

Energy and Sustainability Statement

Astec House

For Bagri Foundation

January 2026

ecolytik

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Report status	Draft
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1 Executive Summary

This Energy and Sustainability Statement summarises the key measures proposed to meet Reading Borough Council's ('RBC') policies in support of the planning application for Astec House.

The proposed development comprises the conversion of the existing Grade II Listed Building to create student accommodation with ancillary landscaping and parking.

1.1 Energy Strategy

The energy strategy for the project has been developed in line with Climate Change ('CC') policies of RBC's Local Plan and Sustainable Design and Construction SPD. The CO₂ emissions for the development have been assessed using the Simplified Building Energy Model (SBEM) method.

Proposed energy measures for the development include:

- **Step 1 – Use less energy:** Improvement to building fabric thermal performance, where deemed feasible and appropriate for the Grade II Listed building. Implementation of high efficiency lighting throughout the building.
- **Step 2 – Supply energy efficiently:** No existing or proposed district heating/energy networks are available in proximity to the application site. It is proposed to replace the existing building's services systems with new, more efficient equipment.
- **Step 3 – Use Low and Zero Carbon ('LZC') technology:** New, more efficient Air Source Heat Pumps ('ASHP') will supply space heating (a portion) and cooling to the building. Heating (majority) and hot water is proposed to be supplied by new, more efficient gas boilers with low emissions.

Overall, the proposed development is anticipated to achieve an 62% reduction in regulated CO₂ emissions over the existing building baseline, which is considered notable for a refurbishment scheme of this nature.

1.2 Sustainability Strategy

Broader sustainability considerations for the scheme include the effective use of existing buildings and land, climate resilience, low embodied carbon, appropriate material selection, health and wellbeing, sustainable transport and waste management among others.

The design of the proposed development attains significant operational carbon reductions for a scheme of this nature and improves the sustainability credentials of the site, which demonstrates the client and design team's aspirations to meet and exceed RBC's planning policy requirements as far as possible.

The proposed refurbishment and conversion scheme will also target BREEAM 'Very Good' under the Refurbishment and Fit-Out 2014 scheme in line with RBC's policy CC2 for minor non-residential developments of less than 1,000m² of floor space.

Table 1. Planning policies applicable for the proposed development, and the report sections where they are responded to.

	3 Energy Strategy	4.1 Health and Wellbeing	4.2 Nature, Landscape and Biodiversity	4.3 Climate Resilience	4.4 Water and Surface Water Runoff	4.5 Materials and Waste	4.6 BREEAM
Reading's Local Plan (2019)							
CC1: Presumption in favour of sustainable development	◆	◆	◆	◆	◆	◆	◆
CC2: Sustainable design and construction	◆	◆	◆	◆	◆	◆	◆
CC3: Adaptation to climate change		◆	◆	◆			
CC4: Decentralised energy	◆						
CC5: Waste minimisation and storage						◆	
CC8: Safeguarding amenity		◆					
EN1: Protection and enhancement of the historic environment	◆						◆
EN7: Local green space and public open space							
EN8: Undesignated open space		◆					
EN9: Provision of open space		◆					
EN12: Biodiversity and the green network			◆				
EN14: Trees, hedges and woodland			◆				
EN15: Air quality		◆					
EN16: Pollution and water resources					◆		
EN17: Noise and vibration		◆					
EN18: Flooding and drainage				◆	◆		
Reading's Sustainable Design and Construction SPD (2019)							
Energy efficiency	◆						
Climate Change Adaptation				◆			
Water management				◆	◆		
Waste reduction						◆	
Decentralised energy and district heating	◆						

2 Introduction

2.1 Site

Astec House is located at 187-189 King's Road, within the jurisdiction of Reading Borough Council (hereafter referred to as 'RBC').

Dating back to post-1832 as part of Waterloo Place, Nos. 187-189 Kings Road is a Grade II Listed, disused heritage building which was most recently utilised as offices.

The proposed development comprises the conversion of the building to create student accommodation with ancillary landscaping and parking.

The approximate site location is presented in Figure 1.

2.2 Planning policies

A review of the applicable policies for the proposed development has been undertaken. A full summary of the relevant RBC policies is presented in Appendix D.

The proposed development has been designed to meet and exceed (where feasible) the following main policy drivers.

- Enhance health and wellbeing through provision of high quality buildings and associated amenity spaces, limiting exposure to sources of air and noise pollution.
- Design in measures to ensure safety, security and resilience.
- Achieve meaningful reductions in carbon emissions without compromising the appearance and features of a Listed Building.
- Enable adaptation to climate change.
- Consider the use of decentralised energy sources.
- Minimise waste.
- Minimise noise and air pollution.
- Improve water efficiency.
- Target BREEAM 'Very good', where possible.

The proposed Energy and Sustainability strategies for the scheme are presented in the following chapters.



Figure 1. Approximate site location of Astec House (source: Google Maps, accessed: December 2025).

3 Energy Strategy

The energy strategy for the proposed development at Astec House has been developed with the following hierarchy in order to address the principles set out within RBC's Climate Change (CC) policies:

- 1. Step 1: use less energy.
- 2. Step 2: supply energy efficiently.
- 3. Step 3: use low or zero carbon (LZC) energy sources.

The energy and carbon assessment has therefore been undertaken in line with Part L2 2021 using the Simplified Building Energy Model (SBEM) method.

The CO₂ emissions at each stage of the hierarchy are compared to the existing building baseline.

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 following sections present the measures adopted at each stage of the energy hierarchy at the proposed development.

3.1 Step 1: use less energy

A range of energy efficiency measures has been applied to the proposed development to minimise energy demand and CO₂ emissions.

3.1.1 Passive design

There are inherent constraints to implementing significant passive design measures for the Grade II Listed Building. The design team have aimed to optimise the performance of the fabric and as far as technically feasible. Rooflights have been proposed to habitable spaces on the top floor to enhance daylight penetration and reduce artificial lighting energy demand.

3.1.2 Fabric specification

As part of the reinstatement and refurbishment works, the building's fabric will be improved where possible and appropriate. The external walls of the building are of solid stone construction; it is currently proposed to insulate them internally.

Insulation is also proposed to be installed to the roof, to minimise heat losses as far as possible.

It is unlikely to be possible to retrofit insulation to the ground contact floor as there is limited floor height in the basement to accommodate this. The design team will review this in more detail post-planning to explore whether the existing screed could be removed and substituted with waterproofing, insulation and an engineered deck.

Furthermore, due to the Grade II Listed nature of the existing building, it is not deemed suitable to significantly improve the thermal performance of the windows from a heritage perspective. New, single glazed windows are proposed to be installed which will include draught sealing.

Key proposed specifications are presented in Table 2. Further technical details regarding the proposals are presented in Appendix A.

3.1.3 Efficient lighting

All light fittings within the proposed development will be specified as low energy lighting with an average efficacy of >100 lm/W.

Lighting controls are proposed to be incorporated, such as occupancy sensing, dimming and constant illuminance control where appropriate. Daylight sensors will be incorporated where suitable to communal areas with good access to daylight.

3.1.4 Controls and Energy Monitoring

All spaces will have localised and appropriately zoned thermal controls in line with BREEAM requirements. Energy sub-meters connected to a Building Management System will enable data to be monitored, verified and reported.



Figure 2. Existing stone façade of Astec House (source: Google Maps, accessed: December 2025).

Table 2. Proposed fabric specifications in line with Part L and considering Listed status constraints.

Element	Existing building baseline	Proposed specification
External walls u-value	2.7 W/m ² .K.	0.3 W/m ² .K.
Roof u-value	2.4 W/m ² .K.	0.18 W/m ² .K.
Floor u-value	2.0 W/m ² .K.	2.0 W/m ² .K.
Windows u-value	5.6 W/m ² .K.	5.6 W/m ² .K.
Rooflights u-value (new)	2.2 W/m ² .K.	1.3 W/m ² .K.

3.2 Step 2: supply energy efficiently

Policy CC4 of RBC’s Local Plan stipulates that major development proposals should prioritise securing energy for the development from a decentralised energy source.

A review of the Government’s Heat Networks Planning Database (Figure 3) shows that there are no existing and proposed district heating/energy network in proximity to the site.

Due to the minor scale and Listed nature of the existing building, it would also be challenging to accommodate the plant and infrastructure requirements to enable a connection to a future heat network.

The proposed strategy includes replacing the old, existing services systems (gas boilers and air source heat pumps), with new high efficiency equivalent systems.

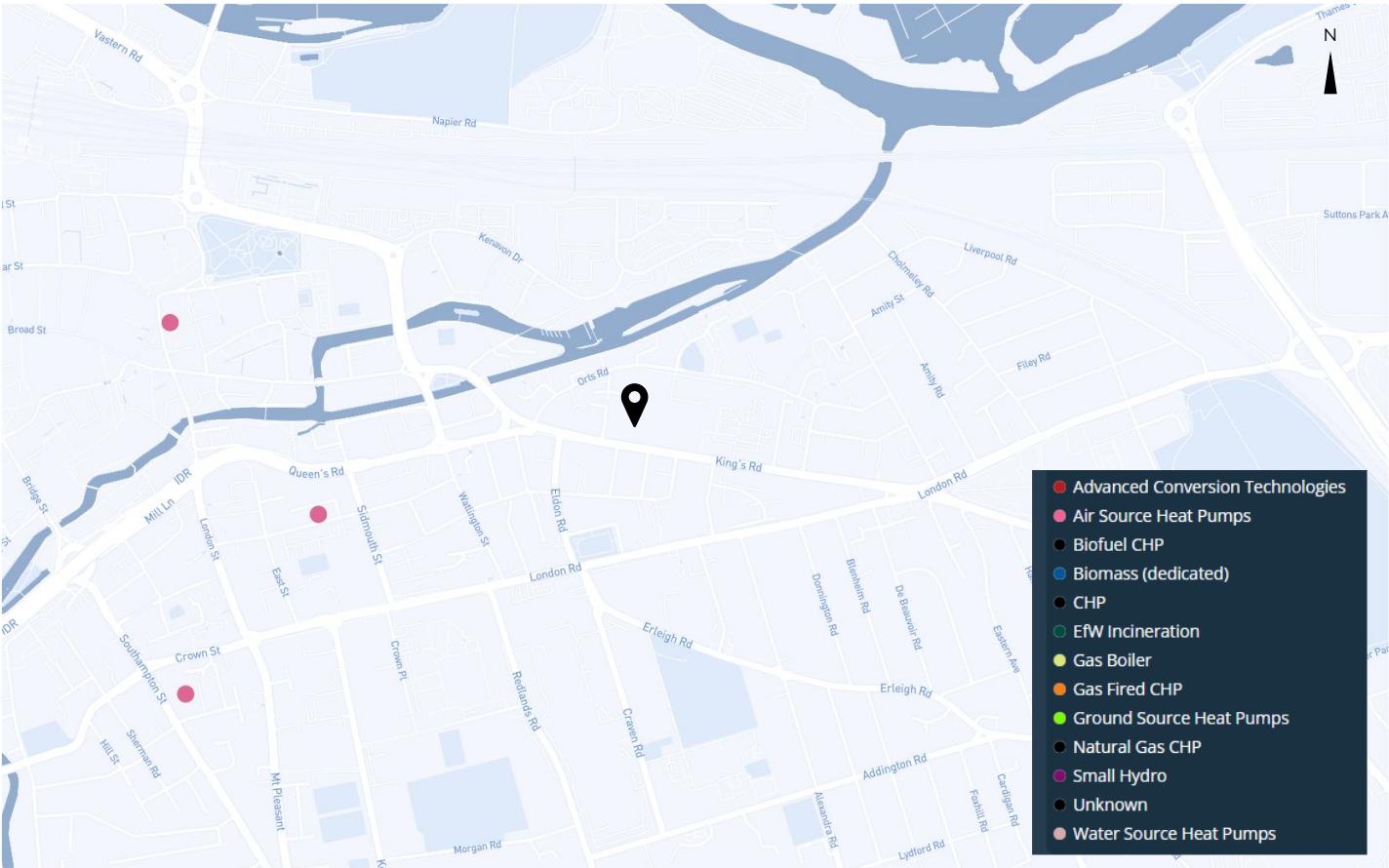


Figure 3. Heat Networks Planning Database for site and surroundings (accessed: December 2025).

3.3 Step 3: Low Zero Carbon technology

The opportunity for producing and utilising renewable energy onsite has been explored for the proposed development.

The majority of the space heating, as well as hot water for the existing building is provided by gas boilers, based on information provided by the applicant team. This system is proposed to be upgraded to a new, more efficient, boiler system with low NOx emissions.

Space heating and cooling is also provided by Air Source Heat Pumps (ASHP). The external condensers of the ASHP are located in the lightwell, as shown in Figure 4. These systems are also proposed to be upgraded to new, more efficient units.

Due to site constraints and the Listed status of the building, it was not deemed possible to integrate additional LZC technologies on or within the building.

An outline feasibility study has been undertaken (see Table 3) and has identified replacing the ASHP as the most suitable approach for the site.

Table 3. Outline LZC feasibility.

LZC Technology	Adopted	Feasibility
Photovoltaics	N	PV are often installed with a slight tilt from horizontal and will likely be visible from street level. Access for installation, maintenance and a review of the structural capacity of the roof are also potential constraints to implementing this technology. Due to the decarbonisation of electricity grid, new ASHPs will provide more carbon savings for the scheme.
Solar thermal	N	As above. In addition, solar thermal requires additional plumbing and thermal stores which make its application challenging for the existing building. Solar thermal does not provide hot water consistently across the year.
Wind turbines	N	The installation of wind turbines at the proposed building will have a notable visual impact on the Listed Building.
Ground source heat pump (GSHP)	N	Ground source heat pump is not deemed suitable for the refurbishment scheme due to cost, complexity and challenges with installing significant services infrastructure within an existing building.
Air source heat pump (ASHP)	Y	ASHP provides an effective way of providing low carbon heating and cooling for the development.
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.



Figure 4. Proposed replacement of existing air source heat pumps in the lightwells with new heat pumps.

3.4 Results

Through the measures outlined for each stage of the energy hierarchy, it is anticipated the proposed development can achieve a 62% reduction in regulated CO₂ emissions over the existing building baseline.

Carbon savings have been maximised as far as technically feasible on site with improvements to fabric and incorporation of renewable technologies in line with policy.

Table 4, Table 5 and Figure 5 present the anticipated CO₂ emissions and savings at each stage of the Energy Hierarchy.

Table 4. Carbon emissions after each stage of the Energy Hierarchy for Astec House.

	Carbon Dioxide Emissions (tCO ₂ /yr)	
	Regulated	Unregulated
Baseline: Existing Building Baseline	43.5	1.3
After energy demand reduction (Step 1)	18.8	1.3
After heat network connection (Step 2)	18.8	1.3
After renewable energy (Step 3)	16.6	1.3

Table 5. Regulated carbon savings from each stage of the Energy Hierarchy for Astec House.

	Regulated carbon dioxide savings	
	tCO ₂ per annum over Existing Building	Improvement over Existing Building (%)
Step 1: Savings from energy demand reduction	24.6	57%
Step 2: Savings from heat network	0.0	0%
Step 3: Savings from renewable energy	2.3	5%
Cumulative on-site savings	26.9	62%

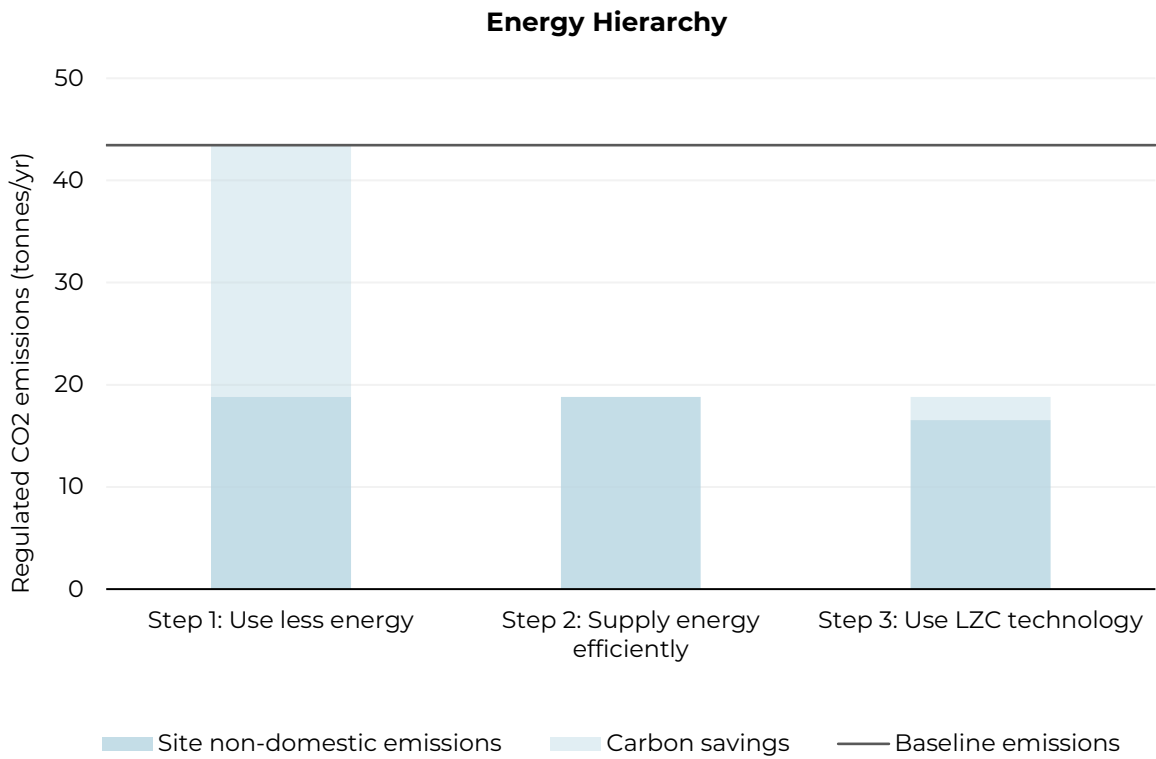


Figure 5. Regulated carbon emissions at each stage of the energy hierarchy.

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 RBC’s Local Plan.

4.1 Health and Wellbeing

4.1.1 Air Quality

Any potential dust and stationary plant emissions during the construction period will be mitigated.

A new, more efficient low NOx emissions gas boiler is proposed to replace the old system. Part of the development’s heating and cooling requirements will also be met by electrically driven air source heat pumps, which would result in no additional NOx or PM emissions on site.

Further details are presented in the Air Quality Assessment accompanying the application.

4.1.2 Noise

The development will incorporate building fabric measures to ensure the impact of any external sources on internal ambient noise levels are within acceptable limits.

Any potential noise impact during minor demolition, construction and operation will be mitigated accordingly. Any external services plant will be acoustically attenuated where required.

4.1.3 Daylight and Sunlight

The proposed development would not result in significant increase in the building’s massing and is not anticipated to have a notable impact on daylight/sunlight levels received by neighbouring properties.

The proposed habitable rooms within the development will receive adequate levels of daylight based on the BRE guidelines.

Please refer to the accompanying Daylight and Sunlight Assessment for the planning application for further details.

4.1.4 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 not introduce any new up-lighting, and all external lighting (aside from security lighting) will be connected to daylight sensors and be time controlled.

4.1.5 External Amenity

There are constraints with providing additional external amenity space on site as this would result in significant alterations to the Listed Building. The site is located within a few minutes’ walk from King George V Memorial Gardens to the south and River Kennet to the North which future building occupants could utilise as external amenity.

4.1.6 Active Travel

The site has excellent access to public transport, particularly via the extensive local bus network and its proximity to a major regional railway hub.

Reading railway station is located approximately 1 km (about a 15-minute walk or a short bus ride), providing connectivity to London Paddington, the Elizabeth Line for various locations within London, as well as Bristol, Cardiff, Oxford and Gatwick Airport.

Several bus stops are also within few minutes’ walk from the site.

Secure cycle storage spaces are proposed to the rear of the site next to the car parking (Figure 6). Short stay cycle parking will also be provided to the front of the site.

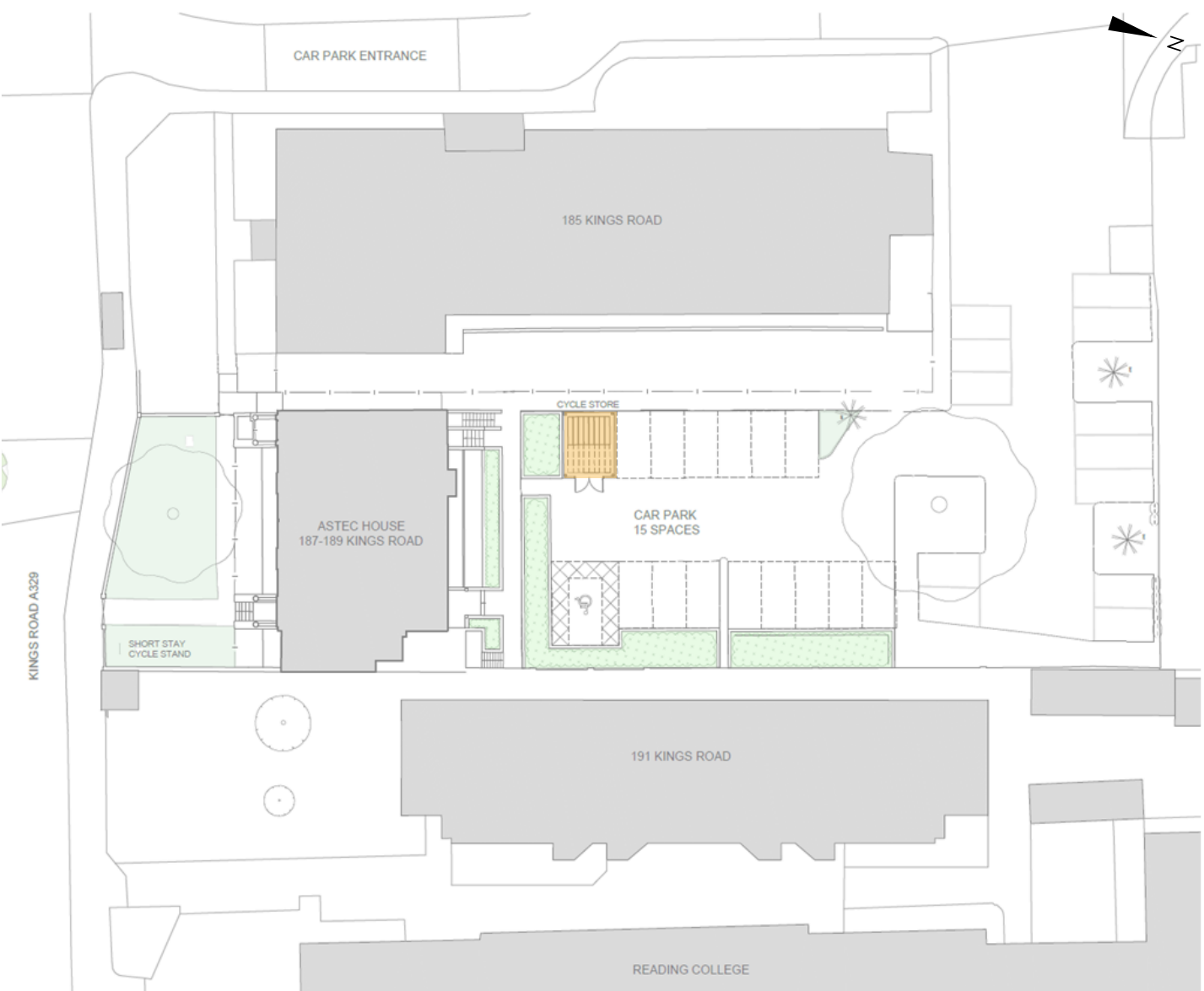


Figure 6. Location of proposed cycle storage space (in orange) (site plan by Mountford Pigott).

4.2 Nature, Landscape and Biodiversity

There are no features of ecological value currently present at Astec House. The proposed scope of works at the site is limited and comprises internal alternations and refurbishment. Some soft landscaping and planning will be introduced to the car park area to the rear, which will increase ecological value at the site.

4.3 Climate Resilience

4.3.1 Managing risk of overheating

To mitigate potential risk of overheating, the proposed development at Astec House has considered the following principles and hierarchy.

1. **Reduce the amount of heat entering the building**

- No notable changes to glazing area on the retained façades are proposed.
- All existing glazed areas are slightly recessed from the facades with deep reveals, which provide some level of solar protection.
- External shading is not deemed appropriate due to the Listed status of the existing building.

2. **Minimise internal heat generation through energy efficient design**

- All heat sources within the building will be factory insulated to reduced heat loss. Any hot water pipework will also be insulated where required.
- All light fixtures will be low energy and will not result in notable internal lighting heat gains.

3. **Manage the heat within the building through exposed internal thermal mass and high ceilings**

- The structure of the existing building is inherently thermally heavy. Where deemed appropriate and beneficial, exposed thermal mass to internal spaces will be retained.

- Certain floors benefit from higher ceilings which will provide an element of stratification.

4. **Provide passive ventilation**

- Openable windows will be the main strategy for providing ventilation to the building.

5. **Provide mechanical ventilation**

- Mechanical ventilation with heat recovery is not currently proposed for the development due to challenges with incorporating ductwork and façade penetrations to the existing building. This can be reviewed in more detail with input from M&E consultants post-planning.

6. **Provide active cooling systems**

- Cooling supplied by new, high efficiency air source heat pumps will be implemented where required.

4.3.2 Managing flood risk

The site is located in an area at low risk of rivers and sea flooding (Figure 7).

The proposed refurbishment development is unlikely to increase exposure to potential risk of flooding for the future occupants, and is unlikely to lead to an increase of flood risk elsewhere.



Figure 7. Flood risk map – rivers and sea flooding (Accessed: December 2025).

4.4 Water and Surface Water Runoff

4.4.1 Water Efficiency

The proposed development will target the BREEAM excellent standard (at least 1no. credit) for the ‘Wat 01’ water category through the implementation of water efficient sanitary fittings and appliances.

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

- WCs: 4 litres effective flush.
- Wash basin taps: 4.5 litres/min.
- Showers: 6 litres/min.
- Kitchenette tap: 5litres/min.
- Domestic sized dishwashers: 12 litres/cycle.
- Domestic sized washing machines: 40 litres/use.
- Waste disposal unit: 0 litres/min.
- Commercial sized washing machines: 7.5 litres/kg.

4.4.2 Surface water runoff

The proposed development will not introduce any additional impermeable areas to the site and is therefore unlikely to result in an increase in flood risk elsewhere. The introduction of SuDs is not deemed relevant to the refurbishment scheme.

4.5 Materials and Waste

4.5.1 Material Selection and Procurement

The proposed development with major internal renovation will retain and fully re-utilise the existing building onsite and is therefore inherently sustainable. The scheme is anticipated to have significantly lower embodied carbon compared to a fully new-build scheme to provide the same type of accommodation. To further reduce embodied carbon of the proposed development, materials with recycled content will be prioritised during detailed design stage specification.

Materials for the scheme will be 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 prioritised where possible.

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.

4.5.2 Waste Management

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

A waste storage area is proposed at lower ground level which will be sufficiently sized for the storage of general, recyclable and organic waste.

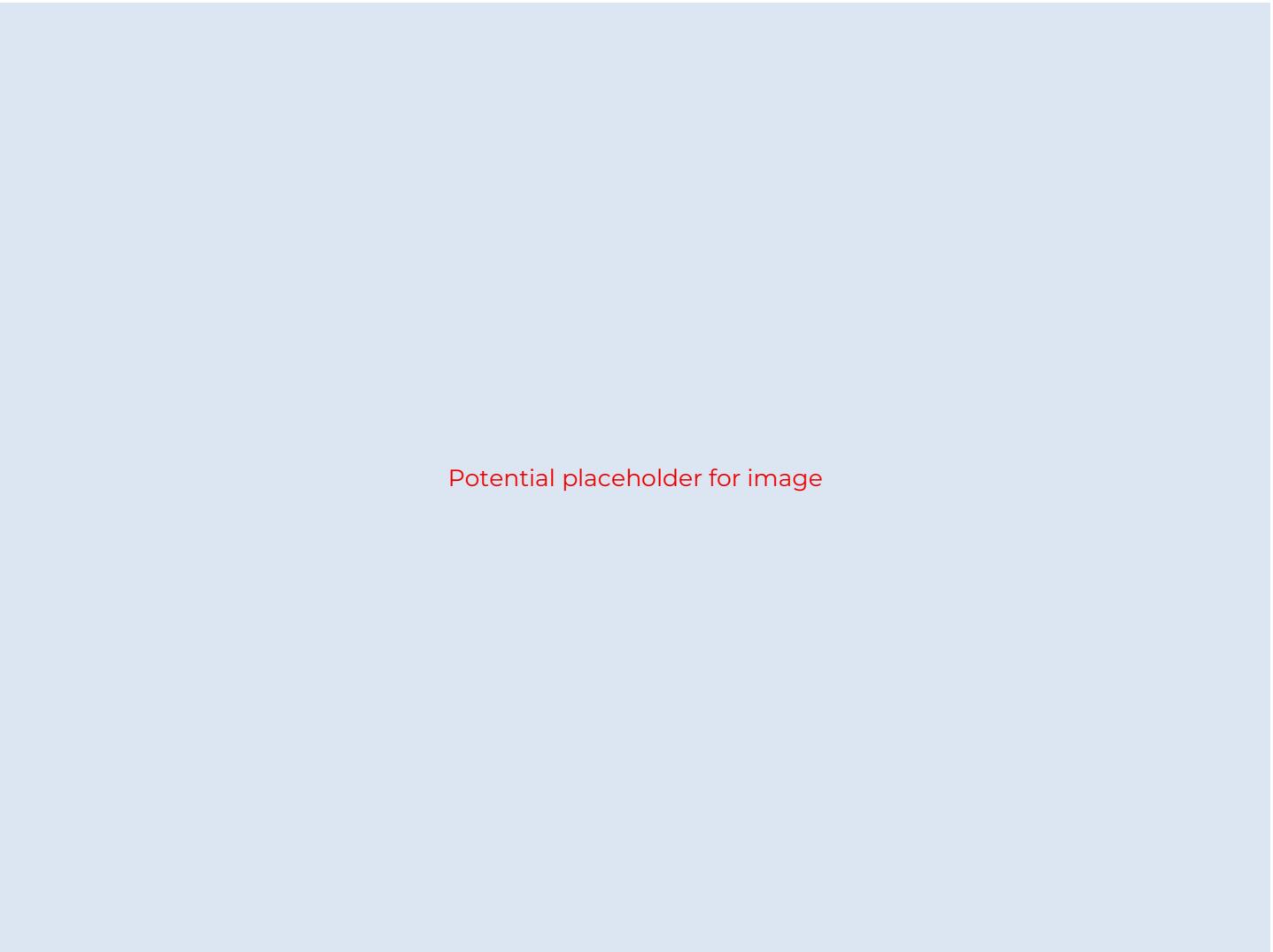


Figure 8. Proposed locations of waste storage area.

4.6 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 Refurbishment and Fit-Out 2014 Multi-residential pre-assessment (including Parts 1 to 4) has been carried out for the proposed development.

The pre-assessment shows that the scheme can achieve a BREEAM ‘Very Good’ rating in line with requirements set out in policy CC2 of RBC’s Local Plan for minor developments.

A summary of the credits targeted is presented in Appendix C.

This pre-assessment will provide the design 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.

Table 6. BREEAM Refurbishment and Fit Out 2014 Pre-Assessment results summary for Astec House.

	Credits available	Credits targeted	% credits targeted	Available weighted score	Category Score
Man	21	11	52.38%	13.52%	7.08%
Hea	20	8	40.00%	15.36%	6.14%
Ene	25	21	84.00%	16.21%	13.61%
Tra	9	4	44.44%	6.76%	3.00%
Wat	9	5	55.56%	6.76%	3.75%
Mat	13	4	30.77%	14.08%	4.33%
Wst	10	4	40.00%	7.04%	2.81%
LE	4	4	100.00%	9.01%	9.01%
Pol	13	9	69.23%	11.26%	7.79%
Inn	10	0	0.00%	10.00%	0.00%
Total	134	70	52.24%	-	57.5%
Rating					Very Good



Figure 9. BREEAM Pre-Assessment performance by category for Astec House.

5 Conclusions

Through the adoption of the sustainable design strategies presented in this report, the client and design team and demonstrated that the proposed development at Astec House will fulfil the relevant policy requirements stipulated by RBC’s Local Plan.

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

Appendix A – Proposed Building Fabric and System specifications

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	Existing spec	Part L 2021	Proposed specification	Unit	Note
Roof					
Existing slate roof	2.4	0.18	0.18	W/m²K	1
Existing Walls					
Stone external walls	2.2	0.30	0.30	W/m²K	1
Existing Floors					
Lower ground floor	2.0	0.25	2.0	W/m²K	1
Windows					
Existing windows (single glazed)	5.6	1.4	5.6	W/m²K	1
New rooflights	-	2.2	1.3	W/m²K	1
Whole building - Air permeability					
Air tightness and draught proofing measures to be applied throughout building.					
Retrofitting insulation					
Where internal insulation may be implemented, considerations should be made to minimise thermal bridging and risk of moisture/condensation. The application of breathable insulation (e.g. wood fibre) is recommended.					

Building Services Systems	Proposed specification	Unit	Note
Ventilation			
Type	Natural with toilet mechanical extract		1, 2
Extract fan efficiency	0.2	W/l.s	1, 2
Heating			
Type	Multi-split		1,2
Heating and hot water source	Gas boiler		
Heating efficiency	>93	%	
Cooling source	Air Source Heat Pump		1,2
Seasonal Energy Efficiency Ratio (SEER)	>500	%	1,2
Lighting			
Lighting efficacy	>100	lm/cW	1, 2
Photoelectric and occupancy controls	Yes, where applicable		1, 2

Notes	
1	Planning stage assumption to achieve planning policy or Building Regulations targets
2	Subject to MEP design by others
NB. Please refer to Approved Document L2 2021 for all requirements to comply with Building Regulations Part L.	

Project name

Existing Building Baseline**As designed**

Date: Mon Dec 22 15:22:44 2025

Administrative information

Building Details

Address: Astec House, 187-189 King's Road, Reading, TBC

Certifier details

Name: Ecolytik

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: v7.0.30

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

Foundation area [m²]: 189.15The CO₂ emission and primary energy rates of the building must not exceed the targets

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

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	9.3
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	45.94
Target primary energy rate (TPER), kWh _{PE} /m ² annum	55.31
Building primary energy rate (BPER), kWh _{PE} /m ² annum	261.72
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	2.72	2.72	1F000000_W1
Floors	0.18	2.02	2.02	1F000014_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	2.44	2.44	1F000008_C
Windows** and roof windows	1.6	5.6	5.6	1F000018_W3_O0
Rooflights***	2.2	2.2	2.2	3F00000B_C_O0
Personnel doors^	1.6	3.5	3.5	1F000001_W1_O0
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

U_a-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	15

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- Gas boiler and AC

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.81	2	-	-	-
Standard value	0.93*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for gas single boiler systems ≤2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.					

1- SYST0000-DHW

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

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	Zone	Standard
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
_ -1F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
_ -1F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
_ -1F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
_ -1F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
_ -1F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
0F WC		0.4	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom		0.4	-	-	-	-	-	-	-	-	-	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 Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom		0.4	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom		0.4	-	-	-	-	-	-	-	-	-	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 Bathroom		60	-	-
_ -1F Bathroom		60	-	-
_ -1F Bathroom		60	-	-
_ -1F Bathroom		60	-	-
_ -1F Bathroom		60	-	-
_ -1F Bedroom		60	-	-
_ -1F Bedroom		60	-	-
_ -1F Bedroom		60	-	-
_ -1F Bedroom		60	-	-
_ -1F Bedroom		60	-	-
_ -1F Circulation		60	-	-
_ -1F Corridor		60	-	-
_ -1F Laundry		60	-	-
_ -1F Store		60	-	-
_ -1F Store		60	-	-
0F Bathroom		60	-	-
0F Bathroom		60	-	-
0F Bathroom		60	-	-
0F Bathroom		60	-	-
0F Bathroom		60	-	-
0F Bedroom		60	-	-
0F Bedroom		60	-	-
0F Bedroom		60	-	-

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
0F Bedroom		60	-	-
0F Bedroom		60	-	-
0F Circulation		60	-	-
0F Circulation		60	-	-
0F Corridor		60	-	-
0F Lobby		60	-	-
0F Office		60	-	-
0F WC		60	-	-
1F Bathroom		60	-	-
1F Bathroom		60	-	-
1F Bathroom		60	-	-
1F Bathroom		60	-	-
1F Bathroom		60	-	-
1F Bathroom		60	-	-
1F Bathroom		60	-	-
1F Bedroom		60	-	-
1F Bedroom		60	-	-
1F Bedroom		60	-	-
1F Bedroom		60	-	-
1F Bedroom		60	-	-
1F Bedroom		60	-	-
1F Bedroom		60	-	-
1F Circulation		60	-	-
1F Circulation		60	-	-
1F Corridor		60	-	-
2F Bathroom		60	-	-
2F Bathroom		60	-	-
2F Bathroom		60	-	-
2F Bathroom		60	-	-
2F Bathroom		60	-	-
2F Bathroom		60	-	-
2F Bathroom		60	-	-
2F Bedroom		60	-	-
2F Bedroom		60	-	-
2F Bedroom		60	-	-
2F Bedroom		60	-	-
2F Bedroom		60	-	-
2F Bedroom		60	-	-
2F Bedroom		60	-	-
2F Circulation		60	-	-
2F Circulation		60	-	-
2F Corridor		60	-	-
3F Bathroom		60	-	-

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 Bathroom		60	-	-
3F Bathroom		60	-	-
3F Bathroom		60	-	-
3F Bathroom		60	-	-
3F Bedroom		60	-	-
3F Bedroom		60	-	-
3F Bedroom		60	-	-
3F Bedroom		60	-	-
3F Bedroom		60	-	-
3F Circulation		60	-	-
3F Communal use		60	-	-
3F Corridor		60	-	-

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?
_ -1F Bathroom	N/A	N/A
_ -1F Bathroom	N/A	N/A
_ -1F Bathroom	N/A	N/A
_ -1F Bathroom	N/A	N/A
_ -1F Bathroom	N/A	N/A
_ -1F Bedroom	NO (-44.4%)	NO
_ -1F Bedroom	NO (-68.2%)	NO
_ -1F Bedroom	NO (-43.3%)	NO
_ -1F Bedroom	NO (-56.7%)	NO
_ -1F Bedroom	NO (-57.4%)	NO
_ -1F Circulation	N/A	N/A
_ -1F Corridor	N/A	N/A
_ -1F Laundry	N/A	N/A
_ -1F Store	N/A	N/A
_ -1F Store	N/A	N/A
0F Bathroom	N/A	N/A
0F Bathroom	N/A	N/A
0F Bathroom	N/A	N/A
0F Bathroom	N/A	N/A
0F Bathroom	N/A	N/A
0F Bedroom	YES (+99%)	NO
0F Bedroom	NO (-38.9%)	NO
0F Bedroom	YES (+98.8%)	NO
0F Bedroom	YES (+15.1%)	NO
0F Bedroom	NO (-4.3%)	NO
0F Circulation	N/A	N/A
0F Circulation	N/A	N/A
0F Corridor	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0F Lobby	N/A	N/A
0F Office	NO (-37.8%)	NO
0F WC	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bedroom	NO (-0.9%)	NO
1F Bedroom	NO (-52.7%)	NO
1F Bedroom	NO (-54.6%)	NO
1F Bedroom	NO (-55.3%)	NO
1F Bedroom	YES (+16%)	NO
1F Bedroom	YES (+36.4%)	NO
1F Bedroom	NO (-42%)	NO
1F Circulation	NO (-87.1%)	NO
1F Circulation	NO (-90.4%)	NO
1F Corridor	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bedroom	NO (-61.6%)	NO
2F Bedroom	NO (-26.3%)	NO
2F Bedroom	NO (-51.6%)	NO
2F Bedroom	NO (-68.5%)	NO
2F Bedroom	NO (-64.5%)	NO
2F Bedroom	NO (-19.1%)	NO
2F Bedroom	NO (-35.5%)	NO
2F Circulation	NO (-87.1%)	NO
2F Circulation	NO (-90.4%)	NO
2F Corridor	N/A	N/A
3F Bathroom	YES (+202.5%)	NO
3F Bathroom	YES (+122.1%)	NO
3F Bathroom	N/A	N/A
3F Bathroom	YES (+107.4%)	NO
3F Bathroom	YES (+111.6%)	NO
3F Bedroom	NO (-63.6%)	NO
3F Bedroom	YES (+13.7%)	NO
3F Bedroom	NO (-2.2%)	NO
3F Bedroom	NO (-53.5%)	NO
3F Bedroom	NO (-75.2%)	NO
3F Circulation	NO (-78.8%)	NO
3F Communal use	YES (+1.8%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
3F Corridor	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?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	945.8	945.8
External area [m ²]	1283.5	1283.5
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	15	3
Average conductance [W/K]	3543.9	638.84
Average U-value [W/m ² K]	2.76	0.5
Alpha value* [%]	4.11	27.74

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

Building Use

% Area Building Type

Retail/Financial and Professional Services
 Restaurants and Cafes/Drinking Establishments/Takeaways
 Offices and Workshop Businesses
 General Industrial and Special Industrial Groups
 Storage or Distribution
 Hotels
 Residential Institutions: Hospitals and Care Homes
100 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	195.95	33.82
Cooling	11.14	3.02
Auxiliary	0.19	1.11
Lighting	8.3	4.59
Hot water	10.71	10.99
Equipment*	10.21	10.21
TOTAL **	226.28	53.54

* 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	6.67
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>6.67</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	589.52	152.58
Primary energy [kWh _{PE} /m ²]	261.72	55.31
Total emissions [kg/m ²]	45.94	9.3

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	532.6	56.9	195.9	11.1	0.2	0.76	1.42	0.81	2
Notional	104.7	47.9	33.8	3	0.2	0.86	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 1 Assessment

As designed

Date: Fri Jan 09 17:39:43 2026

Administrative information**Building Details**

Address: Astec House, 187-189 King's Road, Reading, TBC

Certifier details

Name: Ecolytik

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: v7.0.30

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

Foundation area [m²]: 189.15**The CO₂ emission and primary energy rates of the building must not exceed the targets**

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

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	9.3
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	19.86
Target primary energy rate (TPER), kWh _{PE} /m ² annum	55.31
Building primary energy rate (BPER), kWh _{PE} /m ² annum	115.84
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	0.3	0.3	1F000000_W1
Floors	0.18	2.02	2.02	1F000014_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.18	0.18	1F000008_C
Windows** and roof windows	1.6	5.6	5.6	1F000018_W3_O0
Rooflights***	2.2	1.3	1.3	3F00000B_C_O0
Personnel doors^	1.6	3.5	3.5	1F000001_W1_O0
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

U_{a-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	15

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- Gas boiler and AC

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.81	2	-	-	-
Standard value	0.93*	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 gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.					

1- SYST0000-DHW

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

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	Zone	Standard
Standard value		0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
_ -1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
_ -1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
_ -1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
_ -1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
_ -1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F WC		0.2	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	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 Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom	0.2	-	-	-	-	-	-	-	-	-	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 Bathroom		100	-	-
_ -1F Bathroom		100	-	-
_ -1F Bathroom		100	-	-
_ -1F Bathroom		100	-	-
_ -1F Bathroom		100	-	-
_ -1F Bedroom		100	-	-
_ -1F Bedroom		100	-	-
_ -1F Bedroom		100	-	-
_ -1F Bedroom		100	-	-
_ -1F Bedroom		100	-	-
_ -1F Circulation		100	-	-
_ -1F Corridor		100	-	-
_ -1F Laundry		100	-	-
_ -1F Store		100	-	-
_ -1F Store		100	-	-
0F Bathroom		100	-	-
0F Bathroom		100	-	-
0F Bathroom		100	-	-
0F Bathroom		100	-	-
0F Bathroom		100	-	-
0F Bedroom		100	-	-
0F Bedroom		100	-	-
0F Bedroom		100	-	-

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
0F Bedroom		100	-	-
0F Bedroom		100	-	-
0F Circulation		100	-	-
0F Circulation		100	-	-
0F Corridor		100	-	-
0F Lobby		100	-	-
0F Office		100	-	-
0F WC		100	-	-
1F Bathroom		100	-	-
1F Bathroom		100	-	-
1F Bathroom		100	-	-
1F Bathroom		100	-	-
1F Bathroom		100	-	-
1F Bathroom		100	-	-
1F Bathroom		100	-	-
1F Bedroom		100	-	-
1F Bedroom		100	-	-
1F Bedroom		100	-	-
1F Bedroom		100	-	-
1F Bedroom		100	-	-
1F Bedroom		100	-	-
1F Bedroom		100	-	-
1F Circulation		100	-	-
1F Circulation		100	-	-
1F Corridor		100	-	-
2F Bathroom		100	-	-
2F Bathroom		100	-	-
2F Bathroom		100	-	-
2F Bathroom		100	-	-
2F Bathroom		100	-	-
2F Bathroom		100	-	-
2F Bathroom		100	-	-
2F Bedroom		100	-	-
2F Bedroom		100	-	-
2F Bedroom		100	-	-
2F Bedroom		100	-	-
2F Bedroom		100	-	-
2F Bedroom		100	-	-
2F Bedroom		100	-	-
2F Circulation		100	-	-
2F Circulation		100	-	-
2F Corridor		100	-	-
3F Bathroom		100	-	-

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 Bathroom		100	-	-
3F Bathroom		100	-	-
3F Bathroom		100	-	-
3F Bathroom		100	-	-
3F Bedroom		100	-	-
3F Bedroom		100	-	-
3F Bedroom		100	-	-
3F Bedroom		100	-	-
3F Bedroom		100	-	-
3F Circulation		100	-	-
3F Communal use		100	-	-
3F Corridor		100	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
_ -1F Bathroom	N/A	N/A
_ -1F Bathroom	N/A	N/A
_ -1F Bathroom	N/A	N/A
_ -1F Bathroom	N/A	N/A
_ -1F Bathroom	N/A	N/A
_ -1F Bedroom	NO (-44.4%)	NO
_ -1F Bedroom	NO (-68.2%)	NO
_ -1F Bedroom	NO (-43.3%)	NO
_ -1F Bedroom	NO (-56.7%)	NO
_ -1F Bedroom	NO (-57.4%)	NO
_ -1F Circulation	N/A	N/A
_ -1F Corridor	N/A	N/A
_ -1F Laundry	N/A	N/A
_ -1F Store	N/A	N/A
_ -1F Store	N/A	N/A
0F Bathroom	N/A	N/A
0F Bathroom	N/A	N/A
0F Bathroom	N/A	N/A
0F Bathroom	N/A	N/A
0F Bathroom	N/A	N/A
0F Bedroom	YES (+99%)	NO
0F Bedroom	NO (-38.9%)	NO
0F Bedroom	YES (+98.8%)	NO
0F Bedroom	YES (+15.1%)	NO
0F Bedroom	NO (-4.3%)	NO
0F Circulation	N/A	N/A
0F Circulation	N/A	N/A
0F Corridor	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0F Lobby	N/A	N/A
0F Office	NO (-37.8%)	NO
0F WC	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bedroom	NO (-0.9%)	NO
1F Bedroom	NO (-52.7%)	NO
1F Bedroom	NO (-54.6%)	NO
1F Bedroom	NO (-55.3%)	NO
1F Bedroom	YES (+16%)	NO
1F Bedroom	YES (+36.4%)	NO
1F Bedroom	NO (-42%)	NO
1F Circulation	NO (-87.1%)	NO
1F Circulation	NO (-90.4%)	NO
1F Corridor	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bedroom	NO (-61.6%)	NO
2F Bedroom	NO (-26.3%)	NO
2F Bedroom	NO (-51.6%)	NO
2F Bedroom	NO (-68.5%)	NO
2F Bedroom	NO (-64.5%)	NO
2F Bedroom	NO (-19.1%)	NO
2F Bedroom	NO (-35.5%)	NO
2F Circulation	NO (-87.1%)	NO
2F Circulation	NO (-90.4%)	NO
2F Corridor	N/A	N/A
3F Bathroom	YES (+201.4%)	NO
3F Bathroom	YES (+121.3%)	NO
3F Bathroom	N/A	N/A
3F Bathroom	YES (+106.6%)	NO
3F Bathroom	YES (+110.8%)	NO
3F Bedroom	NO (-63.6%)	NO
3F Bedroom	YES (+13.6%)	NO
3F Bedroom	NO (-2.3%)	NO
3F Bedroom	NO (-53.5%)	NO
3F Bedroom	NO (-75.2%)	NO
3F Circulation	NO (-78.8%)	NO
3F Communal use	YES (+1.7%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
3F Corridor	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?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	945.8	945.8
External area [m ²]	1283.5	1283.5
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	15	3
Average conductance [W/K]	1202.39	638.84
Average U-value [W/m ² K]	0.94	0.5
Alpha value* [%]	12.1	27.74

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

Building Use

% Area Building Type

Retail/Financial and Professional Services
 Restaurants and Cafes/Drinking Establishments/Takeaways
 Offices and Workshop Businesses
 General Industrial and Special Industrial Groups
 Storage or Distribution
 Hotels
 Residential Institutions: Hospitals and Care Homes
100 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	76.44	33.82
Cooling	7.07	3.02
Auxiliary	0.09	1.11
Lighting	4.79	4.59
Hot water	10.71	10.99
Equipment*	10.21	10.21
TOTAL **	99.11	53.54

* 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	6.67
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>6.67</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	256.53	152.58
Primary energy [kWh _{PE} /m ²]	115.84	55.31
Total emissions [kg/m ²]	19.86	9.3

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] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	218.5	38	76.4	7.1	0.1	0.79	1.5	0.81	2
	Notional	104.7	47.9	33.8	3	0.2	0.86	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 Assessment

As designed

Date: Fri Jan 09 17:28:48 2026

Administrative information**Building Details**

Address: Astec House, 187-189 King's Road, Reading, TBC

Certifier details

Name: Ecolytik

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: v7.0.30

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

Foundation area [m²]: 189.15**The CO₂ emission and primary energy rates of the building must not exceed the targets**

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

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	9.3
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	17.5
Target primary energy rate (TPER), kWh _{PE} /m ² annum	55.31
Building primary energy rate (BPER), kWh _{PE} /m ² annum	99.79
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	0.3	0.3	1F000000_W1
Floors	0.18	2.02	2.02	1F000014_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.18	0.18	1F000008_C
Windows** and roof windows	1.6	5.6	5.6	1F000018_W3_O0
Rooflights***	2.2	1.3	1.3	3F00000B_C_O0
Personnel doors^	1.6	3.5	3.5	1F000001_W1_O0
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

U_a-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	15

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- Gas boiler and AC

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.9	5	-	-	-
Standard value	0.93*	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 gas single boiler systems ≤2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.					

1- SYST0000-DHW

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

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	Zone	Standard
	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
_ -1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
_ -1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
_ -1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
_ -1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
_ -1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
0F WC		0.2	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom		0.2	-	-	-	-	-	-	-	-	-	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 Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
1F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
2F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom	0.2	-	-	-	-	-	-	-	-	-	N/A
3F Bathroom	0.2	-	-	-	-	-	-	-	-	-	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 Bathroom		100	-	-
_ -1F Bathroom		100	-	-
_ -1F Bathroom		100	-	-
_ -1F Bathroom		100	-	-
_ -1F Bathroom		100	-	-
_ -1F Bedroom		100	-	-
_ -1F Bedroom		100	-	-
_ -1F Bedroom		100	-	-
_ -1F Bedroom		100	-	-
_ -1F Bedroom		100	-	-
_ -1F Circulation		100	-	-
_ -1F Corridor		100	-	-
_ -1F Laundry		100	-	-
_ -1F Store		100	-	-
_ -1F Store		100	-	-
0F Bathroom		100	-	-
0F Bathroom		100	-	-
0F Bathroom		100	-	-
0F Bathroom		100	-	-
0F Bathroom		100	-	-
0F Bedroom		100	-	-
0F Bedroom		100	-	-
0F Bedroom		100	-	-

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
0F Bedroom		100	-	-
0F Bedroom		100	-	-
0F Circulation		100	-	-
0F Circulation		100	-	-
0F Corridor		100	-	-
0F Lobby		100	-	-
0F Office		100	-	-
0F WC		100	-	-
1F Bathroom		100	-	-
1F Bathroom		100	-	-
1F Bathroom		100	-	-
1F Bathroom		100	-	-
1F Bathroom		100	-	-
1F Bathroom		100	-	-
1F Bathroom		100	-	-
1F Bedroom		100	-	-
1F Bedroom		100	-	-
1F Bedroom		100	-	-
1F Bedroom		100	-	-
1F Bedroom		100	-	-
1F Bedroom		100	-	-
1F Bedroom		100	-	-
1F Circulation		100	-	-
1F Circulation		100	-	-
1F Corridor		100	-	-
2F Bathroom		100	-	-
2F Bathroom		100	-	-
2F Bathroom		100	-	-
2F Bathroom		100	-	-
2F Bathroom		100	-	-
2F Bathroom		100	-	-
2F Bathroom		100	-	-
2F Bedroom		100	-	-
2F Bedroom		100	-	-
2F Bedroom		100	-	-
2F Bedroom		100	-	-
2F Bedroom		100	-	-
2F Bedroom		100	-	-
2F Bedroom		100	-	-
2F Circulation		100	-	-
2F Circulation		100	-	-
2F Corridor		100	-	-
3F Bathroom		100	-	-

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 Bathroom		100	-	-
3F Bathroom		100	-	-
3F Bathroom		100	-	-
3F Bathroom		100	-	-
3F Bedroom		100	-	-
3F Bedroom		100	-	-
3F Bedroom		100	-	-
3F Bedroom		100	-	-
3F Bedroom		100	-	-
3F Circulation		100	-	-
3F Communal use		100	-	-
3F Corridor		100	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
_ -1F Bathroom	N/A	N/A
_ -1F Bathroom	N/A	N/A
_ -1F Bathroom	N/A	N/A
_ -1F Bathroom	N/A	N/A
_ -1F Bathroom	N/A	N/A
_ -1F Bedroom	NO (-44.4%)	NO
_ -1F Bedroom	NO (-68.2%)	NO
_ -1F Bedroom	NO (-43.3%)	NO
_ -1F Bedroom	NO (-56.7%)	NO
_ -1F Bedroom	NO (-57.4%)	NO
_ -1F Circulation	N/A	N/A
_ -1F Corridor	N/A	N/A
_ -1F Laundry	N/A	N/A
_ -1F Store	N/A	N/A
_ -1F Store	N/A	N/A
0F Bathroom	N/A	N/A
0F Bathroom	N/A	N/A
0F Bathroom	N/A	N/A
0F Bathroom	N/A	N/A
0F Bathroom	N/A	N/A
0F Bedroom	YES (+99%)	NO
0F Bedroom	NO (-38.9%)	NO
0F Bedroom	YES (+98.8%)	NO
0F Bedroom	YES (+15.1%)	NO
0F Bedroom	NO (-4.3%)	NO
0F Circulation	N/A	N/A
0F Circulation	N/A	N/A
0F Corridor	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0F Lobby	N/A	N/A
0F Office	NO (-37.8%)	NO
0F WC	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bathroom	N/A	N/A
1F Bedroom	NO (-0.9%)	NO
1F Bedroom	NO (-52.7%)	NO
1F Bedroom	NO (-54.6%)	NO
1F Bedroom	NO (-55.3%)	NO
1F Bedroom	YES (+16%)	NO
1F Bedroom	YES (+36.4%)	NO
1F Bedroom	NO (-42%)	NO
1F Circulation	NO (-87.1%)	NO
1F Circulation	NO (-90.4%)	NO
1F Corridor	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bathroom	N/A	N/A
2F Bedroom	NO (-61.6%)	NO
2F Bedroom	NO (-26.3%)	NO
2F Bedroom	NO (-51.6%)	NO
2F Bedroom	NO (-68.5%)	NO
2F Bedroom	NO (-64.5%)	NO
2F Bedroom	NO (-19.1%)	NO
2F Bedroom	NO (-35.5%)	NO
2F Circulation	NO (-87.1%)	NO
2F Circulation	NO (-90.4%)	NO
2F Corridor	N/A	N/A
3F Bathroom	YES (+201.4%)	NO
3F Bathroom	YES (+121.3%)	NO
3F Bathroom	N/A	N/A
3F Bathroom	YES (+106.6%)	NO
3F Bathroom	YES (+110.8%)	NO
3F Bedroom	NO (-63.6%)	NO
3F Bedroom	YES (+13.6%)	NO
3F Bedroom	NO (-2.3%)	NO
3F Bedroom	NO (-53.5%)	NO
3F Bedroom	NO (-75.2%)	NO
3F Circulation	NO (-78.8%)	NO
3F Communal use	YES (+1.7%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
3F Corridor	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?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	945.8	945.8
External area [m ²]	1283.5	1283.5
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	15	3
Average conductance [W/K]	1202.39	638.84
Average U-value [W/m ² K]	0.94	0.5
Alpha value* [%]	12.1	27.74

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

Building Use

% Area Building Type

Retail/Financial and Professional Services
 Restaurants and Cafes/Drinking Establishments/Takeaways
 Offices and Workshop Businesses
 General Industrial and Special Industrial Groups
 Storage or Distribution
 Hotels
 Residential Institutions: Hospitals and Care Homes
100 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	68.73	33.82
Cooling	2.83	3.02
Auxiliary	0.09	1.11
Lighting	4.79	4.59
Hot water	9.64	10.99
Equipment*	10.21	10.21
TOTAL **	86.09	53.54

* 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	6.67
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>6.67</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	256.53	152.58
Primary energy [kWh _{PE} /m ²]	99.79	55.31
Total emissions [kg/m ²]	17.5	9.3

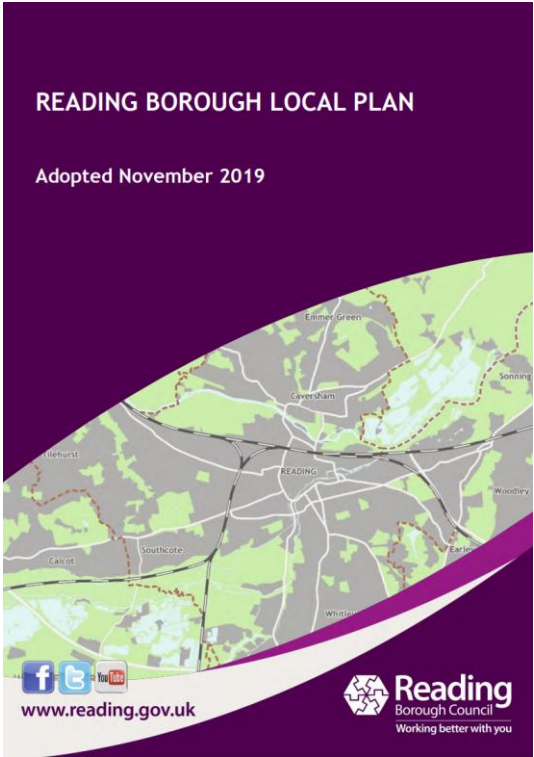
HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	218.5	38	68.7	2.8	0.1	0.88	3.74	0.9	5
	Notional	104.7	47.9	33.8	3	0.2	0.86	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 – Reading policies

RBC Local Plan (November 2019)



The Reading Borough Local Plan is the Council's primary planning document and sets out the long-term vision, objectives and policies to guide development in Reading up to 2036. It provides the framework for deciding planning applications and managing growth by identifying where development should take place, what form it should take, and how it should contribute to sustainable development. The plan balances the need for new homes, jobs and infrastructure with the protection of the environment, historic assets and quality of life, ensuring that growth is delivered in a coordinated, sustainable and locally appropriate way.

The energy and sustainability policies within the London Plan relevant to the proposed development at Astec House are summarised below.

CC1: Presumption in favour of sustainable development

- The council will take a positive approach to development that reflects the principles of

sustainable development set out in national policy.

- Proposals that accord with the development plan will normally be approved without delay.
- Where policies are out of date, permission may be granted unless adverse impacts significantly and demonstrably outweigh the benefits.
- Early and proactive engagement is encouraged to secure sustainable outcomes.

CC2: Sustainable design and construction

- Development must minimise the use of energy, water, materials and other resources through efficient design.
- Major non-residential development should achieve BREEAM "Excellent", with minor schemes achieving at least "Very Good".
- Water efficiency measures such as low-flow fittings, rainwater harvesting or greywater reuse should be incorporated.
- Proposals should reduce environmental impacts over the lifetime of the building.

CC3: Adaptation to climate change

- Development must demonstrate how it will adapt to the impacts of climate change.
- Building design should optimise orientation, shading, ventilation and thermal comfort.
- Green roofs, green walls and resilient landscaping are encouraged where appropriate.
- Surface water runoff should be minimised through sustainable drainage measures.

CC4: Decentralised energy

- Larger developments are required to consider decentralised and low-carbon energy sources.
- Development should connect to existing district heating networks where feasible.
- Where networks are not available, proposals should demonstrate future connection potential.

- The policy seeks to reduce carbon emissions associated with heating and power.

CC5: Waste minimisation and storage

- Development must provide adequate space for waste storage and recycling.
- Layouts should allow convenient and safe access for residents and collection vehicles.
- Proposals should minimise waste generation during construction and occupation.
- Recycling and composting should be prioritised over landfill disposal.

CC6: Accessibility and the intensity of development

- Development intensity should reflect the accessibility of a site by public transport, walking and cycling.
- Higher densities are encouraged in highly accessible locations.
- Proposals should reduce reliance on private cars.
- Efficient use of land, particularly brownfield sites, is promoted.

CC7: Design and the public realm

- Development must achieve high standards of design that respond positively to local character.
- Buildings and spaces should create safe, inclusive and attractive environments.
- The public realm should be enhanced through appropriate materials, landscaping and layout.
- Developments should improve permeability and legibility for pedestrians and cyclists.

EN7: Local green space and public open space

- Designated local green spaces will be protected from inappropriate development.
- Development should enhance the quality and usability of public open space where possible.

- Green spaces should support recreation, health and wellbeing.
- Proposals should respect the character and function of existing open spaces.

EN8: Undesignated open space

- Important undesignated open spaces will be protected where they provide amenity, recreational or visual value.
- Development will only be permitted where there is no significant harm to the space.
- Retention of open space within dense urban areas is encouraged.
- Open spaces should contribute to green infrastructure networks.

EN9: Provision of open space

- New development must provide open space to meet the needs it generates.
- Provision should be accessible, safe and of a usable size and quality.
- On-site provision is preferred, with off-site contributions used where appropriate.
- Open space should integrate with surrounding areas and networks.

EN10: Access to open space

- Development should ensure good access to open space for new and existing communities.
- Safe and convenient walking and cycling routes should be provided.
- Barriers to access should be minimised wherever possible.
- Proposals should strengthen links between neighbourhoods and green spaces.

EN11: Waterspaces

- Rivers, canals and other waterspaces will be protected and enhanced.
- Development should improve access to waterspaces where appropriate.
- Proposals should support biodiversity and water quality improvements.

- Waterspaces should form part of the wider green infrastructure network.

EN12: Biodiversity and the green network

- Development must avoid harm to biodiversity and ecological networks.
- Opportunities to enhance habitats and species should be taken wherever possible.
- Green features should be integrated into the design of buildings and spaces.
- Connectivity between habitats across the borough should be strengthened.

EN14: Trees, hedges and woodland

- Important trees, hedgerows and woodland will be protected from unnecessary loss.
- Existing trees should be retained and incorporated into site layouts.
- Replacement planting will be required where loss is unavoidable.
- Tree planting is encouraged to support biodiversity and climate resilience.

EN15: Air quality

- Development should not worsen local air quality and should seek improvements where possible.
- Mitigation measures are required where adverse impacts are identified.
- Sensitive uses should be protected from poor air quality.
- Contributions may be sought to support air quality improvement measures.

EN17: Noise and vibration

- Development must not result in unacceptable levels of noise or vibration.

- Proposals should protect existing and future occupants from noise impacts.
- Noise-sensitive uses should be located and designed to minimise exposure.
- Mitigation measures must be provided where adverse impacts are identified.

EN16: Pollution and water resources

- Development must not result in unacceptable pollution of land, air or water.
- Water resources, including groundwater and rivers, must be protected.
- Appropriate mitigation must be provided where risks are identified.
- Sustainable water management practices are encouraged.

EN18: Flooding and drainage

- Development must not increase flood risk on-site or elsewhere.
- Sustainable drainage systems should be incorporated wherever feasible.
- Proposals must be supported by appropriate flood risk assessments.
- Natural watercourses and floodplains should be protected.

H12: Purpose-built student accommodation

- Purpose-built student accommodation will be supported in appropriate locations.
- Development should be well related to the town centre, universities and public transport.
- Schemes must achieve high standards of design, amenity and management.
- Proposals should not result in an over-concentration of student accommodation.

- Student housing should contribute positively to the wider built environment and community.

TR1: Achieving the transport strategy

- Development should support the council's transport strategy and sustainable travel objectives.
- Proposals must prioritise walking, cycling and public transport over private car use.
- Development should be located and designed to reduce the need to travel by car.
- Transport impacts must be appropriately mitigated.

TR2: Access, traffic and highway safety

- Development must provide safe and suitable access for all users.
- Proposals should not have an unacceptable impact on highway safety or traffic flow.
- Appropriate visibility, servicing and turning arrangements must be provided.
- Transport assessments or statements may be required where impacts are significant.

TR3: Transport infrastructure and new development

- Development must contribute to necessary transport infrastructure improvements.
- Contributions may be required through planning obligations or conditions.
- Infrastructure provision should be proportionate to the scale and impact of development.
- Schemes should support capacity, safety and sustainable transport improvements.

TR4: Car and cycle parking and electric vehicle charging

- Parking provision should reflect accessibility, location and sustainable transport objectives.
- Car parking should be minimised in highly accessible locations.
- Adequate and secure cycle parking must be provided.
- Electric vehicle charging infrastructure should be incorporated into new development.

TR5: Public transport, walking and cycling

- Development should improve connectivity to public transport networks.
- Safe and direct walking and cycling routes should be provided and enhanced.
- Barriers to movement should be removed wherever possible.
- Proposals should contribute to a legible, connected and inclusive movement network.

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