

Wilmslow Road, Manchester

Energy Statement

**Ensphere Group Ltd
on behalf of Watkin Jones**



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Wilmslow Road, Manchester

Energy Statement

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This document has been prepared and checked in accordance with Ensphere Group Ltd's Quality Management System.

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1. Executive Summary

- 1.1 This Energy Statement presents the sustainability credentials for a proposed scheme at Wilmslow Road, Manchester.
- 1.2 Development proposals include the conversion and extension of retained building and new development to accommodate student residential accommodation.
- 1.3 Consideration has primarily been given to the planning policy context and other requirements prior to establishing a strategy based upon the energy hierarchy; with a priority given to energy reduction and efficiency. Renewable and low carbon technologies have also been considered in the context of their technical feasibility and financial viability.
- 1.4 The following is therefore proposed:
- High performance building fabric and energy efficient lighting, services and controls to reduce energy demand for space heating, cooling, ventilation and lighting.
 - Passive design measures to reduce energy demand.
 - Air Source Heat Pumps (ASHPs) for hot water heating.
- 1.5 The domestic hot water demand represents approximately 71% of the overall regulated energy demand. The application of ASHPs to hot water therefore permits the scheme to significantly exceed the Council's 20% renewable target.
- 1.6 Overall, the proposed energy strategy is therefore considered consistent with the National Planning Policy Framework and policies of the Council. When implemented, the scheme will provide an efficient and low carbon development.

2. Introduction

- 2.1 Ensphere Group Ltd was commissioned by Watkin Jones to produce an Energy Statement for the proposed redevelopment at Wilmslow Road, Manchester.

Site and Surroundings

- 2.2 The site is located within Fallowfield, immediately west of the University of Manchester Fallowfield Campus. The site is located circa 2km south of the main University of Manchester Campus, 3km south of Manchester Metropolitan University Campus, and 4km south of Manchester City Centre.
- 2.3 The site currently consists of the Union of Shop, Distributive and Allied Workers (USDAW) Head Office and associated car parking.
- 2.4 Vehicular access to the Application Site is currently afforded via three bellmouth accesses off Langley Road. An historic vehicular access point in the form of a dropped kerb arrangement is available to the site's Wilmslow Road frontage.

Proposed Development

- 2.5 Partial demolition of existing buildings, conversion and extension of retained building and new development to accommodate student residential accommodation and amenity / management facilities, with hard and soft landscaping, parking and access arrangements.

Report Objective

- 2.6 The objective of the Energy Statement is to outline how energy efficiency, low carbon and renewable technologies have been considered as part of the energy strategy.

3. Assessment Methodology

- 3.1 The assessment methodology follows the Energy Hierarchy, on the basis that it is preferable to firstly minimise carbon dioxide emissions through reduced energy demand; prior to considering low carbon and renewable energy supply options.
- 3.2 The tiers of the Energy Hierarchy are:
- Be Lean Demand Reduction
 - Be Clean Use Energy More Efficiently
 - Be Green Use Renewable Energy
- 3.3 Where opportunities to improve the efficiency of the design have been maximised, consideration is then given to the second principle whereby priority is given to the efficient use of energy. This is on the basis that low carbon technologies can be cost-effective and provide significant carbon savings when compared to conventional technologies.
- 3.4 The third principle of the hierarchy promotes the use of renewable technologies. Whilst these technologies can be relatively expensive to install, they do offer the potential to significantly reduce carbon emissions.
- 3.5 The following sections of the report review the planning policy requirements prior to establishing a baseline from which the principles of the Energy Hierarchy are applied.

4. Planning Context

4.1 Local planning policy relevant to sustainable development is considered below:

National Context

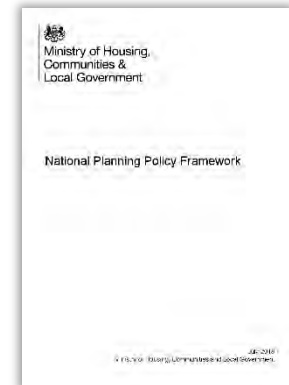
National Planning Policy Framework (2019)

4.2 The National Planning Policy Framework (NPPF) was updated in February 2019. Paragraph 7 of the revised NPPF states that:

4.3 *“the purpose of the planning system is to contribute to the achievement of sustainable development”*

4.4 Chapter 14 of the NPPF includes consideration of climate change and the use and supply of renewable and low carbon energy. Paragraph 148 states:

4.5 *“The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.”* The NPPF goes on to establish a “presumption” in favour of sustainable development.



Planning Practice Guidance (2016; updated 2018)

- Climate Change - Advises how planning can identify suitable mitigation and adaption measures in plan-making and the application process to address the potential for climate change.
- Renewable and Low Carbon Energy - The guidance is intended to assist local councils in developing policies for renewable energy in local plans, and identifies the planning considerations for a range of renewable sources.

Local Context

Manchester City Council Core Strategy (2012)

4.6 The Manchester City Council Core Strategy sets out the vision, objectives, strategy and policies that will guide public and private sector investment to manage development and regeneration in the council over the next 15 years. The Core Strategy is the key planning document in the Manchester Local Development Framework (MDF).

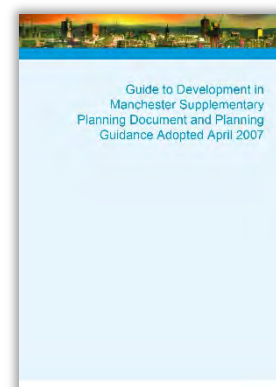


4.7 The following policies are considered most pertinent to this report:

- Policy EN4 (*Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development*) – developments must follow the Energy Hierarchy and reduce carbon emissions.
- Policy EN5 (*Strategic Areas for Low and Zero Carbon Decentralised Energy Infrastructure*) – Highlights areas within which projects will need to consider proposals for energy infrastructure.
- Policy EN6 (*Target Framework for CO₂ reductions from low or zero carbon energy suppliers*) – requires major applications to reduce carbon emissions.
- Policy EN7 (*Energy Infrastructure Opportunities*) – includes a presumption in favour of low and zero carbon decentralised energy.
- Policy EN8 (*Adaption to Climate Change*) – all new developments are expected to be adaptable to climate change in terms of design, layout, siting and function.
- Policy EN16 (*Air Quality*) – developers are expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development and from the use of the development.

Guide to Development in Manchester (SPD) (2007)

4.8 The Guide to Development in Manchester (SPD) sets out the required documents and format that should accompany planning proposals in Manchester. Whilst written in the context of the former Unitary Development Plan, the guide remains an adopted document and gives reference to environmental standards, particularly in relation to energy efficiency and renewable energy.



4.9 References are made to carbon reduction targets in the context of earlier versions of the Building Regulations; however, the renewable energy target remains current and reference is made for developers to aim for at least 20% of final site energy demand.

4.10 The guide also includes a section on environmental design stating that developments should be a BREEAM rating of “Very Good”.

The Greater Manchester Spatial Framework Publication Plan 2020

4.11 When adopted, the Greater Manchester Spatial Framework will set out how Greater Manchester should develop up to the year 2037. The document includes a series of draft policies, including the following:

- Draft Policy GM-S 1 (*Sustainable Development*) - To help tackle climate change, development should aim to maximise its economic, social and environmental benefits simultaneously, minimise its adverse impacts, utilise sustainable construction techniques and actively seek opportunities to secure net gains across each of the different objectives.
- Draft Policy GM-S 2 (*Carbon and Energy*) – includes an expectation that all new development will be net zero from 2028; and encourages BREEAM “Excellent” for non-domestic.
- Draft Policy GM-S 3 (*Heat and Energy Networks*) – encourages connection to District Energy Networks (DEN).
- Draft Policy GM-S 4 (*Resilience*) – includes a requirement for adaptable buildings and places that can easily respond to changing needs, future climate impacts and new technologies.
- Draft Policy GM-S 6 (*Clean Air*) - Restricting and carefully regulating developments that would generate significant point source pollution such as some types of industrial activity and energy generation.

5. Anticipated Demand & Renewable Target

- 5.1 This section establishes the anticipated energy demand from which the contribution from renewables should be calculated. For the purposes of this assessment and in line with the local authority policies and guidance, the anticipated demand equates to calculating the baseline total energy demand (regulated) of the development (kWh per annum) using approved compliance software.
- 5.2 Regulated energy concerns that which is covered by the Building Regulations and include the energy consumed in the operation of the space heating / cooling and hot-water systems, ventilation and internal lighting.

Table 5.1 Total area weighted Energy demand being met by renewables

	Area weighted energy demand of the Development (kWh per annum)					
	Space Heating	Domestic Hot Water	Lighting	Auxiliary	Cooling	Total
Energy Demand (including energy efficiency measures)	264,524	1,079,569	85,472	77,508	3,271	1,510,345

Renewable Energy Target

- 5.3 In line with the Guide to Development in Manchester (SPD) renewable energy target of at least 20% of final site energy demand, the application of renewables should be to at least 302,069kWh per annum.

6. Demand Reduction

- 6.1 This section considers features of the proposed design (including indicative performance levels) relevant to passive design and energy efficiencies.

Passive Design

- 6.2 Passive design seeks to maximise the use of natural sources of heating, cooling and ventilation to maintain thermal comfort levels within the building.

Building Massing & Orientation

- 6.3 The development proposals include the redevelopment to managed student accommodation. The orientation is primarily affected by the existing environment, responding to the existing context. The proposed massing will reduce the surface area relative to the volume, which will help limit heat losses.

Daylighting

- 6.4 Access to daylight is predominantly from the south and west sides of the proposed development.

Fabric Efficiency

- 6.5 Fabric efficiency concerns the thermal properties associated with the building fabric and construction.

Insulation

- 6.6 Heat Transfer Coefficients, otherwise referred to as U-Values, are a measure of the rate of heat transfer through a building element over a given area, under standardised conditions (i.e. the rate at which heat is lost or gained through a fabric).
- 6.7 It is intended that the performance of the building fabric will incorporate relatively low U-Values to reduce the rate at which the buildings lose heat, preserving the heat within the space and reducing the requirement for mechanical heating.

Table 6.1 Proposed Building Fabric U-Values

Fabric Element	Part L2A (W/m ² K)	Proposed (W/m ² K)
External Wall / Internal walls to unheated spaces	0.35	0.18/0.30
Roof	0.25	0.13
Ground Floor	0.25	0.15
Windows	2.2 (including frame)	1.4 (double glazed)

Air Tightness

- 6.8 A high level of air tightness is proposed and a level below $5\text{m}^3/\text{h}/\text{m}^2$ is targeted, meaning that air infiltration between the internal and the external environment will be largely controlled and space heating demand further reduced.

Thermal Bridging

- 6.9 Thermal bridging is the penetration of the insulation layer by a highly conductive non-insulating material allowing rapid heat transfer from an interior to exterior environment (and vice versa). In well insulated buildings, as much as 30% of heat loss can occur through thermal bridges.
- 6.10 The building fabric shall be constructed so that there are no reasonably avoidable thermal bridges in the insulation layers caused by gaps within the various elements. It is expected that Accredited Construction Details (ACDs) will be applied.

System Efficiencies

Heating Systems

- 6.11 Heating systems will be principally electric on the basis that this technology will continue to decarbonise into the future and with the continuing decarbonisation of the national grid.
- 6.12 It is proposed to incorporate a renewable technology as the basis of the domestic hot water heating strategy (see sections below).

Ventilation / Cooling Systems

- 6.13 The development will have the capability to be naturally ventilated with the design intent being that spaces will be capable of cooling naturally by means of openable windows. In the event that local environmental factors deem it necessary to rely on other methods of ventilation to dissipate heat; mechanical ventilation will be incorporated. Comfort cooling will be minimised and limited to large common rooms, where occupancy levels may be high, management suite and the server room.

Extract Fans

- 6.14 It is anticipated that extract fans will be employed in WC and kitchen areas. The specific fan power (SFP) for these systems will be efficient and target a power consumption rate of $0.3\text{W}/\text{l/s}$.

Controls

- 6.15 Time and temperature controls by suitable arrangement will be installed (Building Management System), in order to maximise the efficiency of the heating and/or cooling systems.

Lighting Efficiency

- 6.16 Lighting design is intended to be highly efficient and in excess of Building Standards requirements. In the industrial components it is intended that lighting efficacy shall be in excess of 100 lumens/circuit Watt (likely predominantly LED).

- 6.17 External lighting shall be highly efficient and employ controls to avoid energy wastage from unnecessary operation during daytime.

Appliances

- 6.18 Appliances such as fridges, freezers etc. may be included. It is proposed that the EU energy label of these appliances shall be A+ or greater.

Overheating Mitigation

- 6.19 The issue of overheating will need detailed and considered assessment at a later stage of design on the basis that, as buildings become progressively better sealed and insulated, the potential for overheating increases. However, given that the buildings will have openable windows, it is considered probable that the risk will be mitigated.

- 6.20 The following is, nevertheless, relevant:

Limiting Summer External Gains

- 6.21 The following shall be considered in conjunction and interrelationship with the ventilation strategy, to ensure thermal comfort for occupants and energy savings.
- Solar control glazing shall be installed to the elevations most affected; the precise specification of glazing types for windows is to be based upon further analysis at later stages so that the appropriate balance is found between limiting summer heat gains without compromising daylight harvesting and winter solar gains.
 - Thermal mass (discussed above) and internal occupant-controlled shading elements will be considered at the more detailed design stage along with heat reflective finishes of the external building surfaces.

Limiting Internal Heat Gains

- 6.22 Heat losses from the Hot Water and Low Temperature Hot Water (LTHW) distribution network are considered to be a significant source of potential overheating in well insulated buildings. This issue can be a significant factor affecting comfort and will therefore need full consideration during the detailed design of the mechanical systems.
- 6.23 However, it is expected that attention will be given to:
- The positioning of the distribution network and its potential impact on surrounding spaces;
 - The (mechanical) ventilation of spaces where heating pipework is distributed (e.g. corridors);
 - The implementation of combined passive/active ventilation systems for air exhaust of spaces into corridors and to the outside;

- Maximising the natural ventilation potential of spaces;
- The performance of the insulation, with calculations undertaken assessing heat losses from the pipework relative to the heat losses from the spaces.

7. Heating Infrastructure

Combined Heat & Power (CHP)

- 7.1 Combined Heat & Power (CHP) systems generate electrical energy and provide the waste heat from the process to be used on site. They are typically gas-fired but can be run off alternative fuel sources. CHP is a highly efficient means to supply heat in developments, providing significant carbon savings and wider environmental benefits (the power generation is much less resource intensive and carbon emitting compared to grid electricity from the average UK power station).

CHP Appraisal

- 7.2 Whilst the site has a heating demand, it is modest in scale and likely subject to daily / weekly / yearly fluctuation due to occupancy patterns. At this scale, it is generally not economic to install CHP as smaller CHPs tend to have lower electrical efficiencies and therefore higher carbon emissions. CHP also tends to emit higher levels of NO_x than other heating systems; potentially adversely impacting local air quality.
- 7.3 A centralised CHP plant would create complex managerial arrangements and the administrative burden of managing CHP electricity sales to grid when the power is not required on site; combined with the relatively low unit price for small volumes of exported CHP electricity can create incentives for the CHP to be installed but not operated. CHP is therefore not proposed.

District Energy Networks (DEN)

- 7.4 The term “district energy” applies to the energy distribution network, rather than the origins of the energy and the extent of any carbon savings will be largely determined by the energy source and heat losses on the network

DEN Appraisal

- 7.5 In the absence of a DEN in close proximity to the Site and small heating demand, it is not proposed to accommodate DEN as part of the energy strategy.

8. Renewable Energy

- 8.1 Renewable technologies are those which take their energy from sources which are considered to be inexhaustible (e.g. sunlight, wind etc.). Emissions associated with renewables are generally considered to be negligible and the technologies are frequently referred to as “zero carbon”.

Biomass Systems

- 8.2 Biomass systems are heating systems that use agricultural, forest, urban and industrial residues and waste to produce heat and (depending on the system) electricity. At the building scale, biomass boilers using wood pellets or woodchips are the norm. Biomass should be sourced locally to limit “embodied carbon” associated with transport and ideally be derived from waste wood products to limit the take-up of agricultural land for fuel crops.

Biomass Appraisal

- 8.3 Whilst technically feasible, the site is in an urban setting and the absence of a readily available and diverse local fuel source creates risk associated with security of fuel supply. This has implications for operational viability.
- 8.4 Carbon emissions associated with cultivation, processing and transport of biomass are not normally considered in the context of planning or Building Regulations meaning that total carbon emissions are likely to be significantly higher than estimated. Biomass is also likely to cause other air quality impacts (e.g. particulates), which have implications for local air quality.
- 8.5 Biomass is therefore not a preferred technology for the scheme.

Heat Pumps

- 8.6 Heat pumps draw thermal energy from the air, water or ground (“source”) and upgrade it to be used as useful heat at another location (“sink”). Heat pumps require electricity to operate (or gas in the case of Gas Absorption Heat Pumps) as mechanical input is required to convert harvested energy to useful heat and complete its transport to the “sink”.
- 8.7 Heat pumps are generally considered as renewable (despite an electrical or gas requirement) because the source of the heat is the ambient temperature in the exterior environment, which is ultimately heated via the sun.
- 8.8 Reversible systems can provide air conditioning comfort cooling; however, when in cooling mode, the system is not considered renewable as it is not taking advantage of a renewable source of energy.

Heat Pump Appraisal

- 8.9 The absence of nearby waterbody and relatively small footprint of the site rule out the options of Water Source and Ground Source Heat Pumps.
- 8.10 There is potential to include Air Source Heat Pumps (ASHPs); and it is proposed to use this technology to provide hot water heating.

Micro Hydro Power

- 8.11 Micro hydro power systems harness energy from flowing water by using height differences (called “head”); the minimum allowable head is 1.5m and ideally not lower than 10m.

Micro Hydro Appraisal

- 8.12 There is no surface water course immediately accessible to the site. Micro hydro is therefore not considered an option for the site, for technical feasibility reasons.

Micro Wind Power

- 8.13 Wind turbines are used to generate electricity; with power production determined by the rotation of the blades and being proportionate to the speed of their rotation. The technology is most efficient for constant, low turbulence wind profiles.

Micro Wind Appraisal

- 8.14 Whilst wind turbines are considered technically feasible in a limited capacity, wind speeds are relatively low and subject to turbulence. The technology is therefore likely to underperform.
- 8.15 Given the uncertainty over performance and the fact that any contribution will likely be quite minor micro wind turbines are not proposed for the development.

Solar Systems

- 8.16 Both solar thermal and photovoltaic (PV) systems convert energy from the sun into a form which can be applied within the building. Solar thermal generates energy for heating (usually for hot water) and PV generates electricity. Hybrid photovoltaic / solar thermal collectors are also available and co-generate heat and power.

Solar System Appraisal

- 8.17 Whilst an area of flat roof will be available as part of the proposed development, solar technologies would only partially contribute to the carbon reduction target and an alternative technology has therefore been selected.

9. Summary

- 9.1 This Energy Statement provides an overview of the energy strategy in consideration of the site context, anticipated energy requirements and local priorities and initiatives.
- 9.2 A review of Manchester City Council's planning policies has identified a number of requirements relating to energy. Of these, Core Strategy policies EN4 (*Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development*), EN5 (*Strategic Areas for Low and Zero Carbon Decentralised Energy Infrastructure*), EN6 (*Target Framework for CO₂ reductions from low or zero carbon energy suppliers*), EN7 (*Energy Infrastructure Opportunities*), EN8 (*Adaption to Climate Change*) and EN16 (*Air Quality*) are considered most pertinent. Consideration has also been given to the Guide to Development in Manchester and emerging Greater Manchester Spatial Framework.
- 9.3 The approach follows the Energy Hierarchy and the buildings' fabric shall be constructed to a high-performance standard, achieving high levels of thermal insulation and low air permeability. Energy efficient lighting and appropriate controls shall be employed throughout the development.
- 9.4 Low carbon and renewable technologies have been assessed and it is proposed to incorporate Air Source Heat Pumps (ASHPs) for hot water heating.
- 9.5 As outlined in Section 5 above, the domestic hot water demand represents approximately 71% of the overall regulated energy demand. The application of ASHPs to hot water therefore permits the scheme to significantly exceed the Council's 20% renewable target.
- 9.6 Overall, the proposed energy strategy is therefore considered consistent with the National Planning Policy Framework and policies of the Council. When implemented, the scheme will provide an efficient and low carbon development.

Appendices

A. Site Plans

B. Key Local Planning Policy Requirements

Manchester City Council Core Strategy (2012)

The Manchester City Council Core Strategy is the overall strategic plan for Manchester.

Policy EN4 – Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development

The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO₂ emissions, and rising fossil fuel prices, through the following actions:

- All development must follow the principle of the Energy Hierarchy, being designed:
 - o to reduce the need for energy through design features that provide passive heating, natural lighting and cooling
 - o to reduce the need for energy through energy efficient features such as improved insulation and glazing
 - o to meet residual energy requirements through the use of low or zero carbon energy generating technologies
- Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies.
- Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings.
- Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.
- The use of building materials with low embodied carbon in new development and refurbishment schemes.

Policy EN5 – Strategic Area for Low and Zero Carbon Decentralised Energy Infrastructure

Within Manchester it is considered that the following strategic areas, indicated on the key diagram, will have a major role to play in achieving an increase in the level of decentralised, low and zero carbon energy supplies available:

- The Regional Centre, which also includes the Oxford Road Corridor and Eastlands
- District Centres and associated major development sites
- Airport Strategic Site
- Strategic housing location
- Strategic employment locations

Within these areas new development, regeneration and retrofit projects, will be expected to take place in the context of more detailed proposals for decentralised low and zero carbon energy infrastructure in the form of energy proposals plans. The Council will work with all relevant stakeholders, which may include developers, landowners, residents, community groups, private sector partners, utilities companies, neighbouring authorities and other public sector bodies, as appropriate, to bring forward such plans.

Where investment or development is being undertaken into or adjacent to a public building/asset or district heating network, full consideration shall be given to the potential role that these can have in providing an anchor load within a decentralised energy network or in creating opportunities for CO₂ reduction funded by contributions.

Policy EN6 – Target Framework for CO₂ reductions from low or zero carbon energy supplies

Applications for residential development of 10 or more units and all other development over 1,000 sq m will be expected as a minimum to meet the target shown in Tables 12.1 or 12.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO₂ emissions for all phases of the development.

Developments smaller than the above threshold, but involving the erection of a building or substantial improvement to an existing building will also be expected to meet the minimum target, where viable, but will not be expected to submit an energy statement.

The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows

- **Target 1 Network development areas:** Locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling).
- **Target 2 Electricity intense areas:** Locations where the predominant building type has an all electric fit-out such as retail units and leisure complexes.
- **Target 3 Micro-generation areas:** Locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical.

Domestic CO₂ emissions reduction targets

Table 12.1

Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target 2: Electricity intense buildings	+15% increase on Part L 2010
Target 3: Micro development area	+15% increase on Part L 2010

Non-domestic CO₂ emissions reduction targets

Table 12.2

Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor, or connection or where not feasible, a 15% increase on Part L 2010
Target 2: Electricity intense buildings (Applies to commercial uses with a high proportion of emissions from electricity use (>45 kg CO ₂ /m ²))	+10% increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

Where the CO₂ emissions reduction required under any future revision to Part L of the building regulations becomes greater than the '% Minimum requirement', the reduction required under building regulations would apply.

Where the Council identifies an 'allowable solution', for example within an energy proposals plan, that would produce higher carbon reductions at no extra cost than that of achieving the '% Minimum requirement' (or required under building regulations if greater) the higher percentage reduction will be required. The cost comparison is based on the cost of incorporating the 'allowable solution' at design stage.

The energy statement will be required to be submitted at the outset of any proposed development (outline application or before). Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO₂ mitigation, subject to the energy statement incorporating evidence such as modelling to demonstrate compliance.

Guidance on what the energy statement should contain and how to decide which target applies to a development proposal is given in Appendix A.

Policy EN7 – Energy Infrastructure Opportunities

There will be a general presumption in favour of low and zero carbon decentralised energy schemes, subject to the following considerations:

- That any new generating plant capable of producing heat and cooling as well as electricity should be located in a way that facilitates future connection to a local distributed energy system.
- That any energy centre, including generating plant, standby/boiler plant and substations, shall be located and designed to a high quality so as to integrate with and contribute to the townscape.
- Biofuels should be obtained from sustainable sources and processes and in a way that minimises transport impacts, following a sequential approach in order to minimise CO₂ emissions – firstly prioritising local and regional sources, followed by national, European and international.
- Consideration should be given to biofuel delivery by rail and waterways where possible. Where large-scale fuel or feedstock delivery is required by road the energy centre must be located in or adjacent to light industrial, industrial or leisure uses with any impact on local residential amenity minimised.
- The cumulative impact of energy schemes will be taken into account when considering applications, to include modelled impacts on air quality and landscape character, with reference to Policy EN16.
- Flood risk, through the Manchester-Salford-Trafford Strategic Flood Risk Assessment.

In determining proposals for development, consideration will be given to the need to safeguard strategic energy sites and network routes, both proposed or existing, where these have been identified as having strategic significance for the delivery of low or zero carbon energy infrastructure or, would be required in order to achieve the successful regeneration of an area in line with targets for reducing carbon emissions.

Policy EN8 – Adaption to Climate Change

All new development will be expected to be adaptable to climate change in terms of the design, layout, siting and function of both buildings and associated external spaces. In achieving developments which are adaptable to climate change developers should have regard to the following, although this is not an exhaustive list:

- Minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rain water permeability
- Reduction in urban heat island effect through the use of Green Infrastructure such as green roofs, green walls, increased tree cover and waterways
- The need to control overheating of buildings through passive design
- The opportunity to provide linked and diverse green space to enhance natural habitats which will assist species adaptation

Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO₂ mitigation under Policy EN6, subject to sufficient evidence to quantify their contribution to compliance.

Policy EN 16 – Air Quality

The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself, including from Combined Heat and Power and biomass plant.

When assessing the appropriateness of locations for new development the Council will consider the impacts on air quality, alongside other plan objectives. This includes cumulative impacts, particularly in Air Quality Management Areas.

C. Indicative Energy Model Outputs

BRUKL Output Document



Compliance with England Building Regulations Part L 2013

Project name

Wilmslow Road

As designed

Date: Mon Dec 07 09:34:46 2020

Administrative information

Building Details

Address: ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	29.2
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	29.2
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	29
Are emissions from the building less than or equal to the target?	BER <= TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _{Limit}	U _{Calc}	U _{Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.18	0.18	"BL000000_W1"
Floor	0.25	0.15	0.15	"BL000000_F"
Roof	0.25	0.13	0.13	"BL000002_C"
Windows***, roof windows, and rooflights	2.2	1.4	1.4	"BL000003_W1_O0"
Personnel doors	2.2	2.2	2.2	"BL000000_W1_O0"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

U_{Limit} = Limiting area-weighted average U-values [W/(m²K)]
U_{Calc} = Calculated area-weighted average U-values [W/(m²K)]
U_{Calc} = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.
** 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.
N.B. Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	5

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Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

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- Panel heaters

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

2- Split system

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	5.1	3.79	-	-	-
Standard value	2.5*	2.6	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 all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

3- DHW - Efficiency 2.8

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.8	3.79	-	-	-
Standard value	2.5*	2.6	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. For types <=12 kW output, refer to EN 14825 for limiting standards.

1- SYST0002-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0
Standard value	N/A	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
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 supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		Zone	Standard
LDK_A_Block_A_L00	0.3	-	-	-	-	-	-	-	-	-	-	N/A
Laundry_Block_A_L00	0.3	-	-	-	-	-	-	-	-	-	-	N/A

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Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Cluster A_Block A_L00		0.3	-	-	-	-	-	-	-	-	-	N/A
WC_Block D_L00		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK B_Block A_L00		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L00		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK C_Block B+C_L00		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block B+C_L00		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK A_Block B+C_L00		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block B+C_L00		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK B_Block B+C_L00		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block B+C_L00		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block B+C_L00		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block B+C_L00		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block A_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block B+C_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block C+C_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster H_Block B+C_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster E_Block B+C_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block A_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block B+C_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block B+C_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block A_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block A_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block B+C_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block C+C_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block B+C_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster H_Block B+C_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block B+C_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster E_Block B+C_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster G_Block B+C_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster F_Block B+C_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block A_L03		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L03		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block A_L03		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block A_L03		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block A_L04		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L04		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block A_L04		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block A_L04		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block A_L05		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L05		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block A_L05		0.3	-	-	-	-	-	-	-	-	-	N/A

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Cluster D_Block A_L05		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block A_L06		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L06		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block A_L06		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block A_L06		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block A_L07		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L07		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block A_L07		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block A_L07		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block A_L08		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L08		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block A_L08		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block A_L08		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block A_L09		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L09		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block A_L09		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block A_L09		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block A_L010		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L010		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block A_L010		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block A_L010		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block A_L011		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L011		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block A_L011		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block A_L011		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster A_Block A_L012		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster B_Block A_L012		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster C_Block A_L012		0.3	-	-	-	-	-	-	-	-	-	N/A
Cluster D_Block A_L012		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK A_Block A_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK A_Block B+C_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK B_Block A_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK B_Block B+C_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK C_Block B+C_L01		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK A_Block A_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK B_Block A_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK C_Block B+C_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK B_Block B+C_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK D_Block B+C_L02		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK A_Block A_L03		0.3	-	-	-	-	-	-	-	-	-	N/A
LDK B_Block A_L03		0.3	-	-	-	-	-	-	-	-	-	N/A

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
LDK C_Block A_L03	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		N/A
LDK A_Block A_L04		0.3	-	-	-	-	-	-	-	-		N/A
LDK B_Block A_L04		0.3	-	-	-	-	-	-	-	-		N/A
LDK C_Block A_L04		0.3	-	-	-	-	-	-	-	-		N/A
LDK A_Block A_L05		0.3	-	-	-	-	-	-	-	-		N/A
LDK B_Block A_L05		0.3	-	-	-	-	-	-	-	-		N/A
LDK C_Block A_L05		0.3	-	-	-	-	-	-	-	-		N/A
LDK A_Block A_L06		0.3	-	-	-	-	-	-	-	-		N/A
LDK B_Block A_L06		0.3	-	-	-	-	-	-	-	-		N/A
LDK C_Block A_L06		0.3	-	-	-	-	-	-	-	-		N/A
LDK A_Block A_L07		0.3	-	-	-	-	-	-	-	-		N/A
LDK B_Block A_L07		0.3	-	-	-	-	-	-	-	-		N/A
LDK C_Block A_L07		0.3	-	-	-	-	-	-	-	-		N/A
LDK A_Block A_L08		0.3	-	-	-	-	-	-	-	-		N/A
LDK B_Block A_L08		0.3	-	-	-	-	-	-	-	-		N/A
LDK C_Block A_L08		0.3	-	-	-	-	-	-	-	-		N/A
LDK A_Block A_L09		0.3	-	-	-	-	-	-	-	-		N/A
LDK B_Block A_L09		0.3	-	-	-	-	-	-	-	-		N/A
LDK C_Block A_L09		0.3	-	-	-	-	-	-	-	-		N/A
LDK A_Block A_L010		0.3	-	-	-	-	-	-	-	-		N/A
LDK B_Block A_L010		0.3	-	-	-	-	-	-	-	-		N/A
LDK C_Block A_L010		0.3	-	-	-	-	-	-	-	-		N/A
LDK A_Block A_L011		0.3	-	-	-	-	-	-	-	-		N/A
LDK B_Block A_L011		0.3	-	-	-	-	-	-	-	-		N/A
LDK C_Block A_L011		0.3	-	-	-	-	-	-	-	-		N/A
LDK A_Block A_L012		0.3	-	-	-	-	-	-	-	-		N/A
LDK B_Block A_L012		0.3	-	-	-	-	-	-	-	-		N/A
LDK C_Block A_L012		0.3	-	-	-	-	-	-	-	-		N/A
WC_Block D_L01		0.3	-	-	-	-	-	-	-	-		N/A
Studio A_Block B+C_L01		0.3	-	-	-	-	-	-	-	-		N/A
Cluster G_Block B+C_L01		0.3	-	-	-	-	-	-	-	-		N/A
LDK D_Block B+C_L01		0.3	-	-	-	-	-	-	-	-		N/A
Cluster F_Block B+C_L01		0.3	-	-	-	-	-	-	-	-		N/A
Cluster C_Block A_L01		0.3	-	-	-	-	-	-	-	-		N/A
LDK C_Block A_L01		0.3	-	-	-	-	-	-	-	-		N/A
Cluster D_Block A_L01		0.3	-	-	-	-	-	-	-	-		N/A
Studio A_Block B+C_L02		0.3	-	-	-	-	-	-	-	-		N/A
Cluster A_Block B+C_L03		0.3	-	-	-	-	-	-	-	-		N/A
Cluster C_Block C+C_L03		0.3	-	-	-	-	-	-	-	-		N/A
Cluster B_Block B+C_L03		0.3	-	-	-	-	-	-	-	-		N/A
Cluster H_Block B+C_L03		0.3	-	-	-	-	-	-	-	-		N/A
Cluster D_Block B+C_L03		0.3	-	-	-	-	-	-	-	-		N/A
Cluster E_Block B+C_L03		0.3	-	-	-	-	-	-	-	-		N/A

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
Cluster G_Block B+C_L03	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		N/A
Cluster F_Block B+C_L03		0.3	-	-	-	-	-	-	-	-		N/A
LDK A_Block B+C_L03		0.3	-	-	-	-	-	-	-	-		N/A
LDK B_Block B+C_L03		0.3	-	-	-	-	-	-	-	-		N/A
LDK C_Block B+C_L03		0.3	-	-	-	-	-	-	-	-		N/A
LDK D_Block B+C_L03		0.3	-	-	-	-	-	-	-	-		N/A
Studio A_Block B+C_L03		0.3	-	-	-	-	-	-	-	-		N/A
Cluster D_Block B+C_L04		0.3	-	-	-	-	-	-	-	-		N/A
Cluster B_Block B+C_L04		0.3	-	-	-	-	-	-	-	-		N/A
Cluster C_Block B+C_L04		0.3	-	-	-	-	-	-	-	-		N/A
Studio A_Block B+C_L04		0.3	-	-	-	-	-	-	-	-		N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
Refuse Store_Block A_L00		100	-	-	42
Cluster Corridor F_Block B+C_L01		-	100	-	60
Cycle Store_Block A_L00		100	-	-	62
LDK A_Block A_L00		-	100	-	293
Laundry_Block A_L00		-	100	-	92
Store A_Block A_L00		100	-	-	14
Cluster A_Block A_L00		-	100	-	177
WC_Block D_L00		-	100	-	55
LDK B_Block A_L00		-	100	-	293
Cluster B_Block A_L00		-	100	-	177
Stairs_Block A_L00		-	100	-	32
Corridor B_Block A_L00		-	100	-	59
Reception_Block D_L00		-	100	50	191
Circulation B_Block D_L00		-	100	-	25
Circulation and Stairs A_Block D_L00		-	100	-	81
Lounge_Block D_L00		-	100	-	138
Entrance_Block D_L00		-	100	-	80
Switch Room_Block B+C_L00		100	-	-	19
Plant Room_Block B+C_L00		100	-	-	244
Circulation B_Block B+C_L00		-	100	-	17
Refuse Store_Block B+C_L00		100	-	-	35
Cluster Corridor D_Block B+C_L00		-	100	-	75
LDK C_Block B+C_L00		-	100	-	348
Cluster D_Block B+C_L00		-	100	-	123
Corridor B_Block B+C_L00		-	100	-	15
LDK A_Block B+C_L00		-	100	-	364
Cluster A_Block B+C_L00		-	100	-	243
Cluster Corridor A_Block B+C_L00		-	100	-	72

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
Corridor A_Block B+C_L00	-	100	-	-	144
LDK B_Block B+C_L00	-	100	-	-	292
Cluster Corridor B_Block B+C_L00	-	100	-	-	54
Entrance_Block B+C_L00	-	100	-	-	44
Stairs B_Block B+C_L00	-	100	-	-	53
Cluster Corridor C_Block B+C_L00	-	100	-	-	66
Store B_Block B+C_L00	100	-	-	-	11
Bike Store A_Block B+C_L00	100	-	-	-	39
Refuse Store A_Block B+C_L00	100	-	-	-	44
Circulation A_Block B+C_L00	-	100	-	-	72
Stairs A_Block B+C_L00	-	100	-	-	49
Store A_Block B+C_L00	100	-	-	-	11
Cluster B_Block B+C_L00	-	100	-	-	294
Cluster C_Block B+C_L00	-	100	-	-	247
Cluster D_Block B+C_L00	-	100	-	-	284
Cluster A_Block A_L01	-	100	-	-	177
Cluster A_Block B+C_L01	-	100	-	-	243
Cluster B_Block A_L01	-	100	-	-	177
Cluster C_Block C+C_L01	-	100	-	-	255
Cluster Corridor A_Block B+C_L01	-	100	-	-	72
Cluster Corridor H_Block B+C_L01	-	100	-	-	54
Cluster Corridor D_Block B+C_L01	-	100	-	-	66
Cluster H_Block B+C_L01	-	100	-	-	185
Cluster E_Block B+C_L01	-	100	-	-	181
Cluster A_Block A_L02	-	100	-	-	177
Cluster D_Block B+C_L01	-	100	-	-	284
Cluster Corridor E_Block B+C_L01	-	100	-	-	72
Cluster B_Block B+C_L01	-	100	-	-	240
Cluster B_Block A_L02	-	100	-	-	177
Cluster C_Block A_L02	-	100	-	-	121
Cluster D_Block A_L02	-	100	-	-	121
Cluster Corridor F_Block B+C_L02	-	100	-	-	60
Cluster A_Block B+C_L02	-	100	-	-	243
Cluster C_Block C+C_L02	-	100	-	-	255
Cluster B_Block B+C_L02	-	100	-	-	240
Cluster Corridor A_Block B+C_L02	-	100	-	-	72
Cluster Corridor H_Block B+C_L02	-	100	-	-	54
Cluster Corridor D_Block B+C_L02	-	100	-	-	66
Cluster Corridor E_Block B+C_L02	-	100	-	-	72
Cluster H_Block B+C_L02	-	100	-	-	185
Cluster D_Block B+C_L02	-	100	-	-	284
Cluster E_Block B+C_L02	-	100	-	-	181
Cluster Corridor C_Block B+C_L02	-	100	-	-	133

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
Cluster G_Block B+C_L02	-	100	-	-	93
Cluster F_Block B+C_L02	-	100	-	-	94
Cluster A_Block A_L03	-	100	-	-	177
Cluster B_Block A_L03	-	100	-	-	177
Cluster C_Block A_L03	-	100	-	-	121
Cluster D_Block A_L03	-	100	-	-	121
Cluster A_Block A_L04	-	100	-	-	177
Cluster B_Block A_L04	-	100	-	-	177
Cluster C_Block A_L04	-	100	-	-	121
Cluster D_Block A_L04	-	100	-	-	121
Cluster A_Block A_L05	-	100	-	-	177
Cluster B_Block A_L05	-	100	-	-	177
Cluster C_Block A_L05	-	100	-	-	121
Cluster D_Block A_L05	-	100	-	-	121
Cluster A_Block A_L06	-	100	-	-	177
Cluster B_Block A_L06	-	100	-	-	177
Cluster C_Block A_L06	-	100	-	-	121
Cluster D_Block A_L06	-	100	-	-	121
Cluster A_Block A_L07	-	100	-	-	177
Cluster B_Block A_L07	-	100	-	-	177
Cluster C_Block A_L07	-	100	-	-	121
Cluster D_Block A_L07	-	100	-	-	121
Cluster A_Block A_L08	-	100	-	-	177
Cluster B_Block A_L08	-	100	-	-	177
Cluster C_Block A_L08	-	100	-	-	121
Cluster D_Block A_L08	-	100	-	-	121
Cluster A_Block A_L09	-	100	-	-	177
Cluster B_Block A_L09	-	100	-	-	177
Cluster C_Block A_L09	-	100	-	-	121
Cluster D_Block A_L09	-	100	-	-	121
Cluster A_Block A_L010	-	100	-	-	177
Cluster B_Block A_L010	-	100	-	-	177
Cluster C_Block A_L010	-	100	-	-	121
Cluster D_Block A_L010	-	100	-	-	121
Cluster A_Block A_L011	-	100	-	-	177
Cluster B_Block A_L011	-	100	-	-	177
Cluster C_Block A_L011	-	100	-	-	121
Cluster D_Block A_L011	-	100	-	-	121
Cluster A_Block A_L012	-	100	-	-	177
Cluster B_Block A_L012	-	100	-	-	177
Cluster C_Block A_L012	-	100	-	-	121
Cluster D_Block A_L012	-	100	-	-	121
Corridor A_Block A_L00	-	100	-	-	55

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
Circulation/Lift A_Block A_L00	-	60	100	-	77
Corridor C_Block A_L00	-	60	100	-	15
Store B_Block A_L00	100	-	-	-	7
Circulation/Lift A_Block A_L01	-	60	100	-	46
Corridor A_Block A_L02	-	60	100	-	55
Corridor B_Block A_L02	-	60	100	-	59
Circulation/Lift A_Block A_L02	-	60	100	-	46
Corridor C_Block A_L02	-	60	100	-	45
Corridor A_Block A_L01	-	60	100	-	55
Cluster Corridor C_Block B+C_L01	-	60	100	-	133
Corridor B_Block A_L01	-	60	100	-	59
Circulation A_Block B+C_L02	-	60	100	-	107
Circulation A_Block B+C_L01	-	60	100	-	107
Corridor A_Block A_L03	-	60	100	-	55
Corridor B_Block A_L03	-	60	100	-	59
Circulation/Lift A_Block A_L03	-	60	100	-	46
Corridor C_Block A_L03	-	60	100	-	45
Corridor A_Block A_L04	-	60	100	-	55
Corridor B_Block A_L04	-	60	100	-	59
Circulation/Lift A_Block A_L04	-	60	100	-	46
Corridor C_Block A_L04	-	60	100	-	45
Corridor A_Block A_L05	-	60	100	-	55
Corridor B_Block A_L05	-	60	100	-	59
Circulation/Lift A_Block A_L05	-	60	100	-	46
Corridor C_Block A_L05	-	60	100	-	45
Corridor A_Block A_L06	-	60	100	-	55
Corridor B_Block A_L06	-	60	100	-	59
Circulation/Lift A_Block A_L06	-	60	100	-	46
Corridor C_Block A_L06	-	60	100	-	45
Corridor A_Block A_L07	-	60	100	-	55
Corridor B_Block A_L07	-	60	100	-	59
Circulation/Lift A_Block A_L07	-	60	100	-	46
Corridor C_Block A_L07	-	60	100	-	45
Corridor A_Block A_L08	-	60	100	-	55
Corridor B_Block A_L08	-	60	100	-	59
Circulation/Lift A_Block A_L08	-	60	100	-	46
Corridor C_Block A_L08	-	60	100	-	45
Corridor A_Block A_L09	-	60	100	-	55
Corridor B_Block A_L09	-	60	100	-	59
Circulation/Lift A_Block A_L09	-	60	100	-	46
Corridor C_Block A_L09	-	60	100	-	45
Corridor A_Block A_L010	-	60	100	-	55
Corridor B_Block A_L010	-	60	100	-	59

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
Circulation/Lift A_Block A_L010	-	60	100	-	46
Corridor C_Block A_L010	-	60	100	-	45
Corridor A_Block A_L011	-	60	100	-	55
Corridor B_Block A_L011	-	60	100	-	59
Circulation/Lift A_Block A_L011	-	60	100	-	46
Corridor C_Block A_L011	-	60	100	-	45
Corridor A_Block A_L012	-	60	100	-	55
Corridor B_Block A_L012	-	60	100	-	59
Circulation/Lift A_Block A_L012	-	60	100	-	46
Corridor C_Block A_L012	-	60	100	-	45
LDK A_Block A_L01	-	60	100	-	293
LDK A_Block B+C_L01	-	60	100	-	364
LDK B_Block A_L01	-	60	100	-	293
LDK B_Block B+C_L01	-	60	100	-	292
LDK C_Block B+C_L01	-	60	100	-	348
LDK A_Block A_L02	-	60	100	-	293
LDK B_Block A_L02	-	60	100	-	293
LDK C_Block A_L02	-	60	100	-	400
LDK A_Block B+C_L02	-	60	100	-	364
LDK B_Block B+C_L02	-	60	100	-	292
LDK C_Block B+C_L02	-	60	100	-	348
LDK D_Block B+C_L02	-	60	100	-	299
LDK A_Block A_L03	-	60	100	-	293
LDK B_Block A_L03	-	60	100	-	293
LDK C_Block A_L03	-	60	100	-	400
LDK A_Block A_L04	-	60	100	-	293
LDK B_Block A_L04	-	60	100	-	293
LDK C_Block A_L04	-	60	100	-	400
LDK A_Block A_L05	-	60	100	-	293
LDK B_Block A_L05	-	60	100	-	293
LDK C_Block A_L05	-	60	100	-	400
LDK A_Block A_L06	-	60	100	-	293
LDK B_Block A_L06	-	60	100	-	400
LDK C_Block A_L06	-	60	100	-	293
LDK A_Block A_L07	-	60	100	-	293
LDK B_Block A_L07	-	60	100	-	400
LDK C_Block A_L07	-	60	100	-	293
LDK A_Block A_L08	-	60	100	-	293
LDK B_Block A_L08	-	60	100	-	400
LDK C_Block A_L08	-	60	100	-	293
LDK A_Block A_L09	-	60	100	-	400
LDK B_Block A_L09	-	60	100	-	293
LDK C_Block A_L09	-	60	100	-	400

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
LDK A_Block A_L010	-	100	-	-	293
LDK B_Block A_L010	-	100	-	-	293
LDK C_Block A_L010	-	100	-	-	400
LDK A_Block A_L011	-	100	-	-	293
LDK B_Block A_L011	-	100	-	-	293
LDK C_Block A_L011	-	100	-	-	400
LDK A_Block A_L012	-	100	-	-	293
LDK B_Block A_L012	-	100	-	-	293
LDK C_Block A_L012	-	100	-	-	400
Library_Block D_L01	-	100	-	-	150
Circulation B_Block D_L01	-	100	-	-	110
Circulation A_Block D_L01	-	100	-	-	83
WC_Block D_L01	-	100	-	-	49
Studio A_Block B+C_L01	-	100	-	-	70
Cluster G_Block B+C_L01	-	100	-	-	93
LDK D_Block B+C_L01	-	100	-	-	299
Cluster F_Block B+C_L01	-	100	-	-	94
Study_Block D_L01	-	100	-	-	136
Cluster C_Block A_L01	-	100	-	-	121
LDK C_Block A_L01	-	100	-	-	400
Corridor C_Block A_L01	-	100	-	-	45
Cluster D_Block A_L01	-	100	-	-	121
Stairs B_Block B+C_L01	-	100	-	-	53
Stairs_Block A_L01	-	100	-	-	32
Stairs A_Block B+C_L01	-	100	-	-	49
Stairs_Block A_L02	-	100	-	-	32
Store A_Block B+C_L01	100	-	-	-	11
Studio A_Block B+C_L02	-	100	-	-	70
Stairs B_Block B+C_L02	-	100	-	-	53
Stairs A_Block B+C_L02	-	100	-	-	49
Store A_Block B+C_L02	100	-	-	-	11
Stairs_Block A_L03	-	100	-	-	32
Stairs_Block A_L04	-	100	-	-	32
Stairs_Block A_L05	-	100	-	-	32
Stairs_Block A_L06	-	100	-	-	32
Stairs_Block A_L07	-	100	-	-	32
Stairs_Block A_L08	-	100	-	-	32
Stairs_Block A_L09	-	100	-	-	32
Stairs_Block A_L010	-	100	-	-	32
Stairs_Block A_L011	-	100	-	-	32
Stairs_Block A_L012	-	100	-	-	32
Cluster Corridor F_Block B+C_L03	-	100	-	-	60
Cluster A_Block B+C_L03	-	100	-	-	243

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
Cluster C_Block C+C_L03	-	100	-	-	255
Cluster B_Block B+C_L03	-	100	-	-	240
Cluster Corridor A_Block B+C_L03	-	100	-	-	72
Cluster Corridor H_Block B+C_L03	-	100	-	-	54
Cluster Corridor D_Block B+C_L03	-	100	-	-	66
Cluster Corridor E_Block B+C_L03	-	100	-	-	72
Cluster H_Block B+C_L03	-	100	-	-	185
Cluster D_Block B+C_L03	-	100	-	-	284
Cluster E_Block B+C_L03	-	100	-	-	181
Cluster Corridor C_Block B+C_L03	-	100	-	-	133
Cluster G_Block B+C_L03	-	100	-	-	93
Cluster F_Block B+C_L03	-	100	-	-	94
Circulation A_Block B+C_L03	-	100	-	-	107
LDK A_Block B+C_L03	-	100	-	-	364
LDK B_Block B+C_L03	-	100	-	-	292
LDK C_Block B+C_L03	-	100	-	-	348
LDK D_Block B+C_L03	-	100	-	-	299
Studio A_Block B+C_L03	-	100	-	-	70
Stairs B_Block B+C_L03	-	100	-	-	53
Stairs A_Block B+C_L03	-	100	-	-	49
Store A_Block B+C_L03	100	-	-	-	11
Stairs A_Block B+C_L04	-	100	-	-	49
Store A_Block B+C_L04	100	-	-	-	11
Cluster D_Block B+C_L04	-	100	-	-	284
Cluster B_Block B+C_L04	-	100	-	-	240
Cluster C_Block B+C_L04	-	100	-	-	255
Stairs B_Block B+C_L04	-	100	-	-	53
Studio A_Block B+C_L04	-	100	-	-	70
Circulation A_Block B+C_L04	-	100	-	-	107
Cluster Corridor C_Block B+C_L04	-	100	-	-	133
Cluster Corridor D_Block B+C_L04	-	100	-	-	66
ROOF	100	-	-	-	487
Management Suite_Block D_L00	100	-	-	-	472
Games Area_Block D_L00	-	100	-	-	302
Management_Block D_L00	100	-	-	-	285
Office_Block D_L01	100	-	-	-	107
Office/Bursar_Block D_L01	100	-	-	-	275
Meeting_Block D_L01	100	-	-	-	268

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Cluster A_Block A_L00	NO (-22.9%)	NO
Cluster B_Block A_L00	YES (+14.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Reception_Block D_L00	NO (-52.4%)	NO
Cluster D_Block B+C_L00	NO (-10.1%)	NO
Cluster A_Block B+C_L00	NO (-13.1%)	NO
Cluster B_Block B+C_L00	NO (-41.2%)	NO
Cluster C_Block B+C_L00	NO (-10.5%)	NO
Cluster D_Block B+C_L00	NO (-29.8%)	NO
Cluster A_Block A_L01	NO (-22.9%)	NO
Cluster A_Block B+C_L01	NO (-13.1%)	NO
Cluster B_Block A_L01	YES (+14.4%)	NO
Cluster C_Block C+C_L01	NO (-41.9%)	NO
Cluster H_Block B+C_L01	NO (-13.3%)	NO
Cluster E_Block B+C_L01	NO (-10.1%)	NO
Cluster A_Block A_L02	NO (-22.9%)	NO
Cluster D_Block B+C_L01	NO (-29.8%)	NO
Cluster B_Block B+C_L01	NO (-37.4%)	NO
Cluster B_Block A_L02	YES (+14.4%)	NO
Cluster C_Block A_L02	YES (+13.2%)	NO
Cluster D_Block A_L02	NO (-26.8%)	NO
Cluster A_Block B+C_L02	NO (-13.1%)	NO
Cluster C_Block C+C_L02	NO (-41.9%)	NO
Cluster B_Block B+C_L02	NO (-37.4%)	NO
Cluster H_Block B+C_L02	NO (-13.3%)	NO
Cluster D_Block B+C_L02	NO (-29.8%)	NO
Cluster E_Block B+C_L02	NO (-10.1%)	NO
Cluster G_Block B+C_L02	NO (-13.1%)	NO
Cluster F_Block B+C_L02	NO (-10.1%)	NO
Cluster A_Block A_L03	NO (-22.9%)	NO
Cluster B_Block A_L03	YES (+14.4%)	NO
Cluster C_Block A_L03	YES (+13.2%)	NO
Cluster D_Block A_L03	NO (-26.8%)	NO
Cluster A_Block A_L04	NO (-22.9%)	NO
Cluster B_Block A_L04	YES (+14.4%)	NO
Cluster C_Block A_L04	YES (+13.2%)	NO
Cluster D_Block A_L04	NO (-26.8%)	NO
Cluster A_Block A_L05	NO (-22.9%)	NO
Cluster B_Block A_L05	YES (+14.4%)	NO
Cluster C_Block A_L05	YES (+13.2%)	NO
Cluster D_Block A_L05	NO (-26.8%)	NO
Cluster A_Block A_L06	NO (-22.9%)	NO
Cluster B_Block A_L06	YES (+14.4%)	NO
Cluster C_Block A_L06	YES (+13.2%)	NO
Cluster D_Block A_L06	NO (-26.8%)	NO
Cluster A_Block A_L07	NO (-22.9%)	NO
Cluster B_Block A_L07	YES (+14.4%)	NO
Cluster C_Block A_L07	YES (+13.2%)	NO
Cluster D_Block A_L07	NO (-26.8%)	NO
Cluster A_Block A_L08	NO (-22.9%)	NO
Cluster B_Block A_L08	YES (+14.4%)	NO
Cluster C_Block A_L08	YES (+13.2%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Cluster D_Block A_L08	NO (-26.8%)	NO
Cluster A_Block A_L09	NO (-22.9%)	NO
Cluster B_Block A_L09	YES (+14.4%)	NO
Cluster C_Block A_L09	YES (+13.2%)	NO
Cluster D_Block A_L09	NO (-26.8%)	NO
Cluster A_Block A_L010	NO (-22.9%)	NO
Cluster B_Block A_L010	YES (+14.4%)	NO
Cluster C_Block A_L010	YES (+13.2%)	NO
Cluster D_Block A_L010	NO (-26.8%)	NO
Cluster A_Block A_L011	NO (-22.9%)	NO
Cluster B_Block A_L011	YES (+14.4%)	NO
Cluster C_Block A_L011	YES (+13.2%)	NO
Cluster D_Block A_L011	NO (-26.8%)	NO
Cluster A_Block A_L012	NO (-22.9%)	NO
Cluster B_Block A_L012	YES (+14.4%)	NO
Cluster C_Block A_L012	YES (+13.2%)	NO
Cluster D_Block A_L012	NO (-26.8%)	NO
Studio A_Block B+C_L01	NO (-25.3%)	NO
Cluster G_Block B+C_L01	NO (-13.1%)	NO
Cluster F_Block B+C_L01	NO (-10.1%)	NO
Cluster C_Block A_L01	YES (+13.2%)	NO
Cluster D_Block A_L01	NO (-26.8%)	NO
Studio A_Block B+C_L02	NO (-25.3%)	NO
Cluster A_Block B+C_L03	NO (-13.1%)	NO
Cluster C_Block C+C_L03	NO (-41.9%)	NO
Cluster B_Block B+C_L03	NO (-37.4%)	NO
Cluster H_Block B+C_L03	NO (-13.3%)	NO
Cluster D_Block B+C_L03	NO (-29.8%)	NO
Cluster E_Block B+C_L03	NO (-10.1%)	NO
Cluster G_Block B+C_L03	NO (-13.1%)	NO
Cluster F_Block B+C_L03	NO (-10.1%)	NO
Studio A_Block B+C_L03	NO (-25.3%)	NO
Cluster D_Block B+C_L04	NO (-29.8%)	NO
Cluster B_Block B+C_L04	NO (-37.4%)	NO
Cluster C_Block B+C_L04	NO (-41.9%)	NO
Studio A_Block B+C_L04	NO (-25.3%)	NO
Management Suite_Block D_L00	YES (+8.4%)	NO
Games Area_Block D_L00	YES (+51.2%)	NO
Management_Block D_L00	NO (-42.3%)	NO
Office_Block D_L01	N/A	N/A
Office/Bursar_Block D_L01	NO (-32.1%)	NO
Meeting_Block D_L01	NO (-49.1%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	14221.7	14221.7		A1/A2 Retail/Financial and Professional services
External area [m ²]	12178.3	12178.3		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	MAN	MAN		B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	5	3		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	5663.19	6753.82		B8 Storage or Distribution
Average U-value [W/m ² K]	0.47	0.55		C1 Hotels
Alpha value* [%]	24.59	16.08	100	C2 Residential Institutions: Hospitals and Care Homes
				C2 Residential Institutions: Residential schools
				C2 Residential Institutions: Universities and colleges
				C2A Secure Residential Institutions
				Residential spaces
				D1 Non-residential Institutions: Community/Day Centre
				D1 Non-residential Institutions: Libraries, Museums, and Galleries
				D1 Non-residential Institutions: Education
				D1 Non-residential Institutions: Primary Health Care Building
				D1 Non-residential Institutions: Crown and County Courts
				D2 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

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	18.6	20.32
Cooling	0.23	0.12
Auxiliary	5.45	7.26
Lighting	6.01	9.27
Hot water	27.11	28.05
Equipment*	31.79	31.79
TOTAL**	57.39	65.01

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

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	153.23	141.44
Primary energy* [kWh/m ²]	171.79	156.9
Total emissions [kg/m ²]	29	29.2

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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 SSEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	57.2	94.2	18.9	0	5.6	0.84	0	1	0
Notional	60.2	79.6	20.4	0	7.4	0.82	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	141.6	86.4	8.3	9.3	0	4.75	2.59	5.1	3.65
Notional	144.4	63.6	16.5	4.9	0	2.43	3.6	----	----

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 SSEF	= 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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{Typ}	U _{Min}	Surface where the minimum value occurs*
Wall	0.23	0.18	"BL000000_W1"
Floor	0.2	0.15	"BL000000_F"
Roof	0.15	0.13	"BL000002_C"
Windows, roof windows, and rooflights	1.5	1.1	"BL00000D_C_O0"
Personnel doors	1.5	2.2	"BL000000_W1_O0"
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"
U _{Typ} = Typical individual element U-values [W/(m²K)]			U _{Min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	5

D. General Notes

The report is based on information available at the time of the writing and discussions with the client during any project meetings. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by Ensphere Group Ltd for inaccuracies in the data supplied by any other party.

The review of planning policy and other requirements does not constitute a detailed review. Its purpose is as a guide to provide the context for the development and to determine the likely requirements of the Local Authority.

No site visits have been carried out, unless otherwise specified.

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