

Energy and Sustainability Statement

138-144 Friar Street

For National Pub Portfolio Limited
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1 Executive Summary

This Statement presents the key energy and sustainability measures proposed in support of the planning application for 138-144 Friar Street in Reading. The proposal entails the phased redevelopment of the site involving the demolition of Nos. 138–141 and 142–143 Friar Street, partial demolition of No. 144 Friar Street, and erection of a basement and 6-storey building to provide co-living residential accommodation (purpose-built shared living accommodation – Sui Generis use class), together with the partial retention of the former Bugle Public House as a standalone Class E commercial unit.

The energy and sustainability strategy for the proposal has been developed in accordance with relevant policies set out within the adopted Reading Borough Local Plan (2019) and Reading Sustainable Design and Construction SPD (2019). Relevant policies within the emerging Draft Partial Update to the Local Plan (2025) have also been considered.

1.1 Energy Strategy

The energy strategy for the project has been developed in line with the Energy Hierarchy set out in emerging draft policy CC2. Estimated energy use and CO₂ emissions for the development have been assessed using the Simplified Building Energy Model (SBEM) based on the Part L2 2021 methodology, as well as with predictive energy modelling in line with CIBSE TM54.

Proposed energy measures for the development include:

- **Step 1:** Passive design with a fabric first approach (enhanced u-values notably below current Part L notional specification, low air tightness target, solar control glazing), low energy lighting and installation of Mechanical Ventilation with Heat Recovery (MVHR).
- **Step 2:** There are no existing or proposed district heat networks or sources of secondary heat in proximity to the scheme. A communal heating strategy is proposed.
- **Step 3:** All co-living units will be served by a communal heating system comprising Air Source Heat Pumps (ASHP).

Commercial spaces will have their own ASHP systems. Photovoltaic arrays are maximised at roof level for onsite energy generation, with consideration for plant provision, green roof, as well as maintenance access.

Overall, the proposed development is anticipated to achieve a 24% reduction in regulated CO₂ emissions over the Part L 2021 baseline (see Figure 1). The proposed energy strategy will meet Policy CC2 of the adopted Local Plan (2019).

The emerging draft Policy CC2 stipulates that net-zero development (*defined as “a scenario in which the quantity of anthropogenic greenhouse gas emissions arising from the development’s operational energy use on an annual basis is zero or negative, and where whole-life emissions are reduced through sustainable design measures”*) should be met onsite.

A predictive energy assessment in line with CIBSE TM54 methodology has been carried out as required by the emerging draft Policy CC2. The predicted Energy Use Intensity and Space Heating Demand are anticipated to align with the targets outlined in the draft policy.

The assessments presented in this report demonstrated that it will not be technically feasible to achieve ‘net-zero’ development on site, due to the nature, scale, and density of the proposal. This is typical for town centre multi-storey developments where the building footprint occupies the majority of the site, and where roof space available for implementation of energy generating renewables (e.g. PV) is very limited compared to the internal floor space of the development. Nevertheless, the proposed scheme has sought to limit energy demand where feasible and reasonable, adopted highly efficient building services systems of the latest technology, and maximised energy generation as far as feasible on site (with consideration for other design matters and constraints), which meets the intent of draft Policy CC2.

The Client and Design team understood that both the adopted and emerging Reading Local Plan policies, or the Sustainable Design and Construction SPD do not set out a mechanism for carbon offset via financial contribution for non-residential developments.

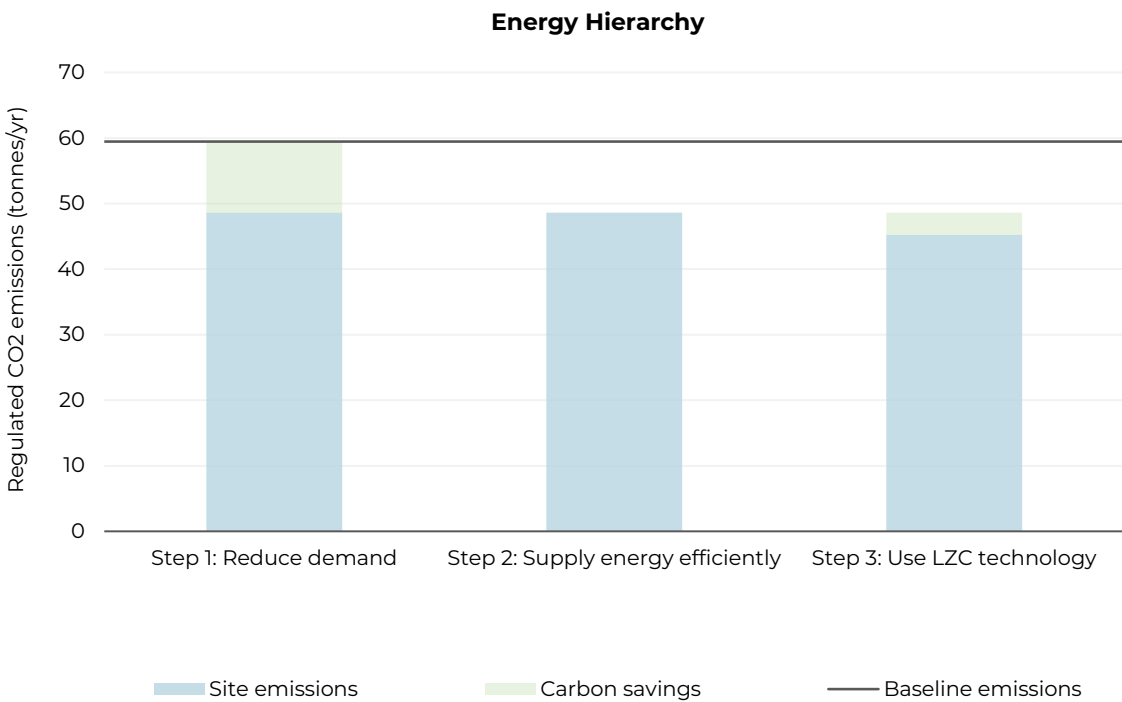


Figure 1. Regulated carbon emissions at each stage of the Energy Hierarchy for the development.

1.2 Sustainability Strategy

The sustainability strategy for the proposal has been developed in accordance with relevant planning policies.

Key considerations include health and wellbeing, climate resilience, water efficiency and surface water runoff, daylight/sunlight, materials and waste, among other aspects detailed within this report.

The proposed scheme aims to achieve BREEAM ‘Excellent’ rating in line with adopted RBC Policy CC2.

1.3 Conclusions

The proposed scheme fully complies with adopted Energy and Sustainability policies set out by RBC, and adheres to emerging draft policies as far as feasible.

2 Introduction

2.1 Site

The site is situated in the heart of Reading Town Centre, adjacent to the key junction of Friar Street and Queen Victoria Street (QVS), approximately a 3-minute walk (circa 250m) from Reading Railway Station.

The site is located adjacent to Queen Victoria Street – Phase 1 (QVS1), which has consent for hotel and leisure use and is currently under refurbishment. These proposals relate to Queen Victoria Street – Phase 2 and are linked to the expansion of the QVS1 application, aiming to further the shared vision of Reading Borough Council and local stakeholders.

A previous application for hotel use on this site was approved (planning ref: PL/22/1235); however, following review the hotel proposal was not considered viable.

The current application is for the phased redevelopment of the site involving the demolition of Nos. 138–141 and 142–143 Friar Street, partial demolition of No. 144 Friar Street, and erection of a basement and 6-storey building to provide co-living residential accommodation (purpose-built shared living accommodation – Sui Generis use class), together with the partial retention of the former Bugle Public House as a standalone Class E commercial unit.

The site location is presented in Figure 2.



Figure 2. Approximate site location of 138-144 Friar Street (source: Google Maps, accessed June 2026).

2.2 Planning policies

A review of the applicable policies for the proposed development has been undertaken. A full summary of the relevant adopted and emerging Reading policies is presented in Appendices A. The proposed development has been designed to meet and exceed (where feasible) the following main policy drivers.

2.2.1 Reading Borough Local Plan (2019)

Energy and carbon:

- Use Energy efficiently. Enable future connection to district heat network.

Sustainability:

- Use water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.
- Target BREEAM Excellent.
- Water efficiency - consider rainwater harvesting and greywater recycling.
- Resilience to climate change.
- Enhance health and wellbeing provision of high quality buildings and associated amenity spaces, limiting exposure to sources of air, light and noise pollution.
- Enhance biodiversity and urban greening.
- Sustainable urban drainage.
- Sustainable transport.

2.2.2 Sustainable Design and Construction SPD (2019)

Energy

- Energy efficiency, energy conservation, inclusion of renewable or low carbon sources.

Sustainability

- Address water conservation, flood risk and drainage strategy, community impacts, transport, material usage, wastage, responsible sourcing and environmental impact, health and Wellbeing, pollution issues, ecological aspects.

- 5% buffer to be included in the BREEAM pre-assessment.

2.2.3 Emerging Reading Borough Local Plan Submission Draft Partial Update (2025)

Reading is working on a partial update to the adopted Local Plan. The proposed updates are currently undergoing public examination. Although the draft partial updates have not been adopted, the principles of the additional energy and sustainability requirements have been considered for the application.

Energy and carbon:

- Achieve net-zero development defined as “a scenario in which the quantity of anthropogenic GHG arising from the development’s operational energy use on an annual basis is zero or negative, and where whole-life emissions are reduced through sustainable design measures”.
- Apply an energy hierarchy set out in CC2.
- Generate at least the same amount of renewable electricity on-site as they demand over the course of the year.
- Carry out predictive energy modelling to account for both total energy use and carbon emissions.
- Achieve a site average space heating demand of 15-20kWh/m².yr and a site average total energy demand of 70kWh/m².yr. No unit shall exceed total energy demand of 90kWh/m².yr.
- Carry out embodied carbon assessment.

Sustainability:

- 95% of all construction waste will be diverted away from landfill.
- Achieve 10% biodiversity net gain.
- Achieve 25% urban greening factor.

The proposed Energy and Sustainability strategies for the proposed development are presented in the following chapters. Table 1 on the next page summarises where relevant policies and guidance set out by Reading Borough Council (RBC) have been responded to within this document.

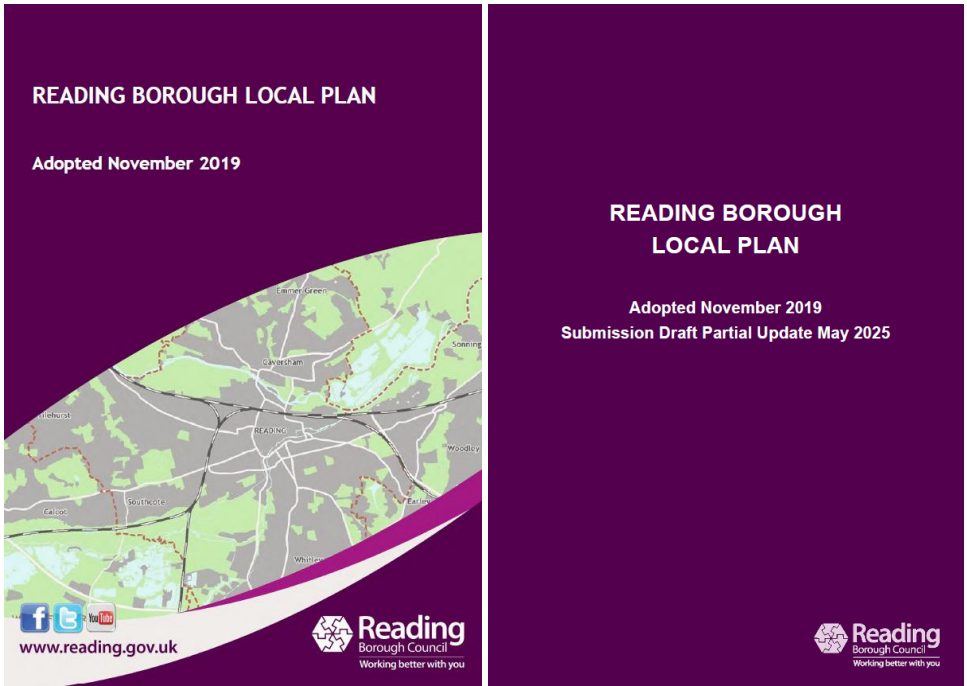


Table 1. Planning policies applicable for the proposed development at 138-144 Friar Street, and the report sections where they are responded to.

	3 Energy Strategy	4.1 Optimising Land Use	4.2 Health and Wellbeing	4.3 Nature, Landscape and Biodiversity	4.4 Climate Resilience	4.5 Water and Surface Water Runoff	4.6 Materials and Waste	4.7 Sustainable Transport	4.8 BREEAM
Reading Borough Local Plan (November 2019)									
CC2: Sustainable Design and Construction	◆					◆	◆		◆
CC3: Adaptation to Climate Change				◆	◆	◆			
CC4 Decentralised Energy	◆								
CC5 Waste Minimisation and Storage							◆		
CC8 Safeguarding Amenity			◆						
EN12: Biodiversity and the Green Network				◆					
EN15: Air Quality			◆						
EN16: Pollution and Water Resources			◆			◆			
EN18: Flooding and Sustainable Drainage Systems						◆			
TR1: Achieving the Transport Strategy								◆	
Reading's Sustainable Design and Construction Supplementary Planning Document (December 2019)									
Energy Statement requirements	◆								
Sustainability Statement requirements		◆	◆	◆	◆	◆	◆	◆	◆
BREEAM requirements									◆
Emerging Reading Borough Local Plan Submission Draft Partial Update (May 2025)									
CC2: Sustainable Design and Construction	◆		◆			◆	◆		◆
CC3: Adaptation to Climate Change	◆			◆	◆	◆			
CC4: Heat Networks	◆								
CC5: Waste Minimisation and Storage							◆		
EN12: Biodiversity				◆					
EN18: Flooding and Sustainable Drainage Systems						◆			
EN19: Urban Greening Factor				◆					
TR5: Car and Cycle Parking and Electric Vehicle Charging								◆	

3 Energy Strategy

The Energy Strategy for the proposed development at 138-144 Friar Street has been developed in line with the following Energy Hierarchy:

- 1. Step 1: minimise and manage operational energy demand.
- 2. Step 2: use local low carbon energy sources (e.g. secondary heat) where possible.
- 3. Step 3: onsite low or zero carbon (LZC) energy sources.
- 4. Step 4: monitor and report energy performance.

3.1 Assessment methodologies

3.1.1 Building Regulations Part L modelling

The CO₂ emissions at each stage of the Hierarchy are compared to a Building Regulations Part L2 2021 (adopted June 2022) compliant baseline. Results are summarised under Section 3.6. Planning stage BRUKL outputs are presented in Appendix C.

It should be noted that the estimations presented within this statement are based on the Part L calculation methodology and the associated standard assumptions regarding occupancy, space/system usage and climatic conditions; and should not be considered as a predictive assessment of the likely in-use energy requirements for the development.

The Part L 2026 was recently published in March 2026. Part L 2026 will take effect on 24 March 2026 for building work no in connection with higher-risk buildings, and on 24 September 2027 for building work that is in connection with higher-risk buildings.

Should the scheme fall under Part L 2026, which will be subject to timescales for a meaningful start on site, the client and design team will ensure the relevant latest Building Regulations are complied with.

3.1.2 TM54 Predictive energy use modelling

In addition to Building Regulations Part L energy/carbon modelling, predictive energy modelling has also been undertaken at planning stage to provide an outline estimation of total energy use on site, in line with requirements set out within Policy CC2 of the emerging Draft Partial Update of the Local Plan. The predictive energy modelling was prepared based on the CIBSE TM54 (2022) methodology. Results are summarised under Section 3.6. A separate TM54 Energy Assessment report is submitted as part of the planning application.

The following sections present the measures adopted at each stage of the Energy Hierarchy at the proposed development.

3.1.3 Assessment scope

The energy assessment focuses on the main co-living proposal for the application site.

The Bugle public house which is proposed to be retained is very minor in scale (circa 116m²) and forms only circa 2% of the total GIA of the scheme. The scope of works to The Bugle is also very limited, comprising the repair of façade and timber details, retile of roof, replacement of rainwater goods. There are very limited opportunities to improve energy performance as part of the restoration work, whilst retaining the original features of the public house.

Where required, Building Regulations Part L requirements for existing buildings will be met as part of the retention and refurbishment works for The Bugle.



3.2 Step 1 – Use less energy

A range of energy efficiency measures has been applied to the design of the building fabric and building services systems to minimise energy demand and CO₂ emissions.

3.2.1 Passive Design

Building orientations have been optimised as far as feasible within the constraints of the site.

The majority of the ground floor communal spaces where space conditioning is likely cooling driven will have limited south and west facing glazing, to limit solar gains and cooling energy use.

Glazed areas to studio rooms have been optimised for daylight access, to enhance wellbeing of residents and to reduce artificial lighting demand.

Over 70% of the studio rooms will be east/west/south facing, which enables some passive solar heating to reduce space heating energy demand from active systems.

Low-e and solar control glazing will be specified, which promotes heat retention within the studio rooms in the cooler months whilst limiting excessive solar gains during the summer. The east/west/south facing glazed elements are generally well protected from a solar exposure perspective from surrounding building massing, reducing the risk of overheating and the need for associated mitigation measures.

Please see Figure 3 for illustrations of these design principles incorporated into the scheme.

3.2.2 Fabric Performance

A fabric first approach has been adopted to minimise unwanted heat loss through the building fabric and reduce heating energy demand over the cooler months. The proposed building fabric specification will go notably beyond the notional building standards set out within Building Regulations Part L 2021 (Table 2).

Further details regarding targeted building fabric specification are presented in Appendix B.

3.2.3 Efficient lighting

All light fittings within the proposed development will be specified as low energy lighting, and will only incorporate LEDs with an average efficacy of more than 130 lm/W.

3.2.4 Heat Recovery Ventilation

Mechanical Ventilation with Heat Recovery (MVHR) is proposed to all habitable or regularly occupied spaces to provide good levels of fresh air supply whilst reducing ventilation heat loss during the cooler months.

The MVHR systems will have integrated boost and summer by-pass modes.

3.2.5 Controls and Energy Monitoring

Suitable controls as per BREEAM requirements will be implemented to enable effective monitoring and reporting of energy use on site. A Building Management System/Energy Management System will be installed at the proposed scheme.

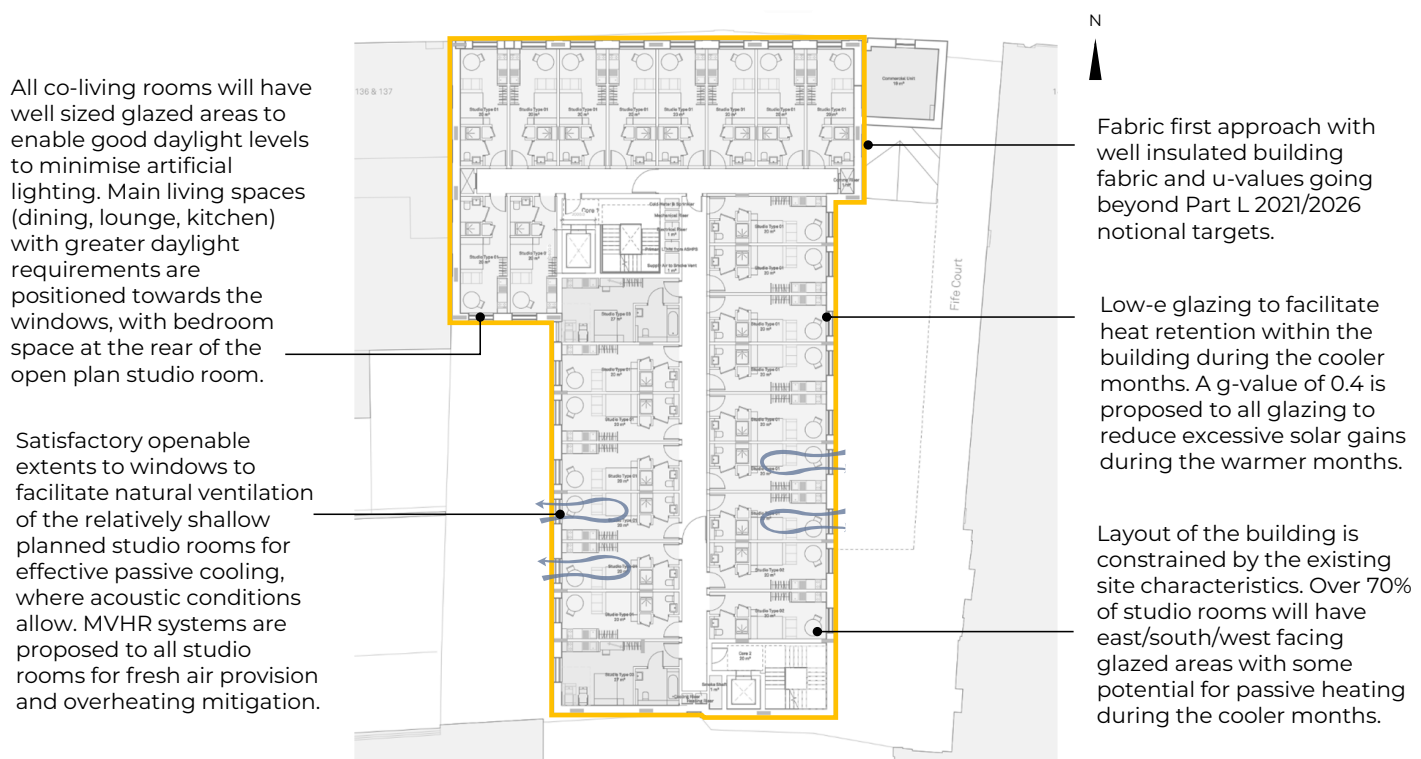


Figure 3. Passive design measures considered for the proposed development at 138-144 Friar Street.

Table 2. Proposed building fabric specifications at 138-144 Friar Street.

Element	Part L 2021/2026 limiting values	Part L 2021/2026 Notional Building values	Proposed specification
External Wall u-value (W/m ² .K)	0.26	0.18	0.15
Roof u-value (W/m ² .K)	0.18	0.15	0.11
Floor u-value (W/m ² .K)	0.18	0.15	0.10
Window u-value (W/m ² .K)	1.6	1.4	1.2
Air permeability	8	3	<3

3.3 Step 2 – Use secondary heat sources

Policy CC3 encourages connection to existing and proposed district energy network. The utilisation of secondary heat (waste heat) should also be prioritised where available.

A review of the Government's Neat Network Planning Database (Figure 4) shows there are a number of existing heat networks in proximity to the application site, but these are understood to be “localised communal” heat networks (e.g. the air source heat pump systems at 35-39 Friar Street (103no. flats and mixed-use scheme) and Market Place (9no. apartments and retail space) rather than “district” heat networks available to multiple sites.

It is also noted that RBC is in the process of planning a District Network for the town. The network is mainly proposed to the north of the rail line, as shown in Figure 5. No district network is currently proposed in proximity to the application site at Friar Street.

The building wide heating system with a centralised heating plant room at basement level is designed to have the capability to connect to a future DHN should one become available in front of the site, subject to detailed considerations of carbon factors, costs, compliance with relevant Building Regulations, and other technical, environmental and practical requirements.

The energy and carbon savings from the building wide heating system with heat pumps are considered under Step 3 of the Energy Hierarchy.

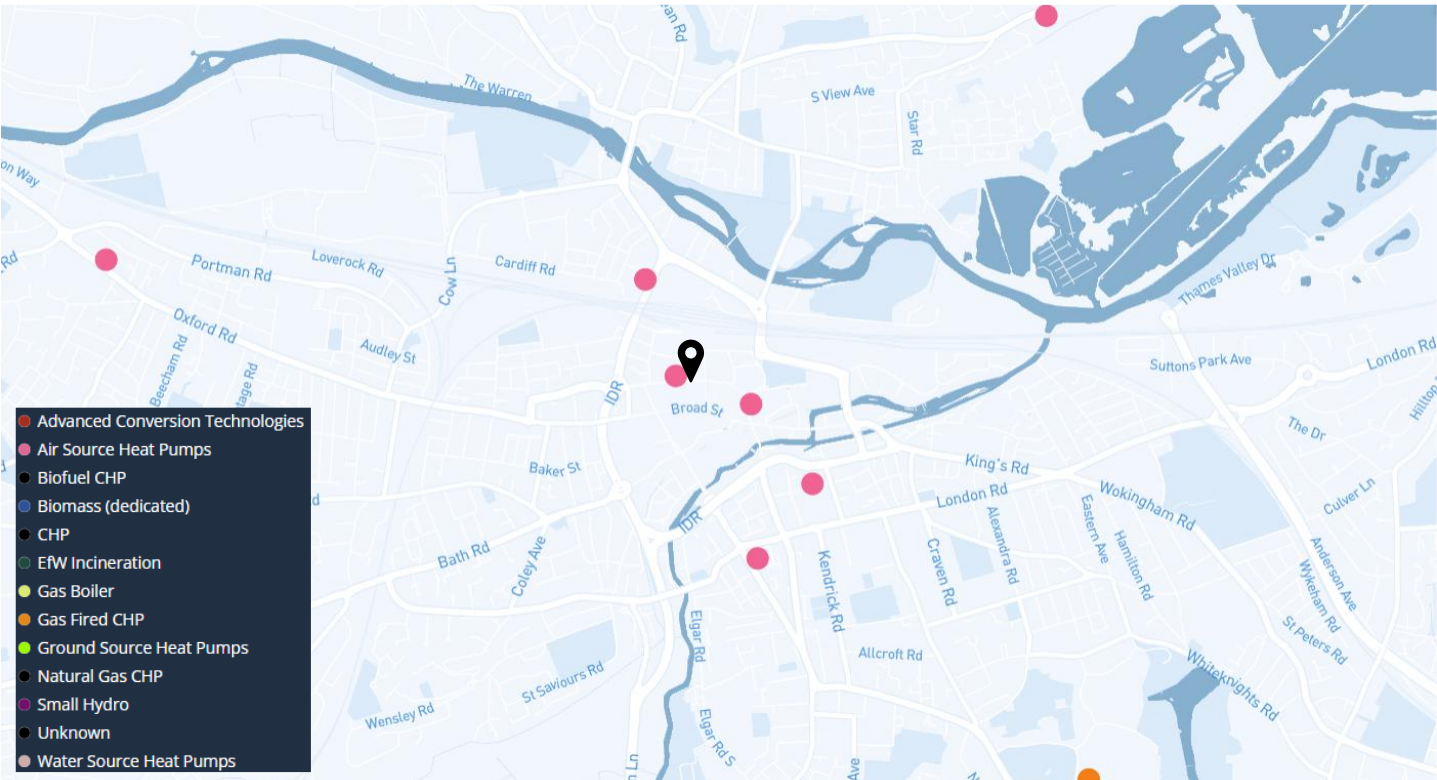


Figure 4. Heat Network Planning Database Map showing existing and planning district heat network heat sources (source: Department for Business, Energy & Industrial Strategy (accessed: June 2026).

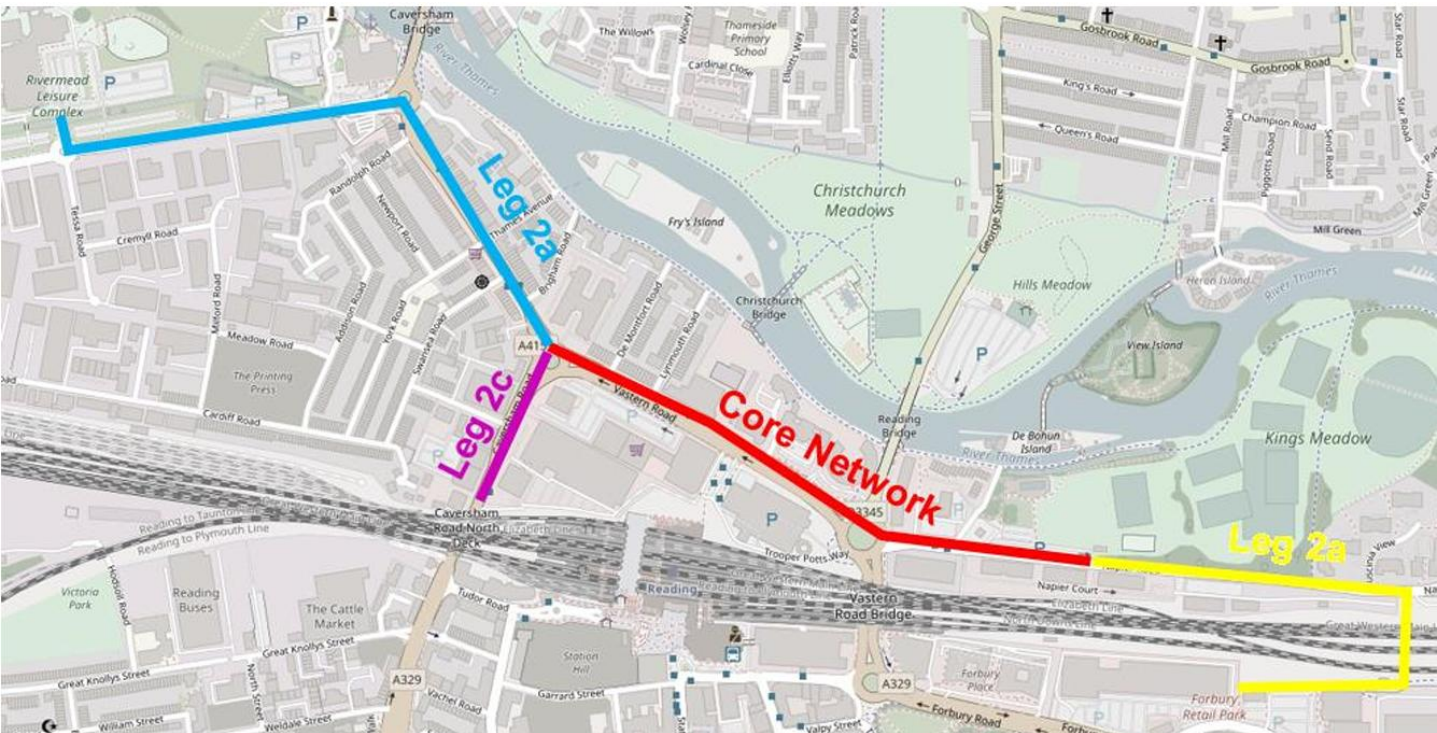


Figure 5. Potential route of Reading District Network, mainly proposed to the north of the rail line (source: Reading Heat Network Work Package 2 – Detailed Techno-economic Feasibility Study, June 2023).

3.4 Step 3 – Onsite LZC technologies

The opportunity for producing and utilising renewable energy onsite will be maximised for the proposed development, in line with Policy CC2.

An outline feasibility study has been undertaken (see Table 3). which identified ASHPs and photovoltaics as the most suitable low/zero carbon technologies for the scheme.

Photovoltaic provision will be maximised on roof space that is not overshadowed and not utilised for building services plant, green roof or access. An indicative PV array of 9.6 kWp is proposed across at roof level as shown in Figure 6. Final design and configuration will be determined with PV specialist input post-planning.

A building wide ASHP system will supply space heating and hot water to all co-living studio rooms. The external units of the ASHPs will be located at roof level, and will be acoustically attenuated where required, subject to detailed design development post planning.

The ground and basement floor communal spaces will be served by separate heat pump.

3.5 Step 4 – Energy use monitoring and reporting

The buildings’ energy performance will be monitored post-construction through the installation of a building management system with appropriate metering in line with BREEAM requirements, which would enable the facilities management team to monitor, manage and reduce their energy usage.

Table 3. Outline LZC feasibility for 138-144 Friar Street.

LZC Technology	Adopted	Feasibility
Photovoltaics	Y	PV provision will be maximised on roof areas not utilised for building services plant, green roof, lift overruns or access. The lower roof is not deemed suitable for PV installation due to overshadowing from surrounding building massing.
Solar thermal	N	A solar thermal hot water system is not compatible with the heat pump strategy without the provision of a separate thermal store. PV is deemed a more effective use of available roof space.
Wind turbines	N	The installation of wind turbines at the proposed building/site will have a notable visual impact on the site and surroundings, and not deemed suitable.
Ground source heat pump (GSHP)	N	The installation of a ground source borehole system requires notable space, time and cost, and is not deemed feasible for a scheme of this scale and nature.
Air Source Heat pumps (ASHP)	Y	Air Source Heat pumps are an effective way of providing low carbon heating and hot water, and will be integrated into the building wide heating system.
Biomass	N	Biomass systems emit high NOx levels and are not supported within urban areas. There is also no suitable space onsite for the storage of biomass.
Battery storage	TBC	Battery storage can be considered for storage of any excess energy generated by the PVs and not immediately used on site. This will be subject to review at detailed design stage post planning, and will depend on fire consultant input.

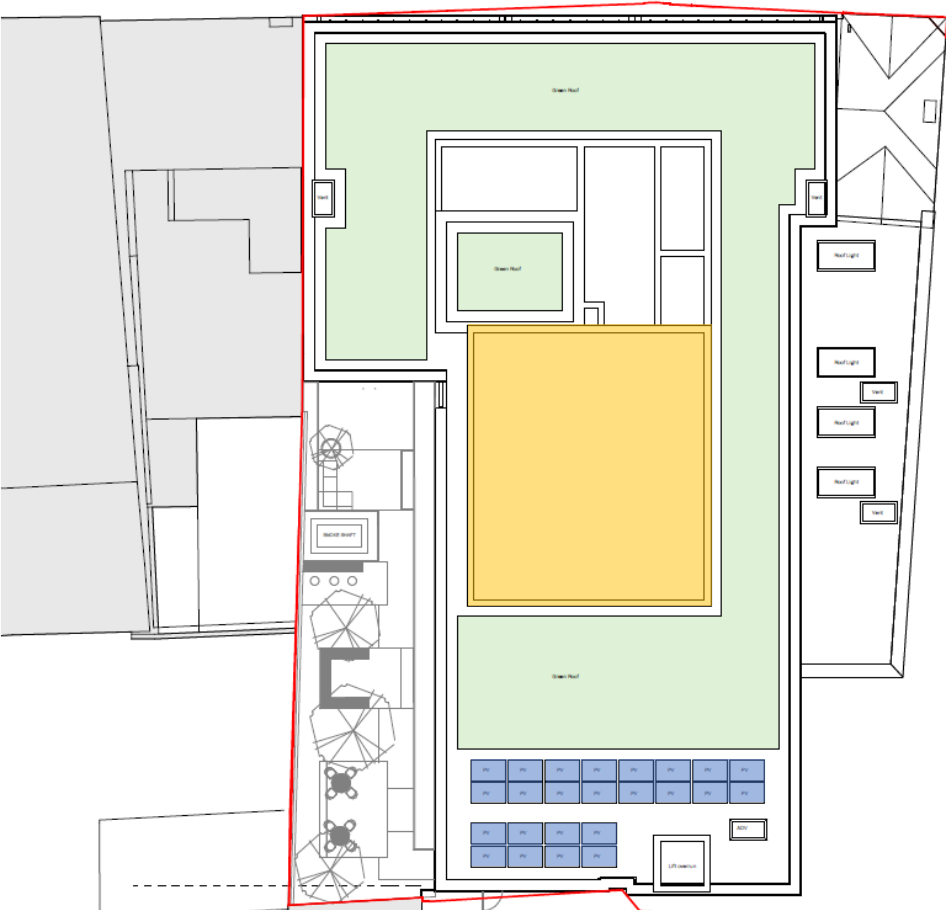


Figure 6. Outline roof plan showing proposed indicative locations of PV array (in blue), ASHP enclosure (in amber) and green/blue roofs in green.

3.6 Results

3.6.1 Building Regulations Part L 2021 Modelling

The proposed development is expected to achieve an 18% reduction in regulated CO₂ at Step 1 of the energy hierarchy and an overall reduction of 24% over the Part L2 2021 baseline (see Table 4, Table 5 and Figure 7).

Should the scheme fall under Part L 2026, which will be subject to timescales for a meaningful start on site, the client and design team will ensure the relevant latest Building Regulations are complied with.

Table 4. Carbon emissions after each stage of the Energy Hierarchy for 138-144 Friar Street.

	Carbon Dioxide Emissions (tCO ₂ /yr)	
	Regulated	Unregulated
Baseline: Part L 2021 Compliant Development	59.5	10.2
After energy demand reduction (Step 1)	48.6	10.2
After heat network connection (Step 2)	48.6	10.2
After renewable energy (Step 3)	45.2	10.2

Table 5. Regulated carbon savings from each stage of the Energy Hierarchy for 138-144 Friar Street.

	Regulated carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Step 1: Savings from energy demand reduction	10.8	18%
Step 2: Savings from heat network or secondary heat source	0.0	0%
Step 3: Savings from renewable energy	3.4	6%
Cumulative on-site savings	14.2	24%

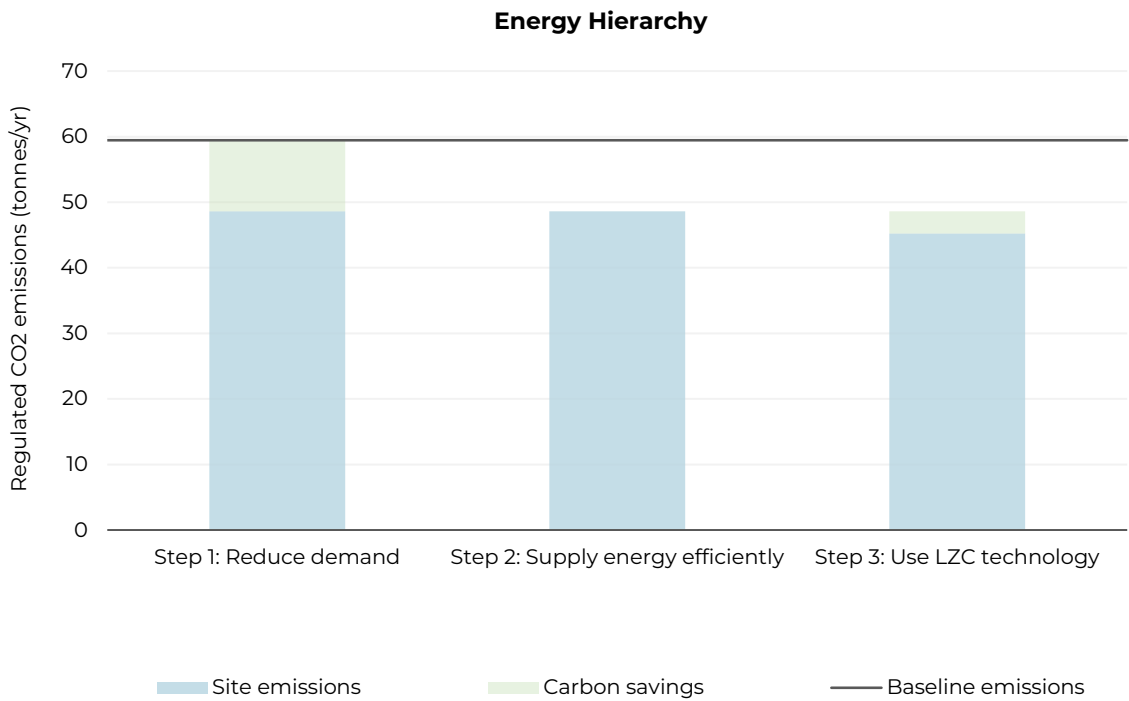


Figure 7. Regulated carbon emissions at each stage of the Energy Hierarchy for the development.

3.6.2 TM54 Predictive energy use modelling

Predictive energy use modelling has been carried out at planning stage for the proposed scheme in line with the CIBSE TM54 (2022) methodology.

CIBSE TM54 Energy Assessments use dynamic thermal simulations and scenario analysis to estimate the predicted energy use of the co-living proposal.

The proposed development's predicted energy use intensity (including regulated and unregulated energy) is anticipated to be in the region of 74-90 kWh/m².year for electricity use for the low and mid-range scenarios that assume good quality construction, efficient fabric and services design, appropriate commissioning and maintenance of building services, as well as reasonable use of the spaces by future occupants.

The space heating demand was estimated to range from 7-12 kWh/m².year for the low and mid-range scenarios. This estimate would rise for the high-end and worst-case scenarios but mostly due to reasons which are outside the developer's control.

For the first year of occupancy, the total operational carbon emissions are estimated to range between 40-110 tCO₂ per annum for the low and mid-range scenarios as shown in Figure 8.

For further details please refer to the TM54 Energy Assessment report accompanying the application.

3.6.3 Energy Use Intensity and Space Heating Demand

Table 6 presents the Energy Use Intensity (EUI) and space heating demand (SHD) of the proposed scheme, based on both Part L modelling and predictive energy modelling.

Part L modelling indicates that the predicted EUI and SHD will be consistent with the benchmarks stipulated in the emerging draft policy CC2.

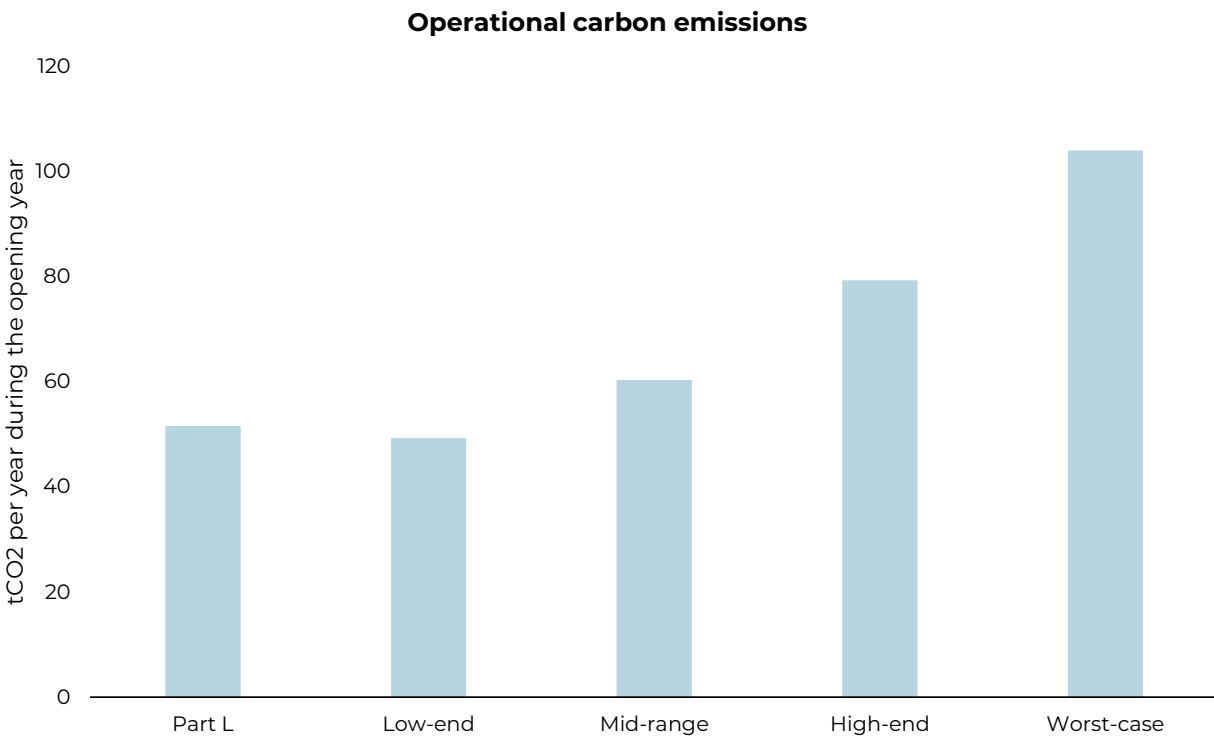


Figure 8. Predicted operational carbon emissions (regulated and unregulated) using different calculation methods.

Table 6. Planning stage estimated Energy Use Intensity and space heating demand for 138-144 Friar Street.

	Energy Use Intensity (kWh/m².yr excluding renewable energy)	Space heating demand (kWh/m².yr)
Part L 2021 modelling	83.4	20.8
TM54 Predictive energy modelling	74-90	7-12
Emerging Policy CC2 target	Average 70, Limit 90	15-20

3.7 Energy Strategy Conclusions

The proposed co-living development at 138-144 Friar Street is anticipated to meet Policy CC2 of the adopted Local Plan (2019), as well as the space heating demand target (15-20 kWh/m².yr) and energy use intensity EUI (70-90 kWh/m².yr) set out within the emerging draft Policy CC2. However, the net zero development criteria of the emerging Policy CC2, ‘where the operational energy use on an annual basis is zero or negative’ cannot be met onsite.

This requirement is considered onerous - even with RBC’s best practice draft energy use intensity (EUI) target of 70-90 kWh/m².yr, for a scheme of 4,865m² GIA, a compliant level of energy consumption is estimated to be:

$$80 \text{ kWh/m}^2\text{.yr} \times 4,865 \text{ m}^2 \text{ GIA}$$
$$= \text{circa } 400 \text{ MWh/yr (400,000 kWh/yr).}$$

As a rule of thumb, PVs roughly generate circa 900 kWh/kWp.yr of energy, therefore the amount needed to match the energy consumption for the draft policy's EUI target would be roughly:

$$(400,000 \text{ kWh/year}) / (900 \text{ kWh/kWp})$$
$$= \text{circa } 445 \text{ kWp.}$$

Circa 445 kWp of PV would equate to 1,112no. 400W PV panels, requiring >2,000m² of panel area. If spacing between panels is considered, a total roof area of circa 3,000m² would need to be available. The project has a roof area of circa 730m² inclusive of overruns, building services plant and access routes. The 'net zero development criteria may be possible to be met by low rise residential schemes designed to Passivhaus standard with 35 kWh/m².yr of EUI, but not likely by multi-storey non-residential development within a dense urban context.

The assessment presented has demonstrated that it will not be technically feasible to achieve ‘net-zero’ development on site, due to the nature, scale, and density of the proposal. This is typical for town centre multi-storey developments where the building footprint occupies the majority of the site, and where space available for implementation of energy generating renewables is very limited compared to the extent of the internal floor space of the development.

Nevertheless, the proposed scheme has sought to limit energy demand as far as feasible and reasonable, adopted highly efficient building services systems of the latest technology, and maximised energy generation as far as feasible on site, which meets the intent of the emerging draft Policy CC2. A summary of how measures have been maximised is as follows:

- The proposed u-values are notable improvements over the notional building specification. Improving the u-values further would result in diminishing returns, as significant increases in insulation thicknesses and wall build-ups would be required without notable further energy and carbon savings.
- Glazing ratios have been optimised to reduce heat losses and solar gains, whilst enabling good potential for daylighting and natural ventilation.
- Measures have been adopted to reduce overheating risks.
- High specification glazing systems with a target U-value of 1.2 W/m²K are proposed.
- The proposed development includes heat recovery ventilation (with low specific fan power and high heat recovery efficiency) to work in conjunction with low air-tightness beyond notional building specifications to minimise associated ventilation heat losses, whilst providing fresh air supply.
- High specification LED lighting and associated controls are proposed to reduce artificial lighting energy use.
- High efficiency air source heat pump systems will supply 100% of space heating and hot water.
- Photovoltaic provision is maximised at roof level with consideration for other design matters and constraints.

Further improvements to the proposed measures are not deemed realistic at this stage but can be investigated in further detail during technical design post planning.

The Client and Design team understood that both the adopted and emerging Reading Local Plan policies, or the Sustainable Design and Construction SPD do not set out a mechanism for carbon offset via financial contribution for non-residential developments.

4 Sustainability Strategy

This section of the report presents the key elements of the development which responds to the sustainable development policies set out within the Reading's Local Plan and Sustainable Design and Construction SPD.

4.1 Optimising Land Use

The site is occupied by commercial, business and services activities (Sui Generis & Class E).

To allow for the comprehensive redevelopment of the site and integration with the QVS Phase 1 proposal, the existing buildings on the site will be demolished, with the exception of The Bugle pub facade and internal fabric.

The surrounding area is undergoing ongoing densification, with a number of existing and emerging higher rise buildings in close proximity to the application site.

The design and size of the proposed development have been carefully considered to harmonise with the site's surroundings whilst maximising density, to facilitate the delivery of residential rooms via the co-living scheme. The existing Bugle Public House will be partially retained and will be standalone as a commercial unit to the co-living development.

In addition to the provision of co-living units, the development will bring about other benefits such as revitalising the outlook and character of the site, improving local biodiversity through introduction of landscaped areas, and retention of employment opportunities onsite.

4.2 Health and Wellbeing

4.2.1 Air Quality

Any potential dust and stationary plant emissions during the construction period, and any potential impact from traffic flows on the local road network, during and after construction will be mitigated. A fully electric energy strategy is proposed, with no anticipated additional onsite emissions from regularly operating building services plant that could impact on local air quality.

Results of the dispersion modelling carried out for the scheme indicate that the predicted concentrations of PM₁₀ and NO₂ in all modelled years are below the relevant objectives. Predicted concentrations at all the modelled receptors fall within APEC Category A. No mitigation measures are deemed required to the building from an air quality perspective.

Please refer to the Air Quality Assessment prepared by GEM Air Quality Ltd for further details.

4.2.2 Noise

An environmental noise survey has been undertaken by Quantum Acoustics to establish the existing noise levels characterising the proposed development site. The potential risk of the site has been assessed in line ProPG Stage 1 and Stage 2 assessments.

The Stage 1 assessment indicates that the site has a medium noise risk during the daytime and a high noise risk at night at the front of the site, with a low noise risk during the daytime and night-time at the rear of the site.

The subsequent Stage 2 assessment concludes that noise levels both internal within the building and external at the amenity space can be mitigated via good acoustic design. The required mitigation strategies should not create any unintended adverse consequences for future residents. The proposed development is therefore considered to comply fully with relevant national and local planning policy.

The operation of nearby bars and night-clubs can be protected in accordance with the Agent of Change principle by careful consideration of low frequency noise break-in.

Environmental noise criteria are proposed for controlling noise emissions from proposed building services installations.

Further details are presented within the accompanying Noise Assessment prepared by Quantum Acoustics.



Figure 9. Existing site and surrounding context (source: Google Maps, accessed: June 2026).

4.2.3 Daylight and Sunlight

Daylight and sunlight levels to neighbouring properties and the proposed development have been a main consideration since early stage design.

Please refer to the accompanying daylight/sunlight report prepared by Delva Patman Redler for the planning application for further details.

4.2.4 External Lighting

The external lighting design and specification will be in accordance with the ILP's Guidance Note for The Reduction of Obtrusive Light (2021).

The scheme will limit the amount of up-lighting and all external lighting (aside from security lighting) will be connected to daylight sensors and be time controlled.

4.2.5 External amenity

An external courtyard is proposed to the rear of the site at ground floor level as external amenity for future residents and staff.

The application site is also a short walk from the public open spaces at Reading Town Hall (circa 180m) and Forbury Gardens (circa 300m) to the east.

4.3 Nature, Landscape and Biodiversity

4.3.1 Nature and Biodiversity

A Preliminary Ecological Assessment was carried out for the site by JBA.

The ecology survey indicates that there is no vegetated habitat within the red line. Under the UK Habitat Classification the Site is best described as developed land (sealed surface) and built structures. No statutory designated sites were identified within 2 km, and no impact pathway to non-statutory sites is identified; no designated-sites constraint is anticipated. No constraints from designated habitats were identified. There is some potential for nesting birds, and negligible to moderate potential for bats.

Opportunities for biodiversity enhancement has been identified for the scheme, including Integrated bat roosting features and Integrated nesting provision for building-nesting birds to the new building. Further bat surveys are recommended along with mitigation and avoidance measures.

Further details are presented in the Ecological Report and Biodiversity Net Gain Assessment prepared by JBA.

4.3.2 Landscape

Landscape spatial strategy to the courtyard consists of a series of distinct spaces that cater to larger groups upon entry at the northern end of the courtyard, then smaller green sanctuary spaces to the south. A green buffer will shield the courtyard's eastern edge from onlooking co-living units. The landscape plan presented in Figure 10 demonstrate spatial strategy translates into a cohesive and functional external environment. A hierarchy of spaces provides opportunities for informal socialising, outdoor working and quiet retreat.

Along with the provision of a biodiverse roof, the landscape strategy for the proposal aims to achieve an Urban Greening Factor of 0.25, in line with emerging draft Policy E14.

Further details are presented in the Landscape Design Strategy and Urban Greening Factor Assessment prepared by Exterior Architecture.



4.4 Climate Resilience

4.4.1 Managing risk of overheating

The scheme has been designed in line with an appropriate hierarchy following the principles set out within policy CC3 of the emerging Draft Update to the Local Plan.

Key measures include reasonable glazing ratios, maximising opening glazing areas, appropriate glazing specification, efficient building services including lighting, mechanical ventilation and heating, well insulated services to manage internal heat generation, to work in conjunction with openable windows when noise and security constraints allow.

The proposed strategy also includes measures for maintaining a comfortable internal environment with windows closed due to noise constraints. All co-living units are proposed to have MVHR systems with integrated air tempering coils, while the basement and ground floor shared spaces are proposed to benefit from energy efficient cooling systems.

Detailed analysis was carried out to evaluate the summertime performance of the studio rooms and in order to reduce potential overheating risks in accordance with Part O (2021) of the Building Regulations.

Please refer to the accompanying Overheating Risk Assessment prepared for the planning application for further details.

4.4.2 Managing flood risk

The application site is located in an area at low risk from rivers and sea flooding (Figure 12).

A site-specific Flood Risk Assessment has been undertaken by Ridge for the proposed development, which confirmed that the risk of flooding from all sources is considered to be low and does not require management or mitigation. A sequential test is not deemed required, and safe access and egress will be available to and from the site during flood conditions.

Further details are presented in the Drainage and Flood Risk Report prepared by Ridge.

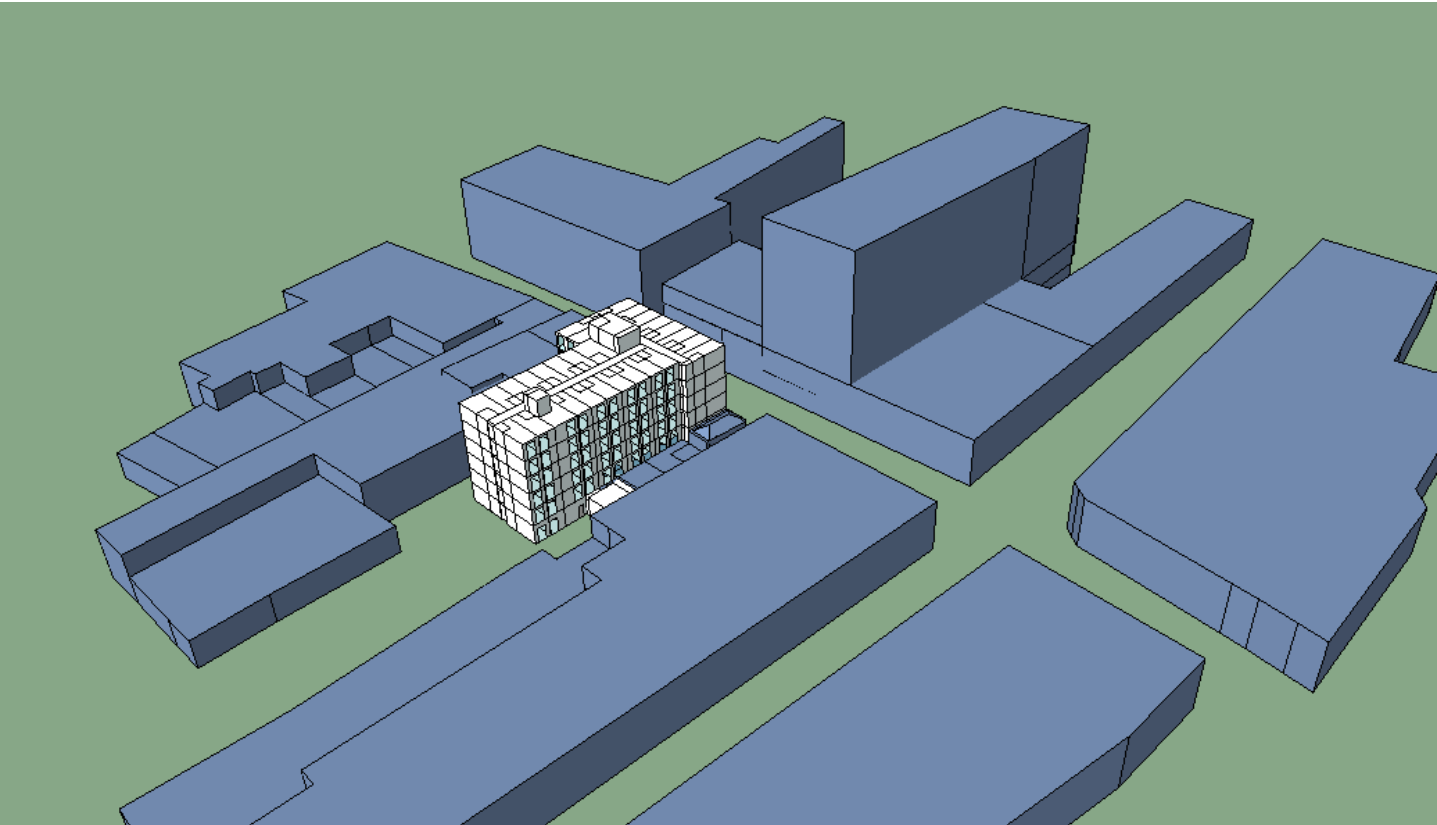


Figure 11. Thermal model of the proposed development. View from southeast.

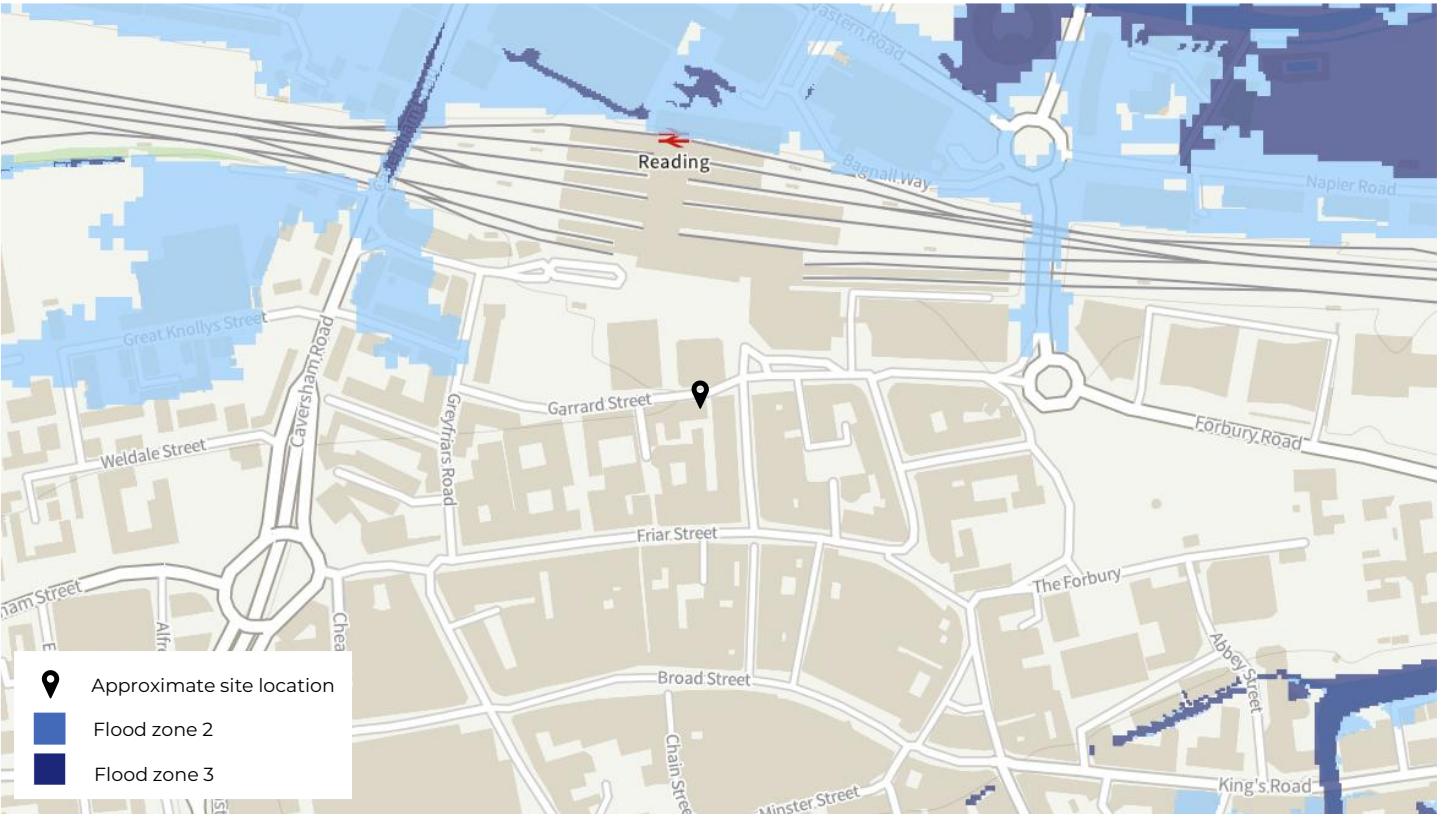


Figure 12. Flood risk map – rivers and sea flooding (accessed: June 2026).

4.5 Water and Surface Water Runoff

4.5.1 Water Efficiency

Water efficient sanitary fittings and appliances will be specified and installed to target a 45% reduction in water consumption compared to the BREEAM V7 baseline.

The following suggested flow rates shall be considered during detailed design of the development to achieve the water consumption target:

- WCs: 3.75 litre effective flush volume.
- Wash basin taps: 4 litres/min.
- Kitchen sink taps: 6 litres/min.
- Showers: 6 litres/min.
- Baths: 140 litres to overflow;
- Domestic sized dishwasher: 12 litres/cycle (where provided).
- Domestic sized washing machine: 40 litres/use (where provided).
- Commercial sized dishwasher: 5 litres/rack.
- Commercial or industrial sized washing machine: 7.5 litres/kg.

Rainwater harvesting and greywater recycling have been considered for the proposed development in line with Policy CC2. Greywater recycling is not deemed suitable due to the high maintenance cost and the high risk of contamination.

4.5.2 Surface water runoff

As part of the drainage strategy, it is proposed that surface water will be discharged into the Thames Water surface water network to the north of the site.

SuDS have been included with a green roof and areas of new external works being permeable construction. In addition, to achieve the rate of surface water reduction and associated storage, 2no. below ground geo-cellular attenuation tanks are proposed.

The system has been designed to accommodate the 1 in 100 + 45% climate change storm event with a peak discharge rate of 1.4l/s – this is between 90-96% reduction when compared to the existing building. The proposed surface water drainage network provides sufficient capacity for the proposed development.

Further details are presented in the Drainage and Flood Risk Report prepared by Ridge.

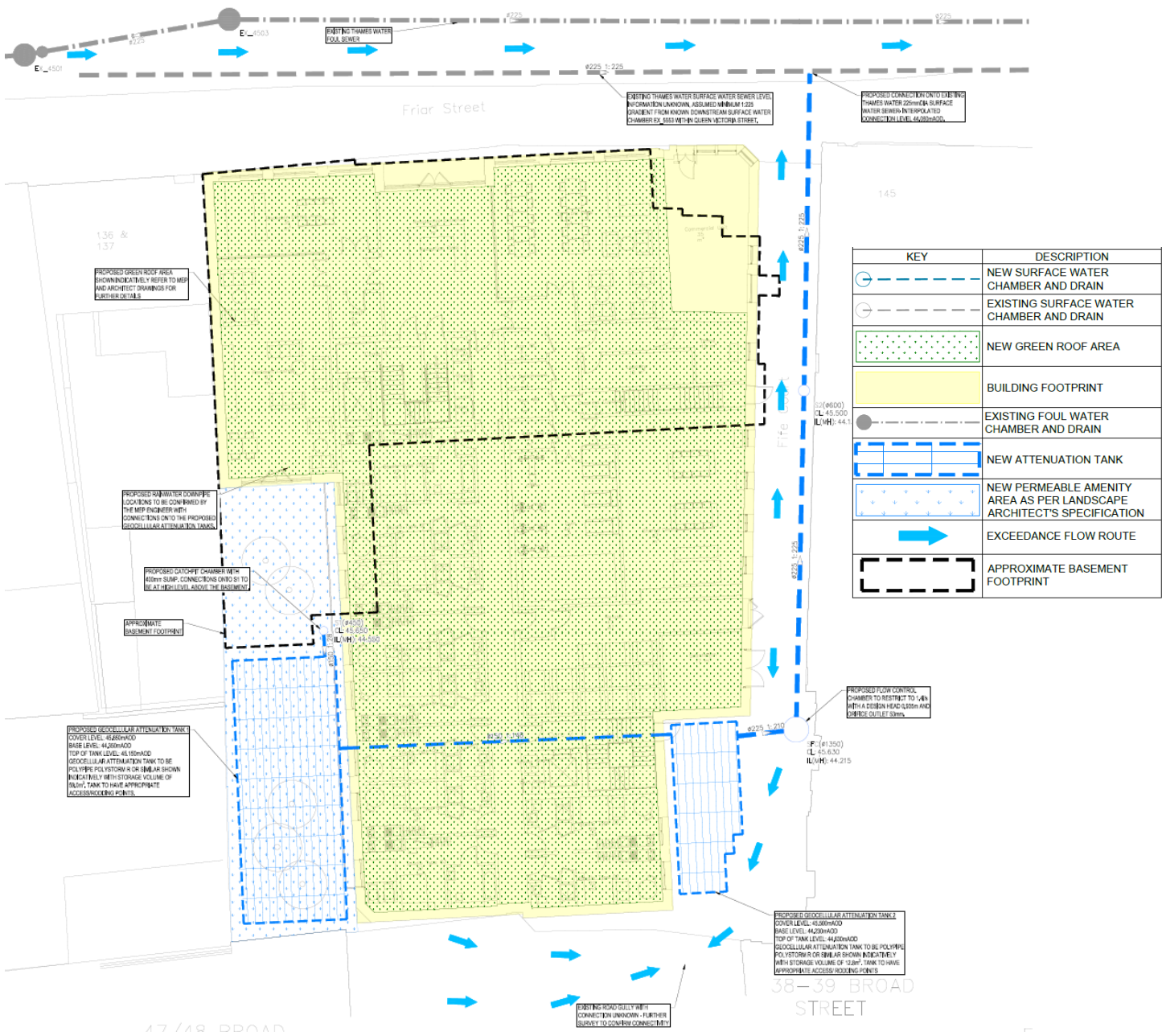


Figure 13. Proposed surface water drainage strategy for 138-144 Friar Street, prepared by Ridge.

4.6 Materials and Waste

4.6.1 Material Selection and Procurement

The structure grid of the proposed building has been rationalised and stacked to minimise transfer structures and the associated concrete and steel volume. Materials have been selected for longevity and durability as well as recoverability and recyclability at end of life. To minimise potential sources of indoor air pollution, low VOC materials, paints and finishes will be specified where possible.

To reduce embodied carbon of the proposed development, materials with recycled content will be prioritised during detailed design stage specification.

All timber used on the site will be FSC or PEFC certified. Where feasible, all other construction materials utilised at the development will be certified under BES6001 and EMS or other similar responsible sourcing certification schemes.

Where practicable, the contractor will source items locally, and where possible amalgamate deliveries to reduce the overall number of vehicle movements taking place.

4.6.2 Embodied Carbon and Whole Life Carbon

A Whole Life Carbon Assessment was carried out for 138-144 Friar Street, in line with RICS guidance and submitted to support the planning application.

In terms of embodied carbon, the proposed development was generally found to meet currently available industry benchmarks. Key carbon hotspots were identified in that report together with potential opportunities to further reduce associated emissions post-planning.

Given the fabric and systems efficiency of the proposed development, operational emissions were found to claim a smaller proportion of whole life carbon emissions.

One of the benchmarks included in Policy CC2 of the emerging Draft Update to the Local Plan sets out that embodied carbon emissions should be within 800 kgCO₂e/m² for new-build, major commercial developments over 5,000m² for the superstructure, substructure and finishes. While the proposed scheme at 138-144 Friar Street is below the 5,000m² area threshold and does not strictly classify as a commercial development, it has aimed to achieve this benchmark. The preliminary analysis at planning stage in line with RICS 2023 guidance shows that if the notable uncertainty factors associated with early-stage analysis are eliminated as the project progresses, the proposed scheme is anticipated to achieve this benchmark for the embodied carbon emissions associated with the substructure, superstructure and finishes.

Comparison with other widely used industry benchmarks is shown in Figure 14. Overall, the proposed development was found to perform in line with policy in terms of whole life carbon.

Further information can be found in the Whole Life Carbon Assessment prepared by Ecolytik and accompanying the planning application.

4.6.3 Waste Management and Circular Economy

Waste streams will be efficiently segregated (offsite) and processed during both construction and operation stages, with a target to maximise potential re-use of materials and diversion from landfill in line with Policy CC5.

All waste that cannot be reused or recycled will be disposed of in accordance with legislation and best practice.

The development will target a 95% reuse/recycling rate for demolition and construction waste where feasible in line with the emerging Policy CC2.

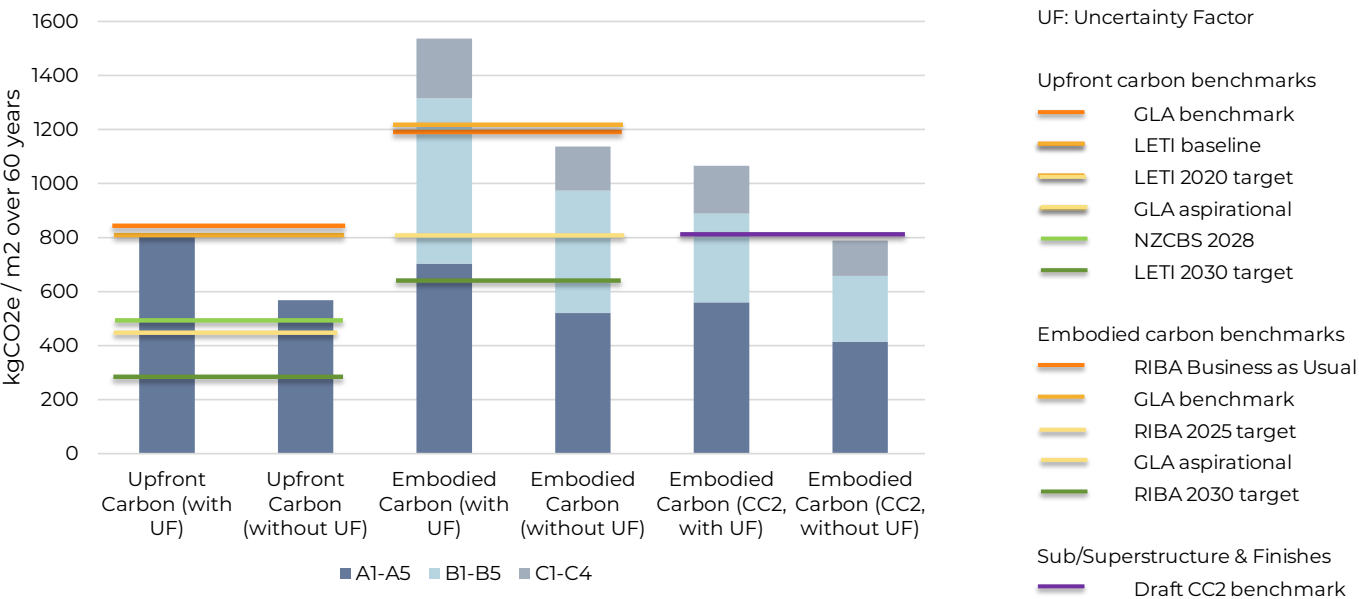


Figure 14. Upfront and embodied Carbon emissions comparison of 138-144 Friar Street with industry benchmarks.

4.7 Sustainable Transport

The application site is located in the heart of Reading town centre and benefits from excellent access to public transport. Reading Train Station is a circa 3 min walk (250m) to the north, with frequent connections into London, the South East and the South West of England. Friar Street and Station Road are also served by frequent bus services to a wide range of local destinations. The site is considered highly sustainable from a public transport access perspective.

4.7.1 Cycle Parking

Secure cycle storage will be provided at basement level to promote use of active travel by future residents and staff.

A total of 52no. secure cycle parking spaces are proposed to the cycle store at basement level, which meets BREEAM requirements and in line with Reading’s Revised Parking Standards and Design SPD (2011).

4.7.2 Car Parking

The development is car free.

Further details are presented in the Transport Statement and Framework Travel Plan prepared by Mode.



Figure 15. Proposed cycle storage provision (in blue, left) at basement level and bin store (in amber, right) at ground floor level.

4.8 BREEAM

BREEAM is a performance-based assessment method and certification scheme for new and refurbished buildings with a primary aim of mitigating the life cycle impacts of buildings on the environment.

A BREEAM New Construction V7 pre-assessment has been carried out for the proposed co-living scheme.

The BREEAM pre-assessment shows that the development can achieve a BREEAM Excellent rating in line with requirements stipulated in Policy CC2 of the adopted Local Plan. A summary of the credits targeted is presented in Appendix D.

This pre-assessment will provide the Client, Design and Contractor Team with information on the key actions that should be carried out from early-stage design through to construction stage to assist with ensuring certification could be achieved.

It should be noted that credits proposed/assumed here are subject to change at design and construction stages post planning.

4.8.1 Assessment scope

Similar to the approach of the energy assessment as noted in Section 3.1.3, the BREEAM assessment focuses on the main co-living proposal for the application site.

The Bugle which is proposed to be retained is very minor in scale and forms only circa 2% of the total GIA of the scheme; the scope of works to the Bugle is also considered very minor. The pub will be partially retained and standalone to the co-living building – as such, it is not deemed suitable for the BREEAM New Construction V7 assessment to encompass the pub which will have its own separate access, is retained rather than new build, and is anticipated to be delivered shell only rather than fully fitted as the co-living scheme.

The main potential environmental effects from the scheme will be from the co-living development which is covered under the proposed BREEAM new construction assessment.

Whilst the formal BREEAM assessment will include the co-living development only, sustainability principles from it would be applied across the whole scheme during the design and construction process. These would include responsible construction practices, responsible sourcing, waste minimisation etc.

Table 7. BREEAM New Construction V7 Pre-Assessment results summary for the new build co-living scheme at 138-144 Friar Street.

	Credits available	Credits targeted	% credits targeted	Available weighted score	Targeted Category Score
Man	21	15	71.43%	11.00%	7.86%
Hea	23	11	47.83%	15.00%	7.17%
Ene	34	26	76.47%	16.50%	12.62%
Tra	12	12	100.00%	8.50%	8.50%
Wat	10	8	80.00%	7.50%	6.00%
Mat	14	9	64.29%	16.00%	10.29%
Wst	10	5	50.00%	7.00%	3.50%
Lue	12	9	75.00%	10.50%	7.88%
Pol	13	10	76.92%	8.00%	6.15%
Inn	10	5	50.00%	10.00%	5.00%
Total	159	110	69.18%	-	74.96%
Rating					Excellent

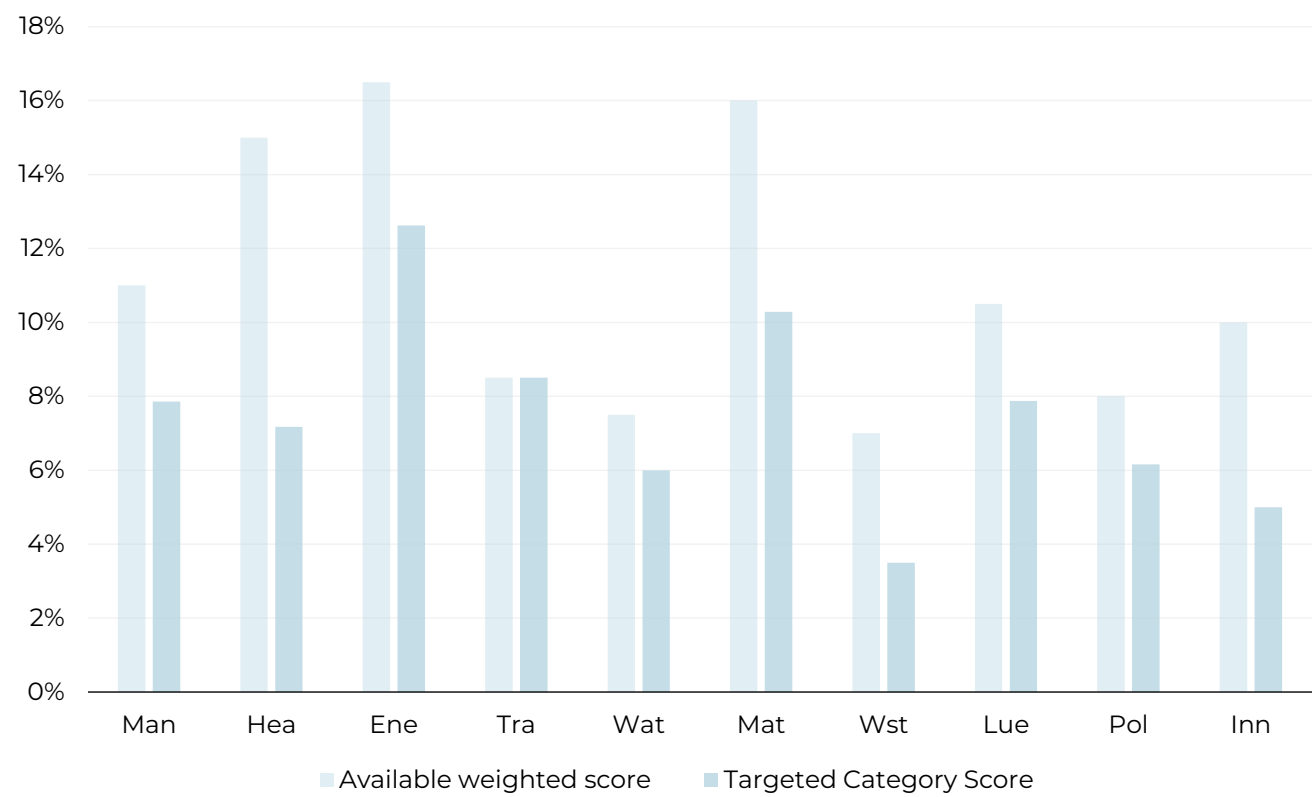


Figure 16. BREEAM Pre-Assessment performance by category for the new build co-living scheme at 138-144 Friar Street.

5 Conclusions

Through the adoption of the energy and sustainability strategies presented in this report, the client and design team demonstrated that the proposed development fully complies with the relevant adopted energy and sustainability policy requirements stipulated by RBC, and adheres to emerging draft policies as far as practicable and feasible onsite, as summarised in Table 8.

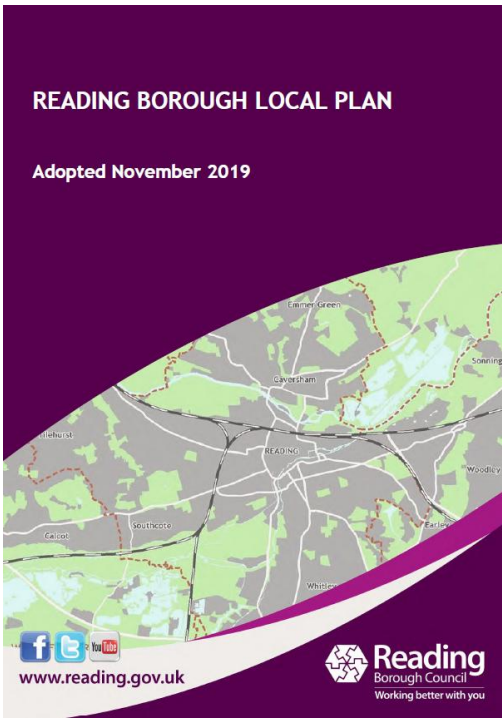
The proposal will positively contribute to sustainable development at the site and its surroundings.

Table 8. Review of compliance of proposed scheme against adopted and emerging RBC energy and sustainability policies.

Reading policy	Requirements	Notes for proposed scheme
Adopted Local Plan (November 2019)		
Adopted Policy CC2	New development to reduce the consumption of resources and materials, and that proposals for new non-residential development (which includes non-C3 use class residential schemes) should meet BREEAM Excellent standards.	Met by proposed scheme. See Section 4.8 and Appendix D.
Adopted Policy CC3	Developments to incorporate measures to adapt to climate change and shall demonstrate how they have been designed to maximise resistance and resilience to climate change.	Met by proposed scheme. See Section 4.4, and accompanying Overheating Assessment and Drainage and Flood Risk Report.
Adopted Policy CC4	Demonstration of how consideration has been given to securing energy for the development from decentralised sources.	Met by proposed scheme. See Sections 3.3 and 3.4.
Adopted Policy CC5	Minimisation of waste during construction and the life of the development.	Met by proposed scheme. See Section 4.6.
Emerging Reading Borough Local Plan Submission Draft Partial Update (May 2025)		
Draft Policy CC2	Achieve net-zero development defined as “a scenario in which the quantity of anthropogenic GHG arising from the development’s operational energy use on an annual basis is zero or negative, and where whole-life emissions are reduced through sustainable design measures”.	Not deemed technically feasible for proposed scheme, as discussed in Section 3.7. Energy and carbon reductions have been maximised on site as far as possible.
	Apply an energy hierarchy set out in CC2.	Met by proposed scheme. See Section 3.
	Generate at least the same amount of renewable electricity on-site as they demand over the course of the year.	Not deemed technically feasible for proposal, as discussed in Section 3.7.
	Carry out predictive energy modelling to account for both total energy use and carbon emissions.	Met by proposed scheme. See Section 3.6.2 and accompanying TM54 Energy Modelling report.
	Achieve a site average space heating demand of 15-20kWh/m².yr and a site average total energy demand of 70kWh/m².yr. No unit shall exceed total energy demand of 90kWh/m².yr.	Met by proposed scheme. See Section 3.6.3.
	Carry out embodied carbon assessment.	Met by proposed scheme. See Section 4.6.2 and accompanying Whole Life Carbon Assessment which includes evaluation of embodied carbon.
Draft Policy CC3	Developments to be designed adapt to climate change and to mitigate the risks of overheating, flooding and extreme storms.	As above for Adopted CC3.
Draft Policy CC4	Demonstrate how consideration has been given to securing energy for the development from decentralised energy production and storage.	As above for Adopted CC4.
Draft Policy CC5	Minimisation of waste during construction and the life of the development	As above for Adopted CC5.

Appendix A – Reading policies

Reading Borough Local Plan (November 2019)



The Local Plan for Reading is the document that contains the policies for how Reading will develop up to 2036. It identifies the amount of development that will take place, the areas and sites where development is expected to be accommodated, and where it will be restricted, and sets out policies for how planning applications will be decided.

The energy and sustainability policies within the Local Plan relevant to the proposed development at 138-144 Friar Street are set out below.

CC2: Sustainable Design and Construction

Proposals for new development, including the construction of new buildings and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural

resources appropriately, efficiently and with care and take account of the effects of climate change.

To meet these requirements:

- All major non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Excellent' standards, where possible;
- All non-residential development or conversions to residential should incorporate water conservation measures so that predicted per capita consumption does not exceed the appropriate levels set out in the applicable BREEAM standard. Both residential and non-residential development should include recycling greywater and rainwater harvesting where systems are energy and cost effective.

CC3: Adaptation to Climate Change

All developments will demonstrate how they have been designed to incorporate measures to adapt to climate change. The following measures shall be incorporated into development:

- Wherever possible, new buildings shall be orientated to maximise the opportunities for both natural heating and ventilation and reducing exposure to wind and other elements;
- Proposals involving both new and existing buildings shall demonstrate how they have been designed to maximise resistance and resilience to climate change for example by including measures such as solar shading, thermal mass, heating and ventilation of the building and appropriately coloured materials in areas exposed to direct sunlight, green and brown roofs, green walls, etc;
- Use of trees and other planting, where appropriate as part of a landscape scheme, to provide shading of amenity

areas, buildings and streets and to help to connect habitat, designed with native plants that are carefully selected, managed and adaptable to meet the predicted changed climatic conditions; and

- All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change

CC4 Decentralised Energy

In meeting the sustainability requirements of this plan, developments of the sizes set out below shall demonstrate how consideration has been given to securing energy for the development from a decentralised energy source.

Any development of more than 20 dwellings and/or non-residential development of over 1,000 sq m shall consider the inclusion of decentralised energy provision, within the site, unless it can be demonstrated that the scheme is not suitable, feasible or viable for this form of energy provision.

Where there is existing decentralised energy provision present within the vicinity of an application site, further developments of 10 dwellings or more or non-residential development of 1,000 sq m or more will be expected to link into the existing decentralised energy network or demonstrate why this is not feasible.

CC5 Waste Minimisation and Storage

Development should demonstrate measures to minimise the generation of waste in the construction, use and life of buildings and promote more sustainable approaches to waste management, including the reuse and recycling of construction waste and the promotion of layouts and designs that provide adequate, well-

designed space to facilitate waste storage, reuse, recycling and composting.

CC8 Safeguarding Amenity

Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of:

- Privacy and overlooking;
- Access to sunlight and daylight;
- Visual dominance and overbearing effects of a development;
- Harm to outlook;
- Noise and disturbance;
- Artificial lighting;
- Vibration;
- Dust and fumes;
- Smell;
- Crime and safety.

The position of habitable rooms, windows and outdoor living spaces will be particularly important. A back-to-back distance of 20 metres between dwellings is usually appropriate, although the circumstances on individual sites may enable dwellings to be closer without a detrimental effect on privacy.

As well as immediate impacts, other aspects to which this policy applies will include matters such as hours of operation of businesses, and effects of traffic movements, particularly of heavy goods vehicles (HGVs). Proposals which would generate regular movements of HGVs on residential roads will not be acceptable.

Where an otherwise acceptable development could change its character to a use that would have a greater impact on amenity without needing planning permission, conditions will be applied to restrict such changes.

EN12: Biodiversity and the Green Network

On all sites, development should not result in a net loss of biodiversity and geodiversity, and should provide a net gain for biodiversity wherever possible. Development should:

- Protect and wherever possible enhance features of biodiversity interest on and adjacent to the application site, incorporating and integrating them into development proposals wherever practicable; and
- Provide new tree planting, wildlife friendly landscaping and ecological enhancements (such as wildlife ponds, bird and bat boxes) wherever practicable.

EN15: Air Quality

Development should have regard to the need to improve air quality and reduce the effects of poor air quality.

Development that would detrimentally affect air quality will not be permitted unless the effect is to be mitigated. The following criteria should be taken into account:

- Whether the proposal, including when combined with the cumulative effect of other developments already permitted, would worsen air quality;
- Whether the development is within, or accessed via, an Air Quality Management Area; and
- Whether it can be demonstrated that a local worsening in air quality that would not detrimentally affect human health or the environment would be offset by an overall improvement in air quality, for instance through reduction in the need to travel.

Where a development would introduce sensitive uses (such as residential, schools and nurseries, hospitals, care facilities) into, or intensify such uses within, an Air Quality Management Area, detrimental effects on that use will be mitigated. Mitigation measures should be detailed in any planning application. If there are significant

detrimental effects that cannot be mitigated, the application should be refused.

Where required, planning obligations will be used to secure contributions to measures to tackle poor air quality or for air quality monitoring.

EN16: Pollution and Water Resources

Development will only be permitted where it would not be damaging to the environment and sensitive receptors through land, noise or light pollution; where it would result in no deterioration in, or ideally enhance, ground and surface water quality; and where adequate water resources, sewerage and wastewater treatment infrastructure will be in place to support the proposed development prior to occupation.

Proposals for development that are sensitive to the effects of noise or light pollution will only be permitted in areas where they will not be subject to high levels of such pollution, unless adequate mitigation measures are provided to minimise the impact of such pollution.

Development will only be permitted on land affected by contamination where it is demonstrated that the contamination and land gas can be satisfactorily managed or remediated so that it is suitable for the proposed end use and will not impact on the groundwater environment, human health, buildings and the wider environment, during demolition and construction phases as well as during the future use of the site.

EN18: Flooding and Sustainable Drainage Systems

Development will be directed to areas at lowest risk of flooding in the first instance, following the Sequential and Exceptions Test set out in the NPPF, and taking into account the effects of climate change. It will consider flooding from all sources, including fluvial, surface water, groundwater and sewer flooding. Where development in areas at risk of flooding is necessary, it will not reduce the capacity of the flood plain to store floodwater, impede the flow of floodwater or in any way increase the risks to life and property arising from flooding. Wherever

possible, development should be designed to reduce flood risk, both on- and off-site.

All major developments must incorporate sustainable drainage systems (SuDS) as appropriate and in line with the Government's Technical Standards⁶⁴. Smaller schemes are encouraged to incorporate SuDS, where possible. Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site. Schemes should ensure that the movement of water through vertical infiltration as well as horizontal run-off does not worsen contamination effects. Wherever possible, SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid damage to existing significant trees, including through changes to the site hydrology. All new developments in areas of flood risk should give priority to SuDS.

TR1: Achieving the Transport Strategy

Proposed development should contribute appropriately to meeting the objectives of the most up-to-date Local Transport Plan or any successor document, including sub-strategies, specific projects identified and the local action plans.

Planning permission will not be granted for major development proposals unless there is a commitment to implement measures to promote and improve sustainable transport facilities, such as through provision to encourage walking, cycling and the use of public transport; and through agreed travel plans, safe routes to local facilities and services, including schools and parks, and similar measures.

All development proposals should make appropriate provision for works and contributions to ensure an adequate level of accessibility and safety by all modes of transport from all parts of a development, particularly by public transport, walking and cycling, in accordance with any agreed transport assessment submitted as part of the application.

TR5: Car and Cycle Parking and Electric Vehicle Charging

Development should provide car parking and cycle parking that is appropriate to the accessibility of locations within the Borough to sustainable transport facilities, particularly public transport.

Development should make the following provision for electric vehicle charging points:

- Within communal car parks for residential or non-residential developments of at least 10 spaces, 10% of spaces should provide an active charging point.

Reading's Sustainable Design and Construction Supplementary Planning Document (December 2019)

Reading Borough Council has declared a Climate Emergency, and set out its commitment to working to achieve a carbon neutral Reading by 2030.

The adopted SPD explains planning requirements with regard to energy, climate change, water management and waste reduction. It is intended to supplement the policies of the Local Plan, particularly:

- CC2: Sustainable Design and Construction
- CC3: Adaptation to Climate Change
- CC4: Decentralised Energy
- CC5: Waste Minimisation and Storage
- EN18: Flooding and Drainage

The document also provides guidelines for planning submissions to demonstrate compliance with the relevant policies:

- To comply with the relevant policies and standards on energy, a combination of measures including those for energy efficiency, energy conservation and inclusion of renewable or low carbon sources should be considered and factored in from the design stage onwards.

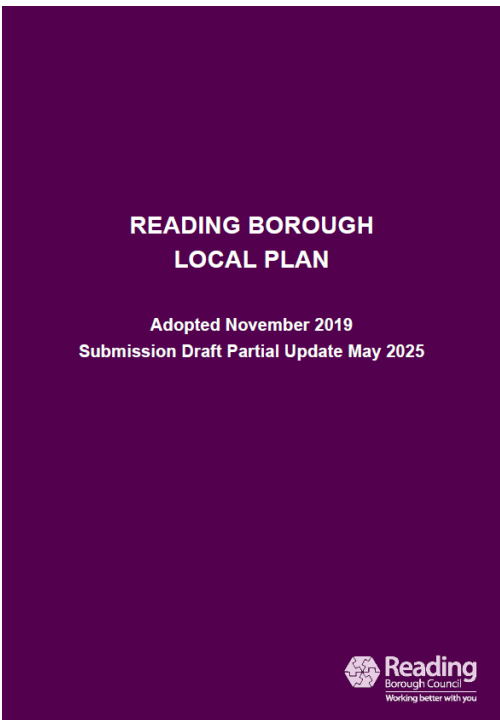
- Sustainability Statements typically require the developer to consider all aspects of development form which can contribute to securing high standards of sustainable development from the outset, including but not limited to:
 - Energy efficiency and carbon emissions of the building;
 - Water conservation;
 - Flood risk and drainage strategy;
 - Community impacts;
 - Transport;
 - Health and Wellbeing including day-lighting analysis and thermal comfort;
 - Material usage, wastage, responsible sourcing and environmental impact, including embodied carbon;
 - Pollution issues, low NOx, low global warming potential (GWP), reducing need for mechanical cooling;
 - Ecological aspects to enhance the proposed developments for flora and fauna; and
 - Best practice management of the site.
- Energy Statements demonstrate how the energy related aspects of the proposed development actually meets the requirements of local planning policy and BREEAM energy and emissions standards. An energy statement would typically include the following information:
 - Energy efficiency of the building;
 - Baseline annual predicted energy demand of the development (regulated and unregulated);
 - Baseline annual predicted carbon emissions of the development (regulated and unregulated), the Target Emission Rate (TER);
 - The contribution of each proposed renewable energy technology;
 - Cost information of technically feasible low or zero carbon renewable technologies, including additional insulation, low carbon decentralised energy, heat pumps etc;
 - Feasibility of district or community heating;
 - Summary of the benefits of various energy technologies;

- The total estimated reduction in the development's baseline carbon and/or energy emissions.

For non-residential developments, the SPD stipulates the following:

- The Local Plan requires BREEAM standards to be achieved for non-residential development, non-C3 forms of development such as student accommodation or residential care, and conversion to residential.
- A 5% buffer should be included in the BREEAM pre-assessment estimator.

Emerging Reading Borough Local Plan Submission Draft Partial Update (May 2025)



A review of the adopted Local Plan was carried out in March 2023, which concluded that there was a need to undertake a Partial Update of the Local Plan to cover around half of the policies in the plan.

A Pre-Submission Draft Local Plan Partial Update was subject to consultation (under Regulation 19) in November and December 2024.

The Local Plan Partial Update was submitted to the Secretary of State on 9th May 2025.

The following updates to Energy and Sustainability related policies are proposed:

CC2: Sustainable Design and Construction

Proposals for new development, including the construction of new building(s) and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of building(s) and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.

All non-residential developments or conversions to residential are required to achieve net-zero development defined as “a scenario in which the quantity of anthropogenic greenhouse gas emissions arising from the development’s operational energy use on an annual basis is zero or negative, and where whole-life emissions are reduced through sustainable design measures.” Net zero building status must be achieved through the application of the following energy hierarchy:

- Minimise and manage operational energy demand through building design, fabric performance and servicing measures;
- Use local low carbon energy resources (such as secondary heat) wherever possible to meet residual demands;
- Meet remaining residual energy demands by producing, storing and using renewable energy on-site; and
- Monitor and report on energy performance.

All non-residential development proposals must include an energy statement which confirms that proposals:

- Can generate at least the same amount of renewable electricity on-site (and

preferably on-plot) as they demand over the course of the year (reasonable estimates of regulated and unregulated use) using a methodology proven to accurately predict post-occupancy performance; and

- Achieve a site average space heating demand of 15-20kWh/m².yr and a site average total energy demand of 70kWh/m².yr. No unit shall exceed total energy demand of 90kWh/m².yr, irrespective of the amount of on-site renewable production. ('Total energy demand' means the amount of energy used as measured by the metering of the building with no deduction for renewable energy generated on site).

An energy statement should include pre-built estimates and as-built calculations prior to occupation. Weight will be given to proposals which demonstrate a commitment to on-going monitoring post-occupation which can be clearly communicated to the occupier.

All non-residential development or conversions to residential must be designed to be water efficient and reduce water consumption in accordance with the ‘fittings approach’ detailed within the Building Regulations. Proposals that achieve water neutrality will be particularly supported. Both residential and non-residential development should include recycling greywater and rainwater harvesting where systems are energy- and cost-effective.

The demolition of an existing building should be accompanied by a full justification for demolition¹⁶ and demonstrate how 95% of all construction waste will be diverted away from landfill¹⁷. For non-listed buildings, demolition will only be acceptable where:

- The building is in such a poor state that it is not practical or viable to refurbish or re-use;
- Such refurbishment or re-use would result in a similar amount or a greater amount of embodied carbon generation; or
- Such refurbishment or re-use would result in a building with poor thermal efficiency

resulting in a greater lifetime carbon emissions than would arise from a re-build.

All applications for new-build commercial floorspace of 5000m² or more must include an embodied carbon assessment. This assessment must demonstrate that a score of less than 800kgCO₂/m² of carbon can be achieved within the development for the substructure, superstructure and finishes.

CC3: Adaptation to Climate Change

All developments will demonstrate how they have been designed to adapt to climate change and to mitigate the risks of overheating, flooding and extreme storms. The following measures shall be incorporated into development unless it can be demonstrated that requirements are not suitable, feasible or viable:

- New buildings shall be orientated to maximise the opportunities for both natural heating and ventilation and reducing exposure to wind and other elements. Proposals involving both new and existing buildings must be designed to maximise resistance and resilience to climate change by including the following measures:
 - Solar shading,
 - Thermal mass,
 - Appropriate heating and ventilation of the building,
 - Appropriately coloured materials in areas exposed to direct sunlight,
 - Green and brown roofs, and
 - Green walls.
- Use of trees and other planting to cool the urban environment through shading of amenity areas, buildings and streets and to help to connect habitat, integrated soft surfaces designed with native plants that are carefully selected, managed and adaptable to meet the predicted changing climatic conditions;
- • All development must address the risks of overheating through passive cooling and energy efficiency measures in the first instance

- All development must minimise the impact of surface water runoff from the development in the design of the drainage system and incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change.

CC4: Heat Networks

Developments must demonstrate how consideration has been given to securing energy for the development from a heat network or, where this is not possible, a non-fossil fuel source.

Any development of more than 20 dwellings and/ or non-residential development of over 1,000 sq m must demonstrate how a connection will be made to a suitable low carbon heat network where available in the vicinity, unless it can be demonstrated that the scheme is not suitable, feasible or viable. Where no such network is available, heat and/or cooling must be supplied from low carbon sources and be connectable to future heat network

Where there is an existing low carbon heat network present within the vicinity of an application site, further developments of 10 dwellings or more or non-residential development of 1,000 sq m or more will be expected to link into the existing low carbon heat network or demonstrate why this is not feasible.

Any proposal for new or extended decentralised energy schemes will only be supported if the scheme is renewable-based.

CC5: Waste Minimisation and Storage

Development should demonstrate measures to minimise the generation of waste in the construction, use and life of buildings and promote more sustainable approaches to waste management, including the reuse and recycling of construction waste and the promotion of layouts and designs that provide adequate, well-designed space to facilitate waste storage, reuse, recycling and composting.

EN12: Biodiversity

On all development sites, a 10% Biodiversity Net Gain (BNG) must be achieved, except that which is exempt as set out within The Biodiversity Gain Requirements (Exemptions) Regulations 2024. The 10% BNG should be delivered on-site wherever possible. However, if on-site provision is not achievable, or Readings Green Network can be more coherently enhanced through off site provision, off-site gain can be pursued, in accordance with the Biodiversity Gain Hierarchy. Where practicable off-site provision should be directed towards areas within the borough and identified in the Council's Natural Environment SPD, BLNRS (or Biodiversity Opportunity Areas (BOAs) until such a time as the BLNRS and the SPD is in place).

Notwithstanding the above development that results in the loss or deterioration of 'irreplaceable habitats' will not be permitted.

EN18: Flooding and Sustainable Drainage Systems

Planning permission will only be granted where proposals have fully considered the effects of flooding from all sources (fluvial, surface water, reservoir, groundwater, and sewer flooding) over the lifetime of the development and accounting for climate change.

Development will be directed to areas at lowest risk of flooding in the first instance, following the Sequential and Exceptions Test set out in the NPPF.

All development must incorporate sustainable drainage systems (SuDS) in line with the Government's Technical Standards⁸² unless this is not viable or feasible. Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site. Schemes should ensure that the movement of water through vertical infiltration as well as horizontal run-off does not worsen contamination effects. SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid damage to existing

significant trees, including through changes to the site hydrology. Surface water must not drain to the foul sewer, as this is a major cause of sewer flooding.

A SuDS maintenance plan must be submitted alongside planning applications to demonstrate how schemes will be managed and remain effective over the lifetime of the development. The implementation of the SuDS maintenance plan may be secured by planning condition.

EN19: Urban Greening Factor

Proposals must demonstrate how an appropriate proportion of green cover will be delivered on site through an Urban Greening Factor (UGF) assessment. This may include both existing and newly established landscaping.

The following criteria must be met (assessed as-built):

- Major developments that are predominately commercial (more than 50% as-built internal floor area) – 25%

TR5: Car and Cycle Parking and Electric Vehicle Charging

Development should provide car parking and cycle parking that is appropriate to the accessibility of locations within the Borough to sustainable transport facilities, particularly public transport.

Within communal car parks for non-residential developments of at least 10 off-road parking spaces, 20% of spaces should provide an active electric vehicle charging point.

There will be a presumption in favour of electric vehicle charging infrastructure within Reading unless there are clear detrimental impacts on: accessibility by foot and cycle or by those with limited mobility; highway safety; residential amenity; important trees; or the significance of a heritage asset or its setting.

Appendix B – Energy calculation assumptions

The items listed below are assumptions only, based on a combination of best judgement at planning stage and information from the design team where appropriate. Throughout the design and construction stages the fabric and system requirements (including provisions of renewable technologies) may change whilst the building designs are being progressed. All information detailed in this summary sheet is preliminary recommendation at the Planning Stage. It should be noted that this document is not exhaustive and the design and construction teams should allow for flexibility on site where necessary.

Building fabric parameter	Part L 2021 notional	Proposed specification	Unit	Note
Floor				
Ground floors	0.15	0.10	W/m²K	1
Walls				
External walls	0.18	0.15	W/m²K	1
Roofs				
Exposed roofs and ceiling terraces	0.15	0.11	W/m²K	1
Air permeability				
Maximum air permeability (test required on site)	3	3	m³/m².h	1
Openings				
New windows - pane and frame	1.4	1.2	W/m²K	1
Windows transmittance factor (g-value)	0.29	0.4		1
Windows frame factor	0.1	0.1		1

Building Services Systems	Proposed specification	Unit	Note
Ventilation			
Type	Zonal heat recovery ventilation		1, 2
Specific fan power	0.6 for studios, 1.8 for ground floor shared spaces	W/l.s	1, 2
Heat recovery	Yes		1, 2
Heat recovery type	Plate heat exchanger		1, 2
Heat recovery efficiency	80	%	1, 2
Heating and cooling			
HVAC system type	Air Source Heat Pumps (ASHP) with radiators for co-living units, and ASHP for basement and ground floor shared spaces		1, 2
Seasonal COP in heating mode	>320 for Co-living units, >260 for basement/ground floor spaces	%	1, 2
Seasonal EER in cooling model	>530 (for basement and ground floor spaces only)	%	1, 2
Fuel type	Electricity		1, 2
Hot Water			
Hot water generation type	From main heating system		1, 2
Seasonal COP for hot water	320	%	1, 2
Ductwork			
Ductwork CEN / AHU classification	Class D / Class L1		1, 2
Metering			
The metering warns 'out of range' values.	Yes		1, 2
Lighting			
Lamp efficacy	130	lm/cW	1, 2

Building Services Systems	Proposed specification	Unit	Note
Light output ratio LED	1		1, 2
Lighting controls	Photoelectric options, occupancy sensing		1, 2
Photovoltaics			
Indicative array capacity	9.6	kWp	1, 2
Orientation	South/north		1, 2
Til from horizontal	10 degrees		1, 2
Indicative number of panels	24no. 400W panels		1, 2
Overshadowing	None		1, 2

Notes	
1	Planning stage assumption to achieve planning policy or Building Regulations targets.
2	Subject to MEP Design at fit-out stage.
NB. Please refer to Approved Document L2 2021 for all requirements to comply with Building Regulations Part L.	

Appendix C – Planning stage BRUKL output

Project name

Step 1 - Fabric First Assessment

As designed

Date: Wed Jul 08 11:29:09 2026

Administrative information**Building Details**

Address: 138-144 Friar Street, Reading, RG1 1EX

Certifier details

Name: Ecolytk Ltd

Telephone number: 0203 835 4114

Address: 86-90 Paul Street, London, EC2A 4NE

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.31

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

Foundation area [m²]: 615.95**The CO₂ emission and primary energy rates of the building must not exceed the targets**

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	12.07
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	9.87
Target primary energy rate (TPER), kWh _{PE} /m ² annum	130.6
Building primary energy rate (BPER), kWh _{PE} /m ² annum	106.75
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-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.15	0.15	1F000003_W1
Floors	0.18	0.1	0.1	1F000003_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.11	0.11	1F000001_C
Windows** and roof windows	1.6	1.2	1.2	0F000003_W1_O0
Rooflights***	2.2	1.2	1.2	0F000022_C_O0
Personnel doors^	1.6	1.3	1.3	0F00001F_W9_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-Limit} = Limiting area-weighted average U-values [W/(m²K)]U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]U_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]

* 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/m²K

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

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

Building services

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

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

1- ASHP

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.81	-	-	-	-
Standard value	2.5*	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 all types >12 kW output, except absorption and gas engine heat pumps.					

2- GF ASHP

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.7	5.89	-	-	-
Standard value	2.5*	5	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 all types >12 kW output, except absorption and gas engine heat pumps.					

1- SYST0000-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	2.86	0
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		Zone	Standard
_1F Laundry	-	-	0.3	-	-	-	-	-	-	-	-	N/A
0F Bathroom 1	-	-	-	-	0.8	-	-	-	-	0.8	0.8	N/A
0F Bathroom 2	-	-	-	-	0.8	-	-	-	-	0.8	0.8	N/A
0F Bathroom 3	-	-	-	-	0.8	-	-	-	-	0.8	0.8	N/A
0F Bathroom 4	-	-	-	-	0.8	-	-	-	-	0.8	0.8	N/A
0F Bathroom 5	-	-	-	-	0.8	-	-	-	-	0.8	0.8	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard	
0F Bathroom 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Bathroom 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Bathroom 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Bathroom 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Bathroom 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Studio 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Studio 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Studio 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Studio 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Studio 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Studio 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Studio 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Studio 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Studio 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
0F Studio 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 12	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 13	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 14	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 15	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 16	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 17	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Bathroom 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
1F Studio 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A	

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I		
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
1F Studio 2		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 3		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 4		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 5		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 6		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 7		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 8		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 9		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 10		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 11		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 12		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 13		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 14		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 15		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 16		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 17		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 18		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 19		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 20		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 21		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 22		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 23		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 24		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 25		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 26		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 27		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 1		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 2		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 3		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 4		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 5		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 6		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 7		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 8		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 9		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 10		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 11		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 12		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 13		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 14		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 15		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 16		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 17		-	-	-	-	0.8	-	-	-	-	0.8	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
2F Bathroom 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 12	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 13	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 14	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 15	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 16	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 17	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Studio 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
3F Bathroom 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 12	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 13	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 14	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 15	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 16	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 17	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 12	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 13	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 14	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 15	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 16	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 17	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
3F Studio 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 12	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 13	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 14	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 15	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 16	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 17	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Bathroom 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I		
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
4F Studio 12		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 13		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 14		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 15		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 16		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 17		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 18		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 19		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 20		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 21		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 22		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 23		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 24		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 25		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 26		-	-	-	-	0.8	-	-	-	-	0.8	N/A
4F Studio 27		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 1		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 2		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 3		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 4		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 5		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 6		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 7		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 8		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 9		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 10		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 11		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 12		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 13		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 14		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 15		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 16		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 17		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 18		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 19		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 20		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 21		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 22		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 23		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 24		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 25		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 26		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Bathroom 27		-	-	-	-	0.8	-	-	-	-	0.8	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I		
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
5F Studio 1		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 2		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 3		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 4		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 5		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 6		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 7		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 8		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 9		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 10		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 11		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 12		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 13		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 14		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 15		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 16		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 17		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 18		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 19		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 20		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 21		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 22		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 23		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 24		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 25		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 26		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 27		-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Co-work cafe		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F Gym		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F Private dining		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F Residential co-working		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F Residential co-working 2		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F Shared dining		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F Shared lounge		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F WCs		-	-	0.3	-	-	-	-	-	-	-	N/A

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
_1F Circulation		130	-	-
_1F Cycle store		130	-	-
_1F Laundry		130	-	-
_1F Lift		130	-	-

General lighting and display lighting		General luminaire		Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]	
	Standard value	95	80	0.3	
_1F Plant		130	-	-	
_1F Plant		130	-	-	
_1F Riser		130	-	-	
_1F Stairs		130	-	-	
0F Bathroom 1		130	-	-	
0F Bathroom 2		130	-	-	
0F Bathroom 3		130	-	-	
0F Bathroom 4		130	-	-	
0F Bathroom 5		130	-	-	
0F Bathroom 6		130	-	-	
0F Bathroom 7		130	-	-	
0F Bathroom 8		130	-	-	
0F Bathroom 9		130	-	-	
0F Bathroom 10		130	-	-	
0F Circulation		130	-	-	
0F Circulation		130	-	-	
0F Communal corridor		130	-	-	
0F Lift		130	-	-	
0F Lift		130	-	-	
0F Refuse		130	-	-	
0F Residential entrance		130	-	-	
0F Riser		130	-	-	
0F Risers		130	-	-	
0F Stairs		130	-	-	
0F Stairs		130	-	-	
0F Studio 1		130	-	-	
0F Studio 2		130	-	-	
0F Studio 3		130	-	-	
0F Studio 4		130	-	-	
0F Studio 5		130	-	-	
0F Studio 6		130	-	-	
0F Studio 7		130	-	-	
0F Studio 8		130	-	-	
0F Studio 9		130	-	-	
0F Studio 10		130	-	-	
0F Substation		130	-	-	
1F Bathroom 1		130	-	-	
1F Bathroom 2		130	-	-	
1F Bathroom 3		130	-	-	
1F Bathroom 4		130	-	-	
1F Bathroom 5		130	-	-	
1F Bathroom 6		130	-	-	
1F Bathroom 7		130	-	-	

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
1F Bathroom 8		130	-	-
1F Bathroom 9		130	-	-
1F Bathroom 10		130	-	-
1F Bathroom 11		130	-	-
1F Bathroom 12		130	-	-
1F Bathroom 13		130	-	-
1F Bathroom 14		130	-	-
1F Bathroom 15		130	-	-
1F Bathroom 16		130	-	-
1F Bathroom 17		130	-	-
1F Bathroom 18		130	-	-
1F Bathroom 19		130	-	-
1F Bathroom 20		130	-	-
1F Bathroom 21		130	-	-
1F Bathroom 22		130	-	-
1F Bathroom 23		130	-	-
1F Bathroom 24		130	-	-
1F Bathroom 25		130	-	-
1F Bathroom 26		130	-	-
1F Bathroom 27		130	-	-
1F Communal corridor A		130	-	-
1F Communal corridor B		130	-	-
1F Lift		130	-	-
1F Lift		130	-	-
1F Riser		130	-	-
1F Riser		130	-	-
1F Riser		130	-	-
1F Riser		130	-	-
1F Stairs		130	-	-
1F Stairs		130	-	-
1F Studio 1		130	-	-
1F Studio 2		130	-	-
1F Studio 3		130	-	-
1F Studio 4		130	-	-
1F Studio 5		130	-	-
1F Studio 6		130	-	-
1F Studio 7		130	-	-
1F Studio 8		130	-	-
1F Studio 9		130	-	-
1F Studio 10		130	-	-
1F Studio 11		130	-	-
1F Studio 12		130	-	-
1F Studio 13		130	-	-

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
1F Studio 14		130	-	-
1F Studio 15		130	-	-
1F Studio 16		130	-	-
1F Studio 17		130	-	-
1F Studio 18		130	-	-
1F Studio 19		130	-	-
1F Studio 20		130	-	-
1F Studio 21		130	-	-
1F Studio 22		130	-	-
1F Studio 23		130	-	-
1F Studio 24		130	-	-
1F Studio 25		130	-	-
1F Studio 26		130	-	-
1F Studio 27		130	-	-
2F Bathroom 1		130	-	-
2F Bathroom 2		130	-	-
2F Bathroom 3		130	-	-
2F Bathroom 4		130	-	-
2F Bathroom 5		130	-	-
2F Bathroom 6		130	-	-
2F Bathroom 7		130	-	-
2F Bathroom 8		130	-	-
2F Bathroom 9		130	-	-
2F Bathroom 10		130	-	-
2F Bathroom 11		130	-	-
2F Bathroom 12		130	-	-
2F Bathroom 13		130	-	-
2F Bathroom 14		130	-	-
2F Bathroom 15		130	-	-
2F Bathroom 16		130	-	-
2F Bathroom 17		130	-	-
2F Bathroom 18		130	-	-
2F Bathroom 19		130	-	-
2F Bathroom 20		130	-	-
2F Bathroom 21		130	-	-
2F Bathroom 22		130	-	-
2F Bathroom 23		130	-	-
2F Bathroom 24		130	-	-
2F Bathroom 25		130	-	-
2F Bathroom 26		130	-	-
2F Bathroom 27		130	-	-
2F Communal corridor A		130	-	-
2F Communal corridor B		130	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
2F Lift		130	-	-
2F Lift		130	-	-
2F Riser		130	-	-
2F Riser		130	-	-
2F Riser		130	-	-
2F Riser		130	-	-
2F Stairs		130	-	-
2F Stairs		130	-	-
2F Studio 1		130	-	-
2F Studio 2		130	-	-
2F Studio 3		130	-	-
2F Studio 4		130	-	-
2F Studio 5		130	-	-
2F Studio 6		130	-	-
2F Studio 7		130	-	-
2F Studio 8		130	-	-
2F Studio 9		130	-	-
2F Studio 10		130	-	-
2F Studio 11		130	-	-
2F Studio 12		130	-	-
2F Studio 13		130	-	-
2F Studio 14		130	-	-
2F Studio 15		130	-	-
2F Studio 16		130	-	-
2F Studio 17		130	-	-
2F Studio 18		130	-	-
2F Studio 19		130	-	-
2F Studio 20		130	-	-
2F Studio 21		130	-	-
2F Studio 22		130	-	-
2F Studio 23		130	-	-
2F Studio 24		130	-	-
2F Studio 25		130	-	-
2F Studio 26		130	-	-
2F Studio 27		130	-	-
3F Bathroom 1		130	-	-
3F Bathroom 2		130	-	-
3F Bathroom 3		130	-	-
3F Bathroom 4		130	-	-
3F Bathroom 5		130	-	-
3F Bathroom 6		130	-	-
3F Bathroom 7		130	-	-
3F Bathroom 8		130	-	-

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
3F Bathroom 9		130	-	-
3F Bathroom 10		130	-	-
3F Bathroom 11		130	-	-
3F Bathroom 12		130	-	-
3F Bathroom 13		130	-	-
3F Bathroom 14		130	-	-
3F Bathroom 15		130	-	-
3F Bathroom 16		130	-	-
3F Bathroom 17		130	-	-
3F Bathroom 18		130	-	-
3F Bathroom 19		130	-	-
3F Bathroom 20		130	-	-
3F Bathroom 21		130	-	-
3F Bathroom 22		130	-	-
3F Bathroom 23		130	-	-
3F Bathroom 24		130	-	-
3F Bathroom 25		130	-	-
3F Bathroom 26		130	-	-
3F Bathroom 27		130	-	-
3F Communal corridor A		130	-	-
3F Communal corridor B		130	-	-
3F Lift		130	-	-
3F Lift		130	-	-
3F Riser		130	-	-
3F Riser		130	-	-
3F Riser		130	-	-
3F Riser		130	-	-
3F Stairs		130	-	-
3F Stairs		130	-	-
3F Studio 1		130	-	-
3F Studio 2		130	-	-
3F Studio 3		130	-	-
3F Studio 4		130	-	-
3F Studio 5		130	-	-
3F Studio 6		130	-	-
3F Studio 7		130	-	-
3F Studio 8		130	-	-
3F Studio 9		130	-	-
3F Studio 10		130	-	-
3F Studio 11		130	-	-
3F Studio 12		130	-	-
3F Studio 13		130	-	-
3F Studio 14		130	-	-

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
3F Studio 15		130	-	-
3F Studio 16		130	-	-
3F Studio 17		130	-	-
3F Studio 18		130	-	-
3F Studio 19		130	-	-
3F Studio 20		130	-	-
3F Studio 21		130	-	-
3F Studio 22		130	-	-
3F Studio 23		130	-	-
3F Studio 24		130	-	-
3F Studio 25		130	-	-
3F Studio 26		130	-	-
3F Studio 27		130	-	-
4F Bathroom 1		130	-	-
4F Bathroom 2		130	-	-
4F Bathroom 3		130	-	-
4F Bathroom 4		130	-	-
4F Bathroom 5		130	-	-
4F Bathroom 6		130	-	-
4F Bathroom 7		130	-	-
4F Bathroom 8		130	-	-
4F Bathroom 9		130	-	-
4F Bathroom 10		130	-	-
4F Bathroom 11		130	-	-
4F Bathroom 12		130	-	-
4F Bathroom 13		130	-	-
4F Bathroom 14		130	-	-
4F Bathroom 15		130	-	-
4F Bathroom 16		130	-	-
4F Bathroom 17		130	-	-
4F Bathroom 18		130	-	-
4F Bathroom 19		130	-	-
4F Bathroom 20		130	-	-
4F Bathroom 21		130	-	-
4F Bathroom 22		130	-	-
4F Bathroom 23		130	-	-
4F Bathroom 24		130	-	-
4F Bathroom 25		130	-	-
4F Bathroom 26		130	-	-
4F Bathroom 27		130	-	-
4F Communal corridor A		130	-	-
4F Communal corridor B		130	-	-
4F Lift		130	-	-

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
4F Lift		130	-	-
4F Riser		130	-	-
4F Riser		130	-	-
4F Riser		130	-	-
4F Riser		130	-	-
4F Stairs		130	-	-
4F Stairs		130	-	-
4F Studio 1		130	-	-
4F Studio 2		130	-	-
4F Studio 3		130	-	-
4F Studio 4		130	-	-
4F Studio 5		130	-	-
4F Studio 6		130	-	-
4F Studio 7		130	-	-
4F Studio 8		130	-	-
4F Studio 9		130	-	-
4F Studio 10		130	-	-
4F Studio 11		130	-	-
4F Studio 12		130	-	-
4F Studio 13		130	-	-
4F Studio 14		130	-	-
4F Studio 15		130	-	-
4F Studio 16		130	-	-
4F Studio 17		130	-	-
4F Studio 18		130	-	-
4F Studio 19		130	-	-
4F Studio 20		130	-	-
4F Studio 21		130	-	-
4F Studio 22		130	-	-
4F Studio 23		130	-	-
4F Studio 24		130	-	-
4F Studio 25		130	-	-
4F Studio 26		130	-	-
4F Studio 27		130	-	-
5F Bathroom 1		130	-	-
5F Bathroom 2		130	-	-
5F Bathroom 3		130	-	-
5F Bathroom 4		130	-	-
5F Bathroom 5		130	-	-
5F Bathroom 6		130	-	-
5F Bathroom 7		130	-	-
5F Bathroom 8		130	-	-
5F Bathroom 9		130	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
5F Bathroom 10		130	-	-
5F Bathroom 11		130	-	-
5F Bathroom 12		130	-	-
5F Bathroom 13		130	-	-
5F Bathroom 14		130	-	-
5F Bathroom 15		130	-	-
5F Bathroom 16		130	-	-
5F Bathroom 17		130	-	-
5F Bathroom 18		130	-	-
5F Bathroom 19		130	-	-
5F Bathroom 20		130	-	-
5F Bathroom 21		130	-	-
5F Bathroom 22		130	-	-
5F Bathroom 23		130	-	-
5F Bathroom 24		130	-	-
5F Bathroom 25		130	-	-
5F Bathroom 26		130	-	-
5F Bathroom 27		130	-	-
5F Communal corridor A		130	-	-
5F Communal corridor B		130	-	-
5F Lift		130	-	-
5F Lift		130	-	-
5F Riser		130	-	-
5F Riser		130	-	-
5F Riser		130	-	-
5F Riser		130	-	-
5F Riser		130	-	-
5F Stairs		130	-	-
5F Stairs		130	-	-
5F Studio 1		130	-	-
5F Studio 2		130	-	-
5F Studio 3		130	-	-
5F Studio 4		130	-	-
5F Studio 5		130	-	-
5F Studio 6		130	-	-
5F Studio 7		130	-	-
5F Studio 8		130	-	-
5F Studio 9		130	-	-
5F Studio 10		130	-	-
5F Studio 11		130	-	-
5F Studio 12		130	-	-
5F Studio 13		130	-	-
5F Studio 14		130	-	-
5F Studio 15		130	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
5F Studio 16		130	-	-
5F Studio 17		130	-	-
5F Studio 18		130	-	-
5F Studio 19		130	-	-
5F Studio 20		130	-	-
5F Studio 21		130	-	-
5F Studio 22		130	-	-
5F Studio 23		130	-	-
5F Studio 24		130	-	-
5F Studio 25		130	-	-
5F Studio 26		130	-	-
5F Studio 27		130	-	-
6F Lift		130	-	-
6F Lift		130	-	-
6F Riser		130	-	-
6F Riser		130	-	-
6F Stairs		130	-	-
0F Co-work cafe		130	110	1.364
0F Gym		130	-	-
0F Post		130	-	-
0F Private dining		130	110	1.364
0F Residential co-working		130	-	-
0F Residential co-working 2		130	-	-
0F Shared dining		130	110	1.364
0F Shared lounge		130	-	-
0F WCs		130	-	-

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?
0F Studio 1	NO (-24.7%)	NO
0F Studio 2	NO (-83%)	NO
0F Studio 3	NO (-51.9%)	NO
0F Studio 4	NO (-52.3%)	NO
0F Studio 5	NO (-52.6%)	NO
0F Studio 6	NO (-52.6%)	NO
0F Studio 7	NO (-53.5%)	NO
0F Studio 8	NO (-51.1%)	NO
0F Studio 9	NO (-53.3%)	NO
0F Studio 10	NO (-81.3%)	NO
1F Studio 1	NO (-31.2%)	NO
1F Studio 2	NO (-52.5%)	NO
1F Studio 3	NO (-53.5%)	NO
1F Studio 4	NO (-69.6%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
1F Studio 5	NO (-76.4%)	NO
1F Studio 6	NO (-69.4%)	NO
1F Studio 7	NO (-70.3%)	NO
1F Studio 8	NO (-70%)	NO
1F Studio 9	NO (-69.1%)	NO
1F Studio 10	NO (-70.3%)	NO
1F Studio 11	NO (-69%)	NO
1F Studio 12	NO (-52.9%)	NO
1F Studio 13	NO (-52.2%)	NO
1F Studio 14	NO (-51.5%)	NO
1F Studio 15	NO (-53.6%)	NO
1F Studio 16	NO (-49.5%)	NO
1F Studio 17	NO (-52.7%)	NO
1F Studio 18	NO (-80.9%)	NO
1F Studio 19	NO (-51.1%)	NO
1F Studio 20	NO (-51.6%)	NO
1F Studio 21	NO (-52.4%)	NO
1F Studio 22	NO (-51%)	NO
1F Studio 23	NO (-51.9%)	NO
1F Studio 24	NO (-50.6%)	NO
1F Studio 25	NO (-82.7%)	NO
1F Studio 26	NO (-51.7%)	NO
1F Studio 27	NO (-52.9%)	NO
2F Studio 1	NO (-31.2%)	NO
2F Studio 2	NO (-52.5%)	NO
2F Studio 3	NO (-53.5%)	NO
2F Studio 4	NO (-69.6%)	NO
2F Studio 5	NO (-88.1%)	NO
2F Studio 6	NO (-69.4%)	NO
2F Studio 7	NO (-70.3%)	NO
2F Studio 8	NO (-70%)	NO
2F Studio 9	NO (-69.1%)	NO
2F Studio 10	NO (-70.3%)	NO
2F Studio 11	NO (-69%)	NO
2F Studio 12	NO (-52.9%)	NO
2F Studio 13	NO (-52.2%)	NO
2F Studio 14	NO (-51.5%)	NO
2F Studio 15	NO (-53.6%)	NO
2F Studio 16	NO (-49.5%)	NO
2F Studio 17	NO (-52.7%)	NO
2F Studio 18	NO (-80.9%)	NO
2F Studio 19	NO (-51.1%)	NO
2F Studio 20	NO (-51.6%)	NO
2F Studio 21	NO (-52.4%)	NO
2F Studio 22	NO (-51%)	NO
2F Studio 23	NO (-51.9%)	NO
2F Studio 24	NO (-50.6%)	NO
2F Studio 25	NO (-82.7%)	NO
2F Studio 26	NO (-51.7%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
2F Studio 27	NO (-52.9%)	NO
3F Studio 1	NO (-31.2%)	NO
3F Studio 2	NO (-94.7%)	NO
3F Studio 3	NO (-53.5%)	NO
3F Studio 4	NO (-96.5%)	NO
3F Studio 5	NO (-88.1%)	NO
3F Studio 6	NO (-69.4%)	NO
3F Studio 7	NO (-70.3%)	NO
3F Studio 8	NO (-70%)	NO
3F Studio 9	NO (-69.1%)	NO
3F Studio 10	NO (-70.3%)	NO
3F Studio 11	NO (-69%)	NO
3F Studio 12	NO (-52.9%)	NO
3F Studio 13	NO (-52.2%)	NO
3F Studio 14	NO (-51.5%)	NO
3F Studio 15	NO (-53.6%)	NO
3F Studio 16	NO (-49.5%)	NO
3F Studio 17	NO (-52.7%)	NO
3F Studio 18	NO (-80.9%)	NO
3F Studio 19	NO (-51.1%)	NO
3F Studio 20	NO (-51.6%)	NO
3F Studio 21	NO (-52.4%)	NO
3F Studio 22	NO (-51%)	NO
3F Studio 23	NO (-51.9%)	NO
3F Studio 24	NO (-50.6%)	NO
3F Studio 25	NO (-82.7%)	NO
3F Studio 26	NO (-51.7%)	NO
3F Studio 27	NO (-52.9%)	NO
4F Studio 1	NO (-31.2%)	NO
4F Studio 2	NO (-81.7%)	NO
4F Studio 3	NO (-53.5%)	NO
4F Studio 4	NO (-88.1%)	NO
4F Studio 5	NO (-88.1%)	NO
4F Studio 6	NO (-69.4%)	NO
4F Studio 7	NO (-70.3%)	NO
4F Studio 8	NO (-70%)	NO
4F Studio 9	NO (-69.1%)	NO
4F Studio 10	NO (-70.3%)	NO
4F Studio 11	NO (-69%)	NO
4F Studio 12	NO (-52.9%)	NO
4F Studio 13	NO (-52.2%)	NO
4F Studio 14	NO (-51.5%)	NO
4F Studio 15	NO (-53.6%)	NO
4F Studio 16	NO (-49.5%)	NO
4F Studio 17	NO (-52.7%)	NO
4F Studio 18	NO (-80.9%)	NO
4F Studio 19	NO (-51.1%)	NO
4F Studio 20	NO (-51.6%)	NO
4F Studio 21	NO (-52.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
4F Studio 22	NO (-51%)	NO
4F Studio 23	NO (-51.9%)	NO
4F Studio 24	NO (-50.6%)	NO
4F Studio 25	NO (-82.7%)	NO
4F Studio 26	NO (-51.7%)	NO
4F Studio 27	NO (-52.9%)	NO
5F Studio 1	NO (-31.2%)	NO
5F Studio 2	NO (-81.7%)	NO
5F Studio 3	NO (-53.5%)	NO
5F Studio 4	NO (-88.1%)	NO
5F Studio 5	NO (-88.1%)	NO
5F Studio 6	NO (-69.4%)	NO
5F Studio 7	NO (-70.3%)	NO
5F Studio 8	NO (-70%)	NO
5F Studio 9	NO (-69.1%)	NO
5F Studio 10	NO (-70.3%)	NO
5F Studio 11	NO (-69%)	NO
5F Studio 12	NO (-52.9%)	NO
5F Studio 13	NO (-52.2%)	NO
5F Studio 14	NO (-51.5%)	NO
5F Studio 15	NO (-53.6%)	NO
5F Studio 16	NO (-49.5%)	NO
5F Studio 17	NO (-52.7%)	NO
5F Studio 18	NO (-80.9%)	NO
5F Studio 19	NO (-51.1%)	NO
5F Studio 20	NO (-51.6%)	NO
5F Studio 21	NO (-52.4%)	NO
5F Studio 22	NO (-51%)	NO
5F Studio 23	NO (-51.9%)	NO
5F Studio 24	NO (-50.6%)	NO
5F Studio 25	NO (-82.7%)	NO
5F Studio 26	NO (-51.7%)	NO
5F Studio 27	NO (-52.9%)	NO
0F Co-work cafe	NO (-60.9%)	NO
0F Gym	N/A	N/A
0F Post	N/A	N/A
0F Private dining	NO (-71.3%)	YES
0F Residential co-working	NO (-58.8%)	NO
0F Residential co-working 2	NO (-41.9%)	NO
0F Shared dining	NO (-71.5%)	YES
0F Shared lounge	NO (-38.9%)	YES
0F WCs	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

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

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	4927.7	4927.7
External area [m ²]	4467.7	4467.7
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	1298.35	1820.12
Average U-value [W/m ² K]	0.29	0.41
Alpha value* [%]	35.95	24.99

* 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

100 Hotels

Residential Institutions: Hospitals and Care Homes
 Residential Institutions: Residential Schools
 Residential Institutions: Universities and Colleges
 Secure Residential Institutions
 Residential Spaces
 Non-residential Institutions: Community/Day Centre
 Non-residential Institutions: Libraries, Museums, and Galleries
 Non-residential Institutions: Education
 Non-residential Institutions: Primary Health Care Building
 Non-residential Institutions: Crown and County Courts
 General Assembly and Leisure, Night Clubs, and Theatres
 Others: Passenger Terminals
 Others: Emergency Services
 Others: Miscellaneous 24hr Activities
 Others: Car Parks 24 hrs
 Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	7.49	8.39
Cooling	1.02	0.95
Auxiliary	7.39	5.56
Lighting	5.77	7.76
Hot water	50.4	65.54
Equipment*	14.8	14.8
TOTAL **	72.07	88.19

* 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/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>0</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	121.58	143.27
Primary energy [kWh _{PE} /m ²]	106.76	130.6
Total emissions [kg/m ²]	9.87	12.07

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Central heating using water: radiators, [HS] GSHP/WSHP, [HFT] Electricity, [CFT] Electricity										
	Actual	75.4	37	7.9	0	6.9	2.64	0	2.81	0
	Notional	84.6	52.5	8.9	0	5.1	2.64	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	19.5	217.1	2.1	13.7	13.4	2.64	4.4	2.7	5.89
	Notional	19	201	2	12.7	6.5	2.64	4.4	----	----

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

Project name

Step 3 - LZC Assessment

As designed

Date: Tue Jul 21 15:33:20 2026

Administrative information**Building Details**

Address: 138-144 Friar Street, Reading, RG1 1EX

Certifier details

Name: Ecolytk Ltd

Telephone number: 0203 835 4114

Address: 86-90 Paul Street, London, EC2A 4NE

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.31

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

Foundation area [m²]: 615.95**The CO₂ emission and primary energy rates of the building must not exceed the targets**

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	12.07
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	9.18
Target primary energy rate (TPER), kWh _{PE} /m ² annum	130.6
Building primary energy rate (BPER), kWh _{PE} /m ² annum	99.18
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-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.15	0.15	1F000003_W1
Floors	0.18	0.1	0.1	1F000003_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.11	0.11	1F000001_C
Windows** and roof windows	1.6	1.2	1.2	0F000003_W1_O0
Rooflights***	2.2	1.2	1.2	0F000022_C_O0
Personnel doors^	1.6	1.3	1.3	0F00001F_W9_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-Limit} = Limiting area-weighted average U-values [W/(m²K)]U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]U_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]

* 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/m²K

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

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

Building services

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

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

1- ASHP

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.2	-	-	-	-
Standard value	2.5*	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 all types >12 kW output, except absorption and gas engine heat pumps.					

2- GF ASHP

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.61	5.3	-	-	-
Standard value	2.5*	5	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 all types >12 kW output, except absorption and gas engine heat pumps.					

1- SYST0000-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0.001
Standard value	N/A	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		Zone	Standard
_1F Laundry	-	-	0.3	-	-	-	-	-	-	-	-	N/A
0F Bathroom 1	-	-	-	-	0.8	-	-	-	-	0.8	-	N/A
0F Bathroom 2	-	-	-	-	0.8	-	-	-	-	0.8	-	N/A
0F Bathroom 3	-	-	-	-	0.8	-	-	-	-	0.8	-	N/A
0F Bathroom 4	-	-	-	-	0.8	-	-	-	-	0.8	-	N/A
0F Bathroom 5	-	-	-	-	0.8	-	-	-	-	0.8	-	N/A
0F Bathroom 6	-	-	-	-	0.8	-	-	-	-	0.8	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
0F Bathroom 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Bathroom 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Bathroom 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Bathroom 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Studio 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Studio 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Studio 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Studio 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Studio 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Studio 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Studio 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Studio 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Studio 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Studio 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 12	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 13	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 14	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 15	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 16	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 17	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Bathroom 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I		
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
1F Studio 3		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 4		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 5		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 6		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 7		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 8		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 9		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 10		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 11		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 12		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 13		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 14		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 15		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 16		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 17		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 18		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 19		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 20		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 21		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 22		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 23		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 24		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 25		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 26		-	-	-	-	0.8	-	-	-	-	0.8	N/A
1F Studio 27		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 1		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 2		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 3		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 4		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 5		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 6		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 7		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 8		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 9		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 10		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 11		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 12		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 13		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 14		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 15		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 16		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 17		-	-	-	-	0.8	-	-	-	-	0.8	N/A
2F Bathroom 18		-	-	-	-	0.8	-	-	-	-	0.8	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard	
2F Bathroom 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Bathroom 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Bathroom 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Bathroom 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Bathroom 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Bathroom 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Bathroom 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Bathroom 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Bathroom 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 12	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 13	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 14	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 15	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 16	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 17	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
2F Studio 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
3F Bathroom 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
3F Bathroom 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
3F Bathroom 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
3F Bathroom 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
3F Bathroom 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
3F Bathroom 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
3F Bathroom 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A	

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
3F Bathroom 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 12	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 13	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 14	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 15	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 16	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 17	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Bathroom 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 12	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 13	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 14	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 15	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 16	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 17	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A
3F Studio 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard	
3F Studio 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
3F Studio 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
3F Studio 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
3F Studio 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 12	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 13	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 14	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 15	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 16	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 17	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Bathroom 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 12	-	-	-	-	0.8	-	-	-	-	0.8	N/A	

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard	
4F Studio 13	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 14	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 15	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 16	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 17	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
4F Studio 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 2	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 3	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 4	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 5	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 6	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 7	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 8	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 9	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 10	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 11	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 12	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 13	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 14	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 15	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 16	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 17	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 18	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 19	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 20	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 21	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 22	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 23	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 24	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 25	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 26	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Bathroom 27	-	-	-	-	0.8	-	-	-	-	0.8	N/A	
5F Studio 1	-	-	-	-	0.8	-	-	-	-	0.8	N/A	

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I		
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
5F Studio 2		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 3		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 4		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 5		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 6		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 7		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 8		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 9		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 10		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 11		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 12		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 13		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 14		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 15		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 16		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 17		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 18		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 19		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 20		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 21		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 22		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 23		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 24		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 25		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 26		-	-	-	-	0.8	-	-	-	-	0.8	N/A
5F Studio 27		-	-	-	-	0.8	-	-	-	-	0.8	N/A
0F Co-work cafe		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F Gym		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F Private dining		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F Residential co-working		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F Residential co-working 2		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F Shared dining		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F Shared lounge		-	-	-	-	1.8	-	-	-	-	0.8	N/A
0F WCs		-	-	0.3	-	-	-	-	-	-	-	N/A

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
_1F Circulation		130	-	-
_1F Cycle store		130	-	-
_1F Laundry		130	-	-
_1F Lift		130	-	-
_1F Plant		130	-	-

General lighting and display lighting		General luminaire		Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80		0.3
_1F Plant		130	-		-
_1F Riser		130	-		-
_1F Stairs		130	-		-
0F Bathroom 1		130	-		-
0F Bathroom 2		130	-		-
0F Bathroom 3		130	-		-
0F Bathroom 4		130	-		-
0F Bathroom 5		130	-		-
0F Bathroom 6		130	-		-
0F Bathroom 7		130	-		-
0F Bathroom 8		130	-		-
0F Bathroom 9		130	-		-
0F Bathroom 10		130	-		-
0F Circulation		130	-		-
0F Circulation		130	-		-
0F Communal corridor		130	-		-
0F Lift		130	-		-
0F Lift		130	-		-
0F Refuse		130	-		-
0F Residential entrance		130	-		-
0F Riser		130	-		-
0F Risers		130	-		-
0F Stairs		130	-		-
0F Stairs		130	-		-
0F Studio 1		130	-		-
0F Studio 2		130	-		-
0F Studio 3		130	-		-
0F Studio 4		130	-		-
0F Studio 5		130	-		-
0F Studio 6		130	-		-
0F Studio 7		130	-		-
0F Studio 8		130	-		-
0F Studio 9		130	-		-
0F Studio 10		130	-		-
0F Substation		130	-		-
1F Bathroom 1		130	-		-
1F Bathroom 2		130	-		-
1F Bathroom 3		130	-		-
1F Bathroom 4		130	-		-
1F Bathroom 5		130	-		-
1F Bathroom 6		130	-		-
1F Bathroom 7		130	-		-
1F Bathroom 8		130	-		-

General lighting and display lighting		General luminaire		Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]	
Standard value		95	80	0.3	
1F Bathroom 9		130	-	-	
1F Bathroom 10		130	-	-	
1F Bathroom 11		130	-	-	
1F Bathroom 12		130	-	-	
1F Bathroom 13		130	-	-	
1F Bathroom 14		130	-	-	
1F Bathroom 15		130	-	-	
1F Bathroom 16		130	-	-	
1F Bathroom 17		130	-	-	
1F Bathroom 18		130	-	-	
1F Bathroom 19		130	-	-	
1F Bathroom 20		130	-	-	
1F Bathroom 21		130	-	-	
1F Bathroom 22		130	-	-	
1F Bathroom 23		130	-	-	
1F Bathroom 24		130	-	-	
1F Bathroom 25		130	-	-	
1F Bathroom 26		130	-	-	
1F Bathroom 27		130	-	-	
1F Communal corridor A		130	-	-	
1F Communal corridor B		130	-	-	
1F Lift		130	-	-	
1F Lift		130	-	-	
1F Riser		130	-	-	
1F Riser		130	-	-	
1F Riser		130	-	-	
1F Riser		130	-	-	
1F Stairs		130	-	-	
1F Stairs		130	-	-	
1F Studio 1		130	-	-	
1F Studio 2		130	-	-	
1F Studio 3		130	-	-	
1F Studio 4		130	-	-	
1F Studio 5		130	-	-	
1F Studio 6		130	-	-	
1F Studio 7		130	-	-	
1F Studio 8		130	-	-	
1F Studio 9		130	-	-	
1F Studio 10		130	-	-	
1F Studio 11		130	-	-	
1F Studio 12		130	-	-	
1F Studio 13		130	-	-	
1F Studio 14		130	-	-	

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
1F Studio 15		130	-	-
1F Studio 16		130	-	-
1F Studio 17		130	-	-
1F Studio 18		130	-	-
1F Studio 19		130	-	-
1F Studio 20		130	-	-
1F Studio 21		130	-	-
1F Studio 22		130	-	-
1F Studio 23		130	-	-
1F Studio 24		130	-	-
1F Studio 25		130	-	-
1F Studio 26		130	-	-
1F Studio 27		130	-	-
2F Bathroom 1		130	-	-
2F Bathroom 2		130	-	-
2F Bathroom 3		130	-	-
2F Bathroom 4		130	-	-
2F Bathroom 5		130	-	-
2F Bathroom 6		130	-	-
2F Bathroom 7		130	-	-
2F Bathroom 8		130	-	-
2F Bathroom 9		130	-	-
2F Bathroom 10		130	-	-
2F Bathroom 11		130	-	-
2F Bathroom 12		130	-	-
2F Bathroom 13		130	-	-
2F Bathroom 14		130	-	-
2F Bathroom 15		130	-	-
2F Bathroom 16		130	-	-
2F Bathroom 17		130	-	-
2F Bathroom 18		130	-	-
2F Bathroom 19		130	-	-
2F Bathroom 20		130	-	-
2F Bathroom 21		130	-	-
2F Bathroom 22		130	-	-
2F Bathroom 23		130	-	-
2F Bathroom 24		130	-	-
2F Bathroom 25		130	-	-
2F Bathroom 26		130	-	-
2F Bathroom 27		130	-	-
2F Communal corridor A		130	-	-
2F Communal corridor B		130	-	-
2F Lift		130	-	-

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
2F Lift		130	-	-
2F Riser		130	-	-
2F Riser		130	-	-
2F Riser		130	-	-
2F Riser		130	-	-
2F Stairs		130	-	-
2F Stairs		130	-	-
2F Studio 1		130	-	-
2F Studio 2		130	-	-
2F Studio 3		130	-	-
2F Studio 4		130	-	-
2F Studio 5		130	-	-
2F Studio 6		130	-	-
2F Studio 7		130	-	-
2F Studio 8		130	-	-
2F Studio 9		130	-	-
2F Studio 10		130	-	-
2F Studio 11		130	-	-
2F Studio 12		130	-	-
2F Studio 13		130	-	-
2F Studio 14		130	-	-
2F Studio 15		130	-	-
2F Studio 16		130	-	-
2F Studio 17		130	-	-
2F Studio 18		130	-	-
2F Studio 19		130	-	-
2F Studio 20		130	-	-
2F Studio 21		130	-	-
2F Studio 22		130	-	-
2F Studio 23		130	-	-
2F Studio 24		130	-	-
2F Studio 25		130	-	-
2F Studio 26		130	-	-
2F Studio 27		130	-	-
3F Bathroom 1		130	-	-
3F Bathroom 2		130	-	-
3F Bathroom 3		130	-	-
3F Bathroom 4		130	-	-
3F Bathroom 5		130	-	-
3F Bathroom 6		130	-	-
3F Bathroom 7		130	-	-
3F Bathroom 8		130	-	-
3F Bathroom 9		130	-	-

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	
3F Bathroom 10		130	-	-	
3F Bathroom 11		130	-	-	
3F Bathroom 12		130	-	-	
3F Bathroom 13		130	-	-	
3F Bathroom 14		130	-	-	
3F Bathroom 15		130	-	-	
3F Bathroom 16		130	-	-	
3F Bathroom 17		130	-	-	
3F Bathroom 18		130	-	-	
3F Bathroom 19		130	-	-	
3F Bathroom 20		130	-	-	
3F Bathroom 21		130	-	-	
3F Bathroom 22		130	-	-	
3F Bathroom 23		130	-	-	
3F Bathroom 24		130	-	-	
3F Bathroom 25		130	-	-	
3F Bathroom 26		130	-	-	
3F Bathroom 27		130	-	-	
3F Communal corridor A		130	-	-	
3F Communal corridor B		130	-	-	
3F Lift		130	-	-	
3F Lift		130	-	-	
3F Riser		130	-	-	
3F Riser		130	-	-	
3F Riser		130	-	-	
3F Riser		130	-	-	
3F Stairs		130	-	-	
3F Stairs		130	-	-	
3F Studio 1		130	-	-	
3F Studio 2		130	-	-	
3F Studio 3		130	-	-	
3F Studio 4		130	-	-	
3F Studio 5		130	-	-	
3F Studio 6		130	-	-	
3F Studio 7		130	-	-	
3F Studio 8		130	-	-	
3F Studio 9		130	-	-	
3F Studio 10		130	-	-	
3F Studio 11		130	-	-	
3F Studio 12		130	-	-	
3F Studio 13		130	-	-	
3F Studio 14		130	-	-	
3F Studio 15		130	-	-	

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
3F Studio 16		130	-	-
3F Studio 17		130	-	-
3F Studio 18		130	-	-
3F Studio 19		130	-	-
3F Studio 20		130	-	-
3F Studio 21		130	-	-
3F Studio 22		130	-	-
3F Studio 23		130	-	-
3F Studio 24		130	-	-
3F Studio 25		130	-	-
3F Studio 26		130	-	-
3F Studio 27		130	-	-
4F Bathroom 1		130	-	-
4F Bathroom 2		130	-	-
4F Bathroom 3		130	-	-
4F Bathroom 4		130	-	-
4F Bathroom 5		130	-	-
4F Bathroom 6		130	-	-
4F Bathroom 7		130	-	-
4F Bathroom 8		130	-	-
4F Bathroom 9		130	-	-
4F Bathroom 10		130	-	-
4F Bathroom 11		130	-	-
4F Bathroom 12		130	-	-
4F Bathroom 13		130	-	-
4F Bathroom 14		130	-	-
4F Bathroom 15		130	-	-
4F Bathroom 16		130	-	-
4F Bathroom 17		130	-	-
4F Bathroom 18		130	-	-
4F Bathroom 19		130	-	-
4F Bathroom 20		130	-	-
4F Bathroom 21		130	-	-
4F Bathroom 22		130	-	-
4F Bathroom 23		130	-	-
4F Bathroom 24		130	-	-
4F Bathroom 25		130	-	-
4F Bathroom 26		130	-	-
4F Bathroom 27		130	-	-
4F Communal corridor A		130	-	-
4F Communal corridor B		130	-	-
4F Lift		130	-	-
4F Lift		130	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
4F Riser		130	-	-
4F Riser		130	-	-
4F Riser		130	-	-
4F Riser		130	-	-
4F Stairs		130	-	-
4F Stairs		130	-	-
4F Studio 1		130	-	-
4F Studio 2		130	-	-
4F Studio 3		130	-	-
4F Studio 4		130	-	-
4F Studio 5		130	-	-
4F Studio 6		130	-	-
4F Studio 7		130	-	-
4F Studio 8		130	-	-
4F Studio 9		130	-	-
4F Studio 10		130	-	-
4F Studio 11		130	-	-
4F Studio 12		130	-	-
4F Studio 13		130	-	-
4F Studio 14		130	-	-
4F Studio 15		130	-	-
4F Studio 16		130	-	-
4F Studio 17		130	-	-
4F Studio 18		130	-	-
4F Studio 19		130	-	-
4F Studio 20		130	-	-
4F Studio 21		130	-	-
4F Studio 22		130	-	-
4F Studio 23		130	-	-
4F Studio 24		130	-	-
4F Studio 25		130	-	-
4F Studio 26		130	-	-
4F Studio 27		130	-	-
5F Bathroom 1		130	-	-
5F Bathroom 2		130	-	-
5F Bathroom 3		130	-	-
5F Bathroom 4		130	-	-
5F Bathroom 5		130	-	-
5F Bathroom 6		130	-	-
5F Bathroom 7		130	-	-
5F Bathroom 8		130	-	-
5F Bathroom 9		130	-	-
5F Bathroom 10		130	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
5F Bathroom 11		130	-	-
5F Bathroom 12		130	-	-
5F Bathroom 13		130	-	-
5F Bathroom 14		130	-	-
5F Bathroom 15		130	-	-
5F Bathroom 16		130	-	-
5F Bathroom 17		130	-	-
5F Bathroom 18		130	-	-
5F Bathroom 19		130	-	-
5F Bathroom 20		130	-	-
5F Bathroom 21		130	-	-
5F Bathroom 22		130	-	-
5F Bathroom 23		130	-	-
5F Bathroom 24		130	-	-
5F Bathroom 25		130	-	-
5F Bathroom 26		130	-	-
5F Bathroom 27		130	-	-
5F Communal corridor A		130	-	-
5F Communal corridor B		130	-	-
5F Lift		130	-	-
5F Lift		130	-	-
5F Riser		130	-	-
5F Riser		130	-	-
5F Riser		130	-	-
5F Riser		130	-	-
5F Stairs		130	-	-
5F Stairs		130	-	-
5F Studio 1		130	-	-
5F Studio 2		130	-	-
5F Studio 3		130	-	-
5F Studio 4		130	-	-
5F Studio 5		130	-	-
5F Studio 6		130	-	-
5F Studio 7		130	-	-
5F Studio 8		130	-	-
5F Studio 9		130	-	-
5F Studio 10		130	-	-
5F Studio 11		130	-	-
5F Studio 12		130	-	-
5F Studio 13		130	-	-
5F Studio 14		130	-	-
5F Studio 15		130	-	-
5F Studio 16		130	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
5F Studio 17		130	-	-
5F Studio 18		130	-	-
5F Studio 19		130	-	-
5F Studio 20		130	-	-
5F Studio 21		130	-	-
5F Studio 22		130	-	-
5F Studio 23		130	-	-
5F Studio 24		130	-	-
5F Studio 25		130	-	-
5F Studio 26		130	-	-
5F Studio 27		130	-	-
6F Lift		130	-	-
6F Lift		130	-	-
6F Riser		130	-	-
6F Riser		130	-	-
6F Stairs		130	-	-
0F Co-work cafe		130	110	1.364
0F Gym		130	-	-
0F Post		130	-	-
0F Private dining		130	110	1.364
0F Residential co-working		130	-	-
0F Residential co-working 2		130	-	-
0F Shared dining		130	110	1.364
0F Shared lounge		130	-	-
0F WCs		130	-	-

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?
0F Studio 1	NO (-24.7%)	NO
0F Studio 2	NO (-83%)	NO
0F Studio 3	NO (-51.9%)	NO
0F Studio 4	NO (-52.3%)	NO
0F Studio 5	NO (-52.6%)	NO
0F Studio 6	NO (-52.6%)	NO
0F Studio 7	NO (-53.5%)	NO
0F Studio 8	NO (-51.1%)	NO
0F Studio 9	NO (-53.3%)	NO
0F Studio 10	NO (-81.3%)	NO
1F Studio 1	NO (-31.2%)	NO
1F Studio 2	NO (-52.5%)	NO
1F Studio 3	NO (-53.5%)	NO
1F Studio 4	NO (-69.6%)	NO
1F Studio 5	NO (-76.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
1F Studio 6	NO (-69.4%)	NO
1F Studio 7	NO (-70.3%)	NO
1F Studio 8	NO (-70%)	NO
1F Studio 9	NO (-69.1%)	NO
1F Studio 10	NO (-70.3%)	NO
1F Studio 11	NO (-69%)	NO
1F Studio 12	NO (-52.9%)	NO
1F Studio 13	NO (-52.2%)	NO
1F Studio 14	NO (-51.5%)	NO
1F Studio 15	NO (-53.6%)	NO
1F Studio 16	NO (-49.5%)	NO
1F Studio 17	NO (-52.7%)	NO
1F Studio 18	NO (-80.9%)	NO
1F Studio 19	NO (-51.1%)	NO
1F Studio 20	NO (-51.6%)	NO
1F Studio 21	NO (-52.4%)	NO
1F Studio 22	NO (-51%)	NO
1F Studio 23	NO (-51.9%)	NO
1F Studio 24	NO (-50.6%)	NO
1F Studio 25	NO (-82.7%)	NO
1F Studio 26	NO (-51.7%)	NO
1F Studio 27	NO (-52.9%)	NO
2F Studio 1	NO (-31.2%)	NO
2F Studio 2	NO (-52.5%)	NO
2F Studio 3	NO (-53.5%)	NO
2F Studio 4	NO (-69.6%)	NO
2F Studio 5	NO (-88.1%)	NO
2F Studio 6	NO (-69.4%)	NO
2F Studio 7	NO (-70.3%)	NO
2F Studio 8	NO (-70%)	NO
2F Studio 9	NO (-69.1%)	NO
2F Studio 10	NO (-70.3%)	NO
2F Studio 11	NO (-69%)	NO
2F Studio 12	NO (-52.9%)	NO
2F Studio 13	NO (-52.2%)	NO
2F Studio 14	NO (-51.5%)	NO
2F Studio 15	NO (-53.6%)	NO
2F Studio 16	NO (-49.5%)	NO
2F Studio 17	NO (-52.7%)	NO
2F Studio 18	NO (-80.9%)	NO
2F Studio 19	NO (-51.1%)	NO
2F Studio 20	NO (-51.6%)	NO
2F Studio 21	NO (-52.4%)	NO
2F Studio 22	NO (-51%)	NO
2F Studio 23	NO (-51.9%)	NO
2F Studio 24	NO (-50.6%)	NO
2F Studio 25	NO (-82.7%)	NO
2F Studio 26	NO (-51.7%)	NO
2F Studio 27	NO (-52.9%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
3F Studio 1	NO (-31.2%)	NO
3F Studio 2	NO (-94.7%)	NO
3F Studio 3	NO (-53.5%)	NO
3F Studio 4	NO (-96.5%)	NO
3F Studio 5	NO (-88.1%)	NO
3F Studio 6	NO (-69.4%)	NO
3F Studio 7	NO (-70.3%)	NO
3F Studio 8	NO (-70%)	NO
3F Studio 9	NO (-69.1%)	NO
3F Studio 10	NO (-70.3%)	NO
3F Studio 11	NO (-69%)	NO
3F Studio 12	NO (-52.9%)	NO
3F Studio 13	NO (-52.2%)	NO
3F Studio 14	NO (-51.5%)	NO
3F Studio 15	NO (-53.6%)	NO
3F Studio 16	NO (-49.5%)	NO
3F Studio 17	NO (-52.7%)	NO
3F Studio 18	NO (-80.9%)	NO
3F Studio 19	NO (-51.1%)	NO
3F Studio 20	NO (-51.6%)	NO
3F Studio 21	NO (-52.4%)	NO
3F Studio 22	NO (-51%)	NO
3F Studio 23	NO (-51.9%)	NO
3F Studio 24	NO (-50.6%)	NO
3F Studio 25	NO (-82.7%)	NO
3F Studio 26	NO (-51.7%)	NO
3F Studio 27	NO (-52.9%)	NO
4F Studio 1	NO (-31.2%)	NO
4F Studio 2	NO (-81.7%)	NO
4F Studio 3	NO (-53.5%)	NO
4F Studio 4	NO (-88.1%)	NO
4F Studio 5	NO (-88.1%)	NO
4F Studio 6	NO (-69.4%)	NO
4F Studio 7	NO (-70.3%)	NO
4F Studio 8	NO (-70%)	NO
4F Studio 9	NO (-69.1%)	NO
4F Studio 10	NO (-70.3%)	NO
4F Studio 11	NO (-69%)	NO
4F Studio 12	NO (-52.9%)	NO
4F Studio 13	NO (-52.2%)	NO
4F Studio 14	NO (-51.5%)	NO
4F Studio 15	NO (-53.6%)	NO
4F Studio 16	NO (-49.5%)	NO
4F Studio 17	NO (-52.7%)	NO
4F Studio 18	NO (-80.9%)	NO
4F Studio 19	NO (-51.1%)	NO
4F Studio 20	NO (-51.6%)	NO
4F Studio 21	NO (-52.4%)	NO
4F Studio 22	NO (-51%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
4F Studio 23	NO (-51.9%)	NO
4F Studio 24	NO (-50.6%)	NO
4F Studio 25	NO (-82.7%)	NO
4F Studio 26	NO (-51.7%)	NO
4F Studio 27	NO (-52.9%)	NO
5F Studio 1	NO (-31.2%)	NO
5F Studio 2	NO (-81.7%)	NO
5F Studio 3	NO (-53.5%)	NO
5F Studio 4	NO (-88.1%)	NO
5F Studio 5	NO (-88.1%)	NO
5F Studio 6	NO (-69.4%)	NO
5F Studio 7	NO (-70.3%)	NO
5F Studio 8	NO (-70%)	NO
5F Studio 9	NO (-69.1%)	NO
5F Studio 10	NO (-70.3%)	NO
5F Studio 11	NO (-69%)	NO
5F Studio 12	NO (-52.9%)	NO
5F Studio 13	NO (-52.2%)	NO
5F Studio 14	NO (-51.5%)	NO
5F Studio 15	NO (-53.6%)	NO
5F Studio 16	NO (-49.5%)	NO
5F Studio 17	NO (-52.7%)	NO
5F Studio 18	NO (-80.9%)	NO
5F Studio 19	NO (-51.1%)	NO
5F Studio 20	NO (-51.6%)	NO
5F Studio 21	NO (-52.4%)	NO
5F Studio 22	NO (-51%)	NO
5F Studio 23	NO (-51.9%)	NO
5F Studio 24	NO (-50.6%)	NO
5F Studio 25	NO (-82.7%)	NO
5F Studio 26	NO (-51.7%)	NO
5F Studio 27	NO (-52.9%)	NO
0F Co-work cafe	NO (-60.9%)	NO
0F Gym	N/A	N/A
0F Post	N/A	N/A
0F Private dining	NO (-71.3%)	YES
0F Residential co-working	NO (-58.8%)	NO
0F Residential co-working 2	NO (-41.9%)	NO
0F Shared dining	NO (-71.5%)	YES
0F Shared lounge	NO (-38.9%)	YES
0F WCs	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

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

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	4927.7	4927.7
External area [m ²]	4467.7	4467.7
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	1298.35	1820.12
Average U-value [W/m ² K]	0.29	0.41
Alpha value* [%]	35.95	24.99

* 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

100 Hotels

Residential Institutions: Hospitals and Care Homes
 Residential Institutions: Residential Schools
 Residential Institutions: Universities and Colleges
 Secure Residential Institutions
 Residential Spaces
 Non-residential Institutions: Community/Day Centre
 Non-residential Institutions: Libraries, Museums, and Galleries
 Non-residential Institutions: Education
 Non-residential Institutions: Primary Health Care Building
 Non-residential Institutions: Crown and County Courts
 General Assembly and Leisure, Night Clubs, and Theatres
 Others: Passenger Terminals
 Others: Emergency Services
 Others: Miscellaneous 24hr Activities
 Others: Car Parks 24 hrs
 Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	6.6	8.39
Cooling	1.13	0.95
Auxiliary	7.12	5.56
Lighting	5.77	7.76
Hot water	47.92	65.54
Equipment*	14.8	14.8
TOTAL **	68.55	88.19

* 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/m²]

	Actual	Notional
Photovoltaic systems	1.59	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>1.59</i>	<i>0</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	121.58	143.27
Primary energy [kWh _{PE} /m ²]	99.18	130.6
Total emissions [kg/m ²]	9.18	12.07

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Central heating using water: radiators, [HS] GSHP/WSHP, [HFT] Electricity, [CFT] Electricity										
	Actual	75.4	37	7	0	6.6	3.01	0	3.2	0
	Notional	84.6	52.5	8.9	0	5.1	2.64	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	19.5	217.1	2.1	15.2	13.4	2.56	3.96	2.61	5.3
	Notional	19	201	2	12.7	6.5	2.64	4.4	----	----

Key to terms

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

Appendix D – BREEAM pre-assessment

BREEAM Pre-assessment

Project: 138-144 Friar Street
Document Version: 03
Date of issue: 29 July 2026
Revision: Draft for team comments
BREEAM Version: BREEAM New Construction v7 Multi-residential Co-living
Scope of pre-assessment: Fully Fitted

Prepared by: SP (BREEAM AP: BREEAMAP1000032); Checked by AE (BREEAM AP: BREEAMAP0761);

A BREEAM pre-assessment has been undertaken for the proposed co-living development at 138-144 Friar Street, Reading. The purpose of this technical note is to demonstrate the BREEAM rating that the development can achieve meets the BREEAM rating required by Reading Borough Council. The pre-assessment shows that the scheme can achieve:

- **Estimated Total Score at pre-assessment stage: 74.9%**
- **Estimated BREEAM rating at pre-assessment stage: Excellent**

Table 1 and Figure 1 on the following page show a summary of the pre-assessment results.

Subsequently, Table 2 on the following page examines each BREEAM category to identify which individual credits are possible. It includes a description of the credit requirements and notes where credits could be potentially achieved, as well as sets out outline information relating to the key actions that should be carried out by the design team to ensure successful certification. It should be noted that a number of credits require action at RIBA Stages 1 and 2 (see items highlighted in green) and should be integrated into the project at an early stage – we recommend that early engagement be undertaken for these credits where feasible to avoid challenges to achieve the corresponding credits further down the design and construction process.

To achieve full certification, formal submission of detailed evidence documentation to the BRE through a certified BREEAM assessor should occur at Detailed Design stage and Post Construction stage. This pre-assessment is intended to provide outline guidance to achieve the targeted BREEAM rating at planning submission stage only and does not constitute a full evidence schedule for Design and Post Construction submissions.

The design team should refer to the details of BREEAM criteria and evidence requirements, accessible at: [BREEAM UK New Construction v7](#)

For ease of reference, actions/evidence responsibilities for the team are colour coded as follows:

- **Client and PM – Fern Asset Management (Client representative)**
- **Architect - FCH**
- **M&E consultant – Innovo**
- **Quantity Surveyor – TBC**
- **Acoustic consultant – Quantum Acoustics**
- **Transport consultant - Mode**
- **Energy and sustainability consultant – Ecolytik**
- **Daylight Consultant - DPR**
- **Drainage consultant - Ridge**
- **Ecologist – JBA**
- **Landscape architect – TBC**
- **Main contractor TBC**
- **Other specialists (including Structural Engineer, Community engagement consultant, Commissioning manager, Suitably Qualified Security Specialist, Lighting designer, Demolition consultant/contractor, Air Quality consultant and IAQ testing, Contaminated land consultant).**

	Stage 2 actions to be carried out prior to the end of Stage 2 Concept Design, and before the start of Stage 3. Mat05 should be started at Stage 1.
	Stage 2 actions that absolutely need to be completed within 20 working days of the planning application is submitted – MAT01
	Stage 2 items that have space/architectural implications

Table references:
P – Prerequisite, E - Exemplary
Subject to notable change in V7.1, updated manual not yet available (in June 2026).

Table 1. BREEAM New Construction v7 Pre-Assessment results summary

	Credits available	Credits targeted	% credits targeted	Available weighted score	Targeted Category Score
Man	21	15	71.43%	11.00%	7.86%
Hea	23	11	47.83%	15.00%	7.17%
Ene	34	26	76.47%	16.50%	12.62%
Tra	12	12	100.00%	8.50%	8.50%
Wat	10	8	80.00%	7.50%	6.00%
Mat	14	9	64.29%	16.00%	10.29%
Wst	10	5	50.00%	7.00%	3.50%
Lue	12	9	75.00%	10.50%	7.88%
Pol	13	10	76.92%	8.00%	6.15%
Inn	10	5	50.00%	10.00%	5.00%
Total	159	110	69.18%	-	74.96%
Rating					Excellent

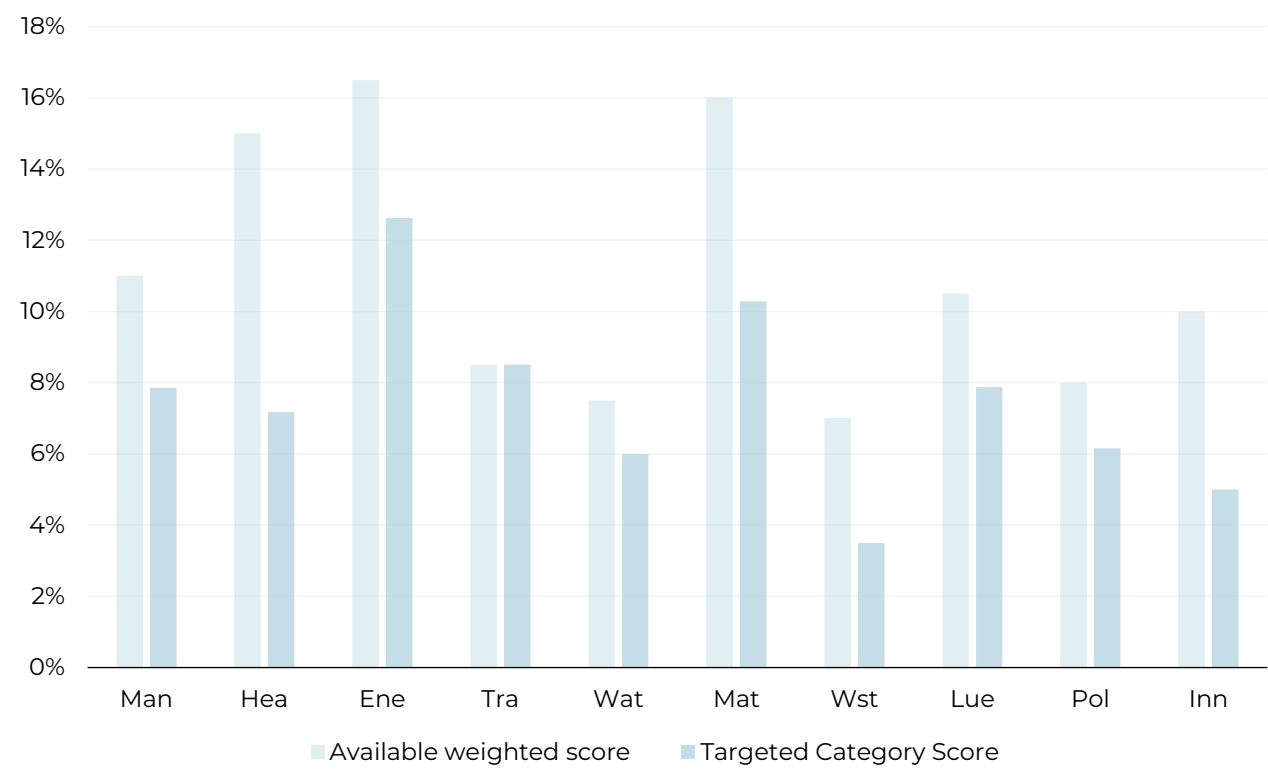


Figure 1. BREEAM New Construction Pre-Assessment performance by category

Table 2. BREEAM Pre-Assessment Schedule

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
Management							
MAN01 Project Brief and Design	Project planning	1	0	Prior to completion of Stage 2, the Client to provide and share a clear briefing document to all relevant parties. Briefing document to include: - Client requirements, e.g. internal environmental conditions required. - Sustainability objectives and targets, including BREEAM performance targets and any wider business or project sustainability objectives. - Timescales and budget. - List of consultees and professional appointments that may be required, e.g. suitably qualified acoustician (SQA) etc. - Constraints for the project, e.g. technical, legal, physical, environmental. Prior to completion of the Stage 2, the project delivery stakeholders to meet to identify and define roles, responsibilities, and contributions for each key phase of project delivery. The following must be considered: - Building user requirements; Aims of the design and design strategy; Particular installation and construction requirements and limitations; Design and construction risk assessments, e.g. national health and safety regulations or best practice, legionella risk assessment; Legislative requirements, e.g. local building regulations, heritage requirements; Sustainability objectives for the project; Ecological protection measures (where required); Procurement and supply chain – responsible and ethical sourcing; Identifying and measuring project success in line with project brief objectives; Building manager's or occupiers' budget and technical expertise in maintaining any proposed systems; Maintainability and adaptability of the proposals; Requirements for the production of project and end user documentation; Requirements for commissioning, training and aftercare support. The project team demonstrate how the project delivery stakeholders' contributions and their input in the design process have influenced the following: - Initial Project Brief; Project Execution Plan; Communication Strategy; Concept Design; Final Design.	Stage 2	- A clear brief from the client. - List in a responsibility matrix (or equivalent) who will be responsible for each role and specific responsibilities at each assessment stage. - Minutes of the key initial meetings to demonstrate that responsibilities were allocated and discussed at the appropriate project stage. - Concise report or summary document, with supporting evidence where required, to demonstrate how the project delivery stakeholders influenced the initial project brief, the project execution plan, communication strategy, and the concept design. - Assessor site inspection report and photographic evidence.	Client and PM
	Stakeholder consultation	1	0	Prior to completion of Stage 2, the design team to consult with all interested parties on matters that cover the minimum consultation content. The project must demonstrate concisely how the interested party contributions and outcomes of the consultation exercise have influenced or changed the initial project brief and concept design; and these changes were implemented within the final design at post-construction. Prior to completion of Stage 4, all interested parties give and receive consultation feedback.	Stage 2	- List all interested parties consulted. - Summary report on how the interested party stakeholder contributions and consultation outcomes influenced or changed the initial project brief and concept design. - Documentation demonstrating the dissemination of feedback to all relevant parties. - Assessor site inspection report and photographic evidence.	Client and PM + Architect + Community engagement consultant
	BREEAM AP (concept design)	1	1	The project team to formally agree strategic BREEAM targets at Concept Stage (Stage 2). Appoint BREEAM AP at Concept Stage.	Stage 2	- Contract or letters of appointment to agree targets. - Meetings minutes, communication records, formal notes of conversations and other statements reporting on discussions.	Client and PM + BREEAM AP

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
	BREEAM AP (monitoring process)	1	1	As above for Developed Design Stage (Stage 4).	Stage 3 and 4	- As above for Developed Design Stage.	Client and PM + BREEAM AP
MAN02 Life cycle cost and service life planning	Elemental LCC options appraisal	2	0	An outline, entire asset LCC plan to be carried out by a competent person at Stage 2 together with any design options appraisals in line with ISO 15686-5:2017 and BREEAM requirements. The elemental LCC plan should provide an indication of future replacement costs over a period of analysis as required by the client (e.g. 20, 30, 50 or 60 years); and should include service life, maintenance and operation cost estimates. Elemental LCC plan to be used to influence building and systems design and specification to minimise life cycle costs and maximise critical value.	Stage 2	- Elemental LCC plan. - Confirmation from the design team as to how the LCC has influenced design/specification and drawings/ specifications to support this. - Assessor site inspection report and photographic evidence.	Quantity Surveyor
	Component Level LCC options appraisal	1	0	A component level LCC options appraisal to be carried out by a competent person by the end of Stage 4 in line with ISO 15686-5:2017 and BREEAM requirements. The component level LL should include the following component types where present: Envelope (e.g. cladding, windows, or roofing), Services (heat source, cooling source, or controls, also intelligent lighting controls against standard controls); Finishes (walls, floors or ceilings); External spaces (alternative hard landscaping, boundary protection). Component LCC plan to be used to influence building and systems design and specification.	Stage 4	- Component level LCC plan. - Confirmation from the design team as to how the LCC has influenced design/specification and drawings/ specifications to support this. - Assessor site inspection report and photographic evidence.	Quantity Surveyor
	Capital cost reporting	1	1	Report the capital cost for the building in pounds per square metre of gross internal floor area (£k/m²) as part of the submission to BRE.	Stage 4 and 5	- Predicted and final capital cost.	Quantity Surveyor
MAN03 Responsible construction	Legal and sustainable timber	P	P	All timber and timber-based products used during the construction process of the project are legal and sustainable timber.	Stage 4 and 5	- Relevant section or clauses of the building specification or contract or a signed and dated letter of commitment to meet the relevant criteria. - Certificates, delivery tickets, invoices, purchase orders, confirmation from suppliers or site photographs, for all timber used onsite.	Client and PM + Contractor
	Environmental management	1	1	All parties who at any stage manage the construction site (e.g. the principal contractor, the demolition contractor) must operate an EMS covering their main operations. The EMS must be third-party certified to ISO 14001, EMAS (EU Eco-Management and Audit Scheme), or an equivalent standard. All parties who manage the construction site at any stage must implement best practice pollution prevention policies and procedures on site, and complete Table 4.2 of the BREEAM manual.	Stage 4 and 5	- Commitment by client at design stage. - A copy of the principal contractor's EMS/EMAS certificate. - A copy of the checklist (Table 4.2) and supporting evidence confirming the proposed measures and procedures against each section. - Evidence to support that procedures and policies for pollution prevention management were in place and implemented.	Client and PM + Contractor
	BREEAM AP (site)	1	1	The client and the contractor to formally agree performance targets. Involve a BREEAM AP at Construction Stage.	Stage 5	- Commitment by client at design stage. - BREEAM AP report.	Client and PM + BREEAM AP

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
	Responsible construction management	2	2	For 1 credit, achieve items required to achieve 1 credit in Table 4.1 of the BREEAM manual. OR => 60% and a minimum pillar score of 55%. <u>(Minimum requirement for BREEAM Excellent and above).</u> For 2 credits, achieve the above for 1 credit, and 6 more items in Table 4.1 of the BREEAM manual. OR => 75% and a minimum pillar score of 65%. <u>(Minimum requirement for BREEAM Outstanding).</u>	Stage 5	- Commitment by client at design stage. - Supporting evidence such as site plans, procedures or policies, site inspection reports or photographs, site records or letters. - CCS certificate and monitor's final report.	Contractor
	Responsible construction management (exemplary)	1E	1E	Achieve all items in Table 4.1 of the BREEAM manual. OR => 85% and a minimum pillar score of 70%.	Stage 5	- As above.	Contractor
	Monitoring of construction site impacts	2	2	Assign responsibility to an individual for monitoring, recording and reporting: - <u>1 Credit</u>: energy use, water consumption and - <u>1 Credit</u>: transportation resulting from all on-site construction processes (and dedicated off-site manufacturing) throughout the build programme.	Stage 5	- Commitment by client at design stage. - Utility records and transportation data for material and waste.	Contractor
MAN04 Commissioning and handover	Schedule and responsibilities	1	1	Prepare a schedule of commissioning and testing covering all relevant systems and controls, and for testing and inspecting building fabric (where relevant). Testing to be carried out in line with appropriate standards (see BREEAM manual). Where a building management system (BMS) is specified: - Carry out commissioning of air and water systems when all control devices are installed, wired and functional; Include physical measurements of room temperatures, off-coil temperatures and other key parameters, as appropriate, in commissioning results; The BMS or 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 prior to handover; Fully train the occupier or facilities team in the operation of the system. Appoint an appropriate project team member to monitor and programme pre-commissioning, commissioning and testing. Where necessary include re-commissioning activities. The principal contractor accounts for the commissioning and testing programme, responsibilities and criteria within their budget and the main programme of works. Allow the required time to complete all commissioning and testing activities prior to handover. <u>(Minimum requirement for BREEAM Very Good and above)</u>	Stage 4 and 5	- Contracts or appointment documents. - Commitment by client at design stage. - Schedule of commissioning and testing. - Principle contractor's programme of works and project budget accounting for commission and testing. - BMS commissioning records or procedures. - Confirmation of appointment of appropriate project team member.	Client and PM + Commissioning manager + Contractor
	Commissioning role	1	1	Achieve the schedule and responsibilities credit above. During the design stage, appoint an appropriate project team member to undertake design reviews and giving advice on suitability for ease of commissioning; provide commissioning management input to construction programming and during installation stages; manage of commissioning, performance testing and handover or post-handover stages. For buildings with complex building services and systems, this role needs to be carried out by a specialist commissioning manager.	Stage 4 and 5	- Contracts or appointment documents. - Design stage commissioning preparation report and meeting minutes. - Copies of design reviews and commissioning records and reports.	Client and PM + Commissioning manager + Contractor
	Envelope testing	1	0	Achieve the schedule and responsibilities credit above.	Stage 5	- Commitment by client at design stage.	Commissioning manager +

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
				Complete post-construction testing and inspection to quality-assure the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths. Airtightness testing and a thermographic survey should be carried out. Rectify any defects identified during post-construction testing and inspection. Any remedial work must meet the required performance characteristics for the building or element as defined at the design stage.		- Thermographic survey and air leakage report. - Verification that remedial works have been completed where required. - Qualifications/certificates for suitably qualified professionals.	Contractor
	Handover	1	1	Prior to handover, develop 2no. building user guides: - a non-technical user guide for distribution to the building occupiers and - a technical user guide for the premises facilities managers. A draft copy is developed and discussed with users first (where the building occupants are known) to ensure the guide is most appropriate and useful to potential users. Prepare 2no. corresponding training schedules timed appropriately around handover and proposed occupation plans for the following users: - a non-technical training schedule for the building occupiers and - a training schedule for the premises facilities managers. <u>(Minimum requirement for BREEAM Very Good and above)</u>	Stage 5	- Commitment by client at design stage. - Building user guides and training schedules.	Client and PM + Contractor
Man 05 Aftercare	Aftercare support	1	1	Provide aftercare support to the building occupiers through having in place operational infrastructure and resources. See BREEAM manual for details. Establish operational infrastructure and resources to coordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months, once the building is substantially occupied. This facilitates analysis of discrepancies between actual and predicted performance, with a view to adjusting systems and user behaviours accordingly.	Stage 5	- Commitment by client at design stage. - Evidence to verify what aftercare has or is due to take place and what procedures are in place for initial and long-term aftercare support. - Where 13 months have passed since building occupation, aftercare data collection records should be available for submission.	Client and PM + Contractor
	In-use commissioning	1	1	Carry out BREEAM compliant in-use commissioning activities over a minimum 12-month period once the building becomes substantially occupied. <u>(Minimum requirement for BREEAM Excellent and above)</u>	Stage 5	- Commitment by client at design stage. - In-use commissioning records/reports and records of occupant interviews.	Contractor
	Post occupancy evaluation	1	1	An independent party to carry out a POE exercise one year after the building is substantially occupied, to gain comprehensive in-use performance feedback and to identify gaps between design intent and in-use performance. The aim is to highlight any improvements or interventions that need to be made and to inform operational processes. The client or building occupier to commit funds to pay for the POE in advance.	Stage 5	- Commitment by client at design stage. - Evidence of the appointment of the independent third-party and schedule of responsibilities which fulfils the BREEAM criteria.	Client and PM
	Zero carbon transition planning	OE	0	Where net zero carbon benchmarks are not met for operational performance and/ or fossil fuels are being used on-site, a competent person develops a Zero Carbon Transition Plan demonstrating how the asset will achieve net zero carbon in operation by 2050 at the latest.	Stage 5	- Commitment by client at design stage. - Copy of compliant zero carbon transition plan.	
Health and Wellbeing							
HEA01 Natural Light	Glare control	1	1	Identify areas at risk of glare using a glare control assessment. The glare control assessment justifies any areas deemed not at risk of glare. Where risk has been identified within a relevant building area (e.g. workspaces), a glare control strategy is used to design out the potential for glare.	Stage 3 and 4	- Drawings, specification of glare control measures. - Glare control assessment. - Where relevant, manufacturer's data sheets or product literature.	Architect + Daylight Consultant

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
				The glare control strategy does not Increase energy consumption used for lighting-- this is achieved by maximising daylight levels in all weather and ensuring the use or location of shading does not conflict with the operation of lighting control systems. <u>Assume BREEAM compliant blinds can be installed to all non-north facing glazed areas, include to studio rooms if there are desks or study areas in the studios (in addition to curtains where applicable).</u>		- Assessor site inspection report and photographic evidence.	
	Evaluating glare from daylight (exemplary)	1E	0 (credit potentially achievable)	Achieve the credit for 'Glare control'. An evaluation has been undertaken to demonstrate compliance with: - The Daylight Glare Probability (DGP) does not exceed 0.40 over more than 5% of annual operating hours at all workstations in all relevant building areas. OR - Annual Sunlight Exposure ASE1000, $250 \leq 10\%$ of an occupied space. This means no more than 10% of the occupied space in all relevant building areas can receive a daylight illuminance of ≥ 1000 lux for ≥ 250 hours per year. <u>Not currently assumed.</u>	Stage 3 and 4	- As above	Architect + Daylight Consultant
	Daylighting	1	0	The relevant building areas meet the following daylight levels: - Good practice average and minimum point daylight illuminance criteria as outlined in Table 5.2. For resi institutions: Kitchens, living rooms, dining rooms, studies: 100% of spaces achieve average daylight illuminance to at least 100 lux for 3450 hours per year or more AND at least 30lux minimum daylight illuminance at worst lit point for 3450 hours per year. Non-residential or communal occupied spaces: 80% of spaces achieve average daylight illuminance to at least 200 lux for 2650 hours per year or more AND at least 60 lux minimum daylight illuminance at worst lit point for 2650 hours per year or more. - OR - Any level of recommendation using the daylight illuminance criteria in EN 17037:2018+A1:2021 - OR - The relevant building areas achieve at least 'nominally accepted' daylight sufficiency as per IES LM-83-23. <u>Not assumed to be achievable as some rooms are quite constrained by surrounding building massing. TBC by daylight consultant.</u>	Stage 2 and 3	- Design drawings and daylighting calculations. - Assessor site inspection report and photographic evidence.	Architect + Daylight Consultant
	Direct sunlight to windows	1	0	Achieve at least one credit for 'Daylighting'. All relevant units have at least one relevant area that receives at least 3 hours of direct sunlight at windows on equinox day (21 March or 21 September, as the average representation of annual conditions) assuming a cloudless sky. <u>Not assumed to be achievable as some rooms north facing or are quite constrained by surrounding building massing.</u>	Stage 2 and 3	-	
	Daylighting (exemplary)	1E	0	Relevant building areas meet the following exemplary daylight levels: - Exemplary criteria for average and minimum point daylight illuminance as outlined in Table 5.3. at least 80% of the area receive average daylight illuminance (averaged over entire space) of at least 300 lux for 2650 hours per year or more AND minimum daylight illuminance at worst lit point of at least 90 lux for 2650 hours per year or more - OR - Medium rating in EN 17037:2018+A1:2021 OR IES LM-83-23 and the relevant criteria in Table 5.3 <u>As above.</u>	Stage 3	- As above	Architect + Daylight Consultant

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
	View out	1	0	At least 95% of the floor area in 95% of spaces for each relevant building area are within the distances of a window or permanent opening that provides an adequate view out (as per BREEAM requirements). <u>Not assumed to be achievable as some rooms are quite constrained by surrounding building massing. TBC by daylight consultant.</u>	Stage 3	- Design drawings, window schedules and calculations. -	Architect + Daylight Consultant
HEA02 Artificial light	Flicker	P	P	All lighting types should be designed to avoid flicker and stroboscopic effects, including across their full dimming and colour tuning range if applicable. This is applicable to all internal and external lighting.	Stage 3 and 4	- Design drawings/lighting schedules. - Luminaire specifications, manufacturer's product data sheets. - Final construction or equivalent lighting schedules and lighting layout plans.	M&E consultant or Lighting designer
	Internal and external lighting levels	1	1	<u>Internal lighting</u> in all relevant areas of the building is designed to provide illuminance (lux) levels and colouring rendering index in accordance with the SLL Code for Lighting 2012 and other relevant standards. Compliance criteria should include: - Illuminance levels and uniformity, Glare limits, Colour appearance, Colour rendering. For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 7 Sections 2.5, 2.15 to 2.17, 2.22, and 6.10 to 6.20. External lighting located within the construction zone is specified in accordance with BS 5489-1:2020 and BS EN 12464-2:2024. External lighting should provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. Compliance criteria should include: - Illuminance / luminance levels and uniformity, Glare limits, Colour rendering.	Stage 3 and 4	- Design drawings, lighting schedules and lighting control strategy. - A letter of formal confirmation of compliance from the MEP engineer or lighting designer. - Documentary evidence to confirm compliance such as final construction or equivalent lighting schedules, lighting layout plans, lighting control strategy, lighting calculations or light testing results. - Assessor site inspection report and photographic evidence.	M&E consultant or Lighting designer
	Zoning and occupant control	1	1	<u>Internal lighting</u> is zoned to allow for occupant control a. Where applicable, in office areas, zones of no more than four workplaces b. Workstations adjacent to windows or atria and other building areas separately zoned and controlled c. Dining, restaurant, café areas: separate zoning of servery and seating or dining areas Where automatic lighting controls are used for energy efficiency reasons, manual override must be provided.	Stage 3 and 4	- As above.	M&E consultant or Lighting designer
	Lighting control	1E	0	Lighting in each control zone with an occupied space can be manually dimmed by occupants down to no more than 20% of the maximum light output using lighting control interfaces positioned in accessible locations. Lighting in each control zone within an occupied space can be colour tuned over a correlated colour temperature range from 2700K or less to 4000K or more, with automatic controls set to limit the correlated colour temperature in the afternoon and evening to 2700K or less.	Stage 3 and 4	- As above.	M&E consultant or Lighting designer
HEA03 Non-visual effects of light	Non-visual effects of light	1 – only available if Daylighting credits are achieved	0	Achieve at least one credit for 'Daylighting' in Hea 01 Natural light. Achieve 1 of the below: - Where occupant positions are known and fixed: All positions in all relevant building areas receive a vertical illuminance of at least 250 lux melanopic EDI at occupant eyes for at least four hours during the daytime (beginning by noon at the latest).	Stage 3 and 4	- Design drawings/lighting schedules. - Luminaire specifications, manufacturer's product data sheets. - Lighting product datasheets and schedules or specification.	M&E consultant or Lighting designer

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
				- Where occupant positions are unknown or variable: Cylindrical illuminance at eye height across each relevant building area corresponds to at least 250 lux melanopic EDI for at least four hours during the daytime (beginning by noon at the latest). Electric lighting systems and controls are in place to adjust the flux and spectral output of the emitted light over time (colour tuning) so that melanopic EDI at occupant eye level can be reduced in the afternoon and evening, as relevant for each type of application. <u>Credit not likely to be available as daylighting credits not likely to be achievable. Daylight consultant and MEP consultant to advise.</u>		- Documentary evidence to confirm the measured or calculated inputs of illuminance or spectral power density. - The calculated lux melanopic EDI confirming criteria has been achieved. - A letter of formal confirmation of compliance from the MEP engineer or lighting designer. - Final construction drawings or equivalent, lighting product data sheets and schedules.	
HEA04 Indoor air quality	Indoor air quality (IAQ) plan	1	1	A site-specific indoor air quality plan has been produced. The objective of the plan is to facilitate a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during occupation of the building. <u>(Minimum requirement for BREEAM Very Good and above)</u>	Stage 3 and 4	- IAQ plan. - Written confirmation including examples and any documentary supporting evidence to demonstrate how the indoor air quality plan was used to influence the design, specification and installation.	Air quality consultant
	Ventilation	1	0	Ventilation pathways are designed to minimise the ingress and build-up of air pollutants inside the building. Mech vent buildings: - In accordance with best practice: PD CEN/TR 16798-4:2017 Sections 8.8.1 to 8.8.4 OR BRE FB 30 Ventilation for healthy buildings: Reducing the impact of urban air pollution (2011) OR BRE IP 9/14 Locating ventilation inlets to reduce ingress of external pollutants into buildings, as appropriate OR CIBSE TM21 Where present, HVAC systems must incorporate suitable filtration to minimise external air pollution, as defined in BS EN 16798-3:2025 Section B.4.2. The specified filters should achieve supply air classification of at least SUP 2. The level of filtration required is dependent on the quality of the outdoor air. Occupied spaces have calibrated carbon dioxide (CO ₂) or calibrated air quality sensors specified in accordance with Building Regulations ADF2, and: - In mechanically ventilated buildings or spaces: sensors are linked to the mechanical ventilation system and provide demand-controlled ventilation to the space. - In naturally ventilated buildings or spaces: sensors either have the ability to alert the building owner or manager when CO₂ 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 or roof vents. The ventilation strategy provides adequate ventilation rates throughout the year, including sufficient airflow rates in summer to prevent overheating and maintain required thermal comfort conditions. <u>TBC by MEP – CO₂ or air quality sensors will be required to each room, not currently assumed.</u>	Stage 3 and 4	- Ventilation strategy, specification, drawings, calculations to demonstrate compliance. - Confirmation sensors are calibrated and mounted in line with guidance. - For a mechanically ventilated building, the commissioning manager's performance testing report confirming the required fresh air rates are achieved. - Final construction drawings or equivalent and assessor site inspection report and photographic evidence.	M&E consultant
	Emissions from construction products	2	1	<u>For 1 credit:</u> 3 of the 5 product types meet the emission limits, testing requirements and any additional requirements listed in Table 5.6 and M2 of the BREEAM manual. <u>For 2 credits:</u> All product types meet the requirements listed in Table 5.6 .	Stage 3 and 4	- Product specifications, standards, order forms, chain of custodies and relevant emission testing certificates.	Architect + Contractor

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
						- Where applicable for paints and varnishes, evidence of protection against mould growth.	
	Emissions from construction products (exemplary)	2	0	<u>For 1 exemplary credit:</u> 4 of the 5 product types listed in Table 5.7 meet the emission limits, testing requirements and any additional requirements listed in Table 5.7 and M2. <u>For 2 exemplary credits:</u> All product types meet the emission limits, testing requirements and any additional requirements listed in Table 5.7 and M2. <u>Not currently assumed.</u>	Stage 3 and 4	- As above.	Architect + Contractor
	Post-construction indoor air quality measurement	1	0	Achieve ‘Indoor Air Quality Plan’ credit. Post construction (but pre-occupancy) IAQ testing is carried out in line with ISO 16000 standards set out in BREEAM manual. Formaldehyde concentration does not exceed 100µg/m³ averaged over 30 mins. TVOC concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 300µg/m³ over 8 hours. Where limits are exceeded, the project team confirms the measures that have been undertaken in accordance with the IAQ plan, to reduce the levels to within the above limits.	Stage 5	- Commitment to carry out necessary testing post-construction. - Results of indoor air quality testing for formaldehyde and TVOCs. - Where relevant, confirmation of measures undertaken to rectify any shortfalls.	Contractor + IAQ testing
HEA05 Thermal comfort	Thermal modelling – current climate	1	1	Fully dynamic thermal modelling to be carried out in accordance with CIBSE AM11. 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, or occupied spaces meet the Category B requirements for PPD, PMV and local discomfort set out in Table A.1 of Annex A of ISO 7730:2005. - Report the PMV and PPD indices based on the above modelling via the BREEAM Platform For naturally ventilated 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 (where this sets a higher or more appropriate requirement or level for the building type). - The building is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology outlined in either of the following standards as appropriate; CIBSE TM52: The limits of thermal comfort: avoiding overheating in European buildings or CIBSE TM59: Design methodology for the assessment of overheating risk in homes. Use CIBSE 2025 weather files for v7.1.	Stage 3 and 4	- Dynamic thermal modelling report.	Energy consultant
	Thermal modelling – future climate	1	0	Achieve credit for ‘Thermal modelling – current climate’. The thermal modelling demonstrates that the relevant requirements set out above are achieved for a projected climate change environment. Where requirements are not met, demonstrates how the building has been adapted, or designed to be easily adapted in future using passive design solutions to meet the requirements. Use CIBSE 2025 weather files for v7.1.	Stage 3 and 4	- Dynamic thermal modelling report. - Final construction drawings or equivalent, relevant sections of the building specification or assessor site inspection report and photographic evidence to confirm that any required design adaptations or passive measures have been implemented.	Energy consultant
	Thermal zoning and controls	1	1	Achieve credit for ‘Thermal modelling – current climate’. The thermal modelling analysis has informed the temperature control strategy for the building and its users.	Stage 3 and 4	- Thermal comfort strategy highlighting the points that have been considered and decisions taken accordingly.	M&E consultant

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
				The heating and cooling strategy: - should be zoned to efficiently heat and cool spaces, should have degree of occupant control based on occupancy type, patterns and room functions, how the user is likely to interact with the system, and user knowledge and expectations. Where there is more than one system, how the proposed systems will interact and interlock with each other and how this may affect the thermal comfort of the building occupants. The need or otherwise, for an accessible user actuated manual override for any automatic systems.		- HVAC zoning and control strategy, drawings and specifications. - Final construction drawings. - Assessor site inspection report and photographic evidence.	
HEA06 Acoustic performance	Acoustic performance	4	2	The building meets the following acoustic performance standards and testing requirements set out in BREEAM manual or by a suitably qualified acoustician: - <u>1 credit – sound insulation:</u> Airborne sound insulation values are at least 3 dB higher and impact sound insulation values are at least 3 dB lower than the performance standards in the relevant building regulations or standards. - <u>2nd credit – sound insulation:</u> Airborne sound insulation values are at least 5 dB higher and impact sound insulation values are at least 5 dB lower than the performance standards in the relevant building regulations or standards. - <u>1 credit - Indoor ambient noise level:</u> Achieve indoor ambient noise levels that comply with the design ranges given in Section 7 of BS 8233:2014. - <u>1 credit – room acoustics:</u> Achieve the requirements relating to sound absorption within residential spaces and within the common spaces of the building described in the relevant building regulations or building standards national guidance. <u>1st credit for sound insulation targeted. 1 credit for indoor ambient noise level or room acoustic targeted. Acoustician to confirm.</u>	Stage 3 and 4	- Acoustic report setting out required performance standard and relevant design measures to achieve them. - Where relevant, professional report or study from the acoustician confirming the bespoke acoustic performance standards and testing regime. - Acoustic testing report post construction.	Acoustic consultant
HEA07 Safe and healthy surroundings	Safe access	1	1	Dedicated and safe cycle paths are provided from the site entrance to any cycle storage, and connect to off-site cycle paths where applicable Dedicated and safe footpaths are provided on and around the site providing suitable links to: - The site entrance to the building entrance, Car parks (where present) to the building entrance, the building to outdoor space, Connecting to off-site paths where applicable. Pedestrian drop-off areas are designed off, or adjoining to, the access road and should provide direct access to other footpaths.	Stage 2	- Site plan and relevant drawings showing cycle paths, footpaths, and vehicular and delivery access and other compliant features and dimensions where relevant. - Assessor site inspection report and photographic evidence.	Architect + Landscape architect + Transport consultant
	Outside space	1	1	There is an outside space providing building users with an external amenity area. The amenity space should: - Have appropriate seating areas. - Be non-smoking and controlled by building management - Be located to ensure it is accessible to all intended building users and avoids areas that will have disturbances from sources of noise.	Stage 2	- Site plan and landscape drawings.	Architect + Landscape architect
HEA08 Security	Security of site and building	1	0	A Suitably Qualified Security Specialist (SQSS) conducts an evidence-based Security needs assessment (SNA) during or prior to Stage 2. The set of security controls and requirements developed by the SQSS to be incorporated into the development. Any deviation from those controls and recommendations shall be justified and agreed with the SQSS.	Stage 2	- Appointment of SQSS at Stage 2. - SNA report by SQSS. - Drawings and specifications showing incorporation of security measures. - Assessor site inspection report and photographic evidence.	Suitably Qualified Security Specialist

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
	Security rating scheme (exemplary)	1E	0	Achieve 'Security of site and building' credit. A compliant risk-based security rating scheme (e.g. SABRE) has been used. The performance against the scheme has been confirmed by independent assessment and verification.	Stage 2	- Design and post construction certificates for the security rating scheme.	Suitably Qualified Security Specialist
Energy							
ENE01 Energy and carbon performance for regulated energy uses	Calculated Energy performance	9	8	Calculate an Energy Performance Ratio for New Construction (EPR NC). Compare the EPR NC achieved with the benchmarks in Table 6.1 of the BREEAM manual. <u>(Minimum requirement for BREEAM Excellent: 4 credits (OR 3 credits under ENE03 Predicted operational energy performance score)</u>	Stage 2 to 5	- A copy of the building regulations output document from the approved software at design and as-built stages. .	Energy consultant
	Beyond zero net regulated carbon	3E	0	The building regulation modelling results demonstrate that at least 100% of the building's service energy requirements are met by eligible low and zero carbon (LZC) technologies. - <u>1 exemplary credit</u> - ≥ 100% regulated energy use - <u>2 exemplary credits</u> - ≥ 100% regulated energy use AND ≥ 50% unregulated energy use - <u>3 exemplary credits</u>- ≥ 100% regulated energy use AND ≥ 50% unregulated energy use. <u>Not likely to be achievable due to limited space for PVs to achieve net zero onsite.</u>	Stage 2 to 5	- Documents and calculations that demonstrate the proportion of the building's regulated energy consumption that is generated by low and zero carbon generation technologies. - Drawings, technical data or relevant sections of the building specification or other supporting evidence confirming the specification of the modelled LZC systems.	Energy consultant
ENE02 Prediction of operational energy and carbon	Energy strategy	1	1	Define an energy strategy for the building at the concept design stage that describes qualitatively how the operational energy and carbon performance of the building will be minimised.	Stage 2	- Energy strategy statement for the building.	Energy consultant
	Predictive energy modelling	3	3	Estimate unregulated energy uses and occupancy patterns for the building. Construct a detailed energy model during the technical design stage and undertake sensitivity analysis and scenario modelling to explore the impact of key parameters and assumptions on energy consumption. Predict annual operational energy consumption in use by fuel type for the building based on the scenario modelling. The modelling must be updated at the post-construction stage. <u>(Minimum requirement for BREEAM Outstanding: 3 credits)</u>	Stage 3 to 5	- Design and As Built Predictive Energy modelling report (e.g. TM54) which includes: Estimated unregulated energy uses and occupancy patterns used within the detailed energy modelling; Sensitivity analysis and scenario modelling; The predicted annual operational energy consumption in use by fuel type based on the results. This is separate to Part L assessment.	Energy consultant
	Risk assessment and mitigation	1	1	Achieve the 'predictive energy modelling' credits. Highlight any significant design, technical, and process risks that might prevent the buildings achieving energy performance target and indicate how these risks will be mitigated throughout the construction and commissioning process.	Stage 3 and 4	- Energy modelling report or other document that includes a risk assessment and details of mitigation measures.	Energy consultant
	Predicted operational energy performance score	7	3 (depending on predictive energy modelling results)	Achieve the 'predictive energy modelling' credits. Credits are awarded based on the Operational Energy Performance score for New Construction (OEPNC) as shown in Table 6.3 . <u>(Minimum requirement for BREEAM Excellent: 3 credits (or 4 credits in Ene01); Outstanding: 5 credits (or 6 credits in Ene01) and no fossil fuels onsite)</u> <u>Potentially some credits are achievable upon completion of predictive energy modelling.</u>	Stage 3 to 5	- Results of the predictive energy modelling confirming the predicted operational energy consumption for all energy uses. Where appropriate.	Energy consultant
	Disclosing an in-use energy performance target	1E	1E	An in-use energy performance target has been disclosed to stakeholders and been made publicly available prior to practical completion.	Stage 5	- Contract documentation or a letter of commitment from the client or developer for disclosure.	Energy consultant +

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
						- Weblink or other documentation that indicates where the performance target can be viewed by stakeholders and the public.	Client and PM
	Third-party validation of predictive energy modelling	1E	1E	The predicted energy consumption modelling results have undergone third-party validation.	Stage 5	- Energy model validation report by a suitably qualified 3rd party. - Energy modelling report indicating improvements made to the model post validation.	Energy consultant + Client and PM
	Preparing for in-use measurement of energy consumption	1E	0	Achieve maximum available credits in Ene 03 Energy monitoring. The energy modelling outputs include a breakdown of the energy use by sub-meter that aligns with the energy monitoring strategy for the building.	Stage 3 and 4	- Energy modelling report showing a breakdown of results of the energy use by sub-meter.	Energy consultant + M&E consultant
	Commitment to measure energy consumption in-use	1E	1E	The client or building occupier commits funds to pay for the in-use energy consumption to be measured by a suitably qualified energy assessor once the building reaches the occupancy threshold (>80% full occupancy).	Stage 3 and 4	- Commitment from the client that funds will be available to pay for the in-use energy consumption to be measured by a suitably qualified energy assessor. - A signed contract for the scope of work with the person or organisation who will be carrying out the assessment.	Client and PM
ENE03 Energy monitoring	Energy monitoring by end-use	1	1	Identify the energy sources that will be used by the building and estimate the annual energy consumption for Grid supplied electricity/gas, District heating/cooling, Renewable electricity generated on-site. Install energy metering systems so that at least 90% of the estimated annual energy consumption of each energy source is assigned to the end-use categories. Renewable electricity generated on-site and exported from the building must be separately monitored. For buildings with GIA of >1000m², the energy meters are connected to an EMS. (Minimum requirement for BREEAM Very Good and above)	Stage 3 and 4	- Estimates of energy consumption by energy source including an indication of how the estimates were derived. - The metering schedule or metering strategy document. - Specification for the energy monitoring system and/or meters. - Floor plans showing functional or tenanted areas, where applicable. - Construction drawings, specification, manufacturer's product data or O&M documentation for the installed energy monitoring system and/or meters. - Assessors site inspection report and photographic evidence.	Energy consultant + M&E consultant
	Energy monitoring for different occupiers and functional areas	0 (not applicable to long term stay resi institution)	-	Energy monitoring is installed that allows energy consumption to be assigned to separately tenanted or occupied areas and to relevant functional areas within the building. For buildings with GIA of >1000m², the energy meters are connected to an EMS. Functional areas are defined as areas with significantly different energy loads, controls, occupation, or usage patterns. Sub-meter per floor plate in large single occupancy or single-tenancy buildings with one homogeneous function.	Stage 3 and 4	- As above.	Energy consultant + M&E consultant
ENE04 Low carbon design	Building form optimisation	1	0	Carry out an analysis of the site and proposed development during the Concept Design stage to explore the effect of building form on energy demand. Demonstrate that the analysis has informed the building design and will lead to a reduction in building energy consumption in use.	Stage 2	- A copy of the compliant building form analysis	Energy consultant

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
	Fabric performance optimisation	2	2	<u>1 credit</u> - The project team carries out an analysis of the proposed development to explore the impact of alternative fabric specifications on the building's demand for heating and cooling. <u>2 credits</u> – Implement fabric performance measures which reduce the overall building heating and cooling energy demand by ≥ 10% compared to minimum values set by building regulations OR demonstrate that the fabric specification has minimised the demand for heating and cooling. <u>TBC with architects on fabric spec.</u>	Stage 2 to 4	- A copy of the analysis of fabric performance. - Modelling results demonstrating the reduced energy demand for heating and cooling arising from the proposed fabric specification. - Final construction drawings or equivalent, air test results or assessor site inspection report.	Energy consultant
	Low and zero carbon energy generation technologies	2	1	<u>1 credit</u> - One or more eligible LZC energy generation technologies have been installed by competent installers. <u>2 credits</u> – The energy generated by the installed LZC energy generation technologies meet the following targets: - Where PVs are the only LZC energy generation technology installed, the electricity generated must be equal to, or exceed, that generated by reference PV panels covering 50% of the ground floor area OR account for ≥ 60% of the building's annual electricity consumption. - Where only LZC energy generation technologies other than PV panels are installed, the energy generated must be equal to, or exceed, 137 kWh/year/m² of ground floor area OR meet ≥ 60% of the building's annual demand for the relevant energy source. - Where the installed LZC technologies include both PV panels and other LZC technologies, selected generation targets as listed in above 2 points should be used in conjunction scaled proportionally to the amount of electricity generated by each technology. <u>Heat pumps are not considered LZC technology.</u> <u>Assume PVs will be installed and provision will be maximised on available roof space. 2nd credit challenging to achieve.</u>	Stage 2 to 4	- Technical specification for LZC technology and where appropriate, plan drawings showing the LZC systems. - Calculations showing the predicted carbon reduction from the LZC energy generation systems(s) meets the energy generation target. - Confirmation of the competency of the installers or certification of the installation.	Energy consultant + M&E consultant
ENE05 Energy efficient equipment	Energy efficient equipment	Up to 5, assume circa 2 credits available	2	Equipment could include: fridges, fridge freezers, washing machines, washer dryers, tumble dryers, room air conditioners, computer monitors, dishwashers, TVs, and others. It excludes process equipment, temp equipment, emergency equipment Identify items of equipment in the project specification (in-scope equipment) that are users of unregulated energy. Estimate the expected annual energy consumption by the in-scope equipment. Determine the ratio of in-scope unregulated energy use by equipment to regulated energy use to determine the number of credits available and achieved. <u>Assume 100% of all equipment will be energy efficient.</u> <u>Based on BRUKL, assume 20% of total energy use to be unregulated equipment.</u> <u>TBC in TM54 assessment.</u>	Stage 3 to 5	- Calculations to show the estimated energy consumption for all in-scope equipment. - Design drawings, relevant sections of the building specification, equipment schedules or other documentary evidence identifying all proposed in-scope equipment and performance. - Manufacturer's literature or copy of the energy rating label, indicating the energy labelling scheme and the rating achieved. - Assessor site inspection report and photographic evidence.	Energy consultant + MEP consultant + Architect + Contractor + Kitchen specialist
ENE06 Energy efficient systems	Energy efficient systems	Up to 9, assume circa 2 credits available	2	Systems could include: external lighting, cold storage, lifts, commercial laundries, and others. It excludes process systems, temp systems, emergency systems. Identify items of equipment in the project specification (in-scope systems) that are users of unregulated energy. Determine the ratio of in-scope unregulated energy use by equipment to regulated energy use to determine the number of credits available and achieved. <u>Assume 100% of all systems will be energy efficient. Based on BRUKL, assume 20% of total energy use to be unregulated systems. TBC in TM54 assessment.</u>	Stage 3 to 5	- Calculations to show the estimated energy consumption for all in-scope system. - Design drawings, relevant sections of the building specification, systems schedules or other documentary evidence identifying all proposed in-scope system and performance.	Energy consultant + MEP consultant + Architect + Contractor +

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
						- Manufacturer's literature relating to the energy efficiency of the actual installed system. - Assessor site inspection report and photographic evidence.	Lift specialist
ENE07 Flexible demand response	Flexible demand response	2	0	Identify installed systems present on-site and their flexible demand response capability. Flexible demand side response systems to consider: - Electric space heating, space cooling and DHW - Operation can be optimised based on signals from the electricity supplier or local renewable sources. - Electric vehicle charging points - Charging with 1-way or 2-way control based on signals from the electricity supplier or local renewable sources. - Battery storage - The battery energy storage system is capable of charging based on signals from the electricity supplier or local renewable sources. AND/OR The battery energy storage system is capable of feeding electricity back into the grid. <u>Can space heating/cooling/DWH can be optimised based on signals from the electricity supplier or local renewable sources? Can battery storage be installed?</u>	Stage 3 and 4	- Drawings, relevant section or clauses of the building specification or contract. - Manufacturer's technical data confirming the flexible demand capability of the installed systems. - Assessor site inspection report and photographic evidence	M&E consultant
ENE08 Installed controls	Installed controls	2	2	<u>For 1 credit</u> – achieve >33% of installed control points <u>For 2 credits</u> – achieve >66% of installed control points. See Table 6.18 (space heating), Table 6.19 (space cooling), and Table 6.20 (mech vent) in the BREEAM manual for HVAC controls to be considered.	Stage 3 and 4	- Construction drawings, assessor site inspection report and photographic evidence, technical data sheets, invoices or other robust documentation confirming the installed HVAC systems and control functionality	M&E consultant
Transport							
TRA01 Transport assessment and travel plan	Transport assessment and Travel plan	2	2	Undertake a site-specific transport assessment (or develop a travel statement for schemes with limited transport impact) and draft travel plan in line with BREEAM requirements at no later than Stage 2. Demonstrate that the travel plan can guide the appropriate implementation of sustainable transport measures during the design, construction, and occupancy stages and be supported by the building's management during operation.	Stage 2	- Transport Assessment and Travel Plan. - PTAI calculations. - Confirmation that the travel plan will be implemented.	Transport consultant
TRA02 Sustainable transport measures	Transport assessment and Travel plan	P	P	Complete a transport assessment and travel plan as above.	Stage 2	- As above.	Transport consultant
	Transport options implementation	10	10	Identify the sustainable transport measures and award credits based on AI of the project. Sustainable transport measures assumed for this proposal include: - Assumed - 1 point: The existing PTAI calculated in Tra 01 exceed 8. PTAI is 41 for the site, as advised by Mode. - Assumed - 1 point: Provide up-to-date local public transport information in a convenient, accessible area to help building users plan journeys by public transport (digital display or online tool). - Assumed - 1 point: At least three existing accessible amenities are present within 500m walk. The following seems available: - Food outlet - ATM - Pharmacy - Post box - Assumed – 3 points: provision of cinema space and gym within scheme as two new or enhanced amenities type.	Stage 2-4	- Transport Assessment and Travel Plan. - Drawings, reports, specifications, calculations showing sustainable transport measures have been integrated. - Assessor's site inspection report and photographic evidence.	Architect + Transport consultant

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
				- Assumed - 1 point: Install BREEAM compliant cycle storage spaces. 1 space needed for every 10 staff and 1 space per 2 residents. 145 no. single person rooms, 73 cycle spaces for residents. 426m² for communal area habitable spaces - assuming 20 staff - 2 space for staff. Total estimated 75no. spaces, to be halved as PTAI >8, 38no. spaces required for scheme. - Cycles can be secured within spaces in racks with overhead covering. - The distance between each cycle rack, and the cycle racks and other obstructions, e.g. a wall, allows appropriate access to the cycle storage space for easy storage and access to bikes - The storage facility or entrance to the facility is in a prominent site location visible to potential users from either an occupied building or a main access to a building. Signs to be installed if not located close to building entrance. - The cycle storage facility has adequate lighting - Assumed - 1 point: Install at least 2 of BREEAM compliant cycle facilities for staff: (Where facilities are combined – e.g. showers and changing facilities – it must be possible for different people to use them at the same time if they are to count as more than one facility.) - Showers (1.no, not same as toilets) - Changing room (1.no, not same as toilets) - Lockers (2no.) - Drying spaces Total 6 points assumed.			
Water							
WAT01 Water consumption	Water consumption	5+1E	3	Achieve >40% improvement in water consumption over BREEAM baseline performance. More credits may require greywater or rainwater harvesting. (Minimum requirement for BREEAM Good, Very Good and Excellent: 1 credit (15% improvement over baseline); for Outstanding: 2 credits (30% improvement over baseline)). More credits available if greywater or rainwater harvesting for WC flushing can be included. Can this be considered?	Stage 3 and 4	- Building specification, design drawings or schedules confirming the number, specification and water consumption of all water-consuming components. - Construction drawings or sanitaryware schedule. - Manufacturer's product details, EU Energy Label or European Water Label to confirm water consumption for all installed products.	BREEAM Assessor + M&E consultant + Architect
WAT02 Water monitoring	Water monitoring	1	1	Specify a water meter on the mains water supply to the asset. All meters to have pulsed or other open protocol communication output and be connected to BMS where available. (Minimum requirement for BREEAM Good and above) For water-consuming plant or building areas consuming 10% or more of the building's total water demand, fit easily accessible sub-meters or install water monitoring equipment for the area. For buildings with GIA of >1,000m², the water meters are connected to a monitoring and management system.	Stage 3 and 4	- Calculations, drawings, specifications, datasheets that form part of the water metering strategy. - Manufacturer's product details	M&E consultant
WAT03 Water leak detection and prevention	Leak detection system	1	1	Install a leak detection system capable of detecting a major water leak on the utilities' water supply within the building, to detect any major leaks within the building AND between the building and the utilities' water supply, to detect any major leaks between the utilities' supply and the building under assessment.	Stage 3 and 4	- Drawings, specifications, datasheets for the leak detection system.	M&E consultant

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
	Flow control devices	1	1	Install flow control devices that regulate the water supply to each communal WC area or sanitary facility. Flow control devices requirement do not apply to ensembles within studio rooms.	Stage 3 and 4	- Drawings, specifications, datasheets for the flow control devices.	M&E consultant
WAT04 Water efficient equipment and systems	Water efficient equipment and systems	1	1	Water using systems and equipment is anticipated to include the following: - External planting irrigation. Install water efficiency non-sanitary water-using systems and equipment, where the equipment or systems are more water efficient than that of a standard version of the equipment or system OR where the equipment or system meets specific “deemed to comply” water efficiency requirements in <u>M4.2</u> .	Stage 3 and 4	- Drawings, relevant sections of the building specification, schedules or other evidence identifying all water demands from uses other than domestic scale drinking and sanitary use components. - Calculations and data sources used to estimate the annual water consumption and reduction. - Evidence on water efficiency performance of systems and equipment.	M&E consultant + BREEAM Assessor
WAT05 Prediction of operational water consumption	Predict operational water consumption	1	1	Estimate the annual operational water consumption (including both sanitary and non-sanitary water use) for the building. To facilitate this the following parameters must be entered into the calculation: - Number of occupied days per year - Average number of occupiers per day - Average occupancy hours per day	Stage 3 and 4	- Specifications, design drawings or schedules detailing all water-using components and equipment. - Calculations and data sources used to confirm the overall estimated annual operational water consumption for the building.	M&E consultant + BREEAM Assessor
	Disclosing an in-use water performance target and commitment to measure water consumption in-use	1E	1E	Achieve the credit for predicting operational water consumption. Achieve maximum available credits in Wat 02 Water monitoring. Set in-use water performance target and disclose to stakeholders the public prior to practical completion. The client or building occupier commits funds to pay for in-use water consumption measurement and reporting by a suitably qualified individual or organisation once the building is occupied	Stages 3 to 5	- Commitment from client to disclose the in-use water performance target to building stakeholders and members of the public. - Evidence to confirm how this has been made available to building stakeholders the public. - Confirmation that funds have been committed to pay for in-use water consumption measurement and reporting. - Appointment of a suitably qualified individual or organisation.	Client and PM
Materials							
MAT01 Building life cycle assessment	Early design LCA and embodied carbon reporting	2	2	Carry out an early design phase LCA calculation from the materials that the project incorporates into the building. The LCA is to include relevant options appraisals, including a baseline assessment. The LCA must be completed within 20 working days from planning submission. <u>(Minimum requirement for BREEAM Excellent – any project stage LCA; For BREEAM Outstanding: all project stage LCA)</u>	Stage 2 – pre-planning (to be completed within 20 days of planning submission).	- Stage 2 LCA results or output report. - Evidence to demonstrate how the LCA has influenced the design.	LCA Consultant + Full team input
	Technical design LCA and embodied carbon reporting	1	1	Carry out a technical design phase LCA calculation from the materials that the project incorporates into the building. Include at least one assessment showing the evolving design and specification at technical design. <u>(Minimum requirement for BREEAM Excellent – any project stage LCA; For BREEAM Outstanding: all project stage LCA)</u>	Stage 3 and 4	- Stage 4 LCA results or output report.	LCA Consultant + Full team input

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
	Post-construction LCA and embodied carbon reporting	2	2	Carry out a post-construction phase LCA calculation from the materials that the project incorporates into the building. The LCA is to include as-built specification at post-construction. <u>(Minimum requirement for BREEAM Excellent – any project stage LCA; For BREEAM Outstanding: all project stage LCA)</u>	Stage 5	- Clauses of the Employer’s Requirements, contract documentation or a letter of commitment from the client or developer to complete a LCA on the as-built specification at post-construction. - As built LCA results or output report.	LCA Consultant + Full team input
	Embodied carbon benchmark comparison	2 + 1E	0 (Potential credits subject to post planning analysis)	For relevant assessment and building types, compare the calculated embodied carbon emissions (modules A1-A5, B1-B5, C1-C4) against the BREEAM benchmarks.	Stage 2 to 5	- Commitment to achieving benchmark at design stage. - Calculations from the BREEAM Platform.	LCA Consultant
	Third party verification	1E	0	A suitably qualified 3rd party verifies the building LCA work and produces a report describing how they have checked the building LCA work accurately represent the designs under consideration during all key stages (concept design, technical design, post construction). Any recommendations in the third-party verification report must be resolved and evidenced. <u>Not currently assumed.</u>	Stage 2 to 5	- Third party verification report.	Client and PM + Sustainability Consultant
	Embodied carbon public data disclosure	1E	1E	For each project phase where an LCA has been conducted, submit the LCA or carbon results and data to a relevant publicly available LCA or carbon database. If suitable local or national options are not available, submit to the Built Environment Carbon Database (BECD).	Stage 2 to 5	- Confirmation of registration and data submission from the relevant database.	Client and PM
MAT02 Environmental product declarations (EPDs)	Product specification	1	1	Specify construction products with EPD that achieve a total EPD points score of at least 20, according to BREEAM methodology.	Stage 4 and 5	- Copies of EPD certificates. - Specification - Delivery notes	Architect + Sustainability Consultant + Contractor
MAT03 Responsible sourcing of construction products	Legally harvested and traded timber	P	P	100% of timber and timber-based products used on the project are 'Legal' and 'Sustainable' as per the UK Government's Timber Procurement Policy. <u>(Minimum requirement for BREEAM compliance)</u>	Stage 4 and 5	- Timber certificates or chain of custodies. - Robust post-construction evidence to verify proof of purchase such as delivery tickets, invoices, purchase orders, confirmation from suppliers or site photographs.	Contractor
	Enabling sustainable procurement	1	0	A sustainable procurement plan prepared before the end of Concept Design must be used by the design team to guide specification towards sustainable construction products.	Stage 2	- Sustainable Procurement Plan. - Evidence demonstrating the effective implementation of the Sustainable Procurement Plan.	Client and PM
	Measuring responsible sourcing	3 + 1E	2	Use the Mat 03 calculator tool and methodology to determine the number of credits achieved for the construction products specified or procured. Assumed 20% of RSM points can be achieved. Scope to include superstructure, internal finishes, substructure and landscaping. Exemplary credit available if core building services are included in scoping, and 50% of available RSM points achieved.	Stage 4 and 5	- Relevant sections of the building specification, summary or schedule confirming all materials within the project, those to be responsibly sourced and to what level.	Contractor + Sustainability Consultant

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
				<u>Assumed 2 credits is feasible, subject to post planning analysis.</u>		- Responsible sourcing certificates. - Robust post-construction evidence to verify proof of purchase for all materials responsibly sourced such as delivery tickets, invoices, purchase orders, confirmation from suppliers or site photographs.	
MAT04 Durability and resilience	Durability and resilience	1	1	In areas of higher risk, suitable durability and protection measures to vulnerable parts of the building, including: bollards, barriers or raised kerb; robust external wall construction; corridor walls specified to Severe Duty; protection rails; kick plates or impact protection on doors; hard-wearing and easily washable floor finishes; door stoppers, stair noses etc. <u>Where parking or manoeuvring areas are within 1 metre of the building façade and where delivery areas or routes are within 2 metres of the façade, specify bollards or protection rails.</u> Key exposed building elements to been designed and specified to limit long and short-term degradation due to environmental factors, to be demonstrated by the following. - The element or product achieving an appropriate quality or durability standard or design guide (see Table 9.13) OR - A detailed assessment of the element's resilience when exposed to the applicable material degradation and environmental factors. Produce an access to the roof and façade strategy for cost-effective cleaning, replacement and repair in the building's design. Design the roof and façade to prevent water damage, ingress and detrimental ponding.	Stage 3 and 4	- Drawings, specifications, reports showing design measures for durability and resilience. - Where relevant, manufacturer's technical details confirming the material degradation effect mitigated by the specified product. - Roof and façade access strategy. - Drawings and specification showing measures to prevent water damage, ingress and ponding.	Architect
MAT05 Material efficiency	Material efficiency	1	0	Set targets and report on opportunities and methods to optimise the use of materials at each of the design stages, starting from Stage 1. Develop and record the implementation of material efficiency. Report the targets and actual material efficiencies achieved.	Stage 1	- <u>RIBA Stage 1</u>: Dedicated report that sets out a clear framework to guide material efficiency activities throughout the design and construction of the project. The report should set out aims, objectives, targets, performance indicators, opportunities, constraints and responsibilities to guide material efficiency activities. - <u>RIBA Stage 2</u>: Minutes of the workshops held. Documentation demonstrating how the feedback from the workshop has been incorporated in the concept design of the project, for example: outline specification for materials selection, report on approximate predicted reductions in material quantities. - <u>RIBA Stage 4</u>: Report on deviations from previous stages and additional actions to be taken. Documentation demonstrating the incorporation of the outcomes from the concept stage and additional actions, for example:	Architect

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
						design drawings or specifications demonstrating materials efficiency measures undertaken. - <u>As built</u> : Report on deviations from previous stages. Documented evidence of activity to further identify efficiencies at this stage, for example: meeting minutes, training events, waste reduction documentation etc.	
Waste							
WST01 Construction waste management	Pre-demolition audit	1	1 (assume pre-demolition audit will be carried out)	Complete a pre-demolition audit of any existing buildings, structures or hard surfaces being considered for demolition at Stage 2. This must be used to determine whether refurbishment or reuse is feasible and, in the case of demolition, to maximise the recovery of material for subsequent high grade or value applications. The Resource Management Plan should make reference to the audit. Compare actual waste arisings and waste management routes used with that forecast and investigate significant deviations from planned targets. <u>(Minimum requirement for BREEAM Outstanding: Pre-demolition audit OR Resource management plan)</u>	Stage 2	- Pre-demolition audit.	Demolition consultant/ contractor
	Construction resource efficiency	3	2	Prepare a compliant Resource Management Plan (RMP) covering non-hazardous waste materials including demolition and excavation waste and accurate data records on waste arisings and waste management routes. Meet the following benchmarks for non-haz construction waste (excluding demolition and excavation waste): <7.5 m ³ (actual, not bulk volume) per 100m ² (GIFA) or <6.5 tonnes per 100m ² (GIFA). <u>(Minimum requirement for BREEAM Outstanding: Pre-demolition audit OR Resource management plan)</u>	Stage 4 and 5	- Resource Management Plan. - Calculations, waste records, chain of custody showing non-haz construction waste targets are met.	Client and PM + Contractor
	Diversion from landfill	1	1	Meet the following diversion from landfill benchmarks for non-hazardous construction waste and demolition and excavation generated: - By vol.: non-demolition 70%, demolition 80%, - By weight: non-demolition 80%, demolition 90%.	Stage 4 and 5	- Confirmation of procedures in place for sorting construction waste into key waste groups. - Calculations, waste records, chain of custody showing diversion targets are met. - Evidence of waste transfer station recycling rates, where applicable.	Contractor
	Construction waste management	1E	0	Meet the following benchmarks for non-haz construction waste (excluding demolition and excavation waste): <1.6 m ³ (actual, not bulk volume) per 100m ² (GIFA) or <1.9 tonnes per 100m ² (GIFA). Meet the following diversion from landfill benchmarks for non-hazardous construction waste and demolition and excavation generated: By vol.: non-demolition 85%, demolition 85%, excavation 95%; by weight: non-demolition 90%, demolition 95%, excavation 95%. Waste data obtained from licensed external waste contractors is reliable and verifiable, by using data from EA/SEPA/EA Wales/NIEA Waste Return Forms or from a PAS 402:2013 compliant company.	Stage 4 and 5	- As above for Construction resource efficiency and Diversion from landfill. - Evidence to support that all waste data obtained from licensed external waste contractors is reliable and verifiable such as EA/SEPA/EA Wales/NIEA Waste Return Forms or to show that they are a PAS 402:2013 compliant company.	Contractor
WST02 Use of recycled and sustainably sourced aggregates	Pre-demolition audit	P	P	If demolition occurs on site, complete a pre-demolition audit of any existing buildings, structures or hard surfaces in line with WST01 requirements.	Stage 1	- Pre-demolition audit which identifies aggregates available within existing buildings, structures or hard landscaping.	Demolition consultant/ contractor

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
	Project Sustainable Aggregate Points	1	0 (Potential subject to review of site materials post planning)	Identify all aggregate uses and types on the project, determine the quantity in tonnes for each identified use and aggregate type. Identify the region in which the aggregate source is located. Calculate the distance in kilometres travelled by all aggregates by transport type. <u>TBC if there is sufficient space for storage of recycled aggregates on or offsite.</u>	Stage 4 and 5	- Calculations, report, datasheets, transport type, source on aggregates required and used on site. - Purchase orders, invoices, delivery tickets or written evidence from the supplier.	Structural engineer + Contractor
	Project Sustainable Aggregate Points (exemplary)	1E	0	The Project Sustainable Aggregate Points score meets or exceeds the exemplary level performance benchmark of 6 points.	Stage 4 and 5	- As above.	Structural engineer + Contractor
WST03 Operational waste	Operational waste	1	1	Provide a dedicated space for the segregation and storage of operational recyclable waste generated. The space should be clearly labelled, accessible to building occupants or facilities operators, or a capacity appropriate to building type. This is in addition to general waste. <u>Dedicated area for recyclable waste storage at Friar Street should be a minimum of 10 m². This is in addition to general waste storage provision. Provide three internal storage containers for each studio with a minimum total capacity of 30 litres; no individual container smaller than 7 litres; all containers in a dedicated non-obstructive position; storage containers for recycling in addition to non-recyclable waste storage.</u> <u>Provide home composting facilities and a home composting information leaflet within the kitchen area or communal space for each studio. These containers are either emptied into local on-site communal facilities or are collected by composting collection services run by the waste collection authority.</u> <u>For communal dining, Locate recyclable storage in a dedicated non-obstructive position in communal kitchens or other appropriate communal space. Provide a minimum of 10 litres of internal storage for compostable waste.</u> <u>BRE has advised that to avoid overprovision for the project, the above internal bin store requirements can be reduced by 50%. See email correspondence on 29 July.</u> <u>For the external bin store: Where food waste will be stored in the bin store a tap must be provided in /near to it.</u> (Minimum requirement for BREEAM Excellent and above: 1 credit)	Stage 2	- Drawings, calculations and specifications showing operational waste storage strategy and associated signage. - Final construction drawings or equivalent and assessor site inspection report with photographic evidence.	Architect + Contractor
WST04 Speculative finishes (Offices only)	Speculative floor and ceiling finishes	0 (credit not applicable)	0	For tenanted areas, where the future occupant is not known and carpets or other floor or ceiling finishes are installed, these must be limited to a show area only. Only install floor and ceiling finishes selected by the known occupant of a development. Alternatively, where the occupant is not known and only ceiling finishes and no carpets are installed, the building owner confirms that the first tenants will not be permitted to make substantial alterations to the ceiling finishes. <u>Assume occupant is known and finishes will be specified according to occupant preferences.</u>	Stage 3 and 4	- Drawings, finishes schedules relevant sections of the building specifications or contract clauses or letter from the client or developer to confirm that either no finishes will be installed, or these will be limited to a show area only OR will be selected by the known occupant. - Assessor site inspection report with photographic evidence.	Architect + Client
WST05 Adapting to climate change	Resilience of structure, fabric, building services	1	0	Conduct a climate change adaptation strategy appraisal at Stage 2 to identify the impact of expected extreme weather conditions arising from climate change on the building over its projected life cycle. Develop recommendations or	Stage 2	- Copy of a compliant climate change adaptation strategy appraisal at Stage 2 and Stage 4.	Sustainability Consultant + Architect

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
	and renewables installation			solutions based on the climate change adaptation strategy appraisal that aim to mitigate the identified impact. Provide an update during Stage 4 demonstrating how the recommendations or solutions proposed at Stage 2 have been implemented where practical and cost effective.		- Drawings, specification clauses and assessor site inspection report with photographic evidence confirming that specified mitigation measures have been implemented.	
	Responding to climate change (exemplary)	1E	0	Meet the above credit, and criteria for HEA05, ENE01, WAT01, MAT04, POL03 within Table 10.11 of the BREEAM manual.	Stage 2	- As above. - Evidence as HEA05, ENE01, WAT01, MAT04, POL03.	Sustainability Consultant
WST06 Disassembly and adaptability	Design for disassembly and adaptability - recommendations	1	0	Conduct a study to explore the ease of disassembly and the functional adaptation potential of different design scenarios at Stage 2. Develop recommendations or solutions that aim to enable and facilitate disassembly and adaptation.	Stage 2	- Disassembly and adaptability study completed at Stage 2.	Sustainability Consultant + Architect
	Disassembly and adaptability – implementation	1	0	Achieve above credit at Stage 2. Provide an update during Stage 4 on how the recommendations or solutions proposed at Stage 2 have been implemented and on changes to the recommendations and solutions during Stage 4. Produce a building design for disassembly and adaptability manual to communicate the characteristics allowing functional adaptability and disassembly to prospective owners or building operators.	Stage 4	- Disassembly and adaptability study completed at Stage 4 - Implementation plan report. - Building adaptability and disassembly guide to prospective tenants. - Final construction drawings or equivalent and assessor site inspection report with photographic evidence.	Sustainability Consultant + Architect
Land Use and Ecology							
LUE01 Site selection	Previously occupied land	1	1	At least 75% of the proposed development is on previously occupied land.	Stage 4	- Site drawings and historical site information.	Architect
	Contaminated land	0	0	A contaminated land professional undertakes a site investigation, risk assessment and appraisal, which deems that land within the development footprint to be affected by contamination. The client confirms that a remediation strategy will be implemented. <u>Site not assumed to be contaminated.</u>	Stage 2 to 4	- Contaminated land reports. - Remediation strategy and implementation plan. - Verification report, records, or other evidence to demonstrate that the remediation strategy was implemented.	Contaminated land consultant
LUE02 Ecological risks and opportunities	Comprehensive route: Survey and evaluation	1	1	A Suitably Qualified Ecologist (SQE) carries out a survey and evaluation for the site early enough to influence site preparation works, layout and, where necessary, strategic planning decisions, typically at Stage 1 or Stage 2. The SQE's survey and evaluation determines the site's ecological baseline, including: - Current and potential ecological value and condition of the site and related areas within the zone of influence. - Direct and indirect risks to current ecological value from the project. - Capacity and feasibility for enhancement of the site's ecological value and, where relevant, areas within the zone of influence..	Stage 2	- A copy of the Ecological Survey and Evaluation document. - Completed copy of BREEAM GN41.	Ecologist
	Comprehensive route: Determining ecological outcomes	1	1	The SQE collaborates with appropriate project team members (e.g. landscape architect, architect etc.), sharing relevant information and recommendations from the survey and evaluation to influence the project design as well as decisions regarding site preparation and construction works. The ecologist, with full support from the project team, collaborates with representative stakeholders to influence key planning decisions,	Stage 2 to 4	- Statement from the project manager confirming that they collaborated with all project team members and stakeholders to identify and deliver the project's optimal ecological outcomes and measures to achieve them.	Ecologist

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
				The ecologist identifies the optimal ecological outcomes for the site, and identifies measures to achieve these outcomes in line with the mitigation hierarchy for the comprehensive route.		- A report or statement confirming the optimal ecological outcomes identified for the project, as well as the measures being implemented to achieve these outcomes	
	Wider site sustainability	1E	0	Achieve ‘determining ecological outcomes’ above. Wider sustainability related activities and potential ecosystem service benefits are considered as part of determining the optimal ecological outcomes for the site. Incorporate at least one measure into the design that would demonstrate an ecosystem service related benefit.	Stage 2 to 4	- A report or statement confirming which ecosystem service-related benefits were considered, as well as the measure/s being incorporated into the design, This should be part of the optimal ecological outcomes document.	Ecologist
LUE03 Managing impacts on ecology	Ecological risks and opportunities	P	P	Achieve LE02 ‘Survey and evaluation’ and ‘Determining ecological outcomes’.	Stage 2	- As LE02.	Design Team or Ecologist
	Implementation of measures on-site	2	2	Comprehensive route: Handover between the design and construction teams must be sufficiently structured and thorough to ensure that all planned ecological measures are communicated, understood, and adhered to throughout construction. An ecologist to be in place throughout planning, design and construction. If an Ecological Clerk of Works (ECoW) has been appointed for the construction and handover stages (RIBA Stages 5 and 6), there must be an additional handover between the two ecologists. The measures required to achieve optimal ecological outcomes must be integrated with site preparation and construction processes. An Ecologist or an ECoW to be appointed to monitor and advise on the protection of site ecology as agreed.	Stage 2	- Tender documents incorporating ecological requirements to ensure the optimal ecological outcome and the measures required to achieve it have been handed over appropriately. - Evidence from ecologist (or biodiversity champion for foundation route) to confirm measures to achieve optimal outcomes, how the measures will be implemented on site, evidence required and monitoring/reporting procedures. - Site records, site procedures, environmental plans, toolbox talks, site programmes, drawings, site photographs and/ or sign off by the ecologist.	Ecologist
	No net loss - comprehensive route only	1	1	Achieve ‘Implementation of measures on-site’ above. There is no net loss of ecological value on site caused by construction and handover activities. This must be confirmed at project handover by the ecologist.	Stage 3 and 4	- Confirmation from ecologists that there is no net loss of ecological value on site. - As-built Statutory Biodiversity Metric for the site can be used to support the ecologist’s statement.	Ecologist
LUE04 Ecological change and enhancement	Managing negative impacts on ecology	P	P	Achieve ‘Implementation of measures on-site’ in LUE03.	Stage 3 and 4	- As LUE03.	Client and PM + Contractor + Ecologist
	Ecological enhancement	1	1	Comprehensive route: Measures have been implemented that enhance ecological value, which are based on input from the project team and SQE in collaboration with representative stakeholders and data collated as part of ‘Determining ecological outcomes’ in Lue 02. Measures are implemented in the following order: - On-site, and where this is not feasible, - Outside of the site boundary, within the zone of influence. Data collated are analysed and where potentially valuable, provided to the local environmental records centres nearest to, or relevant for, the site.	Stage 3 and 4	- Design drawings, specifications, reports. Method statements. As built drawings and photographs. - Evidence demonstrating that data has been submitted to a local environmental record centre, where relevant.	Ecologist + Landscape architect

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
	Change and enhancement of ecology	3 + 1E	1	Comprehensive route only Credits are awarded based on the total project biodiversity change. The enhancement measures that contribute to the score for biodiversity net gain should be implemented in the following order: - On-site, and where this is not feasible, - Enhancements within the zone of influence/wider development area, and where this is not feasible, - Off-site units following the rules of the Statutory Biodiversity Metric. Subject to: - The SQE confirms that better outcomes for nature can be achieved off-site and/or off-site enhancement would be more be effective than what can be done solely in the development boundary/zone of influence. - There has been no net loss of biodiversity on-site. - There are arrangements in place for the on-going maintenance of the enhanced land to ensure the habitat is safeguarded over a 30-year period. For site baseline of <=0.1 BU, assuming >2.5 Bu/ha biodiversity units per site area OR => 0.02 BU/10m length Biodiversity units per 10m length of hedgerow. TBC by ecologist.	Stage 3 and 4	- Completed version of the Statutory Biodiversity Metric (SBM) or Small Sites Metric (SSM) tool. - Evidence to support the data input within the tool such as ecological survey report and landscape plans (existing and proposed). - Site inspection report or as-built landscape plans or site plans.	Ecologist + Landscape architect
LUE05 Long term ecology management	Ecological change and enhancement	P	P	Achieve at least one credit in LUE04.	Stage 3 and 4	- As LUE04.	Client and PM + Contractor + Ecologist
	Handover to building owner or tenant	1	1	A section on ecology and biodiversity has been included as part of the information supplied to the tenant or building owner. This information must be in a separate document from the landscape and ecology management plan.	Stage 3 and 4	- Ecology and biodiversity handover information.	Ecologist
	Landscape and ecology management plan	1	1	A landscape and ecology management plan, or equivalent, has been developed in accordance with BS 42020:2013 Section 11.1. This will cover detailed plans for an initial 5-year establishment period and maintenance of the scheme, as well as an additional 25-year management strategy. The whole plan should cover a period of 30 years in total. It should cover the broader management of habitats and other ecological features on site, not just those specific to the BNG measures.	Stage 3 to 5	- Landscape and ecology management plan.	Ecologist + Landscape architect
Pollution							
POL01 Impact of refrigerants	No refrigerant use	3	0	No refrigerant use within the installed plant or systems. <u>Refrigerant likely to be present in VRF/VRV/heat pump systems.</u> <u>(Minimum requirement for BREEAM Outstanding: no refrigerant use or refrigerants have an emissions rate < 1000 kgCO₂e per kW)</u>	Stage 3 and 4	- Drawings and specifications of the plant and systems proposed.	M&E consultant
	Compliance with BS EN 378:2016	P	P	All systems with electric compressors must comply with relevant safety standards for installing refrigerant systems (see M2.1). The refrigerants used must have an ozone depletion potential of 0.	Stage 3 and 4	- Drawings, specification, and datasheets for the refrigerant systems. - Evidence to show that systems are installed in line with the relevant safety standards.	M&E consultant
	Impact of refrigerant	2	1	<u>1 credit:</u> Systems using refrigerants have a DELC of ≤1000kgCO₂-eq/kW cooling and heating capacity. <u>2 credits:</u> All refrigerants used have a GWP ≤10. OR The direct effect life cycle CO₂ equivalent emissions (DELC) of ≤100 CO₂-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.	Stage 3 and 4	- Pol01 calculation and document supporting the data used for the calculation. - Manufacturer's literature or data sheets confirming the relevant refrigeration type and system information.	M&E consultant

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
				(Minimum requirement for BREEAM Outstanding: no refrigerant use or refrigerants have an emissions rate < 1000 kgCO ₂ e per kW)			
	Leak detection	1	0	Systems using refrigerants are either: - Hermetically sealed OR - Use environmentally benign refrigerants OR - The refrigerant charge volume is < 500 tonnes of carbon dioxide equivalent (CO₂e). OR There must be either: - A permanent automated refrigerant leak detection system that is capable of continuously monitoring for leaks OR - An inbuilt automated diagnostic procedure for detecting leakage capable of continuously monitoring for leaks. The leak detection system facilitates the isolation and containment of the remaining refrigerant charge in response to a leak detection incident.	Stage 3 and 4	- Datasheet(s) of the refrigerant(s). - Drawings, specification and datasheets for the leak detection system.	M&E consultant
POL02 Local air quality	No installed combustion plant	3	3	Non-combustion systems supply all space heating and domestic hot water generation on-site.	Stage 3 and 4	- Specification and datasheets of space heating and domestic hot water plant.	M&E consultant
POL03 Flood and surface water management	Appropriate consultant appointed	P	P	Suitable qualified flood risk and drainage consultant is appointed to carry out and demonstrate the development's compliance with all criteria.	Stage 2 to 4	- Section with FRA and SuDs strategy confirmation qualification of consultant appointed.	Drainage consultant
	Flood resilience	2	1	2 credits: A site-specific flood risk assessment (FRA) confirms the development is in a flood zone that is defined as having a low annual probability of flooding. The FRA takes all current and future sources of flooding into consideration. 1 credit: For sites with medium to high risk of flooding. Flood risk mitigation measures will be in place. <u>Drainage consultant to confirm</u>	Stage 2 to 4	- Site specific FRA and any associated flood levels and floor level drawings (where relevant). - Evidence to show measures to increase resilience and resistance of the development to flooding as per BREEAM requirements.	Drainage consultant
	Prerequisite for surface water run-off credits	P	P	<u>Prerequisite:</u> Surface water run-off design solutions must be bespoke.	Stage 2 to 4	- Consultant's report and final drawings confirming the site-specific surface water-run off design solutions	Drainage consultant
	Surface water run-off - Rate	1	1	<u>1 credit</u> 'Surface Water Runoff – Rate': - For brownfield sites, drainage measures are specified so that the peak rate of run-off from the site to the watercourses shows a 30% improvement for the developed site compared with the pre-developed site at the 1-year and 100-year event. - Calculations include an allowance for climate change. - Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDs are in place. <u>Drainage consultant to confirm</u>	Stage 2 to 4	- SuDs Strategy report. - Calculation results for the pre-and post-development peak rate and volume of run-off. - Information showing the proposed drainage solution, system failure flood flow routes, potential flood ponding levels and ground floor levels. - Calculation results for the limiting discharge where relevant. - Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDs.	Drainage consultant
	Surface water run-off - Volume	1	1	<u>1 credit</u> 'Surface Water Runoff – Volume': - Flooding of property will not occur in the event of local drainage system failure, AND	Stage 2 to 4	- As above. - Where relevant, information showing the proposed drainage solution, system failure flood flow	Drainage consultant

Assessment Issue	Credit	Credit(s) available	Credits targeted	Criteria	Action by (RIBA Stage)	Evidence required at design and post construction stages	Responsibility
				- EITHER - Drainage design measures are specified so that the post-development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site's for the 100-year 6-hour event + allowance for climate change and any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other SuDS techniques. OR - Justification from the consultant indicating why the above criteria cannot be achieved. Drainage design measures are specified so that the post-development peak rate of run-off is reduced to the limiting discharge. - Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place. <u>Drainage consultant to confirm</u>		routes, potential flood ponding levels and ground floor levels.	
	Minimising watercourse pollution	1	1	No discharge from the developed site for rainfall up to 5mm. Areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided with SuDs. A comprehensive and up to date drainage plan of the site to be made available for the building or site occupiers. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS to be in place. <u>Drainage consultant to confirm</u>	Stage 2 to 4	- Calculation of the 5mm rainfall event from the relevant areas. - Drainage drawings demonstrating compliance. - Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS.	Drainage consultant
POL04 Reduction of night time light pollution	Reduction of light pollution	1	1	External lighting pollution has been eliminated through effective design that removes the need for external lighting. This should not adversely affect the safety and security of the site and its users. OR Alternatively: - The lighting strategy has been designed to reduce obtrusive light. This includes both external lighting and internal lighting in spaces with glazed apertures. - All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00. - Illuminated advertisements are designed to control brightness and minimise visual disturbance during nighttime hours. - Lighting is designed to minimise impacts on nocturnal wildlife.	Stage 3 and 4	- Calculations, Drawings, specifications, datasheets on external lighting design and control strategy.	M&E consultant or Lighting designer
POL05 Reduction of noise pollution	Noise level	1	1	Where there are noise-sensitive areas within the assessed building or noise-sensitive areas within 800 m radius of the assessed site, a noise impact assessment compliant with BS 4142:2014 by a suitably qualified acoustic consultant is commissioned. 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. If noise levels are exceeded, measures are to be installed to attenuate the noise to enable compliance.	Stage 2-4	- Acoustic report at design and as built stages. - Measurements and testing report at post construction. - Manufacturer's details and final construction drawings or equivalent for noise generating plant. - Assessor's site inspection report and photographic evidence	Acoustic consultant
Innovation – see exemplary credits above							

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