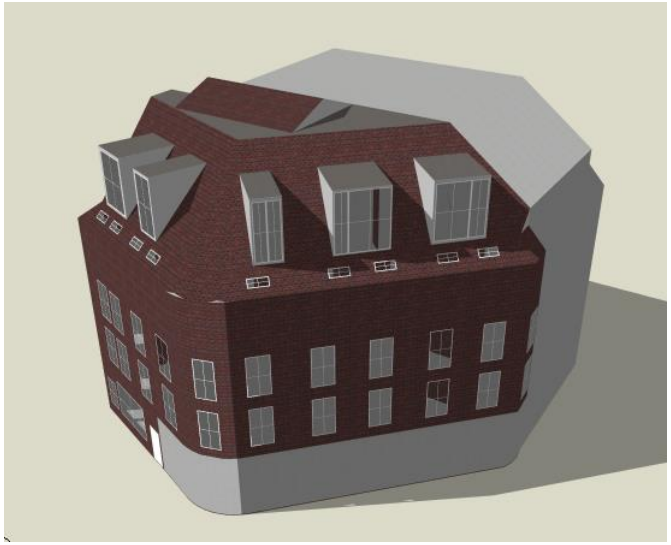
BASEENERGY
Building Assessments for a Sustainable Environment

Energy Statement

70 High Street, Manchester, M4 1ES

Job number: 10364

Date: 04/08/2023



BASE ENERGY LIVERPOOL
Head Office
T: +44 (0)151 933 0328
E: north@baseenergy.co.uk

BASE ENERGY LONDON
London Office
T: +44 (0)203 286 2016
E: south@baseenergy.co.uk

BASE ENERGY SHEFFIELD
Sheffield Office
T: +44 (0)114 303 4986
E: north@baseenergy.co.uk

Revision	Issue Date	Author	Checked	Description
0	04/08/2022	JR	PK	First Issue

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This document and any calculations herein have been produced based on information supplied by the client and their agents and design team. Any amendments to the technical specification on which this report is based may invalidate the results.

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1 Executive Summary

This report has been produced by Base Energy on behalf of Karim Holdings and in support of the planning application for the development named as 70 High Street, Manchester comprising of a 27 Bedroom Hotel falling under the requirements of Manchester City Council

It sets out the design approach with regards to energy, carbon dioxide emissions, and sustainability in order to ensure the development complies with:

- National Planning Policy
- The Manchester City Council Local Plan policies EN4 and EN6

The above policies require:

- A 15 per cent reduction in CO2 over 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.
    - Therefore meeting current Part L 2021 buildings regulations would comply with the above criteria
- An Environmental Standards Statement should be submitted with your application, which addresses sustainability ratings and the provision of renewable energy within the development (Please refer to Appendix A of the Core Strategy for guidance on preparing this statement). This should include a BREEAM pre-assessment rating through the submission of a pre-estimator report which should demonstrate that a rating level of at least Very Good would be achieved. Where this standard is not achievable clear reasons why need to be set out within the submission. This statement must address the guidance within Chapter 4 of the 'Guide to Development in Manchester and policies EN4 and EN6 of the Core Strategy for the City of Manchester, confirm the proposals for the provision of onsite renewable energy to provide 20% of final site energy demand and CO2 reduction.

The design of the development will incorporate energy efficient building fabric and services in addition to low carbon technology:

- Thermal specification meeting where possible Part L 2021 notional U-values
- A design which limits air permeability, targeting 8m3/h/m2
- A design which limits thermal bridging

- Energy saving building services including low energy lighting

This results in a 39.83% reduction over the existing building. Due to the development being in a conservation area, the building is limited to certain fabric and low or zero carbon measures.

2 Existing and Proposed Development

The development site is located on land at 70 High Street, Manchester, M4 1ES

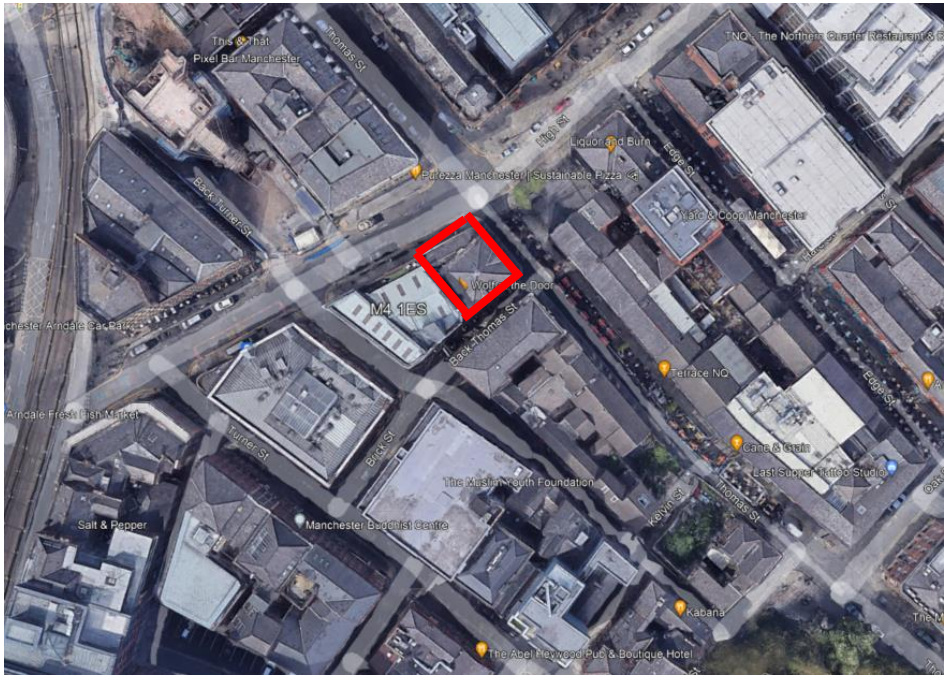
The site is currently used as an unheated storage space (B8) over 4 Levels.

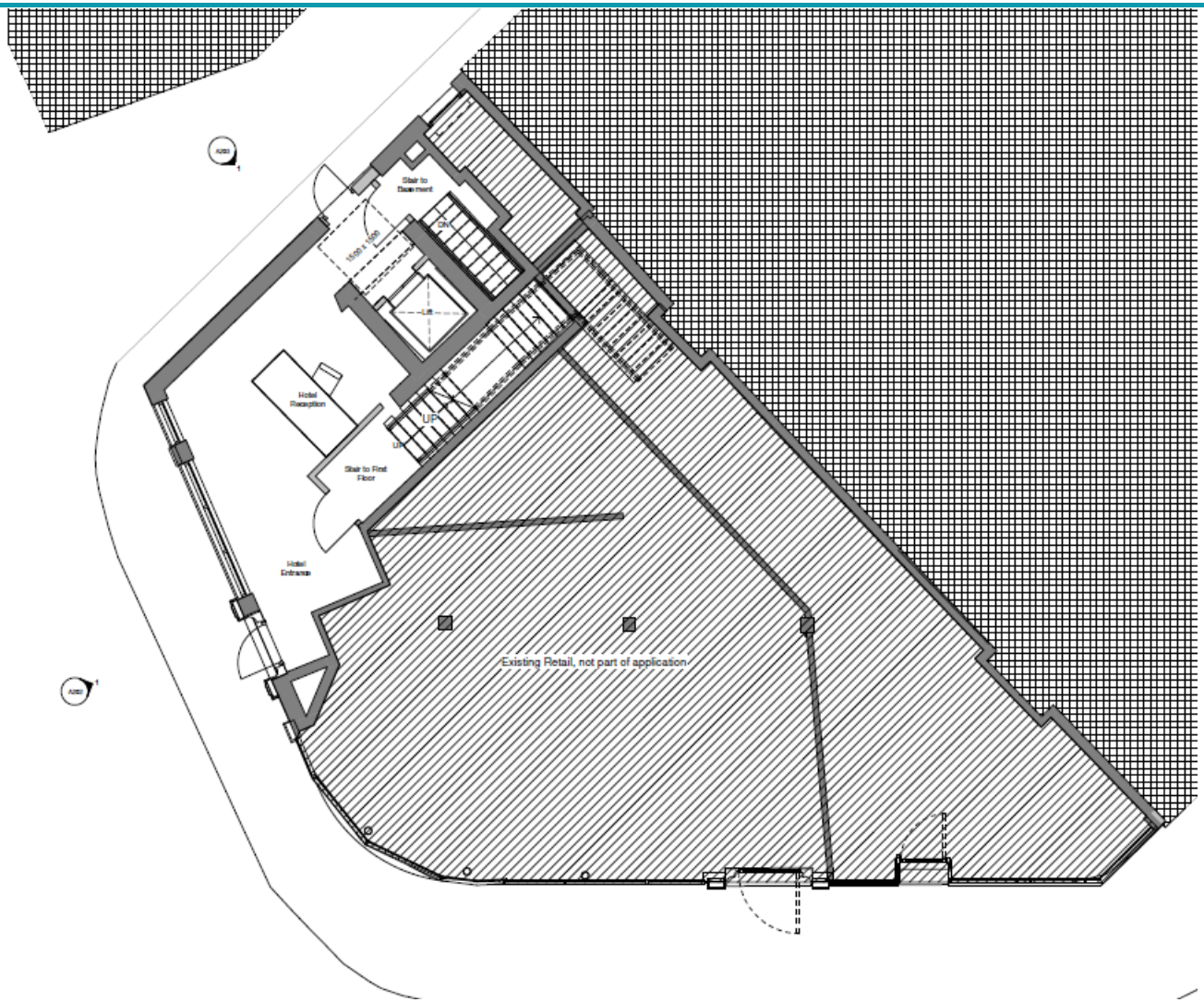
The development proposals are for the conversion of the existing storage space into a 27 Bedroom Hotel.

The development proposals constitute a minor development.

Aspects of the site location, shape, and surroundings (in particular the adjacent buildings), along with any other requirements of planning, use type, and scale will naturally constrain the development proposals in terms of the layout, positioning, and orientation of the proposed development. Subsequently, these constraints will impact on the feasibility of certain renewable technologies (as discussed in Section 4 of this report).

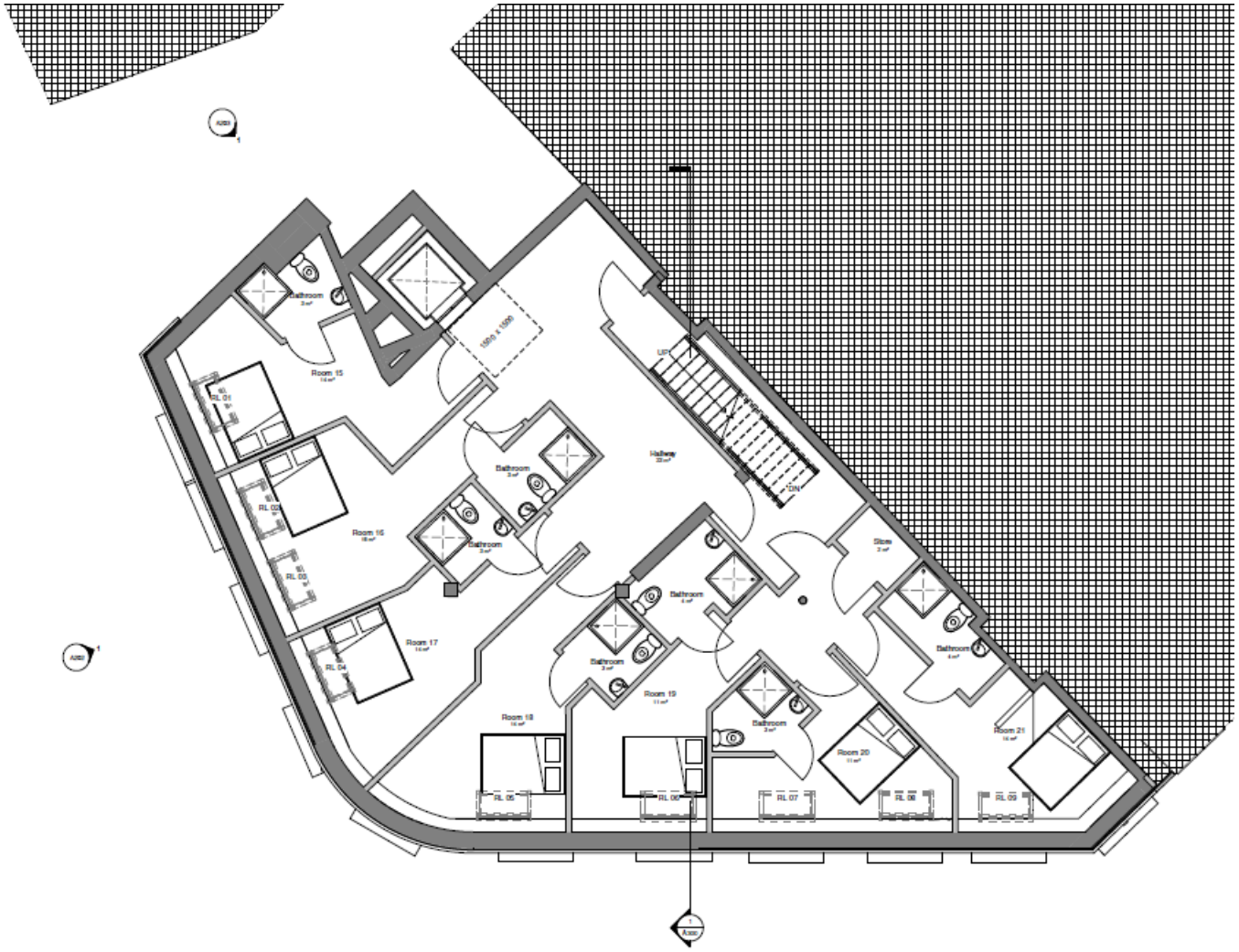
Figure 2.1: Site Location and proposal

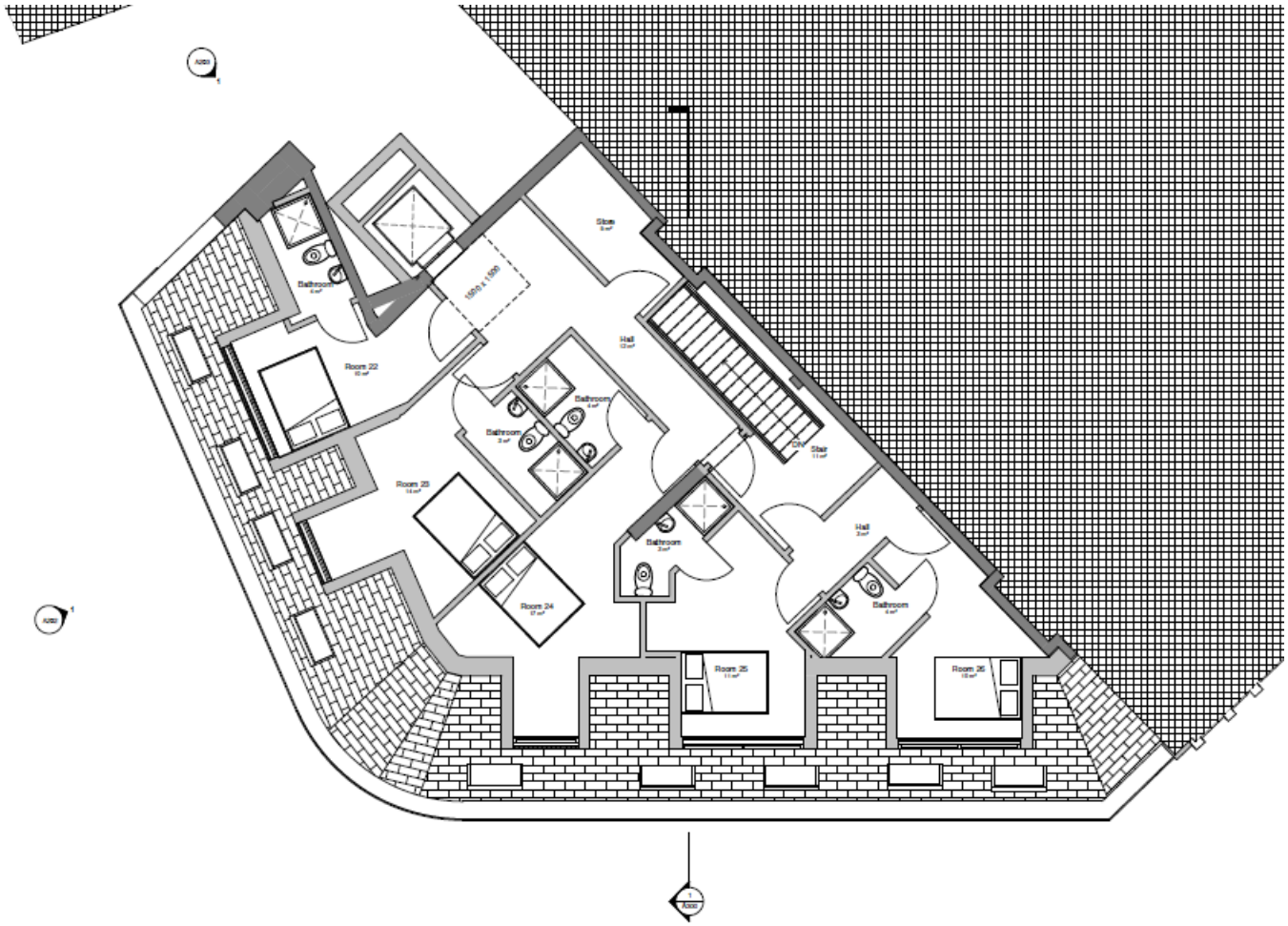



Stair to Basement
CH
Lift
Hotel Reception
UP
Stair to First Floor
Hotel Entrance
Existing Retail, not part of application


Bathroom
Room 1
Room 2
Bathroom
Hallway
Bathroom
Bathroom
Room 3
Store
Bathroom
Bathroom
Room 4
Room 6
Bathroom
Room 7


Bathroom
Room 08
Room 09
Bathroom
Bathroom
Hallway
UP
DN
Stair
Store
Bathroom
Bathroom
Hallway
Bathroom
Room 10
Room 11
Room 12
Room 13
Bathroom
Room 14


Bathroom
Room 15
RL 01
RL 02
Room 16
RL 03
Bathroom
Bathroom
Hallway
UP
DN
Store
Room 17
RL 04
Bathroom
Bathroom
Room 19
Bathroom
Bathroom
Room 18
Room 20
Room 21
RL 05
RL 06
RL 07
RL 08
RL 09


Store
Bathroom
Room 22
Hall
Bathroom
Bathroom
Room 23
Stair
Bathroom
Hall
Room 24
Bathroom
Room 25
Room 26

3 Planning Policy

National Planning Policy Framework 2021

The NPPF was updated in July 2021 to place greater emphasis on beauty, place-making, the environment, and sustainable development. The strengthened environmental objectives aim to protect and enhance the natural, built, and historic environment, and encourage effective land use, greater biodiversity, prudent use of natural resources, minimisation of waste and pollution, and adaptation to climate change alongside a move to a low carbon economy.

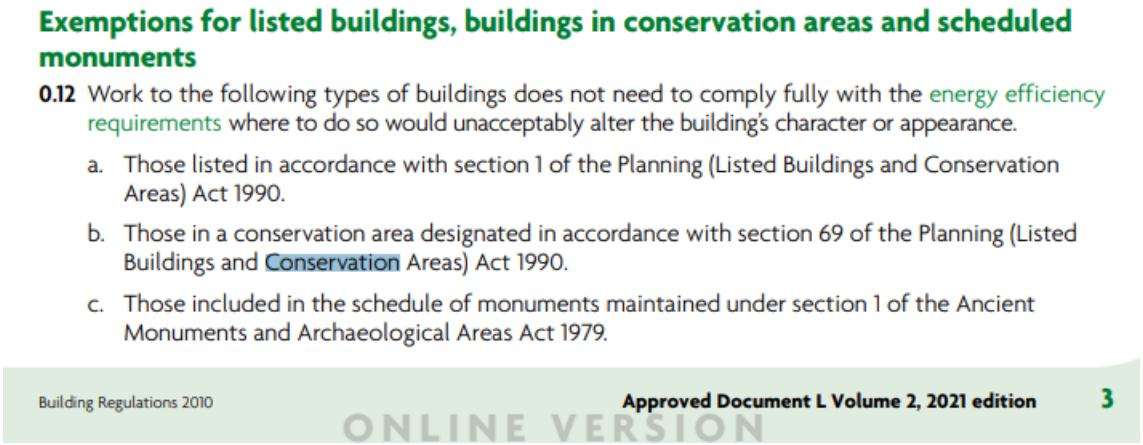
Local Planning Policy

The relevant Manchester City Council Local Planning Policy requirements are as follows.

The development should target:

- The Manchester City Council Local Plan policies EN4 and EN6.
- A 15 per cent reduction in CO2 over 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.
    - Therefore meeting current Part L 2021 buildings regulations would comply with the above criteria
- An Environmental Standards Statement should be submitted with your application, which addresses sustainability ratings and the provision of renewable energy within the development (Please refer to Appendix A of the Core Strategy for guidance on preparing this statement). This should include a BREEAM pre-assessment rating through the submission of a pre-estimator report which should demonstrate that a rating level of at least Very Good would be achieved. Where this standard is not achievable clear reasons why need to be set out within the submission. This statement must address the guidance within Chapter 4 of the 'Guide to Development in Manchester and policies EN4 and EN6 of the Core Strategy for the City of Manchester, confirm the proposals for the provision of onsite renewable energy to provide 20% of final site energy demand and CO2 reduction.

Due to the building being in a conservation area, the below exemptions would apply.



Exemptions for listed buildings, buildings in conservation areas and scheduled monuments

0.12 Work to the following types of buildings does not need to comply fully with the energy efficiency requirements where to do so would unacceptably alter the building's character or appearance.

a. Those listed in accordance with section 1 of the Planning (Listed Buildings and Conservation Areas) Act 1990.

b. Those in a conservation area designated in accordance with section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990.

c. Those included in the schedule of monuments maintained under section 1 of the Ancient Monuments and Archaeological Areas Act 1979.

ONLINE VERSION

The original Building was used as storage space, and it would be difficult to demonstrate a reduction in CO2 emissions between the existing and proposed development of a Hotel. Hence, the proposed model has been used in order to determine the Baseline TER using the building fabric U-Values and services of the original building. This has then been compared to the same model with the improved building fabric U-values in order to determine the reduction in CO2 emissions.

4 Methodology

The Standard Assessment Procedure (SAP) is the UK Government methodology for assessing and calculating the energy performance of dwellings.

The Simplified Building Energy Model (SBEM) is the UK Government methodology for assessing and calculating the energy performance of non-domestic buildings.

SAP and SBEM calculations take into account a range of factors that contribute to energy efficiency, including:

- Materials used for the construction and the thermal insulation of the building fabric (u-values[1] and thermal mass)
- Air permeability
- Efficiency, fuel source, and control of heating and cooling systems
- Ventilation system energy use and heat recovery
- Lighting energy
- Low carbon and energy saving or generating technologies

Approved Document Part L of current Building Regulations addresses the conservation of fuel and power. Part L is divided into two separate documents:

- Part L1 Newly constructed and extended or renovated existing dwellings
- Part L2 Newly constructed and extended or renovated existing non-domestic buildings

To comply with Part L, the calculations should demonstrate how the building will either meet or achieve a percentage reduction in the Building Emission Rate (BER) under the required Target Emission Rate (TER).

The calculation software has been used to calculate a baseline of energy demand and carbon dioxide emissions as appropriate from which any reductions or contributions have been measured.

[1] U-values (Thermal Transmittance) - the measure of the overall rate of heat transfer by all mechanisms under standard conditions, through a particular section of a construction. Lower u-values mean better thermal insulation

5 Baseline Energy & CO2

Energy modelling software has been used to calculate a baseline for the development. This forms the basis from which compliance with planning policy has been measured.

Table 5.1: Baseline CO2

	CO2 Emission Rate (kg CO2/m2/year)	Floor Area (m2)	Total Baseline Emissions (kg CO2/year)
Baseline	93.81	749.2	70,282.45

The Total Baseline CO2 Emissions for the development are shown to be 70,282.45 kg/year.

Table 5.2: Baseline Energy Demand

	Energy Demand (kWh/m2/year)	Floor Area (m2)	Total Baseline Energy Demand (kWhyear)
Baseline	998.54	749.2	7481,06.17

The Baseline Energy Demand for the development is shown to be 748,106.17 kWh per year

6 Low Carbon Design – Fabric First – Be Lean

Before considering low carbon energy generating technology the development has been designed to reduce energy demand through the first step of the energy hierarchy by considering 'fabric first'. A thermally efficient building envelope will follow the design standards as set out below.

Table 6.0: Building Fabric Standards (including u-values W/m²K)

	Part L 2013 Limiting Parameters	Part L 2021 Limiting Parameters	Proposed Development
Walls	0.30	0.26	1.17
Ground Floor	0.25	0.18	0.61
Pitched Roof	0.20	0.16	0.15
Flat Roof	0.20	0.18	0.17
Windows	2.00	1.6	1.6
Doors	2.00	1.6	0.81
Air permeability	10.00	8.00	8.00

- Insulation: The specified building envelope is designed to exceed where possible the notional Part L targets and will help to limit the energy demand of the building for space heating. However, as the building is in a conservation area, the external walls cannot be altered from their original state confirmed by the client (Adam Karim from Karim Holdings). Discussions with the planning department, building control and the Conservation officer must take place to determine if the proposal is acceptable and were the fabric of the building could be insulated to help meet Part L notional u-values.

Once heat retention has been addressed the next step is to ensure energy consuming building services are efficient.

- Lighting: Low energy LED lighting throughout with a minimum efficacy of 110 lumens per watt
- Space & Water Heating: Electric Panel Heaters
- Heating Controls: Comprising programmer & thermostat
- Ventilation: Natural ventilation with localised extract fans

The specifications outlined above, and with the heating provided have been incorporated into the calculation to generate a building emission rate to be measured against the baseline data based on the building which is uninsulated and worst case services and hvac.

Table 6.1: Baseline vs Be Lean CO2

	CO2 Emission Rate (kg CO2/m2/year)	Floor Area (m2)	Total Baseline Emissions (kg CO2/year)	Reduction in CO2
Baseline	93.81	749.2	70282.45	N/A
Be Lean	56.45	749.2	42292.34	**39.83%**

The CO2 Emissions reduction as a result of energy efficient fabric and services is shown to be 27,990.11 kg/year.

Table 6.2: Baseline vs Be Lean Energy Demand

	Energy Demand (kWh/m2/year)	Floor Area (m2)	Total Baseline Energy Demand (kWh/year)	Reduction in Energy Demand
Baseline	998.54	749.2	748,106.17	N/A
Be Lean	602.63	749.2	451,490.4	**39.65%**

The Energy Demand reduction as a result of energy efficient fabric and services is shown to be 296615.77 kWh per year

7 Low Carbon Technology Review & Recommendations

Having set out an energy efficient design, the nest step is to incorporate low carbon technology for energy generation. A number of technologies exist and should be specified where they:

- compliance with planning policy
- are feasible for the site
- are cost efficient
- are appropriate for proposed development form and function
- protect against fuel poverty
- promote fuel security
- reduce reliance on fossil fuels
- reduce carbon emissions
- reduce resource depletion
- reduce pollution

Site location and development form and function will influence the suitability of different technologies through:

- Orientation
- Space (inside and outside of the buildings)
- Surrounding topography, structures, and natural features
- Wind speed
- Overshading
- Geology and ground conditions
- Building form, function, and density

In determining the most feasible renewable technologies for the dwelling, the following have been reviewed:

- Wind turbines
- Ground Source Heat Pumps
- Air Source Heat Pumps
- Biomass
- Combined Heat and Power
- Photovoltaic Panels
- Solar water heating

WIND TURBINES

Wind turbines are used to produce electricity. They can be either pole mounted (in a suitably exposed position) or building mounted; building mounted systems need a sufficient wind speed at the structural height and both a structural survey and planning permission.

- Wind speed can be too low on low rise buildings
- Taller systems need sufficient space
- Wind resources very variable and unpredictable
- May need planning permission

Wind turbine technology is **not recommended** for this development

GROUND SOURCE HEAT PUMP (GSHP)

GSHPs use naturally occurring underground low-level heat in areas with appropriate geological features. Heat is transferred from the ground by either extracting and discharging (re-charging) water from/to the ground directly (open loop) or circulating water through pipes buried within the ground, (closed loop). The water is passed through a heat pump to transfer the heat from this water into a higher temperature water circuit to provide heating. The loop can be fitted horizontally (laid in a shallow trench) or vertically (in a borehole).

- Feasibility analysis is costly
- Suitable ground conditions required
- More capital intensive than air source heat pumps
- Can be more efficient and lower running costs than ASHPs
- Well suited to highly insulated buildings

Ground source heat pump technology is **not recommended** for this development

AIR SOURCE HEAT PUMP (ASHP)

ASHP systems absorb heat from outside air at a low temperature into a fluid which is then passed through an electrically driven compressor where its temperature is increased. There are two main types of ASHP systems: Air to Water systems distribute heat through wet central heating; Air to air produce warm air which is circulated by fans For an ASHP system to be installed, there needs to be ample outdoor space for the external condensing unit; these units can also be noisy and blow out colder air to the neighbouring environment.

- Requires space for external plant and internal hot water tank for wet systems supplying DHW
- Can generate noise though quieter systems have been developed
- Least efficient when most needed
- Longer life than fossil fuel boilers
- High capital costs vs gas systems but lower than GSHPs
- Well suited to highly insulated buildings

Air source heat pump technology **is not recommended** for this development due to space and conservation restrictions. There is potential for ASHP for hot water only, however this would need to be checked with an installer.

BIOMASS

Biomass systems burn wood pellets, chips, or logs to provide heat in a single room, or to power central heating and hot water boilers. There needs to be ample space available for both the boiler and the storage of fuel. There will also be regular deliveries of fuel and therefore adequate site access is required.

- Carbon emissions are cyclical unlike fossil fuel
- Requires fuel storage space and bulk delivery
- Carbon 'neutral' fuel in isolation but supply side emissions are still present so not neutral overall
- Harmful particulate emissions impact air quality and health

Biomass technology **is not recommended** for this development

COMBINED HEAT AND POWER (CHP)

CHP is effectively an on-site small power plant providing both electrical power and thermal heat energy. It is an energy efficiency and low carbon measure rather than a renewable energy technology. A CHP system operates by burning a primary fuel (normally natural gas) by use of either a reciprocating engine or turbine, which in turn drives an alternator to generate electrical power. The heat emitted by the engine and exhaust gases is recovered and used to heat the building or to provide hot water.

- Reduces consumption of and reliance on grid electricity
- Works best with high and consistent heat and hot water demand
- Recovers waste energy
- Can export to the grid
- Uses fossil fuel
- Emissions on site rather than upstream
- Efficiency is sensitive to sizing

CHP **is not recommended** for this development

DISTRICT HEATING

District Heating systems provide multiple buildings or dwellings with heat and hot water from a central boiler house, or 'energy centre'. The system can provide heating or cooling which is transferred from the energy centre through a network of highly insulated pipes carrying the heated water to each dwelling.

- Economies of scale
- Frees up space in habitable areas of development
- Variety of systems
- Can make use of waste heat from industry
- Can be fossil fuel based and dependent

District heating **is not recommended** for this development

SOLAR PHOTOVOLTAIC (PV)

Solar PV cells (which are mounted together in panels or tiles on the roof) convert sunlight into electricity. The cells are made from layers of semi-conducting material; when the light shines on the cell, an electric field is created across the layers. Although PV cells are most effective in bright sunlight, they can still generate electricity on a cloudy day. The power of a PV cell is measured in kilowatts peak (kWp). Each PV panel produces 0.25Watts to 0.35Watts depending on the manufacture.

- Passive technology, requires no energy input from grid
- Does not require sunny days to generate power
- Capital costs can be high although payback is effective
- Needs sufficient roof space and orientation
- Zero site or upstream emissions
- Can export to the grid

Solar PV technology **is not recommended** due to the building being in a conservation area.

SOLAR HOT WATER

Solar hot water systems absorb energy from the sun and transfer this energy using heat exchangers to heat water which can then be stored. Systems should be roof mounted and oriented to face between a south-east and south-west direction.

- Mostly passive technology but requires pump energy
- Not suitable for combi boilers and developments without roof space
- Lower CO2 reductions than other technologies

Solar hot water technology **is not recommended** for this development due to the building being in a conservation area.

Low Carbon Technology Summary

The low carbon technology review indicates that Air Source Heat Pumps could be an option however, due to the lack of roof space and the internal layout of the building, it would be unfeasible.

LOW CARBON TECH

No low carbon technology has been chosen for this property due to the restrictions imposed by the conservation status of the building. Any low carbon technology would be a detriment to the external appearance of the property and need to be checked with the conservation officer.

9 Conclusion

Proposals are for the development named as 70 High Street, Manchester, M4 1ES comprising of a 27 Bedroom Hotel falling under the requirements of Manchester City Council.

Under the local planning policy the proposed development is required to improve on the CO2 emissions by 15% over Part L 2010, which is superseded by current Part L 2021 building regulations.

Energy modelling software has been used to calculate a baseline against which compliance with the above can be measured.

The proposed development will be designed to limit energy demand through the inclusion of a thermally efficient building fabric and energy efficient services were feasible.

No low carbon technology will be incorporated due to the conservation status of the building.

This results in a 39.83% reduction over the existing building.

There are restrictions on the building in terms of its conservation status, therefore, the existing walls have been left as existing and any external Low Zero Carbon technology has not been incorporated into the proposal.

This Energy Statement and the calculations on which it is based demonstrate that the proposed development complies with the local planning policy requirements.

10 Appendix 1- As Designed BRUKL

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

70 High Street - As Designed — As designed

Date: Tue Aug 01 15:51:12 2023

Administrative information

Building Details

Address: Manchester,

Certification tool

Calculation engine: SBEM
Calculation engine version: v6.1.e.0
Interface to calculation engine: DesignBuilder SBEM
Interface to calculation engine version: v7.2.0
BRUKL compliance module version: v6.1.e.1

Certifier details

Name: Base Energy
Telephone number: 0151 933 0328
Address: Base Energy 202 Stanley Road, Bootle, L20 3EN

Foundation area [m²]: 149.85

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

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

Target CO_2 emission rate (TER), $kgCO_2/m^2annum$	38.84	
Building CO_2 emission rate (BER), $kgCO_2/m^2annum$	56.45	
Target primary energy rate (TPER), kWh_{PE}/m^2annum	417.98	
Building primary energy rate (BPER), kWh_{PE}/m^2annum	602.63	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	1.17	1.6	GF - Circulation Area_W_11
Floors	0.18	0.61	2.26	1st - Room 2_F_4
Pitched roofs	0.16	0.15	0.15	4th - Circulation_R_17
Flat roofs	0.18	0.17	0.17	GF - Circulation Area_R_5
Windows** and roof windows	1.6	1.6	1.6	GF - Circulation Area_G_14
Rooflights***	2.2	1.9	1.9	3rd - Room 15_G_13
Personnel doors^	1.6	0.81	0.81	GF - Circulation Area_D_12
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m²K)] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [W/(m²K)]
$U_{a\text{-}Calc}$ = 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	8

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Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	749.2	749.2
External area [m²]	1014.4	1014.4
Weather	MAN	MAN
Infiltration [m^3/hm^2@ 50Pa]	8	3
Average conductance [W/K]	991.3	516.04
Average U-value [W/m^2K]	0.98	0.51
Alpha value* [%]	8.75	27.02

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

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	170.58	58.94
Cooling	0	0
Auxiliary	17.43	23.24
Lighting	4.63	4.53
Hot water	201.2	201.2
Equipment*	11.76	11.76
TOTAL**	393.85	287.91

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

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	6.38
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*6.38*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	535.73	340.27
Primary energy [kWh_{PE}/m^2]	602.63	417.98
Total emissions [kg/m^2]	56.45	38.84

Page 5 of 6