Energy Statement

Mount Clare House, Wandsworth

AKA Capability LLP

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CONSULT SUSTAIN

Contents

Executive Summary

Consult Sustainability Limited has been appointed to prepare a planning stage Energy Statement Assessment for the proposed refurbishment known as Mount Clare House, Wandsworth. The report has been prepared to outline the measures incorporated into the proposed refurbishment to reduce energy demand and CO_2 emissions in support of the planning application.

The development is located within the jurisdiction of the London borough of Wandsworth and the Greater London Authority. Wandsworth and the GLA require developments to seek to maximise energy efficiency and reduce carbon emissions through its design and demonstrate how emissions savings have been maximised at each stage of the energy hierarchy towards achieving minimal carbon emissions.

The proposed refurbishment consists of the retention and refurbishment of existing accommodation buildings for use as temporary hostel accommodation (207 units / 264 bedrooms), with associated landscaping and cycle parking.

Energy demand and CO_2 emission figures are based on draft energy modelling undertaken using IESVE software, Calculations are based on IES modelling comparing the building fabric and services of the proposed refurbishment against a notional building built following Appendix 3 of the GLA' guidance on preparing energy statements.

Following the energy hierarchy, this development will adopt the following strategy:

Be lean: Reduce energy demand and improve operational efficiency by upgrading the building fabric through the installation of additional wall, roof and floor insulation, repairing windows and cracks to lower air permeability, and replacing windows in some locations. Furthermore, new lighting will be installed with smart controls as well as smart thermostats for controlling space heating. Heating will be provided by panel heaters or infrared heaters, whilst hot water will be provided by the existing communal boilers.

These measures enhance thermal performance beyond existing conditions and contribute to reduced energy demand, as further detailed within this report.

Be clean: No opportunities are feasible under this stage of the hierarchy for this refurbishment scope, as further detailed within this report. However, the proposed servicing strategy has been arranged so that future connection would remain technically possible should a network come forward.

Be green: A range of "Be Green" measures were explored at this stage, including on-site renewable energy technologies (such as solar PV, solar thermal and heat pumps) and other low/zero carbon options. A 210 panel (96.6kWp) will be incorporated on the roofs of the blocks that are not over shadowed by the surrounding mature trees.

Policy Compliance

For the purposes of carbon reduction reporting, the current Part L 2021 GLA Carbon Emission Reporting spreadsheet has been completed and incorporated into the report. Because the proposal is a refurbishment and change-of-use of existing buildings rather than a new-build development, the London Plan SI2 requirement for achieving zero-carbon through an offset contribution does not apply in the same way; instead, policy requires that major refurbishments "should aim" to reduce emissions to zero-carbon, which this scheme now achieves with a 36% on-site reduction.

Furthermore, the 28% reduction at the 'Be Lean' stage significantly surpasses the 15% target required by London Plan Policy SI2. As the development exceeds the typical 35% benchmark for major refurbishments, and because the remaining emissions are not subject to the mandatory zero-carbon offset requirement applied to new-build major schemes, no carbon-offset payment is necessary to comply with SI2 or Local Plan LP10.

TABLE 1: TOTAL CARBON DIOXIDE SAVINGS ACHIEVED BY THE PROPOSED SCHEME

	Total Regulated Emissions (Tonnes Co_2 / year)	CO_2 savings (Tonnes CO_2 / year)	Percentage Savings (%)
Part L 2021 Baseline	116.9	-	-
Be Lean	88.5	28.4	24%
Be Clean	88.5	-	-
Be Green	75.3	13.1	11%
Cumulative	75.3	41.6	36%

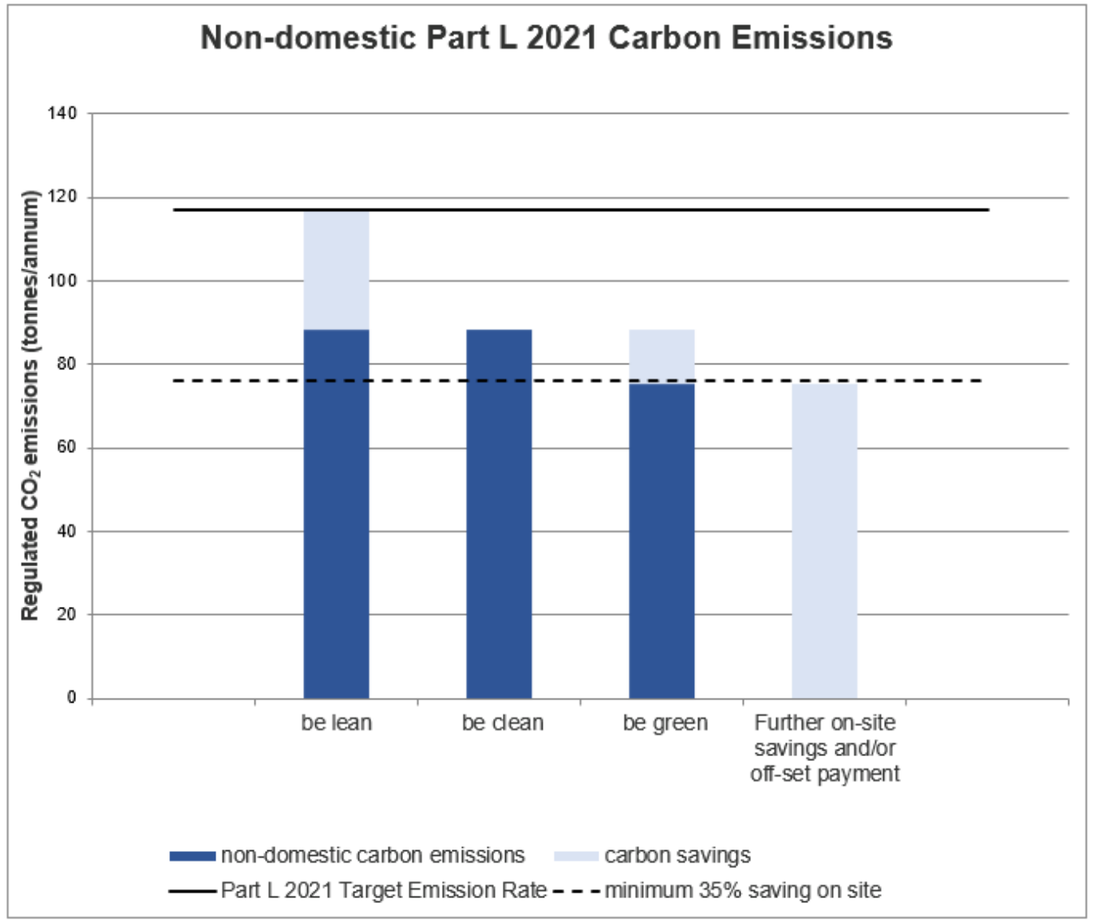

FIGURE 1: CARBON EMISSIONS ACROSS THE ENERGY HIERARCHY

Summary

The development will follow the energy hierarchy and achieve:

- The scheme has focused on a fabric first approach to reduce energy consumption and carbon emissions, achieving a **24%** reduction in regulated CO_2 emissions through enhanced building fabric measures (Lean Stage). This surpasses the 15% reduction target within the London plan.
- Through the inclusion of a 96.6kWp PV array, a further 11% reduction in regulated CO_2 emissions will be achieved at the 'be green' stage.
- **The scheme will achieve a combined 36% reduction in CO_2** over the appendix 3 notional building. This is regarded as significant for a change of use development of this nature.

Introduction

Consult Sustainability Limited has been appointed to prepare a planning stage Energy Statement Assessment for the proposed refurbishment known at Mount Clare House, Wandsworth for the scheme detailed below.

The proposed refurbishment consists of the retention and refurbishment of existing accommodation buildings for use as temporary hostel accommodation (207 units / 264 bedrooms), with associated landscaping and cycle parking.

This report has been prepared by Mr S Searle who is a Member of the Royal Institution of Chartered Surveyors (MRICS 0854781) and accredited On-Construction domestic Energy Assessor (OCDEA Elmhurst EES/022737).

Energy demand and CO_2 emission figures are based on draft energy modelling undertaken using IESVE software. Calculations are based on IES modelling comparing the building fabric and services of the proposed refurbishment against a notional building built following Appendix 3 of the GLA' guidance on preparing energy assessments.

An image of the proposed ground floor of Picasso House is included below:

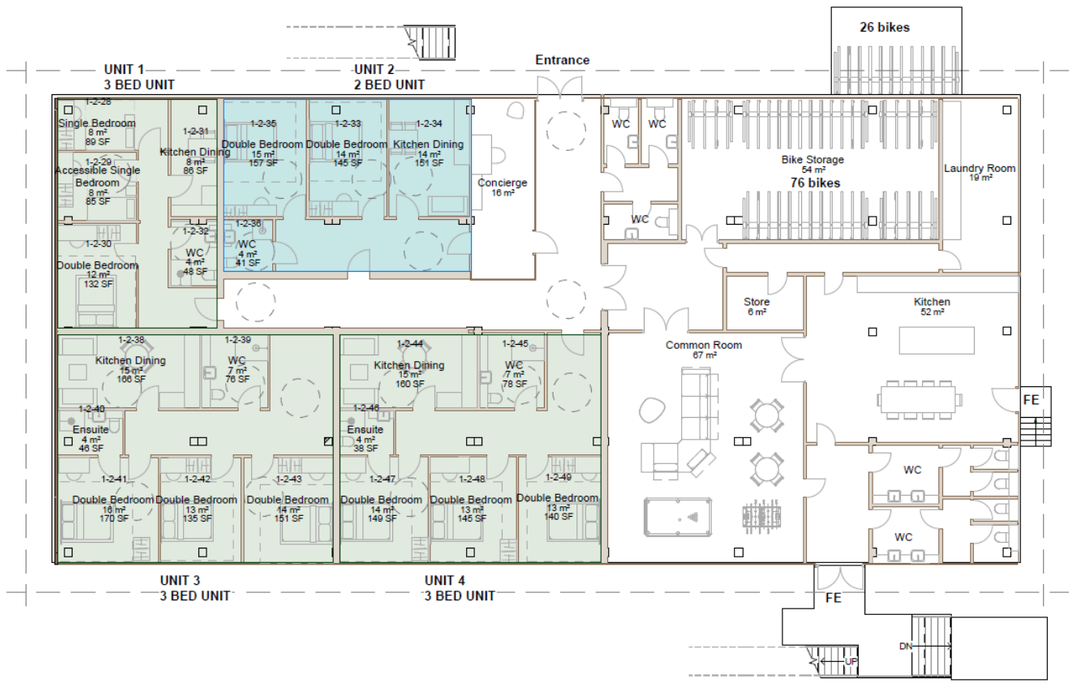

Figure 2: Proposed Ground Floor of Picasso House

Planning Requirements

National Policy - NPPF

At national level, National Planning Policy Framework (2024) sets out the Governments planning policies for England, identifying how the planning system should support the transition to net zero by 2050 and take account of all climate impacts including overheating, water scarcity, storm and flood risks and coastal change. The NPPF should help to shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

Local planning authorities must take a proactive approach to mitigating and adapting to climate change, considering the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures in line with the objectives and provisions of the Climate Change Act 2008.

New development should be planned for in ways that:

a) avoid increased vulnerability to the range of impacts arising from climate change. When a new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and
b) can help to reduce greenhouse gas emissions, such as through its location, orientation, and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.

To help increase the use and supply of renewable and low carbon energy and heat, plans should:

a) provide a positive strategy for energy from these sources, which maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts).
b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
c) identify opportunities for development to draw its energy supply from decentralised, renewable, or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

Local planning authorities should support community-led initiatives for renewable and low carbon energy. This should include developments outside areas identified in local plans or other strategic policies that are being taken forward through neighborhood planning.

In determining planning applications, local planning authorities should expect new development to:

a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
b) take account of landform, layout, building orientation, massing, and landscaping to minimise energy consumption..

When determining planning applications for renewable and low carbon development, local planning authorities should:

a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and give significant weight to the benefits associated with renewable and low carbon energy generation and the proposal's contribution to a net zero future;
b) recognise that small-scale and community-led projects provide a valuable contribution to cutting greenhouse gas emissions;
c) in the case of applications for the repowering and life-extension of existing renewable sites, give significant weight to the benefits of utilising an established site.

Local Policy - Wandsworth Local Plan 2033

At a local level, Wandsworth's Local Plan 2033, sets out the energy requirements for all developments. The Wandsworth Local Plan 2023-2038, and its accompanying "Tackling Climate Change" policies (LP10-LP14), provide the strategic climate, energy, and sustainability framework for development in the borough. Once the design and fabric of new development has minimised the energy needed for heating, cooling and power, the residual energy should be supplied as efficiently as possible using the energy hierarchy.

Policy LP10: Responding to the Climate Crisis

A. Developments are required to mitigate and adapt to climate change over their intended lifetime, reflected through a sustainability statement and measures such as energy conservation, efficiency, and low / renewable energy generation.
B. Where practicable, developments should achieve BREEAM 'Outstanding', BRE Home Quality Mark, or Passivhaus standards.
C. The policy text states: "Where conflict between climate change objectives and the conservation of heritage assets is unavoidable, the public benefit of mitigating the effects of climate change will be weighed against any harm to the significance of the heritage asset"
D. Supporting text (paragraph 15.10) refers to that heritage balancing test.
E. LP10 also requires connection where feasible to decentralised energy networks (DEN) in growth areas and major developments to incorporate on-site DEN where needed.

Policy LP11: Energy Infrastructure

A. New development is expected to connect to any existing Decentralised Energy Network (DEN) or, where that is not feasible, follow an alternative energy strategy, provided it offers efficiency, clean and decarbonised supply, in alignment with the London Plan energy hierarchy. Wandsworth Borough Council+2Wandsworth Borough Council+2
B. If no network currently exists, development should be designed to allow future connection to DEN. Wandsworth Borough Council+2Wandsworth Borough Council+2
C. In planning obligations, developers may be required to make contributions or secure installation, maintenance, and responsibility for DEN and associated infrastructure

PLANNING SUMMARY

THE DEVELOPMENT IS LOCATED WITHIN THE JURISDICTION OF WANDSWORTH BOROUGH COUNCIL WHO REQUIRE DEVELOPMENTS TO SEEK TO MAXIMISE ENERGY EFFICIENCY AND REDUCE CARBON EMISSIONS THROUGH ITS DESIGN, STRUCTURE, ORIENTATION AND POSITIONING, LANDSCAPING AND RELEVANT TECHNOLOGY AND DEMONSTRATE HOW EMISSIONS SAVINGS HAVE BEEN MAXIMISED AT EACH STAGE OF THE ENERGY HIERARCHY TOWARDS ACHIEVING MINIMAL CARBON EMISSIONS.

Energy Hierarchy

Be Lean

Fabric First: Energy Efficiency Standards - Use less energy and manage demand during operation through fabric and servicing improvements and the incorporation of flexibility measures. Demand reduction measures specific to the scheme are encouraged at the earliest design stage of a development and aim to reduce to demand of energy.

Measures typically include passive design: both architectural and building fabric measures, and active design: energy efficient services. It is possible to exceed Building Regulations requirements through demand reduction (Be Lean) measures alone.

Improving the envelope performance beyond the minimum Building Regulations standards can help to reduce the annual CO_2 emissions associated with the dwellings' heating demand, by limiting the heat loss though the buildings' fabric.

After assessing the contribution of the passive elements to the overall energy balance, the aim is to further reduce CO_2 emissions by selecting efficient mechanical and electrical systems and efficient controls to manage the energy used during operation.

Be Clean

Supply Energy Efficiently - Exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly by connecting to district heating networks. A 'clean' energy supply refers to the energy efficiency of heating, cooling, and power systems. Planning applications should demonstrate how the heating, cooling and power systems have been selected to minimise CO_2 emissions.

Be Green

Low Carbon/ Renewable Technologies - Maximise opportunities for renewable energy by producing, storing and using renewable energy on-site.

Use of renewable energy in developments is encouraged at the 'Be Green' third stage. Each renewable energy technology technically feasible and each should be considered in the Energy Assessment.

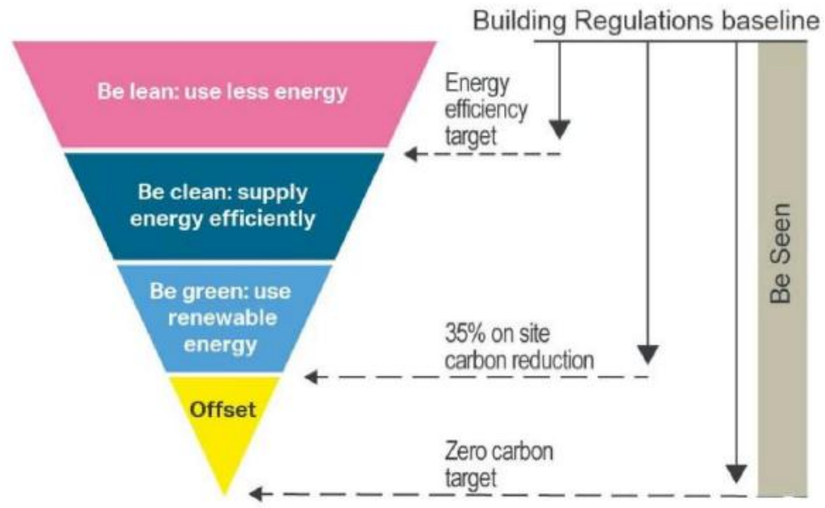

FIGURE 3: LONDON PLAN ENERGY HIERARCHY

Energy Proposals

Be Lean – Energy Efficiency Standards

Fabric Measures

Energy efficiency measures for the building are proposed to be incorporated to reduce the energy demand and CO_2 emissions of the development.

The development will adopt a fabric first approach. For the bungalow, an enhanced building fabric will be installed, with walls, roofs and floors incorporating U-values that far exceed those within the notional building. For Picasso house and the remaining residential blocks, the walls, floors and roofs will be insulated so that the U-values are reduced below the notional building.

Table 1 below outlines the proposed fabric standards against the GLA Guidance on Preparing Energy Assessments Appendix 3 notional values, together with the percentage improvement against each of the measures.

TABLE 1 – PROPOSED FABRIC MEASURES

	Domestic (New) - Approved Document L1 2021				
	A	**B**	**C**	**B**	**C**
Element	GLA Guidance on Preparing Energy Assessments Appendix 3	**Proposed U-Values (W/m^2K)**	**Improvement (%)**	**Proposed U-Values Bungalow (W/m^2K)**	**Improvement (%)**
External Walls	0.55	**0.28**	49%	**0.18**	67%
Roofs	0.18	**0.15**	17%	**0.15**	17%
Floors	0.25	**0.15**	40%	**0.15**	40%
Windows/Doors	1.40	**2.0**	-43%	**1.40**	0%
Air tightness $m^3/hr/m^2$	25.0	**10.0**	60%	**10.0**	60%

Windows

The contractor shall seek to **retain the existing windows within Picasso House and the residential blocks**, with works limited to repair and refurbishment where necessary to ensure continued performance. Where necessary, the windows will be replaced with new windows with a U-value of 1.4. **For the bungalow, new windows** will be installed with a U-value of 1.4.

For the new windows, a glazing g-value of **0.40** has been assumed within the energy modelling to provide a balance between beneficial solar gain and the reduction of overheating risk.

Air Tightness

Good site quality standards will be adhered to achieve a high-performance building with a low air permeability rate. All of the buildings will be sealed with cracks repaired to ensure that air permeability will not exceed **$10m^3/hr/m^2$ at 50 Pascals** or less, against the notional target of $25.00m^3/hr/m^2$.

Low air permeability will be achieved through ensuring diligence during construction and making sure all punctures through the building envelope are adequately sealed.

Lighting

Installing efficient low energy light fittings internally and externally can significantly reduce a building's overall lighting load hence lowering its annual CO_2 emissions. To reduce the energy consumption associated with artificial lighting, energy-efficient fittings will be specified for 100% of internal and external lighting.

Lighting throughout will achieve the following minimum lumens per circuit watt: LED 100lm/W with controls and sensors in communal areas to ensure that lights are not on when spaces are unoccupied.

Ventilation

The units will be naturally ventilated by the openable windows with extract ventilation supplied to kitchens and bathrooms.

Heating / Hot Water

The existing communal boiler will be retained in order to provide the hot water for the buildings, as it remains in good condition and continues to have sufficient service life, having only been installed 5 years prior to the completion of this report. The system will therefore continue to provide space hot water efficiently.

Heat demand will be limited due to the enhanced fabric standards of the building. The space heating within all buildings will be provided by electric panel heaters or infrared heaters to ensure that heating is targeted with fast response times and low heat loss.

BE LEAN SUMMARY

THE PROPOSAL IS TO CONSTRUCT THE DWELLINGS TO HIGH THERMAL PERFORMANCE STANDARDS WITH U-VALUES SIGNIFICANTLY EXCEEDING CURRENT MINIMUM BUILDING REGULATION TARGETS.

THE PROPOSED BUILDING ENHANCEMENTS WILL RESULT IN AN **28%** REDUCTION IN REGULATED CO_2 EMISSIONS AGAINST GLA GUIDANCE ON PREPARING ENERGY ASSESSMENTS APPENDIX 3 NOTIONAL VALUES.

Be Clean – Supply Energy Efficiently

Consideration has been given to connection to local existing or planned heat network to supply an efficient means of supplying heating and hot water.

Consideration has also been given to the exploitation of local and secondary energy opportunities to maximise the use of locally available energy sources whilst minimising primary energy demand and carbon emissions.

No opportunities exist for the exploitation of local energy opportunities.

The use of low-emission combined heat and power has also been considered, however, at this scale it is not economic to install, (and where CHP is installed it tends to have lower electrical efficiencies and therefore higher carbon emissions). There are also growing concerns about the air quality impacts of gas-engine CHP at this scale.

With the Governments current drive to move away from fossil fuels and with the increasing decarbonisation of grid electricity, gas is not proposed for use on this development, and it is proposed that electric heat pumps are used to supply hot water as outlined in the Be Green stage below.

In accordance with the energy hierarchy, the potential for the development to connect to an existing or future District Heat Network (DHN) has been reviewed. The London Heat Map and local authority heat network planning documents indicate that there are currently no existing, emerging or planned heat networks within a viable distance of the Mount Clare site. As such, a district heating connection cannot be delivered at this stage.

However, as part of the refurbishment strategy, opportunities to future-proof the development for potential connection have been considered. The retained communal boiler plant is located in a position within the basement of Picasso House that could, if required, accommodate future modifications for network interface equipment such as heat exchangers. Pipework distribution routes within the blocks are also accessible, allowing for potential reconfiguration should a DHN become available in the future. Although a full district heating-ready specification is not feasible within the limited refurbishment scope, the design does not preclude future adaptation, and no physical interventions proposed now would prevent a DHN connection should one materialise. A potential future DHN Connection is shown within Figure 3 below.

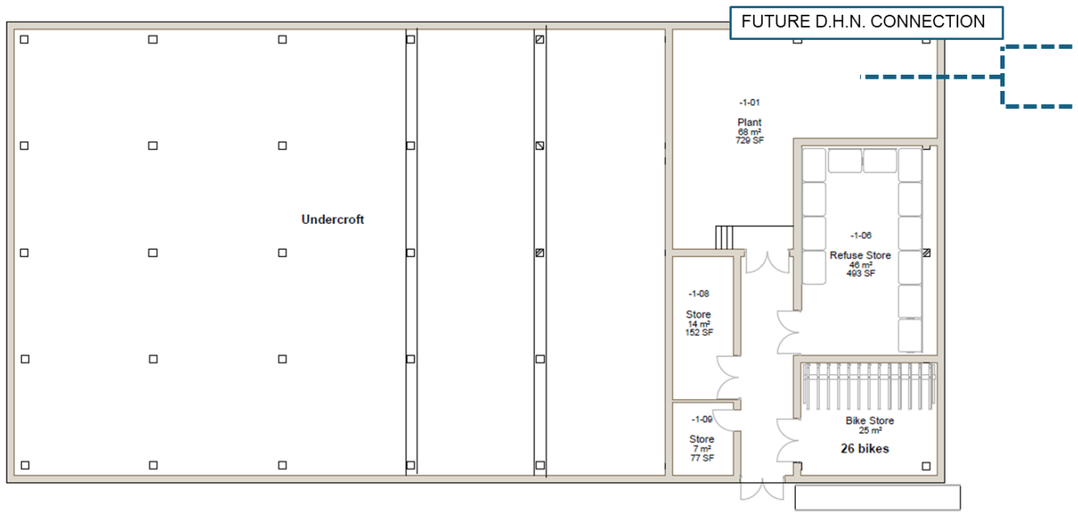

FIGURE 3 – BASEMENT PLAN FOR PICASSO HOUSE ILLUSTRATING POTENTIAL DHN CONNECTION LOCATION

Given the absence of a viable network and the refurbishment-led nature of the project, no "Be Clean" carbon savings can be applied. Nevertheless, the development has been assessed to ensure that, where practical, its servicing strategy will not obstruct the opportunity for a future low-carbon heat source connection consistent with London Plan SI3.

BE CLEAN SUMMARY

NO OPPORTUNITIES HAVE BEEN IDENTIFIED TO EXIST FOR THE EXPLOITATION OF LOCAL ENERGY OPPORTUNITIES. HOWEVER, THE PROPOSED SERVICING STRATEGY HAS BEEN ARRANGED SO THAT FUTURE CONNECTION WOULD REMAIN TECHNICALLY POSSIBLE SHOULD A NETWORK COME FORWARD.

Be Green – Low Carbon/ Renewable Technology Consideration

Feasible Renewable Energy Technology

A reduction in carbon emissions using on-site renewable energy may be achieved through several technologies to generate heat or power. In deciding the most suitable technology consideration has been given to:

- **Carbon reduction effectiveness** – The estimated reduction in CO_2 emission as a result of the installation of the technology.
- **Cost feasibility** – The cost of installation relative to the overall cost of the development.
- **Practicality** – The physical practicality of installing the technology.
- **Planning restrictions** – Whether planning restrictions would prevent installation of the technology i.e. conservation areas, Listed buildings etc.
- **Site related constraints** – Whether specific site conditions would prevent the installation of a technology i.e. heavily shaded reducing efficiency of solar panels.
- **Operating noise consideration** – The expected level of noise associated with a technology and whether this would cause undue disturbance to occupiers or neighbouring properties.

GSHP

Ground Source Heat Pumps (GSHPs)	
CO_2 reduction effectiveness:	Estimated potential 60-70% reduction in CO_2 emissions.
Cost feasibility:	High.
Practicality:	Practical for new buildings with high fabric efficiency standards and low energy demand.
Planning restrictions:	No abnormal planning restrictions.
Site related constraints:	Insufficient space exists within the development boundaries for the incorporation of horizontal 'Slinky's'. Thermogeological assessment of ground conditions plus identification of underground services would need to be established to determine the suitability for bore holes.
Operating noise:	Low.
Ongoing maintenance:	Medium - None to boreholes, annual maintenance requirement for heat pumps.
Overall Feasibility:	**Not considered feasible for this development.**

ASHP

Air Source/Exhaust Air Heat Pumps (ASHP/EAHPs)	
CO_2 reduction effectiveness:	Estimated potential 40-60% reduction in CO_2 emissions.
Cost feasibility:	Medium - dependent on detailed design.
Practicality:	Practical for new buildings with high fabric efficiency standards and low energy demand.
Planning restrictions:	Consideration of location of internal and/or externally mounted plant & equipment and operating noise. ASHPs would need to be located externally, in proximity to the dwellings, either disguised or discreetly hidden to reduce their visual impact. EAHPs can be located internally within the store cupboards against an external wall.
Site related constraints:	None.
Operating noise:	Low - consideration will be required to the siting of the heat pumps to ensure disturbance is not caused to the occupiers or neighbouring properties.
Ongoing maintenance:	Medium - Annual maintenance requirement for heat pumps.
Overall Feasibility:	**Not considered feasible for this development.**

PV

Photovoltaics (PV)	
CO_2 reduction effectiveness:	Significant % reductions available, limited only by available roof area. Unlikely to reach planning CO_2 emission targets alone.
Cost feasibility:	Low – Circa £1k-1.5k/kWp.
Practicality:	PV easy to install and can be fed to the building to provide a reduction in the energy demand, fuel bills and CO_2 emissions. Due to the small building footprint and the number of building storeys, there is limited roof space to accommodate sufficient PV panels to provide meaningful systems to each dwelling.
Planning restrictions:	Consideration of externally mounted panels.
Site related constraints:	None.
Operating noise:	None.
Ongoing maintenance:	Low – Annual cleaning of panels.
Overall Feasibility:	**Considered feasible for this development.**

An indicative location of the PV array is shown in Appendix B.

Solar Thermal

Solar Thermal	
CO_2 reduction effectiveness:	Reduction in CO_2 emissions limited by available roof space and demand for hot water. Estimated potential 5-10% reduction in CO_2 emissions.
Cost feasibility:	Medium.
Practicality:	Panels are easy to install and heat generated can be fed to the building to provide a reduction in the hot water energy demand, fuel bills and CO_2 emissions. In taller blocks of flats, however, greater heat losses can be expected through distribution and these losses can contribute to building overheating.
Planning restrictions:	Consideration of externally mounted panels.
Site related constraints:	None.
Operating noise:	Negligible.
Ongoing maintenance:	Medium – Annual maintenance requirements of mechanical plant.
Overall Feasibility:	**Not considered feasible for this development.**

Wind Turbines

Wind Turbines	
CO_2 reduction effectiveness:	Estimated potential 3-5% reduction in CO_2 emissions
Cost feasibility:	Medium – High.
Practicality:	The standalone wind turbine would require sufficient open space on the site to locate the turbine and be far enough away from buildings to be able to work effectively. Building mounted wind turbines have not been shown to be highly effective.
Planning restrictions:	Consideration of higher impact externally mounted plant and effect on neighbouring properties.
Site related constraints:	Limitations on available roof space, wind speed and efficiency of this technology.
Operating noise:	Medium-High
Ongoing maintenance:	High – Annual maintenance of motors.
Overall Feasibility:	**Not considered feasible for this development.**

Be Green Summary

A range of "Be Green" measures were explored at this stage, including on-site renewable energy technologies (such as solar PV, solar thermal and heat pumps) and other low/zero carbon options. A 210 panel (96.6kWp) will be incorporated on the roofs of the blocks that are not over shadowed by the surrounding mature trees to maximise the amount of renewable energy generated on site and lower the overall energy consumption / carbon emissions. An 11% reduction at the 'Be Green' stage is expected. An indicative location for the PV array is shown in Appendix B.

Carbon Reduction Feasibility

This technical note explains why the development has achieved the maximum feasible reduction in regulated CO_2 emissions for a refurbishment-led change of use. The upgraded strategy now incorporates all practically deliverable fabric and renewable measures, resulting in a 36% reduction in emissions against Part L 2021.

The Lodge is being **retained and refurbished**, including:

- Replacement roof
- Window and door upgrades
- Internal refurbishment

No new-build element is proposed, and therefore new-build energy targets do not apply.

Overview

The design includes:

- **Roof insulation** across all available areas.
- **Cavity wall insulation**, applied where moisture and thermal-bridging risks can be safely managed.
- **Floor insulation**, installed across all available areas.
- **Improved air permeability**, tightening the envelope without compromising ventilation performance.
- **Partial window replacement and repair**, improving U-values while retaining functional frames.
- A **large PV array**, maximised within roof geometry, structural capacity and shading constraints

Collectively, these interventions represent the practical upper limit for a project retaining the existing building fabric and layout.

Fabric Upgrade Feasibility

The retained block construction and existing build-ups create several constraints:

- **Roof insulation** will be upgraded to the practical limit without structural modification to existing build-ups.
- **Cavity wall insulation** will be applied only where condensation modelling confirms acceptable moisture behaviour; further use would create cold-bridging risks or excessive internal space loss.
- **Floor insulation** will be upgraded to the practical limit without structural modification to existing build-ups.
- **Air permeability improvements** will be implemented as far as feasible.
- **Partial window replacement** will be delivered; full replacement has not been considered for all windows as some remain in a good condition (and will be further refurbished).

These measures fully exploit the available opportunities for fabric improvements within retained structures.

Renewables and Low-Carbon Heat Feasibility

A large PV array has now been incorporated, representing the maximum capacity supportable by the roof areas not significantly overshadowed by the surrounding mature trees.

Further expansions are constrained by:

- Roof geometry and limited contiguous mounting zones
- Shading from mature trees and adjacent structures
- Structural loading limits on 1960s roof decks

Other low-carbon options were assessed and dismissed on technical grounds:

- **Air Source Heat Pumps (ASHP)**: Insufficient external plant space given requirement for PV array and an incompatibility with existing internal distribution systems without extensive re-piping. The existing communal boiler is only 5 years old at the time of this report and in good condition with significant serviceable life remaining.
- **Ground Source Heat Pumps (GSHP)**: Not feasible due to the scale of excavation required, disruption to existing underground utilities and cost disproportionality.
- **Solar thermal**: Incompatible with the existing hot-water distribution system. Roof space utilised for Solar PV instead.
- **Wind generation**: Unsuitable due to visual impacts.
- **Battery storage**: Not feasible due to structural loading and fire-strategy implications.

Accordingly, the PV array implemented represents the only viable and proportionate renewable technology available on site.

Feasibility Summary Table

TABLE 2 – SUMMARY OF FEASIBLE VS NON-FEASIBLE MEASURES

Category	Measure	Implemented?	Feasible?	Reason / Constraint
Fabric	Roof insulation	✓ Yes	✓ Feasible	Achieved without structural modification.
	Wall insulation	✓ Partial	⚠ Limited	Condensation/thermal-bridging constraints; internal space loss if extended.
	Floor insulation	✓ Partial	⚠ Limited	Structural build-up restricts deeper insulation.
	Air permeability improvement	✓ Yes	✓ Feasible	Tightened as far as technically feasible.
	Window replacement/repair	✓ Partial	⚠ Limited	Full replacement not considered due to good condition of existing glazing
Renewables	PV array	✓ Large array	✓ Feasible (maximised)	PV array maximised
	Solar thermal	✗ No	Not feasible	PV array incorporated instead
	Wind turbines	✗ No	Not feasible	Visual constraints.
Heating Systems	ASHP	✗ No	Not feasible	Plant-space and distribution constraints; extensive internal works required.
	GSHP	✗ No	Not feasible	Excavation scale, utilities conflicts, disproportionate cost.

Category	Measure	Implemented?	Feasible?	Reason / Constraint
	District heating	✗ No	Not available	No network within viable distance.
Other	Battery storage	✗ No	Not feasible	Structural loading and fire-safety constraints.
	External shading	✗ No	Not feasible	Façade compatibility and structural implications.

Conclusion

With floor, wall and roof insulation, improved air permeability, partial window upgrades, and a maximised PV array, the scheme achieves a 36% regulated CO_2 reduction; a reduction that reflects the limit of what is technically, structurally and practically achievable for a change of use / refurbishment of this nature.

Any further reductions would require:

- wholesale façade replacement,
- complete heating system replacement,
- major structural alterations, or
- technologies incompatible with the existing building fabric and layout.

Such measures would be disproportionate, operationally disruptive, and not technically justified for a change of use / refurbishment of this nature.

Accordingly, the development satisfies the requirement within London Plan, Section 9.2.1 referring to Policy SI 2: *"If London is to achieve its objective of becoming a zero-carbon city by 2050, new development needs to meet the requirements of this policy.* ***Development involving major refurbishment should also aim to meet this policy****."*

Carbon Offset Payment

A carbon-offset payment is not required for this development because the proposal constitutes a refurbishment-led change of use, not a new-build major development. The zero-carbon requirement in London Plan Policy SI2, and the associated obligation to make a carbon-offset payment, is explicitly framed around major new-build schemes, not change of use refurbishments or conversions. For refurbishment projects, SI2 requires only that the *"Development involving major refurbishment should also aim to meet the zero carbon requirement of London Plan Policy SI2*, with no mandatory expectation of achieving net zero through offsetting.

Wandsworth LP10 Responding to the Climate Crisis states that *"All **new** major development should achieve zero carbon standards, as set out in the London Plan, with a minimum on-site reduction of 35%."*

Precedent and Policy

This interpretation is strongly supported by clear precedent and policy across London, demonstrating consistent planning practice.

Kingsway House Precedent (Camden)

The Kingsway House decision represents a highly relevant example. The Camden Planning Committee report for 103 Kingsway (12 December 2024) confirms:

"A refurbishment scheme does not require a carbon offset payment to bring it to zero carbon."
(Camden Council Committee Report Pack, paragraph 10.8)

In that case, the scheme achieved approximately 39% on-site reductions and was accepted as fully compliant without any financial contribution. This aligns directly with the circumstances at Mount Clare: both schemes involve refurbishment of existing accommodation blocks, achieving substantial on-site reductions while retaining the existing built form.

London Borough of Merton Policy Approach

The London Borough of Merton adopts the same interpretation in its 2024 Local Plan, which emphasises on-site performance and discourages reliance on offsetting for refurbishments. Merton's Planning Guidance to support the Climate Change Policies in Merton's Local Plan:

Section 5.1.2.9 states that ***"Any development involving the change of use, conversion or refurbishment of an existing building will not be required to offset the carbon shortfall.*** This is to encourage the refurbishment of existing buildings and disincentivize the demolition of retrofittable buildings, to minimise embodied carbon emissions from development. However, all development will be expected to maximise carbon savings on site towards the Mayor's Zero Carbon Target."

This confirms that refurbishment schemes are assessed on a proportional improvements basis, not a mandatory zero-carbon/offset basis.

London Borough of Hounslow Policy Approach

Hounslow's Supplementary Planning Document on Climate Change Mitigation and Adaptation Supplementary Planning Document on Climate Change Mitigation provides an identical policy position. In describing its carbon-offset framework, the plan stresses that offset payments apply to **major new-build development only** and follow after all on-site opportunities have been exhausted:

Section 3.7 states that ***"Any such development involving the refurbishment, change of use or conversion of an existing building will not be required to offset the carbon shortfall.*** *This is to disincentivise the demolition of retrofittable buildings and encourage their refurbishment, in order to minimise embodied carbon emissions from development"*

This makes clear that offset payments are excluded for refurbishment projects to incentivise the reuse of buildings, which is in line with the proposals at Mount Clare House.

Conclusion

Across Camden, Merton, Hounslow and the London Plan itself, the consistent interpretation is that refurbishment and change-of-use developments are not required to achieve net-zero carbon through financial contributions, provided they maximise feasible on-site reductions.

With the Mount Clare scheme achieving a 36% reduction in regulated emissions through floor, wall and roof insulation, air-permeability upgrades, partial window replacement, and the installation of a large PV array, it demonstrably meets the maximum on-site contribution standard expected of refurbishments.

Accordingly, applying a carbon-offset payment would be inconsistent with:

- London Plan SI2's treatment of refurbishments,
- Wandsworth's own application of SP10, and
- Well-established precedent and policy across London boroughs.

A financial contribution toward net zero is therefore **not required**.

Overheating

A detailed overheating assessment has been undertaken in accordance with CIBSE TM59: Design Methodology for the Assessment of Overheating Risk in Homes (2017) to evaluate the thermal comfort performance for a sample block of the proposed refurbished accommodation. TM59 provides the industry-standard framework for assessing overheating in residential and residential-type buildings, including naturally ventilated units in multi-occupancy accommodation.

Given the nature of the development, a representative residential block was selected for dynamic thermal modelling. The sample (Catlin) was chosen to reflect a typical case orientation, typical glazing ratios, occupancy levels, and internal gains. The modelling was undertaken using standard TM59 assumptions, DSY1 design summer year weather file for Heathrow, and natural ventilation parameters consistent with the proposed refurbishment strategy.

The modelling indicates that the selected sample unit meets the relevant TM59 criteria, demonstrating that overheating risk can be effectively managed without the need for mechanical ventilation or cooling. Compliance is achieved through a combination of passive design features and site-specific advantages, including:

- Internal blinds specified as part of the fit-out strategy, reducing solar gains during peak periods and improving occupant control.
- Natural ventilation, enabled through operable windows sized in accordance with the modelling assumptions, providing adequate purge ventilation during warmer days.
- Shading from mature, established trees within and around the site, which reduces direct solar exposure on façades and limits peak summertime gains, particularly on south- and west-facing elevations.
- Optimised glazing performance, following partial window replacement where feasible, reducing solar transmittance relative to the existing condition.

Taken together, these measures ensure that the habitable rooms assessed operate within acceptable comfort thresholds in accordance with TM59, with no hours of excessive overheating beyond the allowable limits. The assessment demonstrates that the development can rely solely on natural ventilation, in line with London Plan Policy SI4 and the energy hierarchy's preference for passive cooling measures over active systems.

The following table summarises the TM59 compliance outcomes for the sample unit.

Table 3 – TM59 Overheating Assessment Results

Room / Space Modelled	TM59 Criterion A (≤ 1% of occupied hours)	TM59 Criterion B (Night-time comfort) Total Hours	Pass/Fail
Residents GF Bedroom 1	0.5	24	Pass
Residents GF Bedroom 2	0.4	23	Pass
Residents GF Bedroom 3	0.5	26	Pass
Residents GF Bedroom 4	0.5	24	Pass
Residents GF Bedroom 5	0.5	26	Pass
Residents GF Bedroom 6	0.7	22	Pass
Residents GF Bedroom 7	0.6	19	Pass
Residents FF Bedroom 1	0.5	5	Pass
Residents FF Bedroom 2	0.6	6	Pass
Residents FF Bedroom 3	0.3	8	Pass
Residents FF Bedroom 4	0.3	8	Pass
Residents FF Bedroom 5	0.3	9	Pass
Residents FF Bedroom 6	0.2	5	Pass
Residents FF Bedroom 7	0.4	9	Pass
Residents GF Corridor	N/A	N/A	Pass
Residents FF Corridor	N/A	N/A	Pass

BREEAM

A BREEAM pre-assessment has been completed for the proposed development to evaluate the extent to which the refurbishment works can achieve recognised best practice in environmental performance. As the scheme involves the retention and refurbishment of existing buildings and the change of use to temporary accommodation (sui generis), the appropriate methodology is a bespoke refurbishment assessment, aligning with the principles of BREEAM Refurbishment & Fit-Out (RFO) where applicable.

Given the age, layout, and structural configuration of the existing buildings, only a defined subset of BREEAM credits can feasibly be addressed without disproportionate intervention. The pre-assessment therefore focuses on credits that are realistically deliverable within the constraints of retained fabric and existing building geometry, while still maximising environmental benefit.

The assessment identifies a strong performance across management, transport, energy efficiency and materials credits, supported by the inclusion of roof, wall and floor insulation, air-permeability improvements, partial window upgrades, and the installation of a large photovoltaic array. These measures significantly enhance the operational performance of the refurbished blocks and contribute positively to the overall BREEAM score.

Some credits, particularly those reliant on extensive structural modification, full façade replacement, or wholesale reconfiguration of mechanical services, are not achievable in a refurbishment of this nature. This is consistent with the BREEAM RFO guidance, which recognises that refurbishment projects should pursue credits “where reasonably practicable” and within the limits of the existing fabric.

The outcome of the pre-assessment demonstrates that the scheme meets a robust level of sustainability performance, with the potential to achieve a ‘Excellent’ rating (74.33%) under a refurbishment-type assessment pathway. This represents a proportionate and policy-compliant level of environmental performance for a project of this type and aligns with the London Plan, Wandsworth Local Plan, and industry best practice for retained-building schemes. Achieving an Outstanding rating is considered not feasible given the number of credits not achievable and the distance from the 85% credit score threshold.

Please see Table 4 for the full list of credits targeted.

Table 4 – Credits Targeted within the BREEAM Pre-Assessment

BREEAM Issue	Responsible Team	Targeted Credits	Compliance Requirements (Key Points)
Management			
Man 01.1 Stakeholder Consultation (Project Delivery)	Owner / Design Team	1	Clear sustainability brief: client requirements, objectives, timescales, consultees, professional appointments, and constraints.
Man01.2 Stakeholder Consultation (Third Party)	Owner / Design Team / Principal Contractor	1	Third-party consultation before Concept Design ends, demonstrate influence, provide/receive feedback by Technical Design.
Man01.3 Sustainability Champion (Design)	Owner / Principal Contractor	1	Appoint Sustainability Champion, agree/review targets at Concept Design, and demonstrate achievement via the BREEAM assessor’s design report.
Man01.4 Sustainability Champion (Monitoring Progress)	Owner / Principal Contractor	1	Appoint champion to monitor/report BREEAM targets through design, regular reporting.
Man02.1 Elemental Life Cycle Cost (LCC)	Cost Consultant / Principal Contractor	2	LCC plan by Concept Design, appraise options, show LCC influence on design.
Man 02.2 Component level LCC option appraisal	Cost Consultant / Principal Contractor	1	Component-level LCC by end of Technical Design; cover key building elements, justify option selection.
Man02.3 Capital Cost Reporting	Owner / Cost Consultant / Principal Contractor	1	Report capital cost for works in £/m^2 gross internal area.
Man03.1 Environmental Management	Principal Contractor	1	Certified EMS (ISO 14001/EMAS), pollution prevention policy.
Man 03.2 Sustainability Champion (Construction)	Owner / Principal Contractor	1	Champion monitors compliance with BREEAM targets during construction/close-out, targets required in contract, evidence at meetings.
Man03.3 Considerate Construction Management	Principal Contractor	2	Use compliant considerate construction scheme, achieve assessed compliance or above.
Man04.1 Commissioning - Testing Schedule	Principal Contractor	1	Identify commissioning needs and standards, schedule accordingly.
Man04.2 Commissioning – Building Services	Principal Contractor	1	Appoint commissioning manager for complex systems, manage and evidence process.

BREEAM Issue	Responsible Team	Targeted Credits	Compliance Requirements (Key Points)
Man04.4 Handover	Principal Contractor	1	Produce Building User Guide (BUG) for handover; occupiers' training schedule and aftercare/maintenance info.
Man05.1 Aftercare Support	Owner / FM / Occupier	1	Provide aftercare: user meeting, training, helpline, energy/water monitoring for 12 months post-occupation.
Man05.2 Seasonal Commissioning	Owner / FM / Occupier	1	Specialist commissioning/testing over 12 months after occupation, review with occupants; re-commission/update O&M manual as needed.
Man05.3 Post Occupancy Evaluation (POE)	Owner / FM / Occupier	1	POE by independent party after 1 year: review, gather feedback, report performance and lessons learned.
Health & Wellbeing			
Hea01.1 Control of Glare	Architect / ME	1	Design-out glare; use strategy, shading, building orientation and controls; don't increase lighting energy consumption.
Hea01.3 View Out	Architect	2	Specify windows/openings to meet required area, locate for compliance as per standards.
Hea01.4 Internal & External Lighting Levels/Zoning	ME	1	Specify high frequency ballasts, provide appropriate illuminance, zoning for user control, external lighting per code.
Hea02.1 Indoor Air Quality	ME / Principal Contractor / FM	1	Minimise indoor air pollution by design/specification; source control, flush-out; protect/monitor HVAC; maintain IAQ during and after project.
Hea02.2 Ventilation	ME	1	Provide fresh air; design intake/exhaust separation; use sensors/controls and standards compliance.
Hea02.3 Emissions from Construction Products	Architect / Principal Contractor	1	Specify paints/varnishes per VOC content and test emissions for most categories in applicable areas.
Hea04.1 Thermal Modelling	ME	1	Thermal modelling for CIBSE comfort standards, demonstrate winter/summer compliance, report outcomes.
Hea04.2 Adaptability for Climate Change	ME	1	Apply climate scenario projections via modelling; design passive solutions for future adaptability.
Hea04.3 Thermal Zoning and Controls	ME	1	Use results from thermal modelling to inform zoning; design heating/cooling controls in consultation with users.
Hea06 Safety Security	Security Consultant	1	Appoint Suitably Qualified Security Specialist (SQSS), complete needs assessment, build recommendations into the design process.
Energy			
Ene01 Reduction of Energy Use/Carbon Emissions Opt 1	ME	8	Calculate EPRNDR using energy model, compare with BREEAM benchmarks for full building.
Ene02.1 Sub-metering of Major Energy Consuming Systems	ME	1	Design/install meters so ≥90% usage can be attributed to end-use; suitable for monitoring/BMS integration.
Ene03 External Lighting	ME / Lighting Consultant	1	Design building with no external lighting (if possible); otherwise specify LED/high-lumen efficacy and full controls.
Transport			
Tra1 Public Transport Accessibility	N/A	2	Access to local public transport nodes
Tra1 Proximity to Amenities	N/A	2	Access to local amenities
Tra03.1 Cycle Storage	Architect	1	Design/locate secure, accessible cycle storage to support predicted demand.
Tra03.2 Cyclist Facilities	Architect	1	Provide adequate cyclist facilities (showers, lockers); meet user numbers and needs.
Tra05 Travel Plan	Various	1	Prepare travel plan, use transport assessment, promote sustainable options, ensure management support.
Water			
Wat01 Water Consumption	Architect / ID / Principal Contractor	4	Assess new water-consuming components, model efficiency improvements, document via BREEAM calculator, meet minimum standard.
Wat02 Water Meters	ME	1	Specify/fit meters on mains supply and for zones with ≥10% demand, connect sub-meters to BMS if available.
Wat03.1 Leak Detection	ME / Principal Contractor	1	Install automated leak detection system for building mains water, include monitoring and alerting.
Wat04 Water Efficient Equipment	Landscape/Irrigation Consultant /	1	Identify non-domestic water demands, specify efficiency features and equipment.

BREEAM Issue	Responsible Team	Targeted Credits	Compliance Requirements (Key Points)
	Principal Contractor		
Materials			
Mat01 Environmental Impact of Materials	Architect / Structural Engineer / ID / Principal Contractor	3	Conduct LCA using approved tool, score/record results, inform specifications.
Mat03.1 Sustainable Procurement Plan	Principal Contractor	1	Prepare/implement a sustainable procurement plan documenting risks, objectives, sourcing, procedures and compliance records.
Mat03.2 Responsible Sourcing of Materials	Principal Contractor	1	Source ≥3 material types from responsible sourcing schemes, supply certifications for compliance.
Mat04 Insulation	Architect / Principal Contractor	1	Assess and specify insulation for low embodied impact, record with Insulation Index and compliant documentation.
Mat05 Designing for Durability and Resilience	Architect / Principal Contractor	1	Specify and design measures to protect vulnerable materials by area, environmental risks and user impacts.
Mat06 Materials Efficiency	Architect	1	Identify/implement measures to improve materials efficiency, document effects throughout design/construction.
Waste			
Wst01.1 Pre-Refurbishment Audit	Owner / Principal Contractor	1	Pre-refurbishment audit by competent person at Concept Design; identify and direct material streams for reuse, recycling, or recovery.
Wst01.2 Reuse and Direct Recycling of Materials	Principal Contractor	1	≥50% applicable waste reused/recycled on/off-site; track types and rates, report via project waste calculator.
Wst01.3 Resource Efficiency	Principal Contractor / Design Team	2	Develop and monitor Resource Management Plan, minimize waste via BREEAM benchmarks, minimize diversion to landfill and report.
Wst01.4 Diversion from Landfill	Principal Contractor	1	≥85% (volume) or ≥90% (weight) diverted; document and verify via management plan and waste tracking.
Wst03 Operational Waste	Waste Consultant	1	Provide/label operational waste areas for recycling, ensure capacity meets predicted occupancy, sign as needed.
Land Use & Ecology			
LE04 Enhancing Site Ecology	Ecologist / Landscape Architect	1	Appoint SQE, integrate ecology recommendations at concept stage, evidence implementation.
LE05 Long-term Impact on Biodiversity	Ecologist	2	SQE management plan, integrate recommended measures, establish post-handover monitoring and compliance measures for 5 years minimum.
Pollution			
Pol01.1 Impact of Refrigerants	ME / Principal Contractor	2	Meet BS EN 378, specify low GWP refrigerants, calculate DELC.
Pol01.2 Leak Detection	ME / Principal Contractor	1	Automated refrigerant leak detection: monitor and isolate on detection.
Pol03.2 Surface Water Run-Off	Infra Consultant	1	Design/implement SuDS; limit run-off per standards, review and document sequence.
Pol04 Reduction of Night Time Light Pollution	External Lighting Consultant	1	Eliminate external light pollution, install controls and timers to comply with ILP guidance.
Pol05 Noise Attenuation	Acoustic Consultant	1	Carry out compliant assessment/testing, select mitigation, meet BREEAM noise thresholds.
RATING		**74.33%**	**'Excellent'**

Summary

In consideration of the energy hierarchy the following is proposed:

Be lean: Reduce energy demand and improve operational efficiency by upgrading the building fabric through the installation of additional wall, roof and floor insulation, repairing windows and cracks to lower air permeability, and replacing windows in some locations. Furthermore, new lighting will be installed with smart controls as well as smart thermostats for controlling space heating. Heating will be provided by panel heaters or infrared heaters, whilst hot water will be provided by the existing communal boilers.

These measures enhance thermal performance beyond existing conditions and contribute to reduced energy demand, as further detailed within this report.

Be clean: No opportunities are feasible under this stage of the hierarchy for this refurbishment scope, as further detailed within this report. However, the proposed servicing strategy has been arranged so that future connection would remain technically possible should a network come forward.

Be green: A range of "Be Green" measures were explored at this stage, including on-site renewable energy technologies (such as solar PV, solar thermal and heat pumps) and other low/zero carbon options. A 210 panel (96.6kWp) will be incorporated on the roofs of the blocks that are not over shadowed by the surrounding mature trees. An 11% reduction is anticipated at this stage.

Overall: The scheme will achieve a combined 36% reduction in regulated CO2 over a notional building built to the Appendix 3 specification within the GLA's guidance on preparing energy assessments.

Policy Compliance

For the purposes of carbon reduction reporting, the current Part L 2021 GLA Carbon Emission Reporting spreadsheet has been completed and incorporated into the report. Because the proposal is a refurbishment and change-of-use of existing buildings rather than a new-build development, the London Plan SI2 requirement for achieving zero-carbon through an offset contribution does not apply in the same way; instead, policy requires that major refurbishments "should aim" to reduce emissions to zero-carbon, which this scheme now achieves with a 36% on-site reduction.

Furthermore, the 28% reduction at the 'Be Lean' stage significantly surpasses the 15% target required by London Plan Policy SI2. As the development exceeds the typical 35% benchmark for major refurbishments, and because the remaining emissions are not subject to the mandatory zero-carbon offset requirement applied to new-build major schemes, no carbon-offset payment is necessary to comply with SI2 or Local Plan LP10.

Carbon Offset Requirement

London Plan SI2 and Local Plan LP10 require a mandatory carbon-offset payment only for new-build major developments that are required to achieve "zero-carbon" through a combination of on-site savings and offsetting. Refurbishment and change-of-use schemes, such as this proposal, fall under the separate policy expectation that they should *maximise feasible on-site reductions*, rather than achieve net-zero carbon through offset contributions.

This interpretation is consistent with borough practice across London, including the Kingsway House precedent (Camden, 2024), where a refurbishment achieving circa 39% on-site savings was not required to make any offset payment. Similarly, both Merton and Hounslow Local Plan policy explicitly confirm that offset payments apply only to new-build major development, with refurbishments assessed solely on their proportional improvement. On this basis, and given that this scheme demonstrates a robust 36% on-site reduction through fabric upgrades and a substantial PV installation, the development fully satisfies the applicable policy tests without necessitating a carbon-offset contribution.

TABLE 5: TOTAL CARBON DIOXIDE SAVINGS ACHIEVED BY THE PROPOSED SCHEME

	Total Regulated Emissions (Tonnes Co_2 / year)	CO_2 savings (Tonnes CO_2 / year)	Percentage Savings (%)
Part L 2021 Baseline	116.9	-	-
Be Lean	88.5	28.4	24%
Be Clean	88.5	-	-
Be Green	75.3	13.1	11%
Cumulative	75.3	41.6	36%

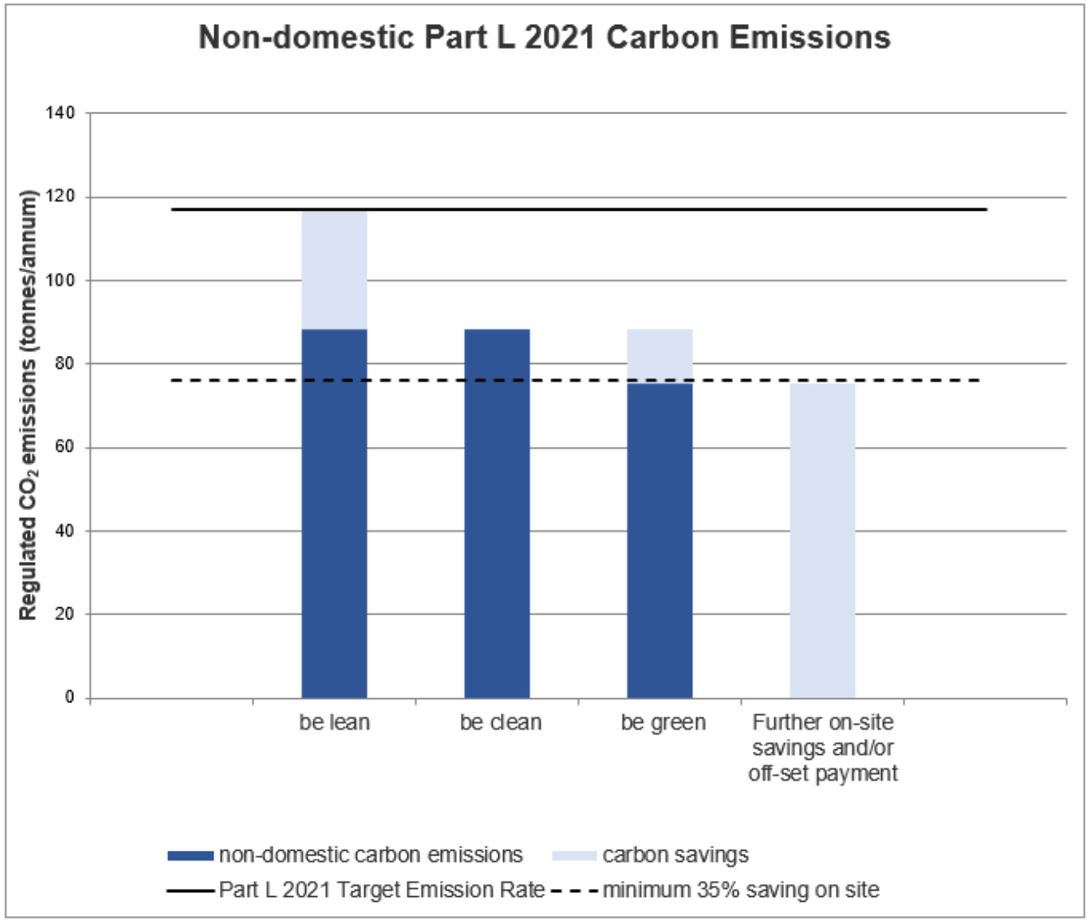

FIGURE 4: CARBON EMISSIONS ACROSS THE ENERGY HIERARCHY

Appendix A – BRUKL Outputs

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Improved - Site excluding Mount Clare House v4

As designed

Date: Tue Nov 18 10:00:35 2025

Administrative information

Building Details

Address: Minstead Gardens, Roehampton Gate, London, SW15 4EE

Certifier details

Name: Oliver Butler

Telephone number: 07984796826

Address: 30 Tweedy Road, London, BR1 3FE

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.29

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

Foundation area [m^2]: 2301.16

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

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	9.46	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	18.37	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	78.62	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	168.48	
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	0.28	0.28	PC000000_W1
Floors	0.18	0.15	0.15	PC000000_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.15	0.15	PC000000_C_A0
Windows** and roof windows	1.6	2	2	PC000000_W1_O0
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.4	1.4	PC000003_W1_O0
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = 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	10

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	<0.9

1- Panel heaters

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	1	-	-	-	-
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					NO

2- Improved System

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.84	-	-	-	-
Standard value	0.93*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.					

1- SYST0002-DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	Hot water provided by HVAC system	-
Standard value	N/A	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	**General luminaire**	**Display light source**	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Picasso GF Laundry Room	100	-	-
Picasso GF Office	100	-	-
Picasso GF WC	100	-	-
Picasso GF WC	100	-	-
Picasso GF WC	100	-	-
Picasso GF WC	100	-	-
Picasso GF Kitchen	100	-	-
Picasso GF Office	100	-	-
Picasso GF Corridor	100	-	-
Picasso GF WC	100	-	-
Picasso GF WC	100	-	-
Picasso GF Corridor	100	-	-
Picasso GF Store	100	-	-
Picasso GF Store	100	-	-
Picasso GF Kitchen	100	-	-
Picasso GF Dining Room	100	-	-
Picasso GF Common Room	100	-	-
Picasso GF Common Room	100	-	-
Picasso GF Reception Kiosk	100	85	1.588

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Picasso FF Bed S	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF WC	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF Kitchen 3	100	-	-
Picasso FF Corridor	100	-	-
Picasso FF Entrance	100	-	-
Picasso FF Kitchen 3	100	-	-
Picasso FF WC	100	-	-
Picasso FF WC	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF Bed D	100	-	-
Picasso FF Store	100	-	-
Picasso FF Bed D	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF WC	100	-	-
Picasso FF Corridor	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF WC	100	-	-
Picasso FF Store	100	-	-
Picasso FF Bed S	100	-	-
Bungalow Living	100	-	-
Bungalow Bed D	100	-	-
Bungalow WC	100	-	-
Bungalow Bed D	100	-	-
Bungalow Entrance	100	-	-
Bungalow Living	100	-	-
Bungalow Bed D	100	-	-
Bungalow EnSuite	100	-	-
Bungalow Entrance	100	-	-
Bungalow EnSuite	100	-	-
Bungalow Bed D	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Picasso GF Store	100	-	-
Picasso GF Store	100	-	-
Picasso GF Store	100	-	-
Picasso GF Reception	100	85	1.588
Picasso GF Corridor	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF EnSuite	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF EnSuite	100	-	-
Picasso FF Bed D	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF Bed D	100	-	-
Picasso FF Entrance	100	-	-
Picasso FF Kitchen 2	100	-	-
Picasso FF WC	100	-	-
Picasso FF Entrance	100	-	-
Picasso FF EnSuite	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF Kitchen 2	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF WC	100	-	-
Picasso FF WC	100	-	-
Picasso FF Entrance	100	-	-
Picasso FF WC	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF Kitchen 2	100	-	-
Picasso FF Bed S	100	-	-
Picasso FF Entrance	100	-	-
Picasso FF Kitchen 3	100	-	-
Picasso FF Bed D	100	-	-
Picasso FF Entrance	100	-	-
Picasso FF Kitchen	100	-	-
Picasso FF Store	100	-	-
Picasso FF WC	100	-	-
Picasso FF WC	100	-	-
Picasso FF WC	100	-	-
Picasso FF WC	100	-	-
Picasso FF Bed D	100	-	-
Picasso FF Bed D	100	-	-
Picasso FF Bed D	100	-	-
Picasso FF EnSuite	100	-	-
Picasso FF Kitchen 3	100	-	-
Picasso FF Corridor	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Residents FF Bed S	NO (-56.3%)	NO
Residents FF Bed S	NO (-56.3%)	NO
Residents GF Bed S	NO (-39.8%)	NO
Residents GF Bed S	NO (-38.1%)	NO
Residents GF Bed S	NO (-56.2%)	NO
Residents GF Bed S	NO (-20.5%)	NO
Residents GF Bed S	NO (-66.5%)	NO
Residents GF Bed S	YES (+133.1%)	NO
Residents GF Bed S	NO (-19.1%)	NO
Residents FF Bed S	YES (+80.1%)	NO
Residents FF Bed S	YES (+133.1%)	NO
Residents FF Bed S	NO (-37.9%)	NO
Residents FF Bed S	NO (-40.1%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-66.4%)	NO
Residents FF Bed S	NO (-20.5%)	NO
Residents FF Bed S	NO (-56.3%)	NO
Residents FF Bed S	NO (-19.1%)	NO
Residents GF Bed S	NO (-39.8%)	NO
Residents GF Bed S	NO (-66.8%)	NO
Residents GF Bed S	NO (-56.2%)	NO
Residents GF Bed S	NO (-20.5%)	NO
Residents GF Bed S	NO (-66.5%)	NO
Residents GF Bed S	YES (+139.1%)	NO
Residents GF Bed S	NO (-19.1%)	NO
Residents FF Bed S	YES (+75.6%)	NO
Residents FF Bed S	YES (+139.1%)	NO
Residents FF Bed S	NO (-66.7%)	NO
Residents FF Bed S	NO (-40.1%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-66.4%)	NO
Residents FF Bed S	NO (-20.5%)	NO
Residents FF Bed S	NO (-56.3%)	NO
Residents FF Bed S	NO (-19.1%)	NO
Residents GF Bed S	NO (-21%)	NO
Residents GF Bed S	NO (-56.4%)	NO
Residents GF Bed S	NO (-66.6%)	NO
Residents GF Bed S	NO (-39.4%)	NO
Residents GF Bed S	NO (-94.7%)	NO
Residents GF Bed S	YES (+76.2%)	NO
Residents GF Bed S	NO (-63.1%)	NO
Residents FF Bed S	YES (+132.4%)	NO
Residents FF Bed S	YES (+76.2%)	NO
Residents FF Bed S	NO (-56.3%)	NO
Residents FF Bed S	NO (-21.4%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-94.6%)	NO
Residents FF Bed S	NO (-39.4%)	NO
Residents FF Bed S	NO (-66.6%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Residents FF Bed S	NO (-20.2%)	NO
Residents FF Bed S	NO (-56.1%)	NO
Residents FF Bed S	NO (-56.1%)	NO
Residents GF Bed S	NO (-40%)	NO
Residents GF Bed S	NO (-38.4%)	NO
Residents GF Bed S	NO (-56%)	NO
Residents GF Bed S	NO (-20.2%)	NO
Residents GF Bed S	NO (-66.7%)	NO
Residents GF Bed S	YES (+132.1%)	NO
Residents GF Bed S	NO (-18.7%)	NO
Residents FF Bed S	YES (+80.9%)	NO
Residents FF Bed S	YES (+132.1%)	NO
Residents FF Bed S	NO (-38.2%)	NO
Residents FF Bed S	NO (-40.4%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-66.6%)	NO
Residents FF Bed S	NO (-20.2%)	NO
Residents FF Bed S	NO (-56.1%)	NO
Residents FF Bed S	NO (-18.7%)	NO
Residents GF Bed S	NO (-40%)	NO
Residents GF Bed S	NO (-66.9%)	NO
Residents GF Bed S	NO (-56%)	NO
Residents GF Bed S	NO (-20.2%)	NO
Residents GF Bed S	NO (-66.7%)	NO
Residents GF Bed S	YES (+138%)	NO
Residents GF Bed S	NO (-18.7%)	NO
Residents FF Bed S	YES (+76.4%)	NO
Residents FF Bed S	YES (+138%)	NO
Residents FF Bed S	NO (-66.8%)	NO
Residents FF Bed S	NO (-40.4%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-66.6%)	NO
Residents FF Bed S	NO (-20.2%)	NO
Residents FF Bed S	NO (-56.1%)	NO
Residents FF Bed S	NO (-18.7%)	NO
Residents GF Bed S	NO (-39.8%)	NO
Residents GF Bed S	NO (-38.1%)	NO
Residents GF Bed S	NO (-56.2%)	NO
Residents GF Bed S	NO (-20.5%)	NO
Residents GF Bed S	NO (-66.5%)	NO
Residents GF Bed S	YES (+133.1%)	NO
Residents GF Bed S	NO (-56.3%)	NO
Residents FF Bed S	YES (+75.6%)	NO
Residents FF Bed S	YES (+133.1%)	NO
Residents FF Bed S	NO (-37.9%)	NO
Residents FF Bed S	NO (-40.1%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-66.4%)	NO
Residents FF Bed S	NO (-20.5%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Residents FF Bed S	NO (-55.8%)	NO
Residents FF Bed S	NO (-39.7%)	NO
Residents FF Bed S	NO (-66.8%)	NO
Residents FF Bed S	NO (-66.8%)	NO
Residents GF Bed S	NO (-20.6%)	NO
Residents GF Bed S	NO (-18.5%)	NO
Residents GF Bed S	NO (-66.7%)	NO
Residents GF Bed S	NO (-39.7%)	NO
Residents GF Bed S	NO (-55.9%)	NO
Residents GF Bed S	YES (+132.1%)	NO
Residents GF Bed S	NO (-38.6%)	NO
Residents FF Bed S	YES (+80.9%)	NO
Residents FF Bed S	YES (+132.1%)	NO
Residents FF Bed S	NO (-18.2%)	NO
Residents FF Bed S	NO (-21.1%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-55.8%)	NO
Residents FF Bed S	NO (-39.7%)	NO
Residents FF Bed S	NO (-66.8%)	NO
Residents FF Bed S	NO (-38.6%)	NO
Residents GF Bed S	NO (-20.6%)	NO
Residents GF Bed S	NO (-56.2%)	NO
Residents GF Bed S	NO (-66.7%)	NO
Residents GF Bed S	NO (-39.7%)	NO
Residents GF Bed S	NO (-55.9%)	NO
Residents GF Bed S	YES (+138%)	NO
Residents GF Bed S	NO (-38.6%)	NO
Residents FF Bed S	YES (+76.4%)	NO
Residents FF Bed S	YES (+138%)	NO
Residents FF Bed S	NO (-56.1%)	NO
Residents FF Bed S	NO (-21.1%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-55.8%)	NO
Residents FF Bed S	NO (-39.7%)	NO
Residents FF Bed S	NO (-66.8%)	NO
Residents FF Bed S	NO (-38.6%)	NO
Residents GF Bed S	NO (-40%)	NO
Residents GF Bed S	NO (-38.4%)	NO
Residents GF Bed S	NO (-56%)	NO
Residents GF Bed S	NO (-20.2%)	NO
Residents GF Bed S	NO (-66.7%)	NO
Residents GF Bed S	YES (+132.1%)	NO
Residents GF Bed S	NO (-56.1%)	NO
Residents FF Bed S	YES (+76.4%)	NO
Residents FF Bed S	YES (+132.1%)	NO
Residents FF Bed S	NO (-38.2%)	NO
Residents FF Bed S	NO (-40.4%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-66.6%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-56%)	NO
Residents FF Bed S	NO (-39.4%)	NO
Residents FF Bed S	NO (-66.6%)	NO
Residents FF Bed S	NO (-66.6%)	NO
Residents GF Bed S	NO (-21%)	NO
Residents GF Bed S	NO (-18.8%)	NO
Residents GF Bed S	NO (-66.6%)	NO
Residents GF Bed S	NO (-39.4%)	NO
Residents GF Bed S	NO (-56.1%)	NO
Residents GF Bed S	YES (+76.2%)	NO
Residents GF Bed S	NO (-38.3%)	NO
Residents FF Bed S	YES (+138.3%)	NO
Residents FF Bed S	YES (+76.2%)	NO
Residents FF Bed S	NO (-18.6%)	NO
Residents FF Bed S	NO (-21.4%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-56%)	NO
Residents FF Bed S	NO (-39.4%)	NO
Residents FF Bed S	NO (-66.6%)	NO
Residents FF Bed S	NO (-38.3%)	NO
Residents GF Bed S	NO (-21%)	NO
Residents GF Bed S	NO (-56.4%)	NO
Residents GF Bed S	NO (-66.6%)	NO
Residents GF Bed S	NO (-39.4%)	NO
Residents GF Bed S	NO (-56.1%)	NO
Residents GF Bed S	YES (+80.7%)	NO
Residents GF Bed S	NO (-38.3%)	NO
Residents FF Bed S	YES (+132.4%)	NO
Residents FF Bed S	YES (+80.7%)	NO
Residents FF Bed S	NO (-56.3%)	NO
Residents FF Bed S	NO (-21.4%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-56%)	NO
Residents FF Bed S	NO (-39.4%)	NO
Residents FF Bed S	NO (-66.6%)	NO
Residents FF Bed S	NO (-38.3%)	NO
Residents GF Bed S	NO (-20.6%)	NO
Residents GF Bed S	NO (-18.5%)	NO
Residents GF Bed S	NO (-66.7%)	NO
Residents GF Bed S	NO (-39.7%)	NO
Residents GF Bed S	NO (-55.9%)	NO
Residents GF Bed S	YES (+132.1%)	NO
Residents GF Bed S	NO (-66.8%)	NO
Residents FF Bed S	YES (+76.4%)	NO
Residents FF Bed S	YES (+132.1%)	NO
Residents FF Bed S	NO (-18.2%)	NO
Residents FF Bed S	NO (-21.1%)	NO
Residents FF Bed S	N/A	N/A

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?
Picasso GF Office	YES (+76.9%)	NO
Picasso GF Office	YES (+84%)	NO
Picasso GF Dining Room	YES (+135.3%)	NO
Picasso GF Reception Kiosk	N/A	N/A
Picasso GF Reception	N/A	N/A
Picasso FF Bed S	NO (-56.5%)	NO
Picasso FF Bed S	NO (-32.8%)	NO
Picasso FF Bed D	YES (+3.4%)	NO
Picasso FF Bed S	YES (+2%)	NO
Picasso FF Bed D	NO (-52.9%)	NO
Picasso FF Bed S	NO (-37.6%)	NO
Picasso FF Bed S	NO (-34.1%)	NO
Picasso FF Bed S	NO (-75%)	NO
Picasso FF Bed S	NO (-36.3%)	NO
Picasso FF Bed D	NO (-56.7%)	NO
Picasso FF Bed D	NO (-61.7%)	NO
Picasso FF Bed D	NO (-56.8%)	NO
Picasso FF Bed D	NO (-68.4%)	NO
Picasso FF Bed S	NO (-43%)	NO
Picasso FF Bed S	NO (-43.7%)	NO
Picasso FF Bed S	NO (-39.9%)	NO
Picasso FF Bed S	NO (-42.8%)	NO
Picasso FF Bed S	NO (-28.2%)	NO
Picasso FF Bed D	NO (-52.4%)	NO
Picasso FF Bed D	NO (-77.2%)	NO
Picasso FF Bed S	NO (-44.4%)	NO
Picasso FF Bed S	NO (-40.6%)	NO
Picasso FF Bed S	NO (-43.9%)	NO
Picasso FF Bed S	NO (-43.7%)	NO
Bungalow Bed D	NO (-48.2%)	NO
Bungalow Bed D	NO (-19.6%)	NO
Bungalow Bed D	NO (-15.3%)	NO
Bungalow Bed D	NO (-71.1%)	NO
Residents GF Bed S	NO (-21%)	NO
Residents GF Bed S	NO (-18.8%)	NO
Residents GF Bed S	NO (-66.6%)	NO
Residents GF Bed S	NO (-39.4%)	NO
Residents GF Bed S	NO (-56.1%)	NO
Residents GF Bed S	YES (+76.2%)	NO
Residents GF Bed S	NO (-66.7%)	NO
Residents FF Bed S	YES (+132.4%)	NO
Residents FF Bed S	YES (+76.2%)	NO
Residents FF Bed S	NO (-18.6%)	NO
Residents FF Bed S	NO (-21.4%)	NO

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF EnSuite	100	-	-
Residents GF Bed S	100	-	-
Residents GF Bed S	100	-	-
Residents GF Corridor	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF Bed S	100	-	-
Residents FF EnSuite	100	-	-
Residents FF EnSuite	100	-	-
Residents FF Bed S	100	-	-
Residents FF Corridor	100	-	-
Residents FF Bed S	100	-	-

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Residents FF Bed S	NO (-63.1%)	NO
Residents GF Bed S	NO (-21%)	NO
Residents GF Bed S	N/A	N/A
Residents GF Bed S	NO (-97.6%)	NO
Residents GF Bed S	NO (-39.4%)	NO
Residents GF Bed S	NO (-56.1%)	NO
Residents GF Bed S	YES (+76.2%)	NO
Residents GF Bed S	NO (-63.1%)	NO
Residents FF Bed S	YES (+132.4%)	NO
Residents FF Bed S	YES (+76.2%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-21.4%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-56%)	NO
Residents FF Bed S	NO (-39.4%)	NO
Residents FF Bed S	NO (-97.6%)	NO
Residents FF Bed S	NO (-63.1%)	NO
Residents GF Bed S	NO (-21%)	NO
Residents GF Bed S	NO (-56.4%)	NO
Residents GF Bed S	NO (-35.3%)	NO
Residents GF Bed S	NO (-39.4%)	NO
Residents GF Bed S	NO (-56.1%)	NO
Residents GF Bed S	YES (+76.2%)	NO
Residents GF Bed S	NO (-92.3%)	NO
Residents FF Bed S	YES (+132.4%)	NO
Residents FF Bed S	YES (+76.2%)	NO
Residents FF Bed S	NO (-56.3%)	NO
Residents FF Bed S	NO (-21.4%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-56%)	NO
Residents FF Bed S	NO (-39.4%)	NO
Residents FF Bed S	NO (-35.4%)	NO
Residents FF Bed S	NO (-92.3%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	4602.3	4602.3
External area [m^2]	12881	12881
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	10	3
Average conductance [W/K]	4654.06	3840.83
Average U-value [W/m^2K]	0.36	0.3
Alpha value* [%]	20.26	18.55

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

Building Use

% Area	Building Type
	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
100	**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	86.99	44.85
Cooling	0	0
Auxiliary	0	0.31
Lighting	6.64	6.54
Hot water	19.66	20.3
Equipment*	16.44	16.44
TOTAL**	**113.29**	**72**

* 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	16.69
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*16.69*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	355.44	281.39
Primary energy [kWh_{PE}/m^2]	168.48	78.62
Total emissions [kg/m^2]	18.37	9.46

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] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	250.5	104.9	87	0	0	0.8	0	1	0
	Notional	216.3	65.1	44.8	0	0	1.34	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

Mount Clare House - Site excluding bungalow

As built

Date: Tue Nov 18 10:09:31 2025

Administrative information

Building Details

Address: Minstead Gardens, Roehampton Gate, London, SW15 4EE

Certifier details

Name: Oliver Butler

Telephone number: 07984796826

Address: 30 Tweedy Road, London, BR1 3FE

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.29

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

Foundation area [m^2]: 143.25

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

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	10.42	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	24.22	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	92.7	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	227.94	
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	0.55	0.55	PC000000_W1
Floors	0.18	0.23	0.25	PC000000_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.21	0.22	PC000000_C_A0
Windows** and roof windows	1.6	1.46	1.46	PC000000_W1_O0
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.4	1.4	PC000003_W1_O0
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = 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	25

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	<0.9

1- Panel heater

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	1	-	-	-	-
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					NO

2- Notional System

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.84	-	-	-	-
Standard value	1	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

1- SYST0001-DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	Hot water provided by HVAC system	-
Standard value	N/A	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	**General luminaire**	**Display light source**	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Picasso GF Laundry Room	95	-	-
Picasso GF Office	95	-	-
Picasso GF WC	95	-	-
Picasso GF WC	95	-	-
Picasso GF WC	95	-	-
Picasso GF WC	95	-	-
Picasso GF Kitchen	95	-	-
Picasso GF Office	95	-	-
Picasso GF Corridor	95	-	-
Picasso GF WC	95	-	-
Picasso GF WC	95	-	-
Picasso GF Corridor	95	-	-
Picasso GF Store	95	-	-
Picasso GF Store	95	-	-
Picasso GF Kitchen	95	-	-
Picasso GF Dining Room	95	-	-
Picasso GF Common Room	95	-	-
Picasso GF Common Room	95	-	-
Picasso GF Reception Kiosk	95	15	9
Picasso GF Store	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Picasso GF Store	95	-	-
Picasso GF Store	95	-	-
Picasso GF Reception	95	15	9
Picasso GF Corridor	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF EnSuite	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF EnSuite	95	-	-
Picasso FF Bed D	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF Bed D	95	-	-
Picasso FF Entrance	95	-	-
Picasso FF Kitchen 2	95	-	-
Picasso FF WC	95	-	-
Picasso FF Entrance	95	-	-
Picasso FF EnSuite	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF Kitchen 2	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF WC	95	-	-
Picasso FF WC	95	-	-
Picasso FF Entrance	95	-	-
Picasso FF WC	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF Kitchen 2	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF Entrance	95	-	-
Picasso FF Kitchen 3	95	-	-
Picasso FF Bed D	95	-	-
Picasso FF Entrance	95	-	-
Picasso FF Kitchen	95	-	-
Picasso FF Store	95	-	-
Picasso FF WC	95	-	-
Picasso FF WC	95	-	-
Picasso FF WC	95	-	-
Picasso FF WC	95	-	-
Picasso FF Bed D	95	-	-
Picasso FF Bed D	95	-	-
Picasso FF Bed D	95	-	-
Picasso FF EnSuite	95	-	-
Picasso FF Kitchen 3	95	-	-
Picasso FF Corridor	95	-	-
Picasso FF Bed S	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Picasso FF Bed S	95	-	-
Picasso FF WC	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF Kitchen 3	95	-	-
Picasso FF Corridor	95	-	-
Picasso FF Entrance	95	-	-
Picasso FF Kitchen 3	95	-	-
Picasso FF WC	95	-	-
Picasso FF WC	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF Bed D	95	-	-
Picasso FF Store	95	-	-
Picasso FF Bed D	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF WC	95	-	-
Picasso FF Corridor	95	-	-
Picasso FF Bed S	95	-	-
Picasso FF WC	95	-	-
Picasso FF Store	95	-	-
Picasso FF Bed S	95	-	-
Bungalow Living	95	-	-
Bungalow Bed D	95	-	-
Bungalow WC	95	-	-
Bungalow Bed D	95	-	-
Bungalow Entrance	95	-	-
Bungalow Living	95	-	-
Bungalow Bed D	95	-	-
Bungalow EnSuite	95	-	-
Bungalow Entrance	95	-	-
Bungalow EnSuite	95	-	-
Bungalow Bed D	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF EnSuite	95	-	-
Residents GF Bed S	95	-	-
Residents GF Bed S	95	-	-
Residents GF Corridor	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF Bed S	95	-	-
Residents FF EnSuite	95	-	-
Residents FF EnSuite	95	-	-
Residents FF Bed S	95	-	-
Residents FF Corridor	95	-	-
Residents FF Bed S	95	-	-

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Residents FF Bed S	NO (-63.3%)	NO
Residents GF Bed S	NO (-21.4%)	NO
Residents GF Bed S	N/A	N/A
Residents GF Bed S	NO (-97.6%)	NO
Residents GF Bed S	NO (-39.7%)	NO
Residents GF Bed S	NO (-56.3%)	NO
Residents GF Bed S	YES (+75.3%)	NO
Residents GF Bed S	NO (-63.3%)	NO
Residents FF Bed S	YES (+131.2%)	NO
Residents FF Bed S	YES (+75.3%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-21.9%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-56.2%)	NO
Residents FF Bed S	NO (-39.7%)	NO
Residents FF Bed S	NO (-97.6%)	NO
Residents FF Bed S	NO (-63.3%)	NO
Residents GF Bed S	NO (-21.4%)	NO
Residents GF Bed S	NO (-56.6%)	NO
Residents GF Bed S	NO (-35.6%)	NO
Residents GF Bed S	NO (-39.7%)	NO
Residents GF Bed S	NO (-56.3%)	NO
Residents GF Bed S	YES (+75.3%)	NO
Residents GF Bed S	NO (-92.4%)	NO
Residents FF Bed S	YES (+131.2%)	NO
Residents FF Bed S	YES (+75.3%)	NO
Residents FF Bed S	NO (-56.6%)	NO
Residents FF Bed S	NO (-21.9%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-56.2%)	NO
Residents FF Bed S	NO (-39.7%)	NO
Residents FF Bed S	NO (-35.7%)	NO
Residents FF Bed S	NO (-92.3%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Residents FF Bed S	NO (-56.5%)	NO
Residents FF Bed S	NO (-56.5%)	NO
Residents GF Bed S	NO (-40.1%)	NO
Residents GF Bed S	NO (-38.4%)	NO
Residents GF Bed S	NO (-56.4%)	NO
Residents GF Bed S	NO (-20.9%)	NO
Residents GF Bed S	NO (-66.7%)	NO
Residents GF Bed S	YES (+131.9%)	NO
Residents GF Bed S	NO (-19.5%)	NO
Residents FF Bed S	YES (+79.2%)	NO
Residents FF Bed S	YES (+131.9%)	NO
Residents FF Bed S	NO (-38.3%)	NO
Residents FF Bed S	NO (-40.4%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-66.6%)	NO
Residents FF Bed S	NO (-20.9%)	NO
Residents FF Bed S	NO (-56.5%)	NO
Residents FF Bed S	NO (-19.5%)	NO
Residents GF Bed S	NO (-40.1%)	NO
Residents GF Bed S	NO (-66.9%)	NO
Residents GF Bed S	NO (-56.4%)	NO
Residents GF Bed S	NO (-20.9%)	NO
Residents GF Bed S	NO (-66.7%)	NO
Residents GF Bed S	YES (+137.9%)	NO
Residents GF Bed S	NO (-19.5%)	NO
Residents FF Bed S	YES (+74.7%)	NO
Residents FF Bed S	YES (+137.9%)	NO
Residents FF Bed S	NO (-66.9%)	NO
Residents FF Bed S	NO (-40.4%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-66.6%)	NO
Residents FF Bed S	NO (-20.9%)	NO
Residents FF Bed S	NO (-56.5%)	NO
Residents FF Bed S	NO (-19.5%)	NO
Residents GF Bed S	NO (-21.4%)	NO
Residents GF Bed S	NO (-56.6%)	NO
Residents GF Bed S	NO (-66.8%)	NO
Residents GF Bed S	NO (-39.7%)	NO
Residents GF Bed S	NO (-94.7%)	NO
Residents GF Bed S	YES (+75.3%)	NO
Residents GF Bed S	NO (-63.3%)	NO
Residents FF Bed S	YES (+131.2%)	NO
Residents FF Bed S	YES (+75.3%)	NO
Residents FF Bed S	NO (-56.6%)	NO
Residents FF Bed S	NO (-21.9%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-94.7%)	NO
Residents FF Bed S	NO (-39.7%)	NO
Residents FF Bed S	NO (-66.8%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Residents FF Bed S	NO (-20.6%)	NO
Residents FF Bed S	NO (-56.3%)	NO
Residents FF Bed S	NO (-56.3%)	NO
Residents GF Bed S	NO (-40.3%)	NO
Residents GF Bed S	NO (-38.7%)	NO
Residents GF Bed S	NO (-56.2%)	NO
Residents GF Bed S	NO (-20.6%)	NO
Residents GF Bed S	NO (-66.9%)	NO
Residents GF Bed S	YES (+130.9%)	NO
Residents GF Bed S	NO (-19.1%)	NO
Residents FF Bed S	YES (+79.9%)	NO
Residents FF Bed S	YES (+130.9%)	NO
Residents FF Bed S	NO (-38.5%)	NO
Residents FF Bed S	NO (-40.7%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-66.7%)	NO
Residents FF Bed S	NO (-20.6%)	NO
Residents FF Bed S	NO (-56.3%)	NO
Residents FF Bed S	NO (-19.1%)	NO
Residents GF Bed S	NO (-40.3%)	NO
Residents GF Bed S	NO (-67.1%)	NO
Residents GF Bed S	NO (-56.2%)	NO
Residents GF Bed S	NO (-20.6%)	NO
Residents GF Bed S	NO (-66.9%)	NO
Residents GF Bed S	YES (+136.8%)	NO
Residents GF Bed S	NO (-19.1%)	NO
Residents FF Bed S	YES (+75.5%)	NO
Residents FF Bed S	YES (+136.8%)	NO
Residents FF Bed S	NO (-67%)	NO
Residents FF Bed S	NO (-40.7%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-66.7%)	NO
Residents FF Bed S	NO (-20.6%)	NO
Residents FF Bed S	NO (-56.3%)	NO
Residents FF Bed S	NO (-19.1%)	NO
Residents GF Bed S	NO (-40.1%)	NO
Residents GF Bed S	NO (-38.4%)	NO
Residents GF Bed S	NO (-56.4%)	NO
Residents GF Bed S	NO (-20.9%)	NO
Residents GF Bed S	NO (-66.7%)	NO
Residents GF Bed S	YES (+131.9%)	NO
Residents GF Bed S	NO (-56.6%)	NO
Residents FF Bed S	YES (+74.7%)	NO
Residents FF Bed S	YES (+131.9%)	NO
Residents FF Bed S	NO (-38.3%)	NO
Residents FF Bed S	NO (-40.4%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-66.6%)	NO
Residents FF Bed S	NO (-20.9%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Residents FF Bed S	NO (-56%)	NO
Residents FF Bed S	NO (-40%)	NO
Residents FF Bed S	NO (-67%)	NO
Residents FF Bed S	NO (-67%)	NO
Residents GF Bed S	NO (-21%)	NO
Residents GF Bed S	NO (-18.9%)	NO
Residents GF Bed S	NO (-66.9%)	NO
Residents GF Bed S	NO (-40%)	NO
Residents GF Bed S	NO (-56.1%)	NO
Residents GF Bed S	YES (+130.9%)	NO
Residents GF Bed S	NO (-38.9%)	NO
Residents FF Bed S	YES (+79.9%)	NO
Residents FF Bed S	YES (+130.9%)	NO
Residents FF Bed S	NO (-18.6%)	NO
Residents FF Bed S	NO (-21.5%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-56%)	NO
Residents FF Bed S	NO (-40%)	NO
Residents FF Bed S	NO (-67%)	NO
Residents FF Bed S	NO (-38.9%)	NO
Residents GF Bed S	NO (-21%)	NO
Residents GF Bed S	NO (-56.4%)	NO
Residents GF Bed S	NO (-66.9%)	NO
Residents GF Bed S	NO (-40%)	NO
Residents GF Bed S	NO (-56.1%)	NO
Residents GF Bed S	YES (+136.8%)	NO
Residents GF Bed S	NO (-38.9%)	NO
Residents FF Bed S	YES (+75.5%)	NO
Residents FF Bed S	YES (+136.8%)	NO
Residents FF Bed S	NO (-56.4%)	NO
Residents FF Bed S	NO (-21.5%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-56%)	NO
Residents FF Bed S	NO (-40%)	NO
Residents FF Bed S	NO (-67%)	NO
Residents FF Bed S	NO (-38.9%)	NO
Residents GF Bed S	NO (-40.3%)	NO
Residents GF Bed S	NO (-38.7%)	NO
Residents GF Bed S	NO (-56.2%)	NO
Residents GF Bed S	NO (-20.6%)	NO
Residents GF Bed S	NO (-66.9%)	NO
Residents GF Bed S	YES (+130.9%)	NO
Residents GF Bed S	NO (-56.4%)	NO
Residents FF Bed S	YES (+75.5%)	NO
Residents FF Bed S	YES (+130.9%)	NO
Residents FF Bed S	NO (-38.5%)	NO
Residents FF Bed S	NO (-40.7%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-66.7%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-56.2%)	NO
Residents FF Bed S	NO (-39.7%)	NO
Residents FF Bed S	NO (-66.8%)	NO
Residents FF Bed S	NO (-66.8%)	NO
Residents GF Bed S	NO (-21.4%)	NO
Residents GF Bed S	NO (-19.3%)	NO
Residents GF Bed S	NO (-66.8%)	NO
Residents GF Bed S	NO (-39.7%)	NO
Residents GF Bed S	NO (-56.3%)	NO
Residents GF Bed S	YES (+75.3%)	NO
Residents GF Bed S	NO (-38.6%)	NO
Residents FF Bed S	YES (+137%)	NO
Residents FF Bed S	YES (+75.3%)	NO
Residents FF Bed S	NO (-19%)	NO
Residents FF Bed S	NO (-21.9%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-56.2%)	NO
Residents FF Bed S	NO (-39.7%)	NO
Residents FF Bed S	NO (-66.8%)	NO
Residents FF Bed S	NO (-38.6%)	NO
Residents GF Bed S	NO (-21.4%)	NO
Residents GF Bed S	NO (-56.6%)	NO
Residents GF Bed S	NO (-66.8%)	NO
Residents GF Bed S	NO (-39.7%)	NO
Residents GF Bed S	NO (-56.3%)	NO
Residents GF Bed S	YES (+79.8%)	NO
Residents GF Bed S	NO (-38.6%)	NO
Residents FF Bed S	YES (+131.2%)	NO
Residents FF Bed S	YES (+79.8%)	NO
Residents FF Bed S	NO (-56.6%)	NO
Residents FF Bed S	NO (-21.9%)	NO
Residents FF Bed S	N/A	N/A
Residents FF Bed S	NO (-56.2%)	NO
Residents FF Bed S	NO (-39.7%)	NO
Residents FF Bed S	NO (-66.8%)	NO
Residents FF Bed S	NO (-38.6%)	NO
Residents GF Bed S	NO (-21%)	NO
Residents GF Bed S	NO (-18.9%)	NO
Residents GF Bed S	NO (-66.9%)	NO
Residents GF Bed S	NO (-40%)	NO
Residents GF Bed S	NO (-56.1%)	NO
Residents GF Bed S	YES (+130.9%)	NO
Residents GF Bed S	NO (-67%)	NO
Residents FF Bed S	YES (+75.5%)	NO
Residents FF Bed S	YES (+130.9%)	NO
Residents FF Bed S	NO (-18.6%)	NO
Residents FF Bed S	NO (-21.5%)	NO
Residents FF Bed S	N/A	N/A

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?
Picasso GF Office	YES (+76%)	NO
Picasso GF Office	YES (+83%)	NO
Picasso GF Dining Room	YES (+134.1%)	NO
Picasso GF Reception Kiosk	N/A	N/A
Picasso GF Reception	N/A	N/A
Picasso FF Bed S	NO (-56.7%)	NO
Picasso FF Bed S	NO (-33.1%)	NO
Picasso FF Bed D	YES (+2.9%)	NO
Picasso FF Bed S	YES (+1.5%)	NO
Picasso FF Bed D	NO (-53.1%)	NO
Picasso FF Bed S	NO (-37.9%)	NO
Picasso FF Bed S	NO (-34.4%)	NO
Picasso FF Bed S	NO (-75.1%)	NO
Picasso FF Bed S	NO (-36.7%)	NO
Picasso FF Bed D	NO (-56.9%)	NO
Picasso FF Bed D	NO (-61.9%)	NO
Picasso FF Bed D	NO (-57%)	NO
Picasso FF Bed D	NO (-68.6%)	NO
Picasso FF Bed S	NO (-43.3%)	NO
Picasso FF Bed S	NO (-44%)	NO
Picasso FF Bed S	NO (-40.2%)	NO
Picasso FF Bed S	NO (-43.1%)	NO
Picasso FF Bed S	NO (-28.6%)	NO
Picasso FF Bed D	NO (-52.6%)	NO
Picasso FF Bed D	NO (-77.3%)	NO
Picasso FF Bed S	NO (-44.7%)	NO
Picasso FF Bed S	NO (-40.9%)	NO
Picasso FF Bed S	NO (-44.2%)	NO
Picasso FF Bed S	NO (-44%)	NO
Bungalow Bed D	NO (-48.5%)	NO
Bungalow Bed D	NO (-20%)	NO
Bungalow Bed D	NO (-15.8%)	NO
Bungalow Bed D	NO (-71.3%)	NO
Residents GF Bed S	NO (-21.4%)	NO
Residents GF Bed S	NO (-19.3%)	NO
Residents GF Bed S	NO (-66.8%)	NO
Residents GF Bed S	NO (-39.7%)	NO
Residents GF Bed S	NO (-56.3%)	NO
Residents GF Bed S	YES (+75.3%)	NO
Residents GF Bed S	NO (-66.9%)	NO
Residents FF Bed S	YES (+131.2%)	NO
Residents FF Bed S	YES (+75.3%)	NO
Residents FF Bed S	NO (-19%)	NO
Residents FF Bed S	NO (-21.9%)	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	4602.3	4602.3
External area [m^2]	12881	12881
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	25	3
Average conductance [W/K]	5271.77	3840.83
Average U-value [W/m^2K]	0.41	0.3
Alpha value* [%]	17.89	18.55

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

Building Use

% Area	Building Type
	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
100	**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	122.83	44.85
Cooling	0	0
Auxiliary	0	0.31
Lighting	8.6	6.54
Hot water	19.66	13.7
Equipment*	16.44	16.44
TOTAL**	**151.08**	**65.4**

* 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	1.04
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*1.04*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	434.68	281.39
Primary energy [kWh_{PE}/m^2]	227.94	92.7
Total emissions [kg/m^2]	24.22	10.42

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] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	353.7	80.9	122.8	0	0	0.8	0	1	0
	Notional	216.3	65.1	44.8	0	0	1.34	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

Notional - Bungalow

As designed

Date: Tue Nov 18 09:55:47 2025

Administrative information

Building Details

Address: Minstead Gardens, Roehampton Gate, London, SW15 4EE

Certifier details

Name: Oliver Butler

Telephone number: 07984796826

Address: 30 Tweedy Road, London, BR1 3FE

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.29

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

Foundation area [m^2]: 143.25

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

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	9.18	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	37.81	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	90.99	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	388.92	
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	0.55	0.55	BN000001_W1
Floors	0.18	0.25	0.25	BN000001_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.18	0.18	BN000001_C
Windows** and roof windows	1.6	1.46	1.46	BN000001_W1_O0
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.4	1.4	BN000003_W1_O6
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = 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	25

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	<0.9

1- Panel heaters

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	1	-	-	-	-
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					NO

2- Notional System

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	2	5	-	2.6	-
Standard value	2.5*	5	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

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

1- SYST0001-DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	Hot water provided by HVAC system	-
Standard value	N/A	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	**General luminaire**	**Display light source**	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Bungalow Living	100	-	-
Bungalow Bed D	100	-	-
Bungalow WC	100	-	-
Bungalow Bed D	100	-	-
Bungalow Entrance	100	-	-
Bungalow Living	100	-	-
Bungalow Bed D	100	-	-
Bungalow EnSuite	100	-	-
Bungalow Entrance	100	-	-
Bungalow EnSuite	100	-	-
Bungalow Bed D	100	-	-

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?**
Bungalow Bed D	NO (-48.2%)	NO
Bungalow Bed D	NO (-19.6%)	NO
Bungalow Bed D	NO (-15.3%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Bungalow Bed D	NO (-71.1%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	143.3	143.3
External area [m^2]	426.6	426.6
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	25	3
Average conductance [W/K]	177.57	139.83
Average U-value [W/m^2K]	0.42	0.33
Alpha value* [%]	29.67	25.24

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

Building Use

% Area	Building Type
	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
100	**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	232.12	65.85
Cooling	0	0
Auxiliary	0	6.21
Lighting	6.72	7.2
Hot water	10.16	13.33
Equipment*	15.39	15.39
TOTAL**	**248.99**	**92.59**

* 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	33.37
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*33.37*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	731.16	392.04
Primary energy [kWh_{PE}/m^2]	388.92	90.99
Total emissions [kg/m^2]	37.81	9.18

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] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	401.2	72.8	139.3	0	0	0.8	0	1	0
	Notional	317.7	74.4	65.9	0	0	1.34	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

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	143.3	143.3
External area [m^2]	426.6	426.6
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	10	3
Average conductance [W/K]	120.71	139.83
Average U-value [W/m^2K]	0.28	0.33
Alpha value* [%]	43.65	25.24

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

Building Use

% Area	Building Type
	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
100	**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	139.3	65.85
Cooling	0	0
Auxiliary	0	6.21
Lighting	6.72	7.2
Hot water	24.18	40.75
Equipment*	15.39	15.39
TOTAL**	**170.2**	**120.01**

* 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	33.37
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*33.37*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	473.95	392.04
Primary energy [kWh_{PE}/m^2]	255.87	118.32
Total emissions [kg/m^2]	27.4	15.69

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

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	<0.9

1- Panel heaters

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	1	-	-	-	-
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					NO

2- Improved System

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.84	-	-	-	-
Standard value	0.93*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.					

1- SYST0002-DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	Hot water provided by HVAC system	-
Standard value	N/A	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	**General luminaire**	**Display light source**	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
Bungalow Living	100	-	-
Bungalow Bed D	100	-	-
Bungalow WC	100	-	-
Bungalow Bed D	100	-	-
Bungalow Entrance	100	-	-
Bungalow Living	100	-	-
Bungalow Bed D	100	-	-
Bungalow EnSuite	100	-	-
Bungalow Entrance	100	-	-
Bungalow EnSuite	100	-	-
Bungalow Bed D	100	-	-

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?**
Bungalow Bed D	NO (-48.2%)	NO
Bungalow Bed D	NO (-19.6%)	NO
Bungalow Bed D	NO (-15.3%)	NO
Bungalow Bed D	NO (-71.1%)	NO

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Improved - Bungalow

As designed

Date: Mon Nov 17 11:58:36 2025

Administrative information

Building Details

Address: Minstead Gardens, Roehampton Gate, London, SW15 4EE

Certifier details

Name: Oliver Butler

Telephone number: 07984796826

Address: 30 Tweedy Road, London, BR1 3FE

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.29

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

Foundation area [m^2]: 143.25

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

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	15.69	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	27.4	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	118.32	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	255.87	
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	0.18	0.18	BN000001_W1
Floors	0.18	0.15	0.15	BN000001_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.15	0.15	BN000001_C
Windows** and roof windows	1.6	1.4	1.4	BN000001_W1_O0
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.4	1.4	BN000003_W1_O6
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = 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	10

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] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	668.5	62.7	232.1	0	0	0.8	0	1	0
	Notional	317.7	74.4	65.9	0	0	1.34	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 B – Indicative PV Array

Appendix C – BREEAM Pre-Assessment

Hea02.4	Post-Construction IAQ Measurement	Owner / FM / Occupier		1	0	1		Volatile organic compound (VOC) emission levels (post construction) 1. The formaldehyde concentration level is measured post construction (but pre-occupancy) and is found to be less than or equal to 100µg/averaged over 30 minutes. 2. The total volatile organic compound (TVOC) concentration level is measured post construction (but pre-occupancy) and found to be less than 300µg/over 8 hours, in line with the Building Regulation requirements. 3. Where VOC and formaldehyde levels are found to exceed the limits defined stated above (1 and 2), the project team confirms the measures that have, or will be taken, in accordance with the IAQ plan, to reduce the levels to within these limits, including re-measurement. The IAQ Plan should outline what remedial measures are appropriate depending on the severity and type of the non-compliannce with prescribed limits. Such measures may include re-testing as a matter of 'best practice'. 4. The testing and measurement of the above pollutants are in accordance with the following standards where relevant: - BS ISO 16000-4: 2011 Diffusive sampling of formaldehyde in air - BS ISO 16000-6: 2011 VOCs in air by active sampling - BS EN ISO 16017-2: 2003 VOCs - Indoor, ambient and workplace air by diffusive sampling - BS ISO 16000-3: 20117 Formaldehyde and other carbonyls in air by active sampling 5. The measured concentration levels of formaldehyde (µg/m3) and TVOC (µg/m3) are reported, via the BREEAM Assessment Scoring and Reporting Tool.
Hea02.5	Adaptability for Natural Ventilation			1	1			1. The ventilation strategy is designed to be flexible and adaptable to potential building occupant needs and climatic scenarios. This can be demonstrated as follows: a. Occupied spaces of the building are designed to be capable of providing fresh air entirely via a natural ventilation strategy. The following are methods deemed to satisfy this criterion dependent upon the complexity of the proposed system: - Room depths are designed in accordance with CIBSE AM10 (section 2.4) to ensure effectiveness of any natural ventilation system. The openable window area in each occupied space is equivalent to 5% of the gross internal floor area of that room/floor plate; OR - The design demonstrates that the natural ventilation strategy provides adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates, through ventilation design tool types that meet the requirements of CIBSE AM108. b. For fit-out projects (Part 3 assessments), local services are designed to provide fresh air via a natural ventilation strategy and are appropriately designed according to the room depth in accordance with CIBSE AM10. 2. Ventilation strategy provides at least two levels of user-control on the supply of fresh air to the occupied space. Apply only to office areas and not to operational areas
Hea04.1	Thermal Modelling	M&E	3	1	1			1. In accordance with CIBSE AM11 Building Energy and Performance Modelling and meet industry standards in thermal comfort levels. 2. The software used at the detailed design stage provides full dynamic thermal analysis. 3. The modelling demonstrates that: a. For air conditioned buildings, summer and winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5; or other appropriate industry standard. b. For naturally ventilated/free running buildings: - Winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5; or other appropriate industry standard. - The building is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology outlined in CIBSE TM52: The limits of thermal comfort: avoiding overheating in European buildings. 4. Where undertaking a Part 4 assessment a competent person (e.g. chartered building services engineer) must assess the suitability of existing building services and controls to identify any changes that may be required as a result of fit-out works. 5. For air conditioned buildings, the PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.
Hea04.2	Adaptability for Climate Change	M&E		1	1			Pre-req. Hea04.1 Adaptability - for a projected climate change scenario 1. Criteria 1 to 4 of Thermal modleling are achieved. 2. Thermal modelling demonstrates that the relevant requirements set out in criterion 3 of Thermal modleling are achieved for a projected climate change environment. Dynamic thermal simulation software packages currently provide the facility for building designs to be assessed under external climatic conditions specific to geographic location. Industry standard weather data for the UK is available in the form of Test Reference Years (TRYs) and Design Summer Years (DSYs) provided by CIBSE. 3. Where thermal comfort criteria are not met for the projected climate change environment, the project team demonstrates how the building has been adapted, or designed to be easily adapted in the future using passive design solutions in order to subsequently meet the requirements under criterion 2 above. 4. For air conditioned buildings, the PMV and PPD indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.
Hea04.3	Thermal Zoning and Controls	M&E		1	1			Pre-req. Hea04.1 Thermal zoning and controls 1. Criteria 1 to 4 of Thermal modleling are achieved. 2. The thermal modelling analysis has informed the temperature control strategy for the building and its users. 3. The strategy for proposed heating/cooling system(s) demonstrates it has addressed: a. Zones within the building and how the building services could efficiently and appropriately heat or cool these areas. b. Any new local cooling or heating services (or changes to existing services) are designed to ensure they do not conflict with core services c. The degree of occupant control required for these zones, based on discussions with the end user (or alternatively building type or use specific design guidance, case studies or feedback. d. How the proposed systems will interact with each other (where there is more than one system) and how this may affect the thermal comfort of the building occupants. e.The need or otherwise for an accessible building user actuated manual override for any automatic systems.

Hea05	Acoustic Performance	Acoustic consultant		3		3		Acoustic performance - The building meets the appropriate acoustic performance standards and testing requirements defined in the checklists and tables section which defines criteria for the acoustic principles of: a. Sound insulation b. Indoor ambient noise level c. Reverberation times. Where undertaking a partial refurbishment or fit-out, the performance standards and testing requirements: a. Part 1: criteria for sound insulation and indoor ambient noise levels b. Part 2: criteria for indoor ambient noise levels only c. Part 3: criteria for sound insulation and indoor ambient noise levels d. Part 4: sound insulation and reverberation control 1 point - The sound insulation between acoustically sensitive rooms and other occupied areas complies with the performance criteria given in Section 7 of BS 8233:2014 (A programme of pre-completion acoustic testing is carried out by a compliant test body and comply with the BREEAM testing and measures procedures) 2 points - Achieve indoor ambient noise levels that comply with the design ranges given in Section 7 of BS 8233:2014 (carried out by a compliant test body compling with the BREEAM testing and measures procedures) 3 points - Achieve the requirements relating to sound absorption, reverberation times and speech transmission index, where applicable, set out in Section 7 of BS 8233:2014. (A programme of acoustic measurements is carried out by a compliant test body compling with the BREEAM testing and measures procedures)
Hea06	Safety & Security	Security consultant	2	1	0	1		In BREEAM RFO, Hea 06 is about ensuring the building's safety and security are considered in design. The main compliance route is to appoint a Suitably Qualified Security Specialist (SQSS) to carry out a security needs assessment and make recommendations, which are then incorporated into the design.
Energy				**25**	**17**	**6**	**2**	
Section Score				19.00%	**12.92%**	4.56%	1.52%	
Ene01	Reduction of Energy Use and Carbon Emissions (option 1)	M&E		15	8	5	2	Whole building energy model (option 1) - Calculate the Energy Performance Ratio for Non Domestic Refurbishment (EPRNDR) and compare with the benchmarks in BREEAM table 27
Ene02.1	Sub-metering of Major Energy Consuming Systems	M&E		1	1			Minimum Standard Requirement Sub-metering of major energy consuming systems 1. Energy metering systems are installed that enable at least 90% of the estimated annual energy consumption of each fuel to be assigned to the various end-use categories of energy consuming systems. Demonstrate that the respective end use(s) is expected to account for less than 10% of the annual energy consumption for the fuel type. Where a given end use(s) will clearly account for less than 10% of the total annual energy consumption for the fuel type in question, a simple hand calculation or use of benchmark data to demonstrate this is acceptable. 2. The energy consuming systems in buildings with a total useful floor area greater than 1,000m2 are metered using an appropriate energy monitoring and management system. 3. The systems in smaller buildings are metered either with an energy monitoring and management system or with separate accessible energy sub-meters with pulsed or other open protocol communication outputs, to enable future connection to an energy monitoring and management system. Examples include automatic meter reading systems (AMR) and building energy management systems (BEMS) 4. The end energy consuming uses are identifiable to the building users, for example through labelling or data outputs For a development consisting of one or more larger units (i.e. greater than 200m2), sufficient sub-metering to allow for monitoring of the relevant function areas or departments within the unit must be specified, in addition to metering of the unit as a whole. Areas to submeter: (Office areas (metering by floor plate)/Catering)
Ene02.2	Sub-metering of High Energy Load and Tenancy Areas	M&E		1	0	1		Sub-metering of high energy load and tenancy areas - An accessible energy monitoring and management system or separate accessible energy sub-meters with pulsed or other open protocol communication outputs to enable future connection to an energy monitoring and management system are provided, covering a significant majority of the energy supply to tenanted areas or, in the case of single occupancy buildings, relevant function areas within the building/unit.
Ene03	External Lighting	M&E / Lighting consultant		1	1			1. The building has been designed to operate without the need for external lighting (which includes on the building, signs and at entrances). OR alternatively, where the building does have external lighting: 2. The average initial luminous efficacy of the external light fittings (The individual luminous fluxes of all luminaires within the construction zone are summed (in lumens), then divided by the total circuit Watts for all the luminaires) within the construction zone is not less than 60 luminaire lumens per circuit Watt. 3. All external light fittings are automatically controlled to prevent operation during daylight hours and have presence detection in areas of intermittent pedestrian traffic.
Ene04.1	Passive Design Analysis	M&E	2	1	1			Passive design analysis carried out to optimise energy reduction measures
Ene04.2	Free cooling	M&E		1	1			Pre-req.Ene04.1
Ene04.3	Low Zero Carbon Technology	M&E / LZC specialist	**2**	1	1			LZC analysis carried out to identify appropriate LZC technology for the site
Ene08	Energy efficient equipment	Owner		2	2			1. Identify the building's unregulated energy consuming loads and estimate their contribution to the total annual unregulated energy consumption of the building, assuming a typical/standard specification. 2. Identify the systems and/or processes that use a significant proportion of the total annual unregulated energy consumption of the development and its operation. 3. Demonstrate a meaningful reduction in the total annual unregulated energy consumption of the building. See Table 32

Hea01.3	View Out	Architect		2	2			The window/opening must be ≥ 20% of the surrounding wall area. Where the room depth is greater than 7m, compliance is only possible where the percentage of window/opening is the same as, or greater than, the values in Table 1.0 of BS 8206. 2.The window/opening must be ≥ 20% of the surrounding wall area 2 points - 95% of the floor area in each relevant building area is within 7m of a wall which has a window or permanent opening that provides an adequate view out. 1 point - 80% of the floor area in each relevant building area is within 7m of a wall which has a window or permanent opening that provides an adequate view out. Adequate view out (view of a landscape or buildings (rather than just the sky) at seated eye level (1.2 – 1.3m) within the relevant building areas and should ideally be through an external window. A view into an internal courtyard or atrium will comply provided the distance from the opening to the back wall of the courtyard/atrium is at least 10m (therefore allowing enough distance for the eyes to refocus). The view cannot be an internal view across the room)
Hea01.4	Internal and External Lighting Levels, Zoning and Control	M&E		1	1			Internal Lighting 1. All internal fluorescent and compact fluorescent lamps are fitted with high frequency ballasts. 2. Internal lighting in all relevant areas of the building is designed to provide an illuminance (lux) level appropriate to the tasks undertaken, accounting for building user concentration and comfort levels. This can be demonstrated through a lighting design strategy that provides illuminance levels in accordance with the SLL Code for Lighting 2012 and any other relevant industry standard. 3. For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 7 a. Limits to the luminance of the luminaires to avoid screen reflections. (Manufacturers' data for the luminaires should be sought to confirm this.) b. For uplighting, the recommendations refer to the luminance of the lit ceiling rather than the luminaire; a design team calculation is usually required to demonstrate this. c. Recommendations for direct lighting, ceiling illuminance, and average wall illuminance. External lighting All external lighting located within the refurbishment or fit-out zone is designed to provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. To demonstrate this, external lighting provided is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas3 and BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places. Zoning and control 1. Internal lighting is zoned to allow for occupant control for the bellow areas present in the building: a. In office areas, zones of no more than four workplaces b. Workstations adjacent to windows/atria and other building areas separately zoned and controlled c. Seminar and lecture rooms: zoned for presentation and audience areas d. Library spaces: separate zoning of stacks, reading and counter areas e. Teaching space or demonstration area f. Whiteboard or display screen g. Auditoria: zoning of seating areas, circulation space and lectern area h. Dining, restaurant, café areas: separate zoning of servery and seating/dining areas i. Retail: separate zoning of display and counter areas j. Bar areas: separate zoning of bar and seating areas k. Wards or bedded areas: zoned lighting control for individual bed spaces and control for staff over groups of bed spaces l Treatment areas, dayrooms, waiting areas: zoning of seating and activity areas and circulation space with controls accessible to staff.
Hea02.1	Indoor Air Quality	M&E / Principal contractor / FM		1	1			Implemented to lead to design, specification and installation decisions and actions that minimise indoor air pollution during the design, construction and occupation of the building. It must consider: a. Removal of contaminant sources b. Dilution and control of contaminant sources c. Procedures for pre-occupancy flush out d. Protection of Heating Ventilation and Air Conditioning (HVAC) systems from sources of pollution during refurbishment/fit-out works e.g. dust e. Procedures for protecting the indoor air quality of areas outside of the refurbishment or fit-out zone that may be affected by the refurbishment/fit-out works f. Procedures for identifying and implementing third party testing and analysis required to ascertain that the contaminant sources have been removed effectively before occupancy g. Commitments for maintaining indoor air quality in-use, e.g. maintenance and cleaning of the HVAC system, ductwork and filters.
Hea02.2	Ventilation	M&E		1	1			Ventilation 1. Provide fresh air as per relvant standards 2. Design ventilation pathways to minimise the build-up of air pollutants in the building, as follows: a. In air conditioned and mixed mode buildings/spaces: - The building's air intakes and exhausts are over 10m apart and intakes are over 20m from sources of external pollution; OR - The location of the building's air intakes and exhausts, in relation to each other and external sources of pollution, is designed in accordance with CEN/TR 16798-4:20171 Sections 8.8.1 to 8.8.4. b. In naturally ventilated buildings/spaces: openable windows/ventilators are over 10m from sources of external pollution. 4. Where present, HVAC systems must incorporate suitable filtration to minimise external air pollution, as defined in EN 16798-3:20172 Section B4.2. 5. Areas of the building subject to large and unpredictable or variable occupancy patterns have carbon dioxide (CO_2) or air quality sensors specified and: a. In mechanical ventilated buildings/spaces: sensor(s) are linked to the mechanical ventilation system and provide demand-controlled ventilation to the space. b. In naturally ventilated buildings/spaces: sensors either have the ability to alert the building owner or manager when CO_2 levels exceed the recommended set point, or are linked to controls with the ability to adjust the quantity of fresh air, i.e. automatic opening windows/roof vents.
Hea02.3	Emissions from Construction Products	Architect / Principla contractor		1	1			1. All decorative paints and varnishes specified meet the criteria in Table 20 VOC criteria by product type. 2. At least five of the seven remaining product categories (listed in table 20) meet the testing requirements and emission levels criteria for volatile organic compound (VOC) emissions. This applies only to office areas and not to operational areas

Man04.4	Handover	Principal contractor		1	1			1. Developing/update Building User Guide (BUG), prior to handover for distribution to the building occupiers and premises manager, with a draft copy developed to ensure the guide is most appropriate and useful to potential users. 2. A training schedule is prepared for building occupiers/premises managers, timed appropriately around handover and proposed occupation plans, which includes the following content as a minimum: a. The design intent of refurbishment/fit-out works b. The available aftercare provision and aftercare team main contact(s), including any scheduled seasonal commissioning and post occupancy evaluation c. Introduction to, and demonstration of, installed systems and key features, particularly building management systems, controls and their interfaces, to ensure they are fully conversant with the detailed operation of the building d. Introduction to the BUG and other relevant building documentation, e.g. design data, technical guides, maintenance strategy, operations and maintenance (O&M) manual, commissioning records, log book etc. e. Maintenance requirements, including any maintenance contracts and regimes in place.
Man05.1	Aftercare Support	Owner / FM / Occupier		1	1			1. Operational infrastructure and resources in place to provide aftercare support to the building occupier(s), which includes as a minimum: a. A meeting programmed to occur between the aftercare team/individual and the building occupier/management (prior to initial occupation, or as soon as possible thereafter) to: - Introduce the aftercare team or individual to the aftercare support available, including the Building User Guide (where existing) and training schedule/content. - Present key information about features of the refurbished building including the design intent and how to use the building to ensure it operates as efficiently and effectively as possible (including the use of local services and controls and central services, as applicable). b. On-site facilities management training, to include a walkabout of the refurbished area of the building and introduction to, and familiarisation with the building systems, their controls and how to operate them in accordance with the design intent and operational demands. c. Initial aftercare support provision for at least the first month of building occupation d. Longer term aftercare support provision for occupants for at least the first 12 months from occupation, e.g. a helpline, nominated individual or other appropriate system to support building users/management. 2. Operational infrastructure and resources for the collection and monitoring of energy and water consumption for a minimum of 12 months (for Part 4, where local metering is available and accessible), once the building is occupied. Discrepancies between actual and predicted performance should be identified, with a commitment to identify actions required to address any discrepancies such as adjusting systems and/or to develop/review operational policies to influence user behaviours accordingly.
Man05.2	Seasonal Commissioning	Owner / FM / Occupier		1	1			1. The folowing will be completed over a minimum 12-month period, once the building becomes substantially occupied (except solar photovoltaics): a. Complex systems - Specialist Commissioning Manager: - Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling/ventilation equipment in mid-summer, and under part load conditions (spring/autumn). - Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy. - Interviews with building occupants (where they are affected by the complex services) to identify problems or concerns regarding the effectiveness of the systems. - Re-commissioning of systems (following any work needed to serve revised loads), and incorporating any revisions in operating procedures into the operations and maintenance (O&M) manuals. b. Simple systems (naturally ventilated) - external consultant/aftercare team/facilities manager: - Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback. - Take all reasonable steps to re-commission systems following the review to take account of deficiencies identified and incorporate any relevant revisions in operating procedures into the O&M manuals.
Man05.3	Post Occupancy Evaluation (POE)	Owner / FM / Occupier		1	1	0		The client/building occupier makes commitment to carry out a post occupancy evaluation (POE) one year after initial building occupation, carried out by an independent party and needs to cover: a. A review of the design intent and construction process (review of design, procurement, construction and handover processes). b. Feedback from building users including facilities management on the design and environmental conditions of the building covering: - Internal environmental conditions (light, noise, temperature, air quality) - Control, operation and maintenance - Facilities and amenities - Access and layout - Other relevant issues. c. Sustainability performance (energy/water consumption, performance of any sustainable features or technologies, e.g. materials, renewable energy, rainwater harvesting etc.). The client/building occupier makes a commitment to carry out the appropriate dissemination of information on the building's post occupancy performance.
Health & Wellbeing				**19**	**11**	**8**	**0**	
Section Score				15.00%	**8.68%**	6.32%	0.00%	
Hea01.1	Control of Glare	Architect / M&E		1	1			1. Designed out the potential for disabling glare of all relevant building areas using a glare control strategy, either through building form and layout and/or building design measures. Compliant shading measures for meeting glare control criteria include: - Building integrated measures (e.g. low eaves) - Occupant controlled devices such as blinds (where transmittance value is < 0.1 (10%) for visible light). Blackout blinds can be used as all relevant criteria are met. - Bioclimatic design - External shading or brise soleil. - Glare control must provide shading from both high level summer and low level winter sun. Where using fixed systems, design studies can be used to demonstrate that sunlight is prevented from reaching building occupants during occupied hours. 2. The glare control strategy avoids increasing lighting energy consumption by ensuring that: a. The glare control system is designed to maximise daylight levels under all conditions while avoiding disabling glare in the workplace or other sensitive areas. The system should not inhibit daylight from entering the space under cloudy conditions, or when sunlight is not on the façade: AND b. The use or location of shading does not conflict with the operation of lighting control systems.
Hea01.2	Daylighting	Architect / M&E		3	0	3		Requires Daylight Analysis to be undertaken, credits scored on amount of daylight received by habitable spaces.

Man 03.2	Sustainability Champion (Construction)	Owner / Principal contractor	5 & 6	1	1			**Sustainability Champion (construction)** 1. Appointed to monitor the project and ensure ongoing compliance with the relevant sustainability performance/process criteria, and therefore BREEAM target(s), during the Construction, Handover and Close Out stages (RIBA Stages 5 and 6). They will report on progress at relevant project team meetings including identifying potential areas of non-compliance and any action needed to mitigate. Ideally be site based or will visit regularl. Visits should occur at key stages of the construction process (when works can be observed before they are covered up or new works or trades start; where significant risks of conflicts or errors could occur; where timing is critical to demonstrating compliance; where key evidence is required to be produced at specific times including, but not limited to photographic, delivery notes and other documentary evidence; and where different trades and systems come together and one could harm the integrity or compliance of another system's performance against BREEAM requirements). 2. The defined BREEAM performance target forms a requirement of the principal contractor's contract. If the BREEAM performance targets set at the end of the Concept design have not been achieved at the post construction stage, the credits awarded for appointing the Sustainability champion must be withheld. 3. To achieve this credit at the final post construction stage of assessment, the BREEAM performance target for the project must be demonstrably achieved by the project. This is demonstrated via the BREEAM assessor's final post construction stage assessment report.
Man03.3	Considerate Construction Management	Principal contractor		2	2			The principal contractor has used a 'compliant' organisational, local or national considerate construction scheme and their performance against the scheme has been confirmed by independent assessment and verification. 1 point - achieves 'compliance' with the criteria of the scheme: a CCS score between 25 and 34 2 points - significantly exceeds 'compliance' with the criteria of the scheme: a CCS score between 35 and 39
Man03.4	Monitoring of Refurbishment or Fit-out-site Impacts	Principal contractor		2	2			1. Individual appointed for monitoring and reporting transport data, energy and water use resulting from all on-site refurbishment or fit-out processes throughout the refurbishment or fit-out programme. The Sustainability Champion could perform this role. 1 point - utility consumption (energy and water) Energy - in kWh/Litters, from the construction plant use, equipment (mobile and fixed) and site accommodation. Report the total carbon dioxide emissions (total kgCO2/project value) from the construction process via the BREEAM Assessment Scoring and Reporting tool. Water - principal constructor's and subcontractors' potable water consumption (m3) from the use of construction plant, equipment (mobile and fixed) and site accommodation. 1 point - Transport of construction materials and waste - Transport movements/impacts from delivery of the majority of refurbishment/fit-out materials to site and refurbishment, fit-out and demolition or strip-out waste from site. As a minimum it must cover: a. Transport of materials from where it is manufacture and pre-assembly finishes and the material is in its final product form to the building site, including any transport, intermediate storage and distribution. b. Monitoring must cover as a minimum: (Where Part 1 is being assessed, materials used in major building elements, including insulation materials/Where Part 2 is being assessed, materials used for core services/Where undertaking a comprehensive refurbishment including fit-out with a combination of Parts 1 - 4, materials used for major building elements, services and interior fit-out/Where within scope, ground works and landscaping materials/Where undertaking a Parts 3 & 4 only assessment, materials used in the fit-out are included). c. Transport of construction waste from the construction gate to waste disposal processing or recovery centre gate. This must cover the construction waste groups outlined in the project's waste management plan. - Using the collated data, report separately for materials and waste, the total fuel consumption (litres) and/or total carbon dioxide emissions (kgCO2 eq), plus total distance travelled (km) via the BREEAM Assessment Scoring and Reporting tool.
Man04.1	Commissioning - Testing Schedule and Responsibilities	Principal contractor		1	1			1. Schedule to identifiy commissioning required that includes a suitable timescale for commissioning and re-commissioning of works carried out. Commissioning should be carried out where changes are being made to the following: a. Building services b. Building services control systems (including Building Management Systems) c. Changes to the building fabric that will affect thermal performance. 2. Schedule to identify standards that all commissioning activities will be conducted in accordance with, such as current Building Regulations, BSRIA1and CIBSE2guidelines. Where BMS is specified, the following commissioning procedures must be carried out: - Commissioning of air and water systems is carried out when all control devices are installed, wired and functional - In addition to air and water flow results, commissioning results include physical measurements of room temperatures, off-coil temperatures and other key parameters as appropriate - The BMS/controls installation should be running in auto with satisfactory internal conditions prior to handover - All BMS schematics and graphics (if BMS is present) are fully installed and functional to user interface before handover - The occupier or facilities team is fully trained in the operation of the system. 3. Appointed project team member to arrange pre-commissioning, commissioning, testing and, re-commissioning on behalf of the client. 4. The principal contractor accounts for the commissioning and testing programme, responsibilities and criteria within their budget and main programme of works, allowing for the required time to complete all commissioning and testing activities prior to handover.
Man04.2	Commissioning - Building Services	Principal contractor	1-4 and 5&6	1	1			1. The commissioning and testing schedule and responsibilities credit is achieved. For projects where work is being undertaken to upgrade, renovate or install new building services and systems, a project team member needs to be appointed to undertake the work. 2. For complex building systems, it must be carried out by a specialist commissioning manager, appointed during the design stage, responsible for: - Undertaking design reviews and giving advice on suitability for ease of commissioning - Providing commissioning management input to construction programming and during installation stages - Management of commissioning, performance testing and handover/post handover stages. For simple building services, it can be carried out by a project team member (must not be involved in the general installation works for the building services system(s))
Man04.3	Testing and Inspecting Building Fabric	Principal contractor		1	0		1	1. Where the building fabric is being upgraded, the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths is quality assured through completion of a thermographic survey as well as airtightness testing and visual inspection during the refurbishment. The survey/testing is undertaken by a Qualified Professional, with visual inspection conducted by a representative of the main contractor or by an independent inspector such as a clerk of works. 2. Any defects identified in the inspection/survey/reports are rectified prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building/element.

PROJECT: **Mount Clare House**

ASSESSMENT: **BREEAM RFO 2014**

SCHEME: **Major Refurb: Multi-Residential**

Targeted Rating: **Excellent**

Current Score **74.33%**

REVISION: **1**

DATE: **18-Nov-25**

BREEAM Issue		Reponsible Team	Compliance by End of RIBA Stage	Available Credits	Targeted Credits	Potential Credits	Not Targeted	Compliance Requirements
Management				**21**	**17**	**0**	**4**	
Section Score				12.00%	**9.71%**	0.00%	2.29%	
Man 01.1	Stakeholder Consultation (Project Delivery)	Owner / Design Team	2	1	1			A clear sustainability brief is developed prior to Concept Designwhich sets out: a. Client requirements e.g. internal environmental conditionsrequired b. Sustainability objectives and targetsincluding target BREEAMrating, business objectives etc. c. Timescales and budget d. List of consultees and professional appointmentsthat may be required e.g. Suitably Qualified Acoustician etc. e. Constraintsfor the project e.g. technical, legal, physical, environmental.
Man01.2	Stakeholder Consultation (Third Party)	Owner / Design Team/Principal Contractor	2 & 4	1	1			Prior to completion of the Concept Design stage, all relevant third party stakeholders have been consulted by the design team and this coversthe minimum consultation content (see compliance note CN3). The project must demonstrate howthe stakeholder contributions and outcomes of the consultation exercise have influenced or changed the Initial Project Brief and Concept Design. Prior to completion of the detailed design (RIBA Stage 4, TechnicalDesign or equivalent), consultation feedbackhas been given to, and received by, all relevant parties
Man01.3	Sustainability Champion (Design)	Owner / Principal Contractor	1, 2, 3 & 4	1	1			A Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance targetsfor the project. The design stage Sustainability Champion is appointed to perform thisrole during the feasibility stage (Stage 1, Preparation and Brief stage, as defined by the RIBA Plan of Work2013 or equivalent). The defined BREEAMperformance target(s) has been formally agreed (see Relevant definitions) between the client and design/project team no later than the Concept Design stage (RIBA Stage 2 or equivalent). To achieve this credit at the interim design stage assessment, the agreed BREEAMperformance target(s) must be demonstrably achieved by the project design. This must be demonstrated via the BREEAMassessor's design stage assessment report.
Man01.4	Sustainability Champion (Monitoring Progress)	Owner / Principal Contractor	1, 2, 3 & 4	1	1			The Sustainability Champion criteria 9, 10 and 11 have been achieved. A Sustainability Champion is appointed to monitor progress against the agreed BREEAMperformance target(s) throughout the design process and formally report progressto the client and design team.
Man02.1	Elemental Life Cycle Cost (LCC)	Cost Consultant / Principal contractor	2	2	0		2	1. A competent person carries out an asset LCC plan at Process Stage 2 (equivalent to Concept Design - RIBA Stage 2) together with any design options appraisals in line with 'Standardised method of life cycle costing for construction procurement' PD 156865: 20081. It should include the cost elements applicable to the assessment parts: Construction, Maintenance, Operation, Occupancy and End of Life. 2. Demonstrate how the elemental LCC plan has been used to influence building and systems design and specification to minimise life cycle costs and maximise critical value. The LCC plan: 1. Appraising a range of options based on the building's basic structure, envelope and life expectancy of the refurbished building 20, 30, 50+ years 2. The servicing strategy for the project outlining services component over a 15 -year period, in the form of an 'elemental LCC Plan'. 3. A fit-out strategy is developed outlining fit-out options over a 10-year period.
Man 02.2	Component level LCC option appraisal	Cost Consultant / Principal contractor	4	1			1	Similar to Elemental LCC but for a component level LCC options appraisal by the end of Process Stage 4 (equivalent to Technical Design – RIBA Stage 4) in line with PD 156865: 2008. The component level LCC includes (where present): Envelope, Services, Finishes, External spaces.
Man02.3	Capital Cost Reporting	Owner / Cost Consultant / Principal contractor		1	1			Report the capital cost for the refurbishment/fit-out works in pounds per square metre of gross internal floor area (£k/m²)
Man 03.0	Prerequisite: legally harvested/sourced timber	Principal contractor	N/A	N/A	N/A			**Legal and sustainable timber** Definition: wood-derived products that originate from a forest where the forest owner/manager holds legal use rights to the forest and there is compliance by the forest management organisation and any contractors with local/national legal criteria including those relevant to: Forest management/Environment/Labour and welfare/Health and safety/Other parties' tenure and use rights/All relevant royalties and taxes are paid/There is full compliance with the criteria of CITES. Relevant documentation demonstrating the above must be provided or made available on request. The policy requires all timber and wood-derived products to be from only: Independently verifiable legal and sustainable sources OR Forest Law Enforcement, Governance and Trade (FLEGT) - licensed timber or equivalent sources)
Man03.1	Environmental Management	Principal contractor		1	1			1. All parties who at any stage manage the construction site operate an EMS covering their main operations. The EMS must be either:Third party certified, to ISO 14001/EMAS or equivalent standard; or Have a structure that is in compliance with BS 8555: 2003 and has reached phase four of the implementation stage, 'implementation and operation of the environmental management system', and has completed phase audits 1 to 4. 2. The principal contractor implements best practice pollution prevention policies and procedures on-site in accordance with Pollution Prevention Guidelines, Working at construction and demolition-sites

Ene09	Drying space	Architect		2	2			For self-contained dwellings: an adequate internal or external space with posts and footings, or fixings capable of holding: a. One to two bedrooms: 4m+ of drying line b. Three or more bedrooms: 6m+ of drying line
Transport				**10**	**8**	**0**	**0**	
Section Score				8.00%	6.40%	0.00%	0.00%	
Tra01	Accessibility Index	Transportation consultant		5	2	0		The public transport Accessibility Index (AI) for the assessed building is calculated. 1 point - ≥ 2 transport Accessibility Index score 2 points - ≥ 4 transport Accessibility Index score 3 points - ≥ 8 transport Accessibility Index score
Tra01	Alternative Transport Measures	Transportation consultant			1			Alternative transport measures, see table 35. 1 point - 2 measures required 2 points - 4 measures required 3 points - 6 measures required
Tra02	Proximity to Amenities	Transportation consultant		2	2			Where a building is located within close proximity of, and accessible to, local amenities which are likely to be frequently required and used by building occupants, as outlined below: within 500 meters of 2 food outlets, access to cash, outdoor space, leisure sports/fitness facility
Tra03.1	Cycle Storage	Architect		1	1			
Tra03.2	Cyclist Facilities	Architect		1	1	0		
Tra05	Travel Plan		1 - 4	1	1	0		1. A travel plan has been developed as part of the feasibility and design stages. 2. A site specific travel assessment/statement has been undertaken to ensure the travel plan is structured to meet the needs of the particular site and covers the following (as a minimum): a. Where relevant, existing travel patterns and opinions of existing building or site users towards cycling and walking so that constraints and opportunities can be identified. b. Travel patterns and transport impact of future building users. c. Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children). d. Disabled access (accounting for varying levels of disability and visual impairment). e. Public transport links serving the site. f. Current facilities for cyclists. 3. The travel plan includes a package of measures to encourage the use of sustainable modes of transport and movement of people and goods during the building's operation and use. 4. If the occupier is known, they must be involved in the development of the travel plan and they must confirm that the travel plan will be implemented post refurbishment or fit-out and be supported by the building's management in operation.
Water				**8**	**7**	**1**	**0**	
Section Score				6.00%	**5.25%**	0.75%	0.00%	
Wat01	Water Consumption	Architect / ID / Principal contractor		5	4	1		1 credit is Minimum Standard Requirement 1. An assessment of the efficiency of newly specified domestic water-consuming componentsusing the BREEAM Wat 01 calculator. Credits available for percentage improvement over baseline building water consumption: 1 point for 12.5% 2 points for 25% 3 points for 40% 4 points for 50% 5 points for 55%
Wat02	Water Meters	M&E		1	1			Criterion 1 is Minimum Standard Requirement 1. Specify a water meter on the mains water supply to each building. This includes instances where water is supplied via a borehole or other private source. 2. For water-consuming plant or building areas consuming 10% or more of the building's total water demand: 2.a: Fit easily accessible sub-meters OR 2.b: Install water monitoring equipment integral to the plant or area. 3 For each meter (main and sub): 3.a: Install a pulsed or other open protocol communication output AND 3.b: Connect it to an appropriate utility monitoring and management system, e.g. a building management system (BMS), for the monitoring of water consumption. If there is no BMS system in operation at Post-Construction stage, award credits provided that the system used enables connection when the BMS becomes operational. 4. If the refurbishment zone is within a site that has an existing BMS, managed by the same occupier/owner (as the space undergoing refurbishment or fit-out), the pulsed/digital water meter(s) for the refurbishment or fit-out zone must be connected to the existing BMS. 5. If the refurbishment or fit-out zone is within a building that is leasehold, the pulsed/digital water meter(s) for the refurbishment or fit-out zone must be connected to the incoming water supply for water using equipment in tenanted areas.
Wat03.1	Leak Detection	M&E / Principal contractor		1	1			1. Install a leak detection system which is capable of detecting a major water leak on the mains water supply within the building and between the building and the utilities water meter is installed. The leak detection system must be: a. A permanent automated water leak detection system that alerts the building occupants to the leak OR an inbuilt automated diagnostic procedure for detecting leaks is installed. b. Activated when the flow of water passing through the water meter/data logger is at a flow rate above a pre-set maximum for a pre-set period of time. c. Able to identify different flow and therefore leakage rates, e.g. continuous, high and/or low level, over set time periods. d. Programmable to suit the owner/occupiers' water consumption criteria. e. Where applicable, designed to avoid false alarms caused by normal operation of large water-consuming plant such as chillers

Wat04	Water Efficient Equipment	Landscape Architect / Irrigation Consultant / Principal contractor		1	1			1. Identify all water demands from uses other than those listed under Wat 01 that could be realistically mitigated or reduced. Where there is no water demand from uses other than domestic-scale, sanitary use components in the building, this issue is not applicable. 2 Identify systems or processes to reduce the relevant water demand, and establish, through either good practice design or specification, a demonstrable reduction in the total water demand of the building.
Materials				**13**	**8**	**5**	**0**	
Section Score				12.50%	**7.69%**	4.81%	0.00%	
Mat01	Environmental Impact of Materials	Architect / Structure Engineer / ID / Principal contractor	4 & 5-6	6	3	3		Option 1 Project lifecycle assessment study: 1. The project uses a life cycle assessment (LCA) tool or undertakes a building information model life cycle assessment BIM LCA 2. The LCA covers new materials as relevant to the assessment parts listed in CN7 and indicated in the 'Materials assessment scope' section of the BREEAM Refurbishment and Fit-out Mat 01 calculator (Part B of the tool). 3. The mandatory requirements identified in the 'Materials assessment tool, method and data' section of the BREEAM Refurbishment and Fit-out Mat 01 calculator have been met. 4. A member of the project team completes the BREEAM Refurbishment and Fit-out Mat 01 calculator using parts A and B and determines a score based on the robustness of the LCA tool used (left side of the tool) and the scope of the assessment in terms of the materials specified that have been considered (right side of the tool) 5. Where the design team can demonstrate how the LCA has benefited the building in terms of measuring and reducing its environmental impact. See CN14 6. Where the design team submit the LCA tool output (e.g. Building Information Model (BIM)) for assessing the building to BRE Global Limited (via the project's appointed BREEAM assessor) to inform future potential LCA benchmarking for BREEAM Option 2 Elemental assessment of environmental performance information 1. Robust environmental performance information has been collected for newly specified materials or where materials are retained in situ 2. The total number of points achieved as set out in the Methodology section are calculated using the BREEAM Mat 01 calculator
Mat03.0	Prerequisite	Principal contractor		NA	NA			Criterion 1 is Minimum Standard Requirement 100% of timber and timber-based products used on the project are 'Legal' and 'Sustainable' as per the UK Government's Timber Procurement Policy (TPP) Definition: wood-derived products that originate from a forest where the forest owner/manager holds legal use rights to the forest and there is compliance by the forest management organisation and any contractors with local/national legal criteria including those relevant to: Forest management/Environment/Labour and welfare/Health and safety/Other parties' tenure and use rights/All relevant royalties and taxes are paid/There is full compliance with the criteria of CITES.
Mat03.1	Sustainable Procurement Plan	Principal contractor		1	1			The principal contractor sources materials for the project in accordance with a documented sustainable procurement plan that must cover the minimum: 1. Risks and opportunities are identified against a broad range of social, environmental and economic issues. BS ISO 20400:2017 Sustainable procurement or BS 8903:2010 Principles and framework for procuring sustainably - Specification can be used as a guide to identify these issues. 2. Aims, objectives and targets to guide sustainable procurement activities. 3. The strategic assessment of sustainably sourced materials available locally and nationally. There should be a policy to procure materials locally where possible. 4. Procedures are in place to check and verify that the sustainable procurement plan is being implemented/adhered to on individual projects. These could include setting out measurement criteria, methodology and performance indicators to assess progress and demonstrate success. Responsible sourcing certification scheme point scores
Mat03.2	Responsible Sourcing of Materials	Principal contractor		3	1	2		Responsible sourcing of materials (RSM) 1 point - where at least three of the material types listed in Table 53 'Material categories' has been responsibly sourced from one of the responsible sourcing schemes recognised by BREEAM The bellow points are awarded where the applicable building materials (Table 53) are responsibly sourced in accordance with the BREEAM methodology 3 points - ≥ 54% of available RSM points achieved 2 points - ≥ 36% of available RSM points achieved 1 point - ≥ 18% of available RSM points achieved
Mat04	Insulation	Architect / Principal contractor		1	1			Embodied impact 1. Any new insulation specified for use within the following building elements must be assessed: External walls/Ground floor/Roof/Building services 2. The Insulation Index for the building fabric and services insulation is the same as or greater than 2.5
Mat05	Designing for Durability and Resilience	Architect / Principal contractor		1	1			Protecting vulnerable parts of the building from damage 1. The building incorporates suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements. Must include: a. Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors). b. Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas. c. Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the building façade for all car parking areas and within 2m for all delivery areas. Protecting exposed parts of the building from material degradation 2. Environmental factors have been identified that are relevant to the site location, Environmental/biological agents/Pollutants. 3. Existing applicable building elements that are exposed to any relevant environmental factors have been identified (see Table 59). 4. Existing applicable building elements (see Table 59) have been surveyed have been assessed to identify impacts of material degradation effects including an assessment to grade the severity of any degradation effects. Design and specification measures have been developed to repair and protect existing elements according to the severity of any degradation affects, to limit degradation. Where it is not feasible to implement measures to limit material degradation for existing elements, justification should be provided. 5. Newly specified materials or newly constructed elements (e.g. a new external wall) within the scope of refurbishment or fit-out works incorporate appropriate design and specification measures to limit material degradation due to environmental factors.

Mat06	Materials Efficiency	Architect	1,2,3,4& 5	1	1			1. Opportunities have been identified, and appropriate measuresinvestigated and implemented within the scope of refurbishment or fit-out works, to optimise the use of materialsthrough building design, procurement, refurbishment, maintenance and end of life (see examplesin Table 60 and Table 61 , in the Additional information section) 2. The above is carried out by the design/construction team in consultationwith the relevant parties(see CN3) at each of the following RIBA stages: a. Preparation and Brief b. Concept Design c. Developed Design d. TechnicalDesign e. Construction
Waste				**12**	**8**	**3**	**1**	
Section Score				7.50%	**5.00%**	1.88%	0.63%	
Wst01.1	Pre-Refurbishment Audit	Owner / Principal contractor	**2**	1	0	1		Pre-refurbishment audit Ensure a pre-refurbishment audit of all existing buildings, structures or hard surfaces within the scope of the refurbishment or fit-out zone is completed. The requirements for carrying out an appropriate pre-refurbishment audit are: a. The audit should be carried out at the Concept Design Stage (equivalent to RIBA stage 2) prior to strip-out or demolition works in order to use the audit results to guide the design, consideration of materials that can be reused, and to set targets for waste management and ensure all contractors are engaged in the process of maximising high grade reuse and recycling opportunities. b. The audit should be carried out by a competent person who has appropriate knowledge of buildings, waste and options for the reuse and recycling of different waste streams. c. Actual waste arisings and waste management routes used should be compared with those forecast from the audit and barriers to achieving targets should be investigated. The audit must be referenced in the Resource Management Plan (RMP) and cover: d. Identification and quantification of the key materials where present on the project e. Potential applications and any related issues for the reuse and recycling of the key materials in accordance with the waste hierarchy. f. Identification of local reprocessors or recyclers for recycling of materials g. Identification of overall recycling rate for all key materials h. Identification of reuse targets where appropriate. i. Identification of overall landfill diversion rate for all key materials.
Wst01.2	Reuse and Direct Recycling of Materials	Principal contractor		2	1	1		Reuse and direct recycling of materials 1. Where, from the waste generated by the refurbishment and fit-out works, waste material types are either directly re-used on-site or off-site or are sent back to the manufacturer for closed loop recycling 2. One credit is achieved where 50% of the total available points for the waste material types, that are present on the project have been achieved (using the Wst 01 calculator tool). 3. Two credits are achieved where 75% of the total available points for the waste material types detailed in Table 65 , that are present on the project have been achieved (using the Wst 01 calculator tool). Note: in most instances any materials specified in Table 65 that are sent to a Material Recovery Facility (MRF) for recovery does not qualify for this credit. To achieve any of the refurbishment resource efficiency credits the assessed development, regardless of value or locality, must have a resource management plan compliant with best practice ehich is a combination of commitments to: 1. Design out waste (materials optimisation) 2. Reduce waste generated on-site 3. Develop and implement procedures to sort and reuse/recycle construction and demolition waste on and off-site (as applicable) 4. Follow guidance from: - DEFRA (Department of Environment, Food and Rural Affairs) - BRE (Building Research Establishment Ltd) - WRAP (Waste and Resources Action Programme) - Welsh Government.
Wst01.3	Resource Efficiency	Principal contractor / Design team		3	2	1		Resource efficiency 1. Develop and implement a compliant Resource Management Plan covering the waste arisings from the refurbishment or fit-out project with the aim of minimising waste , recording and reporting accurate data on waste arisings, excluding strip-out works waste. 2. The non-hazardous waste relating to on-site refurbishment or fit-out, and dedicated off-site manufacture or fabrication processes generated by the building's design and construction meets, or exceeds, the resource efficiency benchmarks set out below: 1 point ≤ 11.3 m3 or ≤ 3.53 tonnes of waste per 100m² (gross internal floor area) 2 points ≤ 4.5 m3 or ≤ 1.2 tonnes of waste per 100m² (gross internal floor area) 3 points ≤ 2.1 m3 or ≤ 0.4 tonnes of waste per 100m² (gross internal floor area)
Wst01.4	Diversion from Landfill	Principal contractor		1	1			Diversion of resources from landfill Refurbishment: 85% by volume or 90% by weight Demolition: 90% by volume or 95% by weight
Wst02	Recycled Aggregates	Design team / Principal contractor		1	0		1	Project Sustainable Aggregate Points 1. The percentage of high grade aggregate that is recycled or secondary aggregate, must meet the following minimum % levels as specified below: - Structural frame, including floor slabs - min 15% - Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads - min 30% - Building foundations - min 20% - Concrete road surfaces - 15% - Pipe bedding - min 100% - Granular fill and capping - min 100% 2. The total amount of recycled or secondary aggregate specified, and meeting criterion 1, is greater than 25% (by weight or volume) of the total high grade aggregate specified for the project. Where the minimum level in criterion 1 is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified. 3. The recycled or secondary aggregates are EITHER: a. Construction, demolition and excavation waste obtained on-site or off-site; OR b. Secondary aggregates obtained from a non-construction post-consumer industrial by product source

Wst03	Operational Waste	Waste consultant		1	1			Operational waste 1. Provide a dedicated space for the segregation and storage of operational recyclable waste generated that must be: a. Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams b. Accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors c. appropriate capacity to the building type, size and predicted volumes of waste that will arise from daily/weekly operational activities and occupancy rates. 2. For consistent and large amounts of operational waste generated, provide: 2.a: Static waste compactors or balers; situated in a service area or dedicated waste management space 2.b: Vessels for composting suitable organic waste OR adequate spaces for storing segregated food waste and compostable organic material for collection and delivery to an alternative composting facility 2.c: A water outlet provided adjacent to or within the facility for cleaning and hygiene purposes where organic waste is to be stored or composted on site.
Wst04	Speculative finishes			1	1			For tenanted areas(where the future occupant is not known), prior to full fit-out works, newinterior finishes(including carpets, other floor finishes, ceiling finishes and any other interior finishes) have been installed in a showarea only. In a building being refurbished or fitted out for a specific occupant, that occupant hasselected (or agreed to)the specified interior finishes.
Wst05	Adaptation to Climate Change	Design team	2	1	1			
Wst06	Functional Adaptability	Design team	2	1	1			A building-specific functional adaptation strategy study has been undertaken by the client and design team by Concept Design (RIBA Stage 2 or equivalent), which includesrecommendationsfor measuresto be incorporated to facilitate future adaptation. Functional adaptation measures(see examplesin Table 69) have been adopted in the design by TechnicalDesign stage (RIBA Stage 4 or equivalent) in accordance with the functional adaptation strategy recommendations, where practical and cost effective. Omissions have been justified inwriting to the assessor.
Land & Ecology				**3**	**3**	**0**	**0**	
Section Score				10.00%	**10.00%**	0.00%	0.00%	
LE04	Enhancing Site Ecology	Ecologist / Landscape architect		1	1			Ecologist's report and recommendations 1. Appointed qualified ecologist (SQE) by the client or their project representative by the end of the Preparation and Brief stage (RIBA Stage 1) to advise on enhancing the ecology of the site at an early stage. 2. The SQE has provided an Ecology Report with appropriate recommendations for the enhancement of the site's ecology at Concept Design stage (RIBA Stage 2). The report is based on a site visit/survey by the SQE . 3. The early stage advice and recommendations of the Ecology Report for the enhancement of site ecology have been, or will be, implemented in the refurbishment or fit-out.
LE05	Long-term Impact on Biodiversity	Ecologist		2	2			1. Where a Suitably Qualified Ecologist (SQE) is appointed prior to commencement of activities on-site and they onfirm that all relevant UK and EU legislation relating to the protection and enhancement of ecology has been complied with during the refurbishment or fit-out process. 2. Where a landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion in accordance with BS 42020:20131 Section 11.1. This is to be handed over to the building owner/occupants for use by the grounds maintenance staff. 3. Where additional measures set by the SQE to improve the assessed site's long term biodiversity are adopted. 1 point - 2 applicable aditional measures adopted 2 points - 4 applicable aditional measures adopted
Pollution				**12**	**8**	**1**	**0**	
Section Score				10.00%	**6.67%**	0.83%	0.00%	
Pol01.1	Impact of Refrigerants	M&E / Principal contractor		2	2			Pre-requisite: All systems with electric compressors comply with the requirements of BS EN 378:20161 (parts 2 and 3). Refrigeration systems containing ammonia comply with the Institute of Refrigeration Ammonia Refrigeration Systems code of practice Impact of refrigerant 2 points if: - the direct effect life cycle CO_2 equivalent emissions (DELC) of ≤100 CO_2-eq/kW. For systems which provide cooling and heating, the worst performing output based on the lower of kW cooling output and kW heating output is used to complete the calculation OR - All refrigerants used have a global warming potential (GWP) ≤10 1 point if systems using refrigerants have a DELC of ≤1000kgCO_2-eq/kW cooling and heating capacity
Pol01.2	Leak Detection	M&E / Principal contractor		1	1			Leak detection 1. Systems using refrigerants have a permanent automated refrigerant leak detection system installed; OR where an inbuilt automated diagnostic procedure for detecting leakage is installed. In all instances a robust and tested refrigerant leak detection system must be installed and must be capable of continuously monitoring for leaks. 2. The system must be capable of automatically isolating and containing the remaining refrigerant(s) charge in response to a leak detection incident
Pol 02	NOx Emissions			3	0			Not targeted due to electicity as main heating source

Pol03.1	Flood Risk Management	Environemntal consultant / Infra consultant		2	2			Flood risk management Low flood risk - Where flood maps from the appropriate statutory body confirm the refurbishment or fit-out is situated in a flood zone that is defined as having a low annual probability of flooding; OR The project meets the requirements for avoidance of flooding in accordance with Checklist 1 tab. Medium/high flood risk - Where flood maps from the appropriate statutory body (i.e.The Environment Agency in England and Wales, the Rivers Agency in Northern Ireland and the Scottish Environment Protection Agency in Scotland) or the relevant local authority/internal drainage board, confirm the site has a medium or high flood risk and a site specific Flood Risk Assessment (FRA) has been undertaken (as relevant to size of project in accordance with CN7). The FRA must take all current and future sources of flooding into consideration in accordance with compliance note. Where the refurbishment or fit-out zone achieves avoidance from flooding through either: The refurbishment and fit-out zone is located entirely on the first floor or above and a flood emergency plan has been developed in accordance with 'Would your business stay afloat? A Guide to preparing your business for flooding', Environment Agency, 2011 OR As a result of the building's floor level or measures to keep water away, the building is defined as achieving avoidance from flooding by following Checklist 1 tab. Where avoidance is not possible, two credits are achieved where a full flood resilience/resistance strategy is implemented for the building's scope of works in accordance with recommendations made by a Suitably Qualified Building Professional.
Pol03.2	Surface Water Run-Off	Infra consultant		2	1	1		Surface water run-off 1 point - neutral impact on surface water No increase in the impermeable surfaces as a result of the refurbishment works; OR If there is an increase in the impermeable surface as a result of the refurbishment works then the following must be met: Hard standing areas - where there is an extension or increase in the hardstanding areas it must be permeable or be provided with on-site SuDS to allow full infiltration of the additional volume, to achieve the same end result. The permeable hardstanding must include all pavements and public rights of way, car parks, driveways and non-adoptable roads, but exclude footpaths that cross soft landscaped areas which will drain onto a naturally permeable surface. Building extension - where there is an increase in building footprint, extending onto any previously permeable surfaces, the additional run-off caused by the area of the new extension must be managed on-site using an appropriate SuDS technique for rainfall depths up to 5mm. 2 points - reducing run-off An appropriate drainage strategy for the site has been design by a consultant with qualifications and experience relevant to designing SuDS and flood prevention measures and completing peak rate of run-off calculations. Either of the following criteria are met: a. There is a decrease in the impermeable area by 50% or more, from the pre-existing impermeable hard surfaces; OR b. Where run-off as a result of the refurbishment is managed on-site using source control achieving the following requirements: - The peak rate of run-off as a result of the refurbishment for the 1 in 100 year event has been reduced by 50% from the existing site. - The total volume of run-off discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration has been reduced by 50%. - An allowance for climate change must be included for all of the above calculations; this should be made in accordance with current best practice planning guidance.
Pol04	Reduction of Night Time Light Pollution	External lighting consultant		1	1			1 External lighting pollution has been eliminated through effective design that removes the need for external lighting. This does not adversely affect the safety and security of the site and its users. OR 2 The external lighting strategy has been designed in compliance with Table 2 (tab 3 ILP guidance) of the Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 2011 available on the ILP website http://www.theilp.org.uk. - Limits to the average upward light ratio of the luminaires, to restrict sky glow. - Limiting illuminance at the windows of nearby properties for which light trespass might be an issue. - Limiting the intensity of each light source in potentially obtrusive directions beyond the site boundaries. - Limiting the average luminance of the building, if it is floodlit. 3 All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00. 4 If safety or security lighting is provided and will be used between 23:00 and 07:00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP guidance notes. 5 Illuminated advertisements are designed in compliance with ILP PLG05 The Brightness of Illuminated Advertisements.
Pol05	Noise Attenuation	Acoustic consultant		1	1			1. There are no noise-sensitive areas within the assessed building or within 800 m radius of the assessed site. OR 2 A noise impact assessment compliant with BS 4142:20141 is commissioned. Noise levels must be measured or determined for: 2.a: Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed assessed site, including existing plant on a building, where the assessed development is an extension to the building 2.b: Noise rating level from the assessed building. Compliance can be demonstrated through the use of acousticians' calculations or by scale model investigations. For such cases BS 7445-2 states that 'as universally agreed prediction models do not exist, the method adopted should be carefully described in the acoustician's report' and that 'when available, prediction models accepted by relevant authorities should be used'. Where prediction through these methods is not possible, measurement will be necessary using either a noise source similar to that proposed or, alternatively, measurement of the actual noise from the installation (once installed); compliance with the latter approach requires a written commitment to appoint a suitably qualified acoustician to carry out the required measurements post-installation, and a further commitment to attenuate the noise source. 3. The noise impact assessment must be carried out by a suitably qualified acoustic consultant. 4. The noise level from the assessed building, as measured in the locality of the nearest or most exposed noise-sensitive development, must be at least 5dB lower than the background noise throughout the day and night. 5. If the noise sources from the assessed building are greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with the criterion.
Innovation				**10**	**2**	**0**	**0**	
Section Score				10.00%	**2.00%**	0.00%	0.00%	
Inn01	Man03 - Considerate Construction	As per the main credit		1	1	0	0	
Inn03	Mat01 - Environmental Performance	As per the main credit		1	0	0		

Inn05	Mat03 - Responsible Sourcing of Materials	As per the main credit		1			
Inn06	Wst01 - Diversion from Landfill	As per the main credit		1	1		
Total Credits				**133**	**89**	**24**	**7**
Total Score				**110.00%**	**74.33%**	**19.14%**	**4.43%**

Required Score: **70%**
Required Score + Buffer: **74%**
Potential Score: 19.14%
Targeted Credits Score: **74.33%**

- Targeted Credits
- Maybe (potential) Credits
- Achieved Credits
- Minimum Standard for Excellent Rating
- Stage 2 credits that might not be achieved.
- Stage 3 Credits
- Stage 4 Credits

Appendix D – Overheating Results

Approved Document O report
Overheating risk in residential buildings
for

Building details

Project name:	Date: 14-11-2025 16:05:44
Location: London Gatwick, United Kingdom	
Address:	
Building use:	
Are there any security, noise, or pollution issues:	

Designer's details

Designer's name:
Designer's organisation:
Designer's address:

Dynamic thermal model

Software: IESVE version 2025.0.0.0	
Weather file: London_GTW_DSY1_2020High50.epw	
Results file: GWK 00 Ls run 01.aps	
Number of rooms analysed: 20	
TM59: summer elevated air speed: 0.1	
TM59: occupant category: Category II (normal)	
Overheating mitigation strategy:	
Has the building construction proposal been modelled accurately?	YES
Have the analysed rooms passed the assessment for Approved Doc O Dynamic Thermal Modelling Method (CIBSE TM 59)?	YES
Designer's signature:	

Summary

CIBSE TM59 overheating methodology for predominantly naturally ventilated rooms assesses against two criteria, (a) and (b) (for Category I occupancy, Tmax is reduced by 1K):

- Criterion (a) states that for living rooms, kitchens and bedrooms, the number of hours during which ΔT is greater than or equal to 1K from May to September (or November to March for southern hemisphere locations) shall not exceed 3% of occupied hours
- Criterion (b) states that the operative temperature of the bedrooms from 22:00-07:00 shall not exceed 26°C for more than 1% of annual hours (33 hours is therefore recorded as a fail). Approved document O applies limits to CIBSE TM59 section 3.3 (openings); these requirements are applied by appropriate assignment of MacroFlo types / scripted profiles in the model (see Modelled Openings Section).

CIBSE TM59 overheating methodology for predominantly mechanically ventilated rooms states the operative temperature of all rooms shall not exceed 26°C for more than 3% of annual occupied hours.

CIBSE TM59 also states that the inclusion of corridors in the overheating analysis is mandatory where community heating pipework runs through them. While there is no mandatory target for communal corridors, if an operative temperature of 28°C is exceeded for more than 3% of the total annual hours this should be identified as a significant risk.

Room name	Naturally ventilated Criterion a check	Naturally ventilated Criterion b check	Mechanically ventilated check	Corridor overheating risk check
Residents GF Corridor	-	-	-	No
Residents GF Bed S 1	Pass	Pass	-	-
Residents GF Bed S 2	Pass	Pass	-	-
Residents GF Bed S 3	Pass	Pass	-	-
Residents GF Bed S 4	Pass	Pass	-	-
Residents GF Bed S 5	Pass	Pass	-	-
Residents GF Bed S 6	Pass	Pass	-	-
Residents GF Bed S 7	Pass	Pass	-	-
Residents GF Corridor	-	-	-	No
Residents FF Corridor	-	-	-	No
Residents FF Bed S 1	Pass	Pass	-	-
Residents FF Corridor	-	-	-	No
Residents FF Bed S 2	Pass	Pass	-	-
Residents FF Bed S 3	Pass	Pass	-	-
Residents FF Bed S 4	Pass	Pass	-	-
Residents FF Bed S 6	Pass	Pass	-	-
Residents FF Bed S 7	Pass	Pass	-	-
Residents FF Bed S 9	Pass	Pass	-	-
Residents FF Corridor	-	-	-	No
Residents FF Bed S 10	Pass	Pass	-	-

Naturally ventilated rooms – criterion (a)

Criterion (a) states that for living rooms, kitchens and bedrooms, the number of hours during which ΔT is greater than or equal to 1K from May to September (or November to March for southern hemisphere locations) shall not exceed 3% of occupied hours.

Room name	Occupied hours	No. hours ΔT ≥ 1°K	% Occupied hours ΔT ≥ 1°K	Criterion a check
Residents GF Bed S 1	3672	18	0.5	Pass
Residents GF Bed S 2	3672	16	0.4	Pass
Residents GF Bed S 3	3672	20	0.5	Pass
Residents GF Bed S 4	3672	19	0.5	Pass
Residents GF Bed S 5	3672	19	0.5	Pass
Residents GF Bed S 6	3672	25	0.7	Pass
Residents GF Bed S 7	3672	21	0.6	Pass
Residents FF Bed S 1	3672	19	0.5	Pass
Residents FF Bed S 2	3672	23	0.6	Pass
Residents FF Bed S 3	3672	11	0.3	Pass
Residents FF Bed S 4	3672	10	0.3	Pass
Residents FF Bed S 6	3672	10	0.3	Pass
Residents FF Bed S 7	3672	9	0.2	Pass
Residents FF Bed S 9	3672	14	0.4	Pass
Residents FF Bed S 10	3672	13	0.4	Pass

Naturally ventilated rooms – criterion (b)

Criterion (b) states that the operative temperature of the bedrooms from 22:00-07:00 shall not exceed 26°C for more than 1% of annual hours (33 hours is therefore recorded as a fail). Any rooms that are not bedrooms are therefore not assessed, hence the corresponding N/A values.

Room name	No. hours > 26°C 22:00-24:00	No. hours > 26°C 00:00-07:00	Total hours > 26°C	Criterion b check
Residents GF Bed S 1	10	14	24	Pass
Residents GF Bed S 2	10	13	23	Pass
Residents GF Bed S 3	11	15	26	Pass
Residents GF Bed S 4	10	14	24	Pass
Residents GF Bed S 5	11	15	26	Pass
Residents GF Bed S 6	7	15	22	Pass
Residents GF Bed S 7	7	12	19	Pass
Residents FF Bed S 1	5	0	5	Pass
Residents FF Bed S 2	6	0	6	Pass
Residents FF Bed S 3	8	0	8	Pass
Residents FF Bed S 4	8	0	8	Pass
Residents FF Bed S 6	9	0	9	Pass
Residents FF Bed S 7	5	0	5	Pass
Residents FF Bed S 9	9	0	9	Pass
Residents FF Bed S 10	9	0	9	Pass

Mechanically ventilated rooms

CIBSE TM59 overheating methodology for predominantly mech. vent. rooms states the operative temperature of all rooms shall not exceed 26°C for more than 3% of annual occupied hours.

Room name	No. hours > 26°C	% Annual hours > 26°C	Mechanically ventilated check
No mech vent rooms	N/A	N/A	N/A

Communal corridors

CIBSE TM59 states that whilst there is no mandatory target for communal corridors, if an operative temperature of 28°C is exceeded for more than 3% of annual hours, then this should be identified as a significant risk within the TM59 overheating report.

Room name	No. hours > 28°C	% Annual hours > 28°C	Corridor overheating risk check
Residents GF Corridor	4	0.0	No
Residents GF Corridor	41	0.5	No
Residents FF Corridor	0	0.0	No
Residents FF Corridor	25	0.3	No
Residents FF Corridor	26	0.3	No

Modelled details & overheating mitigation strategy

Approved document O: Providing Information & Appendix B requires information about the model and the overheating mitigation strategy. The following tables detail the modelling method and mitigation strategies applied to each analysed room. Where multiple active openings per space (windows & louvres) exist they are all listed. Occupancy, equipment and lighting profiles for occupied rooms comply with TM59 section 5.

Modelled occupancy

Room name	Floor area m²	Thermal template	Occupancy profile	Equipment profile	Lighting profile
Residents GF Corridor	21.65	TM59 - Circulation - Corridors			on continuously
Residents GF Bed S 1	10.72	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents GF Bed S 2	10.47	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents GF Bed S 3	10.37	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents GF Bed S 4	10.58	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents GF Bed S 5	10.36	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents GF Bed S 6	6.93	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents GF Bed S 7	10.43	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents GF Corridor	2.02	TM59 - Circulation - Corridors			on continuously
Residents FF Corridor	13.16	TM59 - Circulation - Corridors			on continuously
Residents FF Bed S 1	7.11	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents FF Corridor	1.39	TM59 - Circulation - Corridors			on continuously
Residents FF Bed S 2	6.93	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents FF Bed S 3	10.42	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents FF Bed S 4	10.75	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents FF Bed S 6	10.3	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents FF Bed S 7	10.64	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents FF Bed S 9	10.35	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h
Residents FF Corridor	2.01	TM59 - Circulation - Corridors			on continuously
Residents FF Bed S 10	10.42	TM59 - Single Bedroom	Single Bedroom Occupancy	Single Bedroom Equipment	18-23h

Modelled openings

Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
Residents GF Corridor	56.92	0.5714	0.99, 0.99, 2.13, 1.68, 1.68, 1.68, 1.68, 1.68	90.0, 90.0, 90.0, 90.0, 90.0, 90.0, 90.0, 90.0	58.99	ADO.AlwaysOff, ADO.Section_26ab, ADO.Section_26a
Residents GF Bed S 1	13.13	0.5714	1.13, 1.68, 1.68	90.0, 90.0, 90.0	37.7	ADO.Section_26ab, ADO.Section_26a
Residents GF Bed S 2	13.49	0.5714	1.13, 1.68, 1.68	90.0, 90.0, 90.0	38.6	ADO.Section_26ab, ADO.Section_26a
Residents GF Bed S 3	7.28	0.5714	1.13, 1.68, 1.68	90.0, 90.0, 90.0	38.97	ADO.Section_26ab, ADO.Section_26a
Residents GF Bed S 4	13.21	0.5714	1.13, 1.68, 1.68	90.0, 90.0, 90.0	38.19	ADO.Section_26ab, ADO.Section_26a
Residents GF Bed S 5	7.29	0.5714	1.13, 1.68, 1.68	90.0, 90.0, 90.0	39.01	ADO.Section_26ab, ADO.Section_26a
Residents GF Bed S 6	38.57	0.5714	0.99, 0.99, 0.99, 1.68	90.0, 90.0, 90.0, 90.0	60.39	ADO.Section_26ab, ADO.Section_26a
Residents GF Bed S 7	13.45	0.5714	1.13, 1.68, 1.68	90.0, 90.0, 90.0	38.74	ADO.Section_26ab, ADO.Section_26a
Residents GF Corridor	N/A		1.68, 1.68, 1.68	90.0, 90.0, 90.0	224.55	ADO.Section_26ab
Residents FF Corridor	N/A		1.68, 1.68, 1.68, 1.68, 1.68, 1.68	90.0, 90.0, 90.0, 90.0, 90.0, 90.0	68.94	ADO.Section_26ab
Residents FF Bed S 1	39.43	0.5714	0.99, 0.99, 0.87, 1.68	90.0, 90.0, 90.0, 90.0	57.34	ADO.Section_26ab, ADO.Section_26a
Residents FF Corridor	N/A		1.68, 1.68, 1.68	90.0, 90.0, 90.0	326.33	ADO.Section_26ab, ADO.Section_26a
Residents FF Bed S 2	38.57	0.5714	0.99, 0.99, 0.99, 1.68	90.0, 90.0, 90.0, 90.0	60.39	ADO.Section_26ab, ADO.Section_26a
Residents FF Bed S 3	13.53	0.5714	1.13, 1.68, 1.68	90.0, 90.0, 90.0	38.78	ADO.Section_26ab
Residents FF Bed S 4	13.06	0.5714	1.13, 1.68, 1.68	90.0, 90.0, 90.0	37.59	ADO.Section_26ab

Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
Residents FF Bed S 6	7.32	0.5714	1.13, 1.68, 1.68	90.0, 90.0, 90.0	39.23	ADO.Section_26ab, ADO.Section_26a
Residents FF Bed S 7	13.21	0.5714	1.13, 1.68, 1.68	90.0, 90.0, 90.0	37.98	ADO.Section_26ab
Residents FF Bed S 9	7.27	0.5714	1.13, 1.68, 1.68	90.0, 90.0, 90.0	39.04	ADO.Section_26ab, ADO.Section_26a
Residents FF Corridor	N/A		1.68, 1.68, 1.68	90.0, 90.0, 90.0	225.67	ADO.Section_26ab, ADO.Section_26a
Residents FF Bed S 10	13.45	0.5714	1.13, 1.68, 1.68	90.0, 90.0, 90.0	38.78	ADO.Section_26ab, ADO.Section_26a

Modelled ventilation

Room name	Infiltration rate ACH	Mech vent flow rate ACH
Residents GF Corridor	0.4	0
Residents GF Bed S 1	0.4	0.0
Residents GF Bed S 2	0.4	0.0
Residents GF Bed S 3	0.4	0.0
Residents GF Bed S 4	0.4	0.0
Residents GF Bed S 5	0.4	0.0
Residents GF Bed S 6	0.4	0.0
Residents GF Bed S 7	0.4	0.0
Residents GF Corridor	0.4	0
Residents FF Corridor	0.4	0
Residents FF Bed S 1	0.4	0.0
Residents FF Corridor	0.4	0
Residents FF Bed S 2	0.4	0.0
Residents FF Bed S 3	0.4	0.0
Residents FF Bed S 4	0.4	0.0
Residents FF Bed S 6	0.4	0.0
Residents FF Bed S 7	0.4	0.0
Residents FF Bed S 9	0.4	0.0
Residents FF Corridor	0.4	0
Residents FF Bed S 10	0.4	0.0

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