



ENVIRONMENTAL STANDARDS STATEMENT
27 BYROM STREET, MANCHESTER

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August 2021
V/22342/0.2/P1

ENVIRONMENTAL STANDARDS STATEMENT
27 BYROM STREET

DATE	REVISION	NOTES	CHECKED BY
6 th August 2021	P1	Planning Submission	John Hughes

ENVIRONMENTAL STANDARDS STATEMENT

27 BYROM STREET

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1. Outline Project Information

1.1 Introduction

- 1.1.1 The proposed works at No. 27 Byrom St. involves the construction of an extension and retrofit of an existing office building in central Manchester, with further office space built at the rear of the existing building.
- 1.1.2 This report outlines the energy efficiency and sustainability measures that are proposed to be included in the scheme in order to reduce the anticipated energy consumption and CO₂ emissions associated with the development.

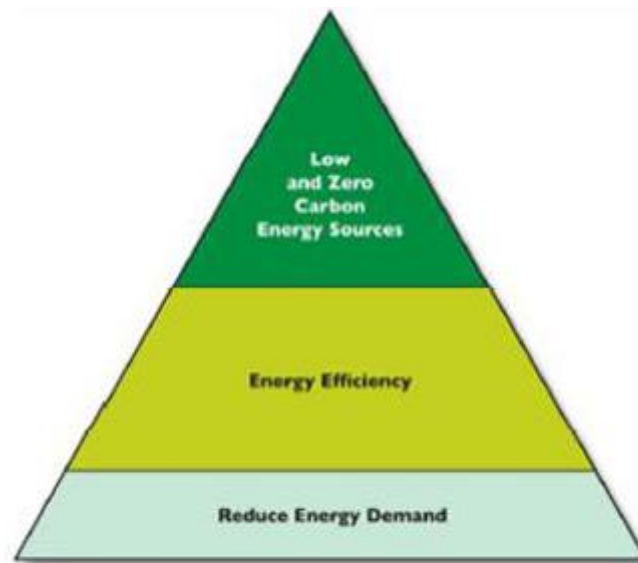
A technical assessment of the development proposals is included within this report, using a Simplified Building Energy Model (SBEM) calculation to demonstrate how the energy demand and carbon dioxide emission reduction targets may be achieved. However, given that the existing building is being retrofitted and the extension is less than 50m², compliance with Approved Document L2A is not required

A feasibility study in respect of renewable and low carbon technologies has also been undertaken, further details of which has been outlined later in the report.

For this project, we are proposing a fabric first approach to the extension and highly efficient building systems to achieve a low energy building, as recommended by bodies such as the Carbon Trust.

2. Energy Reduction Strategy

The strategy for reducing energy consumption within the proposed office extension will follow the energy hierarchy below.



Energy Hierarchy Triangle [source: TAN 22]

2.1 Reduce Energy Demand

Passive measures included within the design of the new office extension to reduce energy use and the associated CO₂ emissions include;

- Enhanced insulation to the building envelope which exceeds Building Regulation requirements
- Reduced air permeability standard

Enhanced insulation to the building envelope

Limiting heat losses across the extension building envelope will future proof the energy efficiency of the office building over its whole life. To achieve this, the base fabric thermal U-Value requirements as detailed within Approved Document L2A 2013 of the Building Regulations will be significantly improved upon.

The following table shows the limiting U-values required in order to achieve Building Regulations compliance, compared to the targeted values, which far exceed the Building Regulations requirements minimum.

Approved Document L2A U-Value comparison

Building Element	AD L2A limiting U-Value (W/m ² .K)	Proposed U-Value (W/m ² .K)
Roof	0.25	0.18
Wall	0.35	0.28
Floor	0.25	0.22
Windows	2.2	1.75

The targeted values as noted above will be confirmed during the detailed design stage of the building.

Engineered Facade Design

The glazed proportion of the building façades and the glazing location has been designed to maximise the use of natural daylight to offset demand for artificial lighting. At the same time as being designed to maximise passive solar gains in winter, the façade will be designed to minimise thermal losses and summertime gains, through the use of high performance glazing, optimising the glazed to opaque proportion of the façade and enhanced insulation levels above the minimum set down by Building Regulations.

Reduced Air Permeability

A significant percentage of heat loss and associated energy use is due to air infiltration associated with poor air tightness. By improving on the air tightness of the building it is possible to reduce infiltrations rates and thus reduce the heat losses, energy use and the associated CO₂ emissions.

The extension will be constructed to improved building air tightness criteria beyond the level required to comply with the Building Regulations. The table below shows the comparison of the targeted air permeability for the building against the allowable maximum limit set within Approved Document L2A of the Building Regulations, although it is not proposed that an air test will be undertaken for this project.

Air Permeability Standard

Building Regulation Document	Maximum allowable air permeability (m ³ /m ² /hr at 50 Pascals)	Targeted air permeability (m ³ /m ² /hr at 50 Pascals)
Approved Document L2A 2013	10	5

2.2 Energy Efficiency

High efficiency installations, controls and equipment will be incorporated as follows;

Highly efficient Heating, Cooling and Ventilation systems via Heat Pumps

All parts of the building will be fitted with highly efficient heating, cooling and ventilation systems in order to reduce the carbon and CO₂ emissions as much as possible. The most efficient products on the market will be considered for this project at the design stage. It is currently proposed that a highly efficient air source heat pump shall be used to provide space heating and cooling via floor standing fan coil units to the new and existing office areas. Whilst many of these areas will be subject to being fit out by others, we have assumed a services strategy for each space in order to complete our calculations.

Natural ventilation will be optimised in order to provide fresh air to the occupants without energy consumption.

Energy efficient lighting

All areas of the offices will incorporate energy efficient low energy lighting throughout (LEDs).

3. Energy Consumption

Initial energy assessment modelling of the office has been carried out using iSBEM software. The software was used to create an energy model of all the services areas of the new and existing office based on the plans and elevations of the building as provided by the Architect.

The iSBEM software has been used to determine the following:-

- a) Percentage reduction in CO₂ emissions compared to the operation of the existing building.
- b) Percentage reduction in energy usage compared to the operation of the existing building.
- c) EPC rating compared to the existing building.

The building was simulated using the enhanced building fabric, energy efficiency and renewable/low carbon measures as described previously.

An EPC certificate was produced for the existing building in February 2020, this have been used as the basis of the comparison with the proposed extended and retrofitted building.

The results are as shown below:

Compliance with Criterion 1 of Approved Document L2A 'Achieving the Building Emissions Rate (BER)'

	Existing Building	Proposed Building	% Reduction
Building Emission Rate (kg.CO ₂ /m ² .annum)	71.24	39.1	45%
Energy Consumption (kWh/m ² .annum)	410	76.16	81%
EPC Rating	85 (D)	64 (C)	24.7%

4. Sustainability Performance

A range of sustainable features are proposed to be part of the scheme as follows:

4.1 Transport

To reduce road congestion and pollution levels by enabling walking, cycling and use of public transport, and reducing the need for travel by private cars, the proposal would utilise the site's proximity of public transport for the occupant's commute to the building.

4.2 Energy

To address the causes of climate change by reducing emissions of greenhouse gases, in particular carbon dioxide generation, the development would look to be as energy efficient as possible and incorporate generate energy from low or zero carbon technologies. The proposal has sought to reduce its overall energy consumption as summarised below.

Energy Efficiency Measures:

Office – The following key energy efficiency design measures to reduce emissions have been incorporated in the building's design:

- Proposed new thermal element U-values;
- Inverter drives installed on all fans/pumps to control the speed of each fan/pump to accurately match the duty and load;
- Natural ventilation to provide emissions free ventilation.
- Air permeability of 5m³/m².hr @ 50Pa or less.

4.3 Water

To conserve water by promoting water efficiency, the proposed development will aim to develop a water strategy that reduces water demand through its design and specification. Consideration has been given to the efficient use of water in the construction phase and the team will require the contractor to monitor water consumption during the construction phase. The design team will ensure that the building limits its water consumption by specifying water efficient sanitary fittings in the shower and toilet facilities to conserve water at its point of use where feasible.

4.4 Materials

Wherever possible, the materials' specification and products used for the proposed development will display the following characteristics:

- Low embodied energy that require little processing
- Locally sourced
- High recycled content including steel, glass, cladding and flooring products
- Reused materials including reclaimed materials
- Durable
- Can be re-used, recycled, refilled, recharged or reconditioned
- Lightweight to reduce volume of materials and require less fuel during transport
- Accredited to a recognised environmental standard

4.5 Considerate Contractors Scheme

The developer should register with the Considerate Contractors Scheme. This will ensure the on-site activities are monitored by an experienced industry professional to assess their performance against the eight point Code of Considerate Practice, which includes the categories Considerate, Environment, Cleanliness, Good Neighbour, Respectful, Safe, Responsible and Accountability.

4.6 Waste Management

Best practice techniques to prevent and minimise waste during the design and construction phases of the development will be considered, as follows:

- Prior to commencement of the construction phase, a site waste management plan (SWMP) will be produced by the developer to limit the on and off site environmental impacts of construction. The SWMP will detail:
 - Recycled and secondary materials
 - Waste reduction
 - Waste segregation
 - Waste recovery
 - Waste disposal
- This scheme will promote the minimisation of waste in site development and seek to maximise the use of recycled materials in construction.

Appendix A BRUKL Output Document

This identifies the anticipated energy use and CO₂ emissions from the proposed development.

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Byrom Street
As designed

Date: Fri Aug 06 14:52:15 2021

Administrative information

Building Details

Address: 27 Byrom Street, Manchester, M3 4PF

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.a.0

Interface to calculation engine: iSBEM

Interface to calculation engine version: v5.6.a

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

Owner Details

Name: Information not provided by the user

Telephone number: Information not provided by the user

Address: Information not provided by the user, Information not provided by the user, Information not provided by the user

Certifier details

Name: John Hughes

Telephone number: 01614786256

Address: Lloyds House, 18 Lloyd Street, Manchester, M2 5WA

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

The building does not comply with England Building Regulations Part L 2013

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	20.1
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	20.1
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	39.1
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 _{s-Limit}	U _{s-Calc}	U _{i-Calc}	Surface where the maximum value occurs [†]
Wall**	0.35	1.1	1.7	ZG-01/nw
Floor	0.25	0.19	0.29	ZB-01/f
Roof	0.25	1.87	2.5	ZS-01/c
Windows***, roof windows, and rooflights	2.2	2.06	2.2	ZG-01/nw/g
Personnel doors	2.2	-	-	"No external personnel doors"
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_{s-Limit} = Limiting area-weighted average U-values [W/(m²K)]
 U_{s-Calc} = Calculated area-weighted average U-values [W/(m²K)]
 U_{i-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	10

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	0.9 to 0.95

1- Air Conditioning

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3	-	-	-
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.					

2- Panel Heaters

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

1- Local Electric

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	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
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	-	-
ZB-01	1.5	-	-	-	-	-	-	-	-	-	N/A
ZG-04	-	1	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Standard value	60	60	22	-
ZG-01	80	-	-	77
ZG-05	80	-	-	180
ZF-01	80	-	-	355

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
ZS-01		80	-	-	74
ZS-02		80	-	-	84
ZS-03		80	-	-	78
ZB-01		-	80	-	49
ZG-03		-	80	-	13
ZG-04		-	80	15	96
ZS-05		-	80	-	11
ZF-03		-	80	-	13

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?
ZG-01	YES (+136.3%)	NO
ZG-05	NO (-32%)	NO
ZF-01	YES (+32.2%)	NO
ZS-01	NO (-0.3%)	NO
ZS-02	NO (-30.6%)	NO
ZS-03	NO (-6.6%)	NO
ZB-01	N/A	N/A
ZG-04	N/A	N/A

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?	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			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	165.4	165.4		A1/A2 Retail/Financial and Professional services
External area [m ²]	182.2	182.2		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	MAN	MAN	100	B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	10	5		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	228.97	75.28		B8 Storage or Distribution
Average U-value [W/m ² K]	1.26	0.41		C1 Hotels
Alpha value* [%]	9.15	23.76		C2 Residential Institutions: Hospitals and Care Homes
* Percentage of the building's average heat transfer coefficient which is due to thermal bridging				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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	38.15	10
Cooling	13.71	7.11
Auxiliary	0.86	0.39
Lighting	17.26	18.85
Hot water	6.18	7.15
Equipment*	35.85	35.85
TOTAL**	76.16	43.49

* 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]	353.46	180.74
Primary energy* [kWh/m ²]	231.48	110.89
Total emissions [kg/m ²]	39.1	20.1

* 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] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	190	175.5	16.2	19.6	0	3.26	2.49	3.5	3.5
Notional	87.2	131.8	10	10.2	0	2.43	3.6	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	256.7	68.8	89.1	0	2.9	0.8	0	1	0
Notional	29.7	62.4	10.1	0	1.3	0.82	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat 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 _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.28	ZG-05/se
Floor	0.2	0.15	ZG-05/f
Roof	0.15	0.18	ZG-05/c
Windows, roof windows, and rooflights	1.5	1.75	ZG-05/c/g
Personnel doors	1.5	-	"No external personnel doors"
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 _{i-Typ} = Typical individual element U-values [W/(m²K)]			U _{i-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	10

Appendix B BREEAM Pre-Assessment

Despite the project involving the construction of a relatively small extension, we have undertaken a BREEAM pre-assessment to demonstrate the developments overall level of sustainability.



BREEAM 2011 New Construction Pre-Assessment Estimator

This assessment and indicative BREEAM rating is not a formal certified BREEAM assessment or rating and must not be communicated as such. The score presented is indicative of a buildings potential performance and is based on a simplified pre-formal BREEAM assessment and unverified commitments given at an early stage in the design process.

Building name	27 Byrom Street
Indicative building score (%)	62.87%
Indicative BREEAM rating	Pre-Assessment result indicates potential for BREEAM Very Good rating
Indicative minimum standards level achieved	Pre-Assessment result indicates the minimum standards for Very Good level