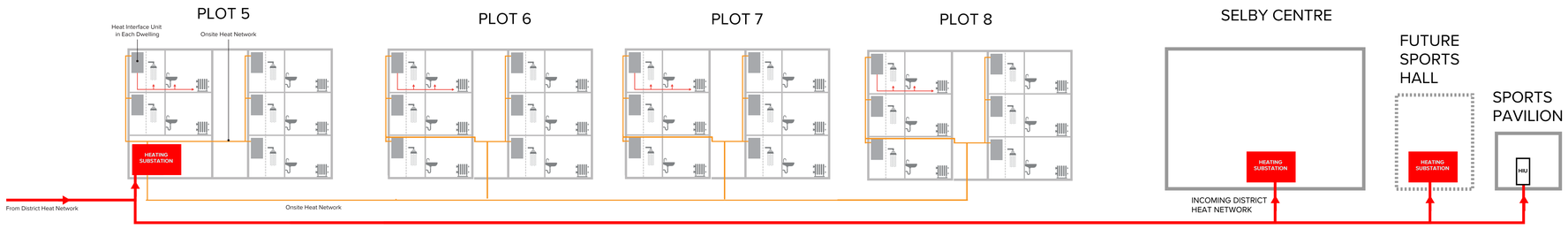
Lighting and lighting controls			Comments
Proposed - LED Assumed (specify as needed)			
Lamp efficacy	120	lm/cW	Based on best judgement at planning stage
Light Output Ratio LED Lighting	1.00		Based on best judgement at planning stage
Light Output Ratio Other Lighting	1.00		Based on best judgement at planning stage
Display Lighting Efficiency	80	lm/W	Based on best judgement at planning stage

Applicable Zones	Photoelectric lighting control	Occupancy Sensing	
Commercial space	Yes - Dimming	Auto-on-off (Foc = 0.90)	Based on best judgement at planning stage
WC	No	Auto-on-off (Foc = 0.90)	Based on best judgement at planning stage

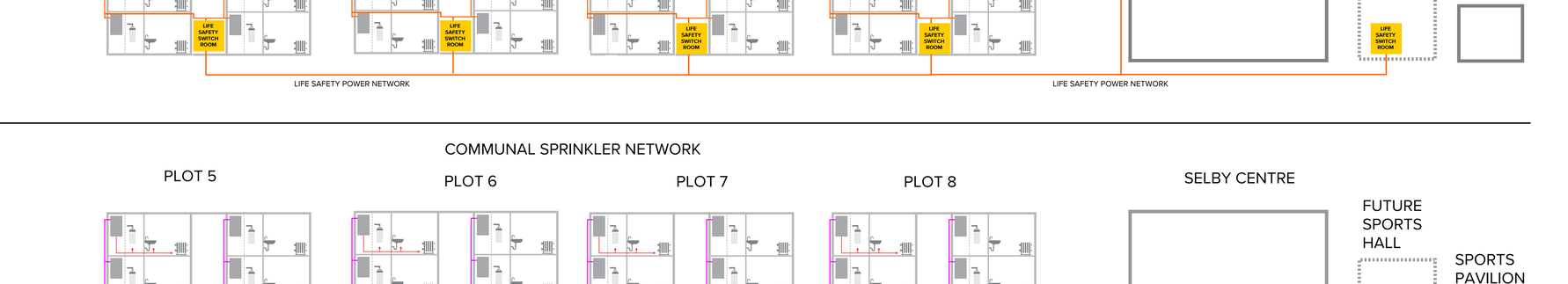
Renewables		Comments
PV	N/A	Based on best judgement at planning stage

APPENDIX E – ENERGY CENTRE LAYOUT AND OUTLINE DISTRICT HEAT NETWORK LAYOUT

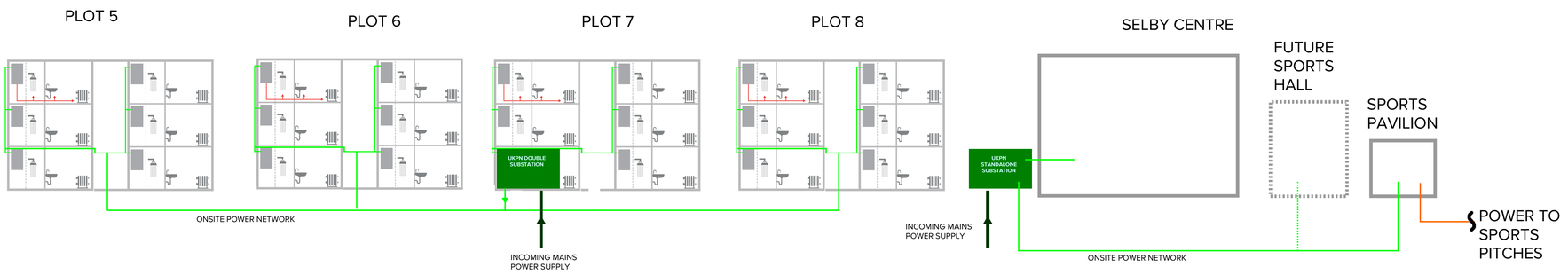
COMMUNAL HEAT NETWORK



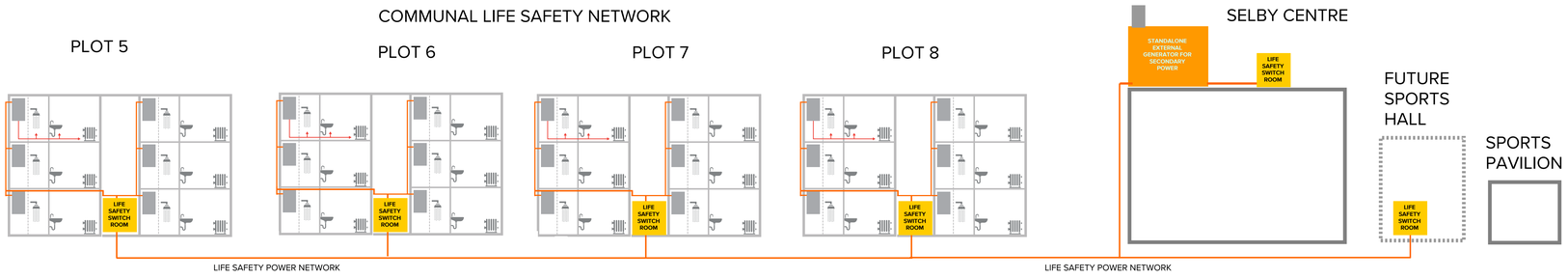
COMMUNAL WATER NETWORK



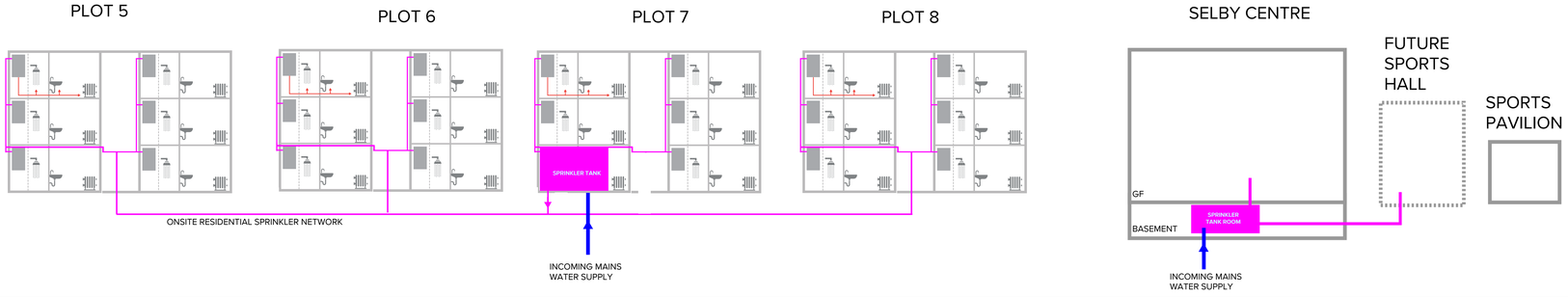
COMMUNAL POWER NETWORK



COMMUNAL LIFE SAFETY NETWORK



COMMUNAL SPRINKLER NETWORK



XCO2

9472 - Selby & Bull

Selby MEP Strategy Schematic Sketches

P0 16.08.24

APPENDIX F – DHN CORRESPONDENCE

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10th August 2023

FAO: Rachel Yehezkel
XCO_2
56 Kingsway Place,
Sans Walk,
London EC1R 0LU

Letter issue by email

Dear Rachel,

RE: Proposal to provide a heat network connection to the Selby Centre redevelopment

Further to your recent email, I am pleased to update and reissue this formal connection offer to you regarding the Selby Centre development. Based on the updated information provided to us, Energetik can offer a low carbon heat supply to your development based on four (4) no. substation connections, as detailed below.

Please note this offer is based on high-level assumptions provided by XCO2 through our initial discussions in 2021, updated in 2023 to include an additional connection for the new 'Sports Pavilion'. The final requirements, and associated price offer contained within this letter, may be subject to change once you have undertaken more detailed building fabric and heat loss calculations. Please note that we will work with you with an aim to reduce the number of commercial connection points where possible, to reduce additional connection costs to you, as well as the ongoing maintenance requirements for Energetik.

Energetik undertake to provide these peak demands as and when they are required with a heat network carbon factor of 0.022 kgCO2/kWh from November 2026 which is calculated to the heat exchanger substation on the development.

Energetik can provide heat to the site from its network to suit the development programme subject to entering in to contract within sufficient time to extend the network from Joyce Avenue. If we are not driven by the Selby Centre development programme then our network will reach Bull Lane (to connect to the North Middlesex University Hospital) in early 2026.

The carbon content of heat between June 2024 and November 2026 shall be 0.27 kgCO2/kWh as the heat network will be supplied by the natural gas back up boilers, the same source that will provide resilience in the unlikely event that heat is not available from the waste heat plant after it commences operation in November 2026.

Residential and Mixed-Use Connection

Based on 216 homes our connection fee valid for a contract signed before 31st March 2024 is £1,017,897.84.

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On the 1st April of each year our residential development connection fees normally change by CPI (although in 2023 we did not pass on to developers the full 10.5% CPI increase, limiting it to 2%). The price paid is based on the date that the heat agreement contract is signed, and payments are made under the payment terms.

Our connection fee assumes the following:

1. Energetik provide a pipe supply to the development residential building plantroom and install two heat exchangers each sized at 60% of the forecast demand
2. The developer provides a coordinated pipe route from the nearest public road to the development plantroom, and within the development site to the plantroom undertakes the civils trenching.
3. The developer provides a plantroom for the heat exchangers
4. The developer designs and installs the hydraulic circulation plant within the development plantroom and pipework to HIUs within each dwelling to Energetik's technical specification (attached), known as the Secondary Heating Network
5. Energetik, upon acceptance of the Secondary Heating Network will be responsible for operation, maintenance and repair of the Secondary Heating Network, including the HIU and heat meter within each dwelling, (although all assets remain the property of the developer and insured by the developer).
6. Energetik will enter into direct contracts with the dwelling occupiers (and in to contracts with social or private landlords where relevant) and be responsible for the heat supply to each dwelling, including accepting any customer bad debt.

Commercial connections

Please note that we have amended how our commercial connection tariffs are calculated since we communicated with you. Historically, our commercial connection tariff was based on the avoided cost of gas boilers. However, in today's environment, this is unrealistic and the cost of providing alternative heat sources (air source heat pumps) must be factored in, as this would be a minimum requirement due to planning obligations. Having said this we have frozen our availability charges over the last two years during high levels of CPI to help.

The prices quoted below are valid until 31st March 2024. In each case, on the 1st April of each year our prices change by CPI. The price paid is based on the date that the heat agreement contract is signed, and payments are made under the payment terms.

Our connection fee for each commercial connection assumes the following:

1. Energetik provide a pipe supply to the development building plantroom and install two heat exchangers each sized at 60% of the forecast demand
2. The developer provides a coordinated pipe route from the nearest public road to the development building plantroom, and within the development site to the plantroom undertakes the civils trenching
3. The developer provides a plantroom for the heat exchangers
4. The developer designs and installs the hydraulic circulation plant within the development plantroom and pipework for the building(s) to Energetik's technical

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specification (attached as an appendix to this letter *"Technical specification Rev 10"*)

5. Energetik will enter into a direct contract with the building user and be responsible for the heat supply to the building up to the heat exchanger, including accepting any customer bad debt

Commercial Connection (Office Building - 4500m2)

Based on a 400kW commercial connection our connection fee is £219,737.00

Commercial Connection (Sports Centre – 1500m2)

Based on a 240kW commercial connection our connection fee is £134,937.00.

New Commercial Connection (Sports Pavilion)

Based on a 120kW commercial connection our connection fee is £71,337.00.

Operational heating charges breakdown

The ongoing relevant heating charges that will apply at the development are detailed below. Each separate heat supply is governed by its own relevant heat supply agreement and is made up of two charging elements:

1. The Availability Charge – this covers the cost of maintaining and, where relevant, replacing the heat infrastructure assets.

2. The Unit Charge – this covers the cost of each kWh of heat consumed.

All our tariff charges set out below are updated annually in accordance with inflation. Our Availability charge is updated according to changes in the Consumer Price Index (CPI). Our Unit Charge for heat is updated according to changes in the retail gas component of CPI.

The tariffs detailed below are applicable up until 31st March 2024.

Our charges change by CPI for the Availability Charge and the gas component of CPI for the Unit Charge each year on 1st April. There has been an unprecedented rise in the gas component of CPI over the last 2 years. However, for the last two years Energetik has applied a 'price discount' to its Unit Chargeto help protect its customers from the highly volatile energy prices. This has ensured that we remain below the price of gas.

Construction heat supply charges

These charges are applicable to the developer and cover the costs associated with the provision of heat during the construction and commissioning of the secondary network of a development prior to occupation. Construction heat supply charges are applicable to the residential element of a development. Commercial connections are chargeable at their respective rates from the date of connection.

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The construction heat availability charge is calculated over a full year, based on a sum of £26.79 per kW of connected capacity per annum. Therefore, the daily availability charge for the construction heat supply to your development will be:

Capacity (kW)	Price per day (£)	Unit charge (p/kWh)
500	36.70	7.0261

Residential heating charges

Relevant party	**Availability charge (p/day)**	**Unit charge (p/kWh)**
Freeholder / Leaseholder / shared owner	117.992	8.5

Social or private tenant availability charge	53.574	8.5
Social or private landlord residual availability charge	64.418	8.5
Landlord void property charge	117.992	8.5

Residential customers pay for their daily availability charges on a pay-as-you-go basis via their installed smart meter (Customer Interface Unit).

Assured shorthold and periodic tenants (with a tenancy of less than 7 years) pay part of the availability charge and the full unit charge. The relevant landlord is responsible for the proportion of the availability charge that covers maintenance charges which are deemed to be included in the rent under Section 11 of the Landlord and Tenant Act 1985. The total availability charge for the tenant and relevant landlord is equivalent to that charged to a residential leaseholder, freeholder or shared owner.

Commercial heating charges

As with the construction heat supply charges, our commercial connection availability charge is calculated over a full year, based on a sum of £26.79 per kW of connected capacity per annum.

Therefore, for the two commercial connections requested, the charges will be:

Connection point	Capacity (kW)	Price per day (£)	Unit charge (p/kWh)
Office building - 400kW	400	29.36	7.0261
Sports Centre - 200 kW	200	14.68	7.0261
Sports pavilion building (New)	120	8.81	7.0261

We would be happy to provide further information if required, or discuss any of the detail contained within this letter.

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Yours Sincerely,

Ian Guest

For and on behalf of Energetik

APPENDIX G – DISTRIBUTION LOSS FACTOR

Primary DLF = 7% losses

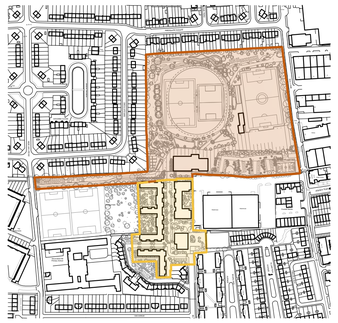
100/(100-7) = 1.0753 (rounded to 1.08)

Secondary DLF = 15% losses

100/(100-15) = 1.1764 (rounded to 1.18)

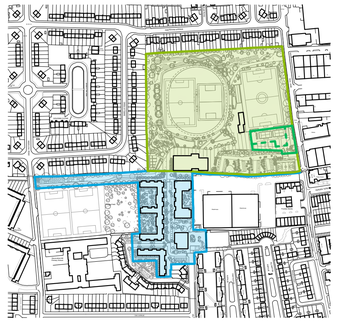
Primary DLF x Secondary DLF = 1.27

APPENDIX H – LOCATION OF TEMPORARY BOILERS



PHASE 1 EXTENT

PHASE 2 EXTENT



ENFIELD DETAILED PLANNING APPLICATION

HARINGEY DETAILED PLANNING APPLICATION

ENFIELD OUTLINE PLANNING APPLICATION

LANSBURY AVENUE

AMERSHAM AVENUE

HARDINGE ROAD

FFARD ROAD

SHAFTESBURY ROAD

COMMERCIAL ROAD

BULL LANE

Landmark Commercial Centre

KEEL CLOSE

WEIR HALL AVENUE

GOLDING CLOSE

BARCLAY ROAD

WEIR HALL ROAD

BARCLAY ROAD

Playing Field

SELBY ENERGETIK SUBSTATION

RESIDENTIAL ENERGETIK SUBSTATION

Warehouse

Warehouse

LOCATION FOR TEMPORARY BACKUP BOILERS 15m x 6m

LOCATION FOR TEMPORARY BACKUP BOILERS 15m x 6m

Plot 5

Plot 6

Plot 7

Plot 8

Frontier Works

Shaw House

HEBDEN TERRACE

Meridian Walk

CASTLEFORD CLOSE

DURBAN ROAD

QUEEN STREET

Tramway Cottages

ACADEMIA WAY

Games Court

Games House

Warehouses

Works

Warehouse

Works

Warehouse

The Weymarks

Devonshire Hill Primary School

DALBYS CRESCENT

OAK AVENUE

SELBY ROAD

TRAFALGAR AVENUE

ALLINGTON AVENUE

PRINCES STREET

RED LINE BOUNDARY MASTERPLAN WIDE

El Sub Sta

Boro Const and LB Bdy

BS

FF

Def

Und

BP

FW

CR

LB

TCB

17.4m

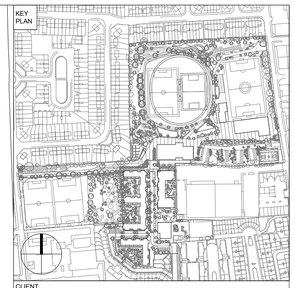
15.5m

15.8m

16.2m

18.0m

1:1000 Scale



KEY PLAN

CLIENT

DO NOT SCALE FROM THIS DRAWING.

THIS DRAWING IS BASED ON DIMENSIONAL SURVEY INFORMATION PROVIDED BY OTHERS. THE ARCHITECT CANNOT ACCEPT RESPONSIBILITY FOR THE ACCURACY OF THIS SURVEY INFORMATION.

ALL DIMENSIONS ARE SHOWN IN METRIC.

NOTES

MASTERPLAN WIDE RED LINE BOUNDARY

ENFIELD AND HARINGEY DETAIL PLANNING APPLICATIONS BOUNDARY

ENFIELD OUTLINE PLANNING APPLICATION BOUNDARY

ENFIELD OUTLINE PLANNING APPLICATION BUILDING FOOTPRINT

PHASES 1 & 2 BOUNDARY

DRAFT

Rev	Reason for Issue	Date
P01	For Coordination	23/04/2024

XCO2

9472 - Selby and Bull

Temporary Boiler Locations

P0 10.06.24

PROJECT

472 Selby Urban Village
Selby Rd, Tottenham, London N17 8JL

TITLE

Site Ground Floor Plan

Proposed

DRAWING NUMBER: 472-KCA-XX-00-DR-A-1000-D

REVISION: P01

Project N° | Originator | Zone | Level | Type | Role | Drawing Number | Stage

STATUS: FOR INFORMATION

REVISION DATE	DRAWN BY	SCALE
23/04/2024	ES / SVS	1:1000 @ A1
FIRST ISSUED	CHECKED BY	PROJECT NUMBER
23/04/2024	AB	472

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