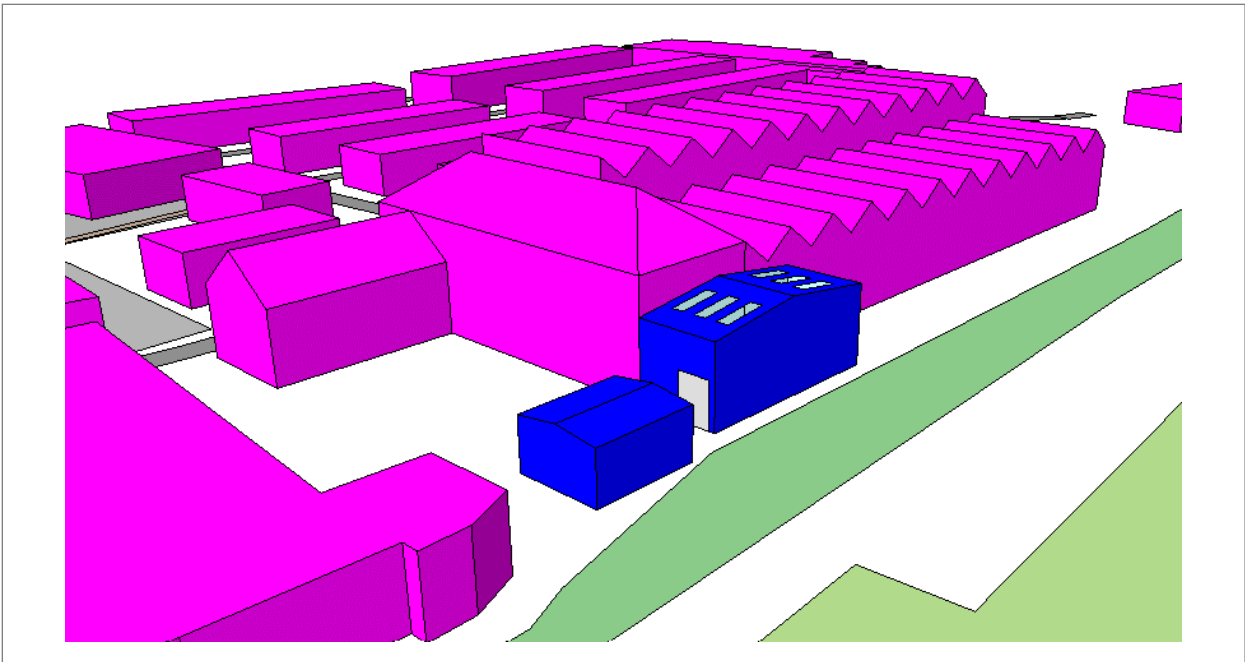




Energy & Carbon Statement

Formulated Polymer Products Factory Extension/Store,
Garden Street,
Ramsbottom
BL0 9BQ

23rd January 2025

Complete Sustainability Solutions Ltd

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Document Status

Client: -- Formulated Polymer Products

Site: -- Garden Street, Ramsbottom, BL0 9BQ

Proposals: -- Extension to Factory and External Storage Building

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Appendix B: Local district and site-wide heat networks

Appendix C: Existing electric car charging points on site

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Document Control Record:

Prepared by	Checked by	Date	Job	Revision
Ben Dibb-Fuller	-	27.01.25	-	-

1 Executive Summary

An energy and carbon statement has been carried out for the proposed extension to the Formulated Polymer Products Factory at the site of the existing factory on Garden Street in Ramsbottom, greater Manchester.

The proposals for the site include for a small extension to the side of the existing factory, allowing access for vehicles on either side via roller shutters, alongside a small detached single standing storage building, again with a roller shutter for vehicle access.

The structure and philosophy of the report has been based upon utilising best practice methodology and adheres to the “Be Lean, Be Clean and Be Green” hierarchy to drive efficiency standards and achieve compliance with the L2B building regulations via the Whole Building Calculation Method.

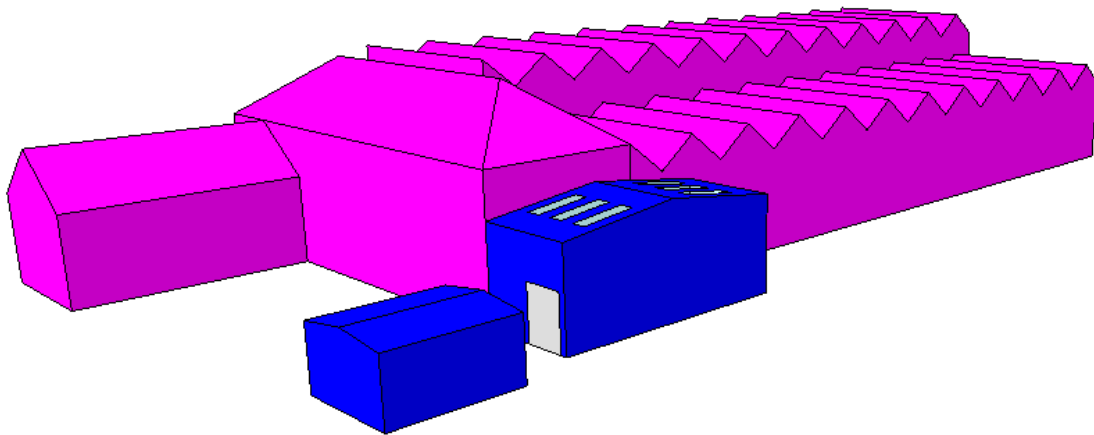


Figure 01.- IES model of the proposed extension and storage building

JP-S2 – Carbon and Energy

It can be concluded the content of this report highlights that the scheme is on course to comply with relevant national and local policy (Places for Everyone (PfE) - Greater Manchester districts) – which the latter states (paraphrased) in the ‘JP-S2 Energy & Carbon’ section of the document:

(a) Be net zero carbon which applies to regulated operational carbon emissions;

Due to the size and age of the existing building, achieving net zero in relation to the regulated operational carbon emissions would not be practically or financially feasible on this project, therefore not applicable for the proposed scheme. However, this report demonstrates that the scheme is on course to comply with current building regulations.

(b). Incorporate adequate electric vehicle charging points, in line with Part S of the Building Regulations, unless superseded by relevant Local Plan policies, to future proof for the likely long-term demand, taking account of the potential maximum energy demand for the site;

No additional electric vehicle charging points are being considered as part of the development, however the site has two existing electric car charging points in the car park to the south of the site, and electric charging for factory vehicles are present within the existing factory area. See Appendix C for more information.

(c). Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date;

Appendix B shows the location of Local district and site-wide heat networks, which the proposed site is not located near, nor is the scheme / servicing strategy appropriate for connection.

(d). In residential developments, achieve energy demand reductions in terms of space heat demand; hot water energy demand and the delivery of on-site renewable energy generation, in accordance with Table 5.1.

N/A to the proposed site.

(e). For non-residential developments, achieve at least BREEAM excellent standard (or equivalent) for the 'Ene 01 – reduction of energy use and carbon emissions' category rising to 'BREEAM outstanding' equivalent for ENE 01 from 2028.

N/A to the proposed site.

(f). Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets

Detailed in this report, utilising best practice methodology and adheres to the "Be Lean, Be Clean and Be Green" hierarchy to drive efficiency standards and achieve compliance with the L2B building regulations via the Whole Building Calculation Method.

JP-C2 – Digital Connectivity

See section 6 of this report

From the SBEM calculations, the results of which as shown in this report, demonstrate that the scheme is on track to match or secure an improvement in carbon emissions utilising the building regulations L2B whole building calculation methodology.

Table 01.- Summary of Results L2B Building Regulations Whole Building Calculation Method

L2B Stage	Regulated Non-residential Carbon Dioxide Savings (kgCO ₂ / m ² / annum)	Percentage improvement on Notional
Notional	42.0	-
Proposed	42.0	0%

The client will use the best endeavours to incorporate the proposed measures to achieve an operational net zero carbon building / project. However, all renewable and low/zero carbon measures are to be reviewed at the time of construction and are subject to financial budget(s) and practical feasibility where the strategy may be revised.

2 Introduction

2.1 Project Scope

This Energy & Carbon Statement report has been prepared to assist with the planning submission for the site.

The purpose of this energy and statement is to model the proposed development, utilising SBEM software to demonstrate compliance with building regulations L2B whole building calculation method, identify the baseline carbon emissions via modelling; then utilise the energy hierarchy to minimise energy usage and carbon emissions, thus ensuring compliance with both national and local policy.

2.2 Development Description

The proposed site in question the existing factory of Formulated Polymer Products (FFP), whereby it is proposed a small extension to the side of the existing building, along with a small external self-standing storage building.

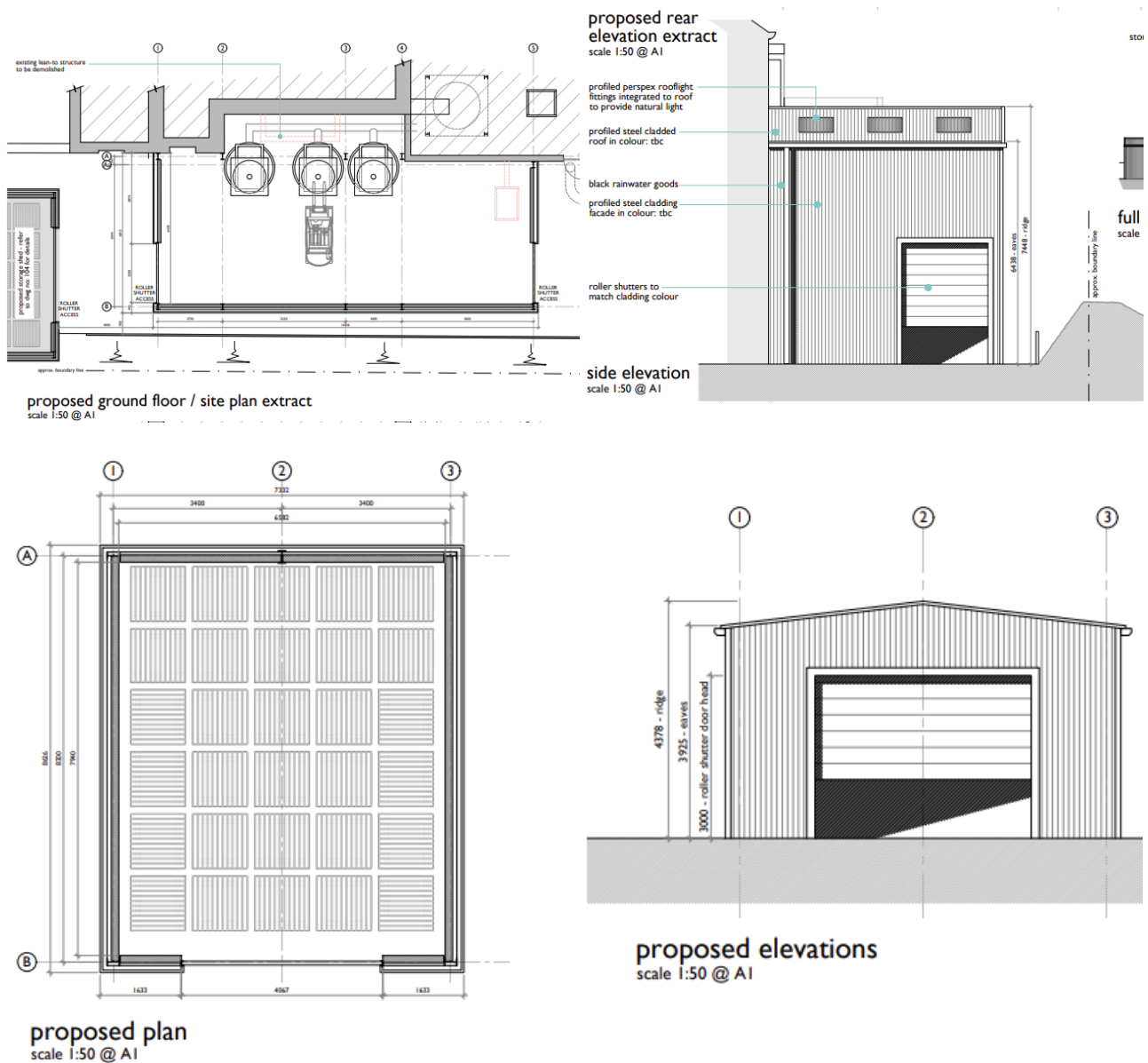


Figure 03.- Proposed GA Floor Plans and Elevations

2.3 Site Location

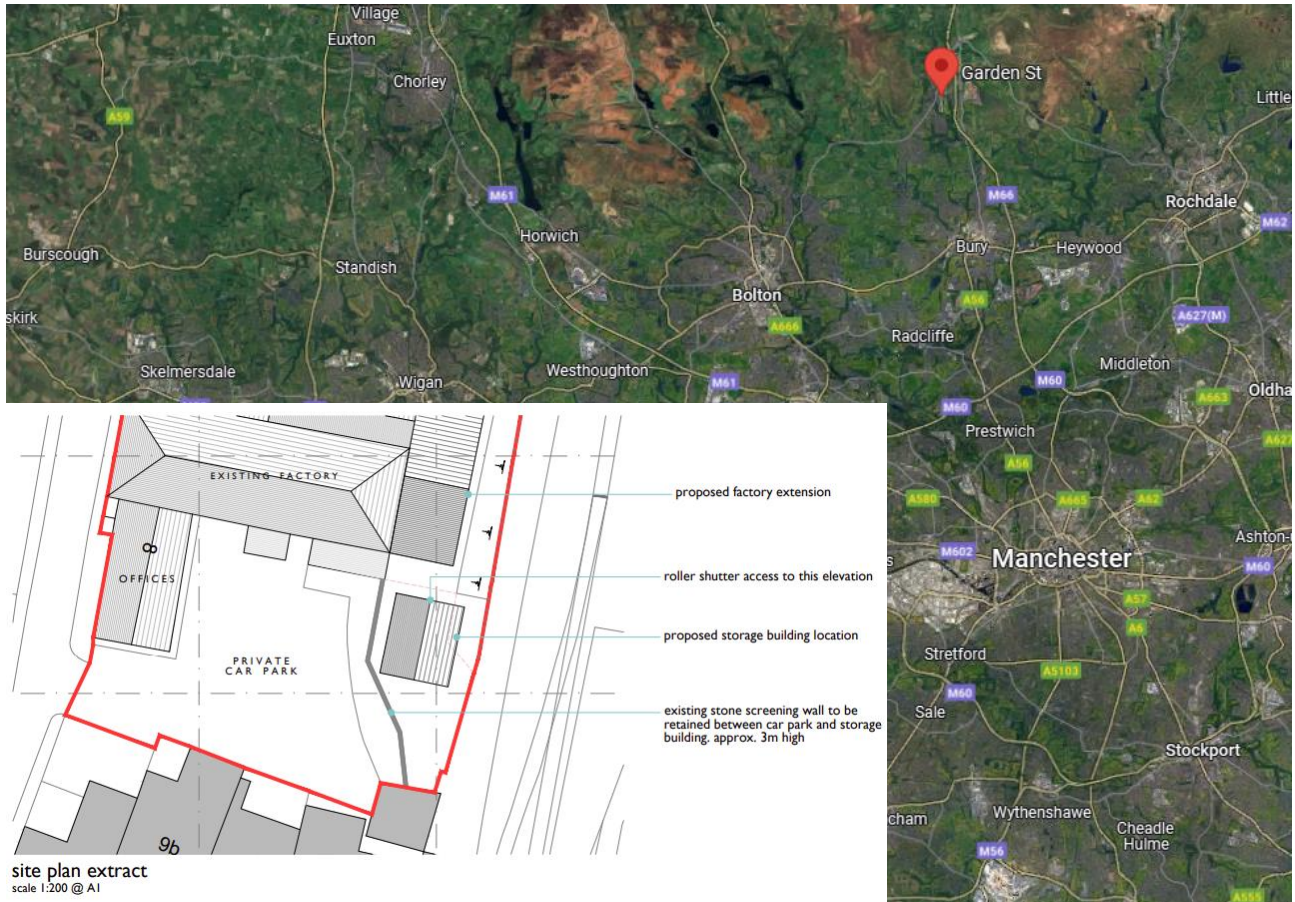


Figure 04.- Location plan of development

3 Policy Context

Within this section of the report we will review both local and national policy, establishing key principles that can be taken forward and applied across the development.

3.1 National Policy Context – National Planning Policy Framework (December 2023)

Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

a) an economic objective – *to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;*

b) a social objective – *to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being.*

c) an environmental objective – *to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.*

3.2 National Policy Context – Local Policy (Places for Everyone (PfE) - Greater Manchester districts)

JP-S2: Carbon and Energy

The aim of delivering a carbon neutral Greater Manchester no later than 2038, with a dramatic reduction in greenhouse gas emissions, will be supported through a range of measures including:

- 1. Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling;*
- 2. Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured;*
- 3. Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;*
- 4. Increasing the range of nature-based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree-planting and natural flood management techniques;*
- 5. An expectation that new development will, unless it can be demonstrated that it is not practicable or financially viable;*

(a) Be net zero carbon which applies:

- from adoption– to regulated operational carbon emissions;*
- from 2028 - to all emissions 'in construction'.*

From 2025 development should also calculate and minimise carbon emissions from unregulated emissions alongside regulated emissions.

Development proposals should set out how this has been achieved in an energy statement in accordance with the energy hierarchy, which in order of importance seeks to:

- i. Minimise energy demand;*
- ii. Maximise energy efficiency;*
- iii. Use renewable energy;*
- iv. Use low carbon energy; and*
- v. Utilise other energy sources.*

From 2025 any residual carbon emissions that cannot be fully mitigated on-site should be offset, in agreement with the relevant local planning authority through a financial contribution to a carbon offset fund.

As an interim measure, development should be consistent with the 2022 Part L Building Regulations unless superseded by changes to building regulations and/or national or local planning policies.

(b). Incorporate adequate electric vehicle charging points, in line with Part S of the Building Regulations, unless superseded by relevant Local Plan policies, to future proof for the likely long-term demand, taking account of the potential maximum energy demand for the site;

(c). Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date;

(d). In residential developments, achieve energy demand reductions in terms of space heat demand; hot water energy demand and the delivery of on-site renewable energy generation, in accordance with Table 5.1.

For renewable energy generation priority should be given to PV installation where technically feasible, alternative technologies will be appropriate where the equivalent generation is evidenced.

(e). For non-residential developments, achieve at least BREEAM excellent standard (or equivalent) for the 'Ene 01 – reduction of energy use and carbon emissions' category rising to 'BREEAM outstanding' equivalent for ENE 01 from 2028.

(f). Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets, including the minimisation of overheating risks and appropriate measures for post occupancy evaluation. Whole life cycle emissions should be considered where possible.

Districts may set out specific carbon emission reduction and energy demand targets within Local Plans. However, Ramsbottom to date has not set any specific targets beyond the above measures.*

4 Design Criteria

Within this section of the report we will, utilising SBEM software, carry out an assessment of the proposed development against current L2B Building Regulations using the Whole Building Calculation Method.

We will establish CO₂ baseline created from assessing the existing building and proposed extension using minimum efficiency standards, where the building emissions rate produced from this 'notional building' will set the minimum emissions rate necessary to match or exceed to ensure compliance with L2B regulations is met.

Using the Be Lean, Be Clean and Be Green energy hierarchy, this will help to establish a low-carbon specification to ensure CO₂ emissions that meet the requirements of both national and local policy.

Full SBEM calculations will be carried out at detailed design to ensure the specification meets the local policy. If any amendments to the design are required these will be incorporated at this point and calculations updated to ensure compliance.

4.1 Review and implement the Energy Hierarchy: Be Lean, Be Clean, Be Green

The Energy Hierarchy is a classification of energy options, prioritised to assist progress towards a more sustainable energy system. The energy hierarchy uses a step-by-step process:

- Step 1 Be lean – Use less energy.
- Step 2 Be Clean – Use energy efficiently
- Step 3 Be Green – Utilise renewable technology.

4.2 Be Lean – Use Less Energy

The developer, in accordance with both national and local planning policy, has stated their wish towards ensuring the development follows a fabric first approach, therefore reducing demand on the national grid as reasonably possible.

However, the proposed extension is unlikely to be heated therefore removing the necessity to meet building fabric minimum standards.

4.3 Be Clean – Supply Energy Efficiently

Within this section of the energy hierarchy, we see an emphasis being placed upon ensuring the regulated energy demands of the development are met as efficiently as possible.

District and site-wide heat networks can be utilised to provide heating and hot water to a development in an efficient manner. In this instance there isn't a district wide network within the vicinity of the scheme (see appendix B).

Furthermore, in many cases we also see opportunities to include a combined heat and power system (CHP), which allows for the production of electricity. Although the scheme will provide a mix of users which could allow for a site side heat network and CHP, The development programme, size of the development, and uses are not aligned in a way to allow for CHP to be considered.

The next stage is to look at possible be clean measures that can be introduced on site. Below we have identified the practical measures to be introduced:

Table 02.- Be Clean – Summary of proposed Be Clean measures

100% LED lighting - 95lm/W

4.4 Be Green – Use Less Energy

The final phase of the report is to ascertain if the development will benefit from renewable/low carbon technologies and the following renewable/low carbon technologies will be analysed for this development;

- Solar Thermal
- Solar PV
- CHP
- Air Source Heat Pump
- Ground Source Heat Pump

See appendix A for detailed summary of the sustainability matrix of Be Green technologies.

Due to the location of the proposed rooflights on the extension, roof-mounted solar PV would not be appropriate to install due to lack of space.

Due to the nature of the building, the inclusion of an air source heat pump to meet the space heating demand is unviable/unjustifiable as it is not known whether the extension is intended to be heated. Also, the size of the extension (111m² floor area) would not justify the purchase and installation of a heat pump.

5 Summary of Results

Table 4 summarises the performance of the development using the guidance outlined in Part L2B for existing buildings respectively as the baseline target.

It can be concluded that CO₂ emissions of predicted energy use of the development will be consistent or even reduced under Part L2B 2021, demonstrating compliance with the building regulations.

Table 04.- Summary of Results L2B Building Regulations Whole Building Calculation Method

L2B Stage	Regulated Non-residential Carbon Dioxide Savings (kgCO ₂ / m ² / annum)	Percentage improvement on Notional
Notional	42.0	-
Proposed	42.0	0%

6 Digital Connectivity

Digital connectivity is a cornerstone of modern urban planning, driving economic growth, social inclusion, and innovation. In the context of the Manchester "Places for Everyone" scheme, ensuring robust and inclusive digital infrastructure is critical to supporting sustainable development, boosting productivity, and improving the quality of life for residents and businesses alike.

High-speed broadband and advanced digital networks enable seamless access to essential services, remote working opportunities, and e-learning platforms, while fostering new economic opportunities in key sectors such as tech, healthcare, and creative industries. By prioritizing digital connectivity, the policy aims to bridge the digital divide, ensuring equitable access for all communities, regardless of geography or socio-economic status.

The emphasis on digital infrastructure aligns with the broader goals of the "Places for Everyone" strategy, which seeks to build resilient and future-proof communities that can adapt to the evolving demands of the digital economy. By integrating cutting-edge digital solutions, Manchester can strengthen its position as a hub for innovation and create a connected, inclusive, and competitive city-region for generations to come.

When assessing the available connections using openreach.com postcode checker for the site, both Copper Broadband and Fibre to the Cabinet Broadband are both available, with Full Fibre Broadband planned to be installed between now and December 2026.

However, due to the nature of the proposed development, it is unlikely that the site is going to rely on or consider an internet connection beyond what is already installed onsite.

Build planned between now and Dec-2026

Full Fibre Broadband



Up to
1600* Mbps
download speed



Up to
115* Mbps
upload speed

This is a full-fibre connection

[Learn more](#)
[Keep me updated](#)

Available now

Fibre to the Cabinet Broadband



Up to
76* Mbps
download speed



Up to
15* Mbps
upload speed

This is a part-fibre connection

[Learn more](#)
[Register my interest](#)

Available now

Copper Broadband



Up to
21* Mbps
download speed



Up to
1* Mbps
upload speed

This is a copper connection

[Learn more](#)
[Register my interest](#)

7 Conclusion

This report is based upon a review of the proposals and a thorough analysis of relevant national and local planning policy requirements. Both the National Planning Policy Framework 2021 and Local Plan (Places for Everyone (PfE) - Greater Manchester districts).

The Places for Everyone (PfE) - Greater Manchester districts - policy requires demonstration of compliance with policies JP-S2 (Carbon and Energy) and JP-C2 (Digital Connectivity) which, as detailed within this report, is on track to achieve.

JP-S2 – Carbon and Energy

To demonstrate compliance with police JP-S2 Carbon and energy, the development will follow the Be Lean, Be Clean, Be Green Energy Hierarchy to showcase this:

Energy Efficient Measures (Be Lean – Use Less Energy)

To maximise the energy efficiency of the development and reduce the energy demand, the development will upgrade any thermal elements that fall outside the minimum threshold as set out in Table 4.2 of the as Building Regulations *Volume 2: Buildings other than dwellings*.

Due to the proposed extension not being intended to be heated, building fabric minimum values are not required to be met.

Energy Efficient Measures (Be Clean – Supply Energy Efficiently)

The developments will utilise electric as a primary fuel for heating and hot water where possible and will be provided with a high level of user control including local and central temperature controls.

Dedicated LED low energy efficient light fittings within all areas.

Renewable Technologies (Be Green – Use Renewable Energy)

All The following renewable technologies have been evaluated as part of this report;

- Solar Thermal
- Solar PV
- Combined Heat and Power (CHP)
- Air Source Heat Pump
- Ground Source Heat Pump

No renewable technologies have been proposed for the scheme due to lack of suitability.

It can be concluded the content of this report highlights, via SBEM calculations, the scheme is on track to secure compliance with L2B building regulations via the whole building calculation method.

JP-C2 – Digital Connectivity

Section 6.0 of this report details how this policy is on course to adhere to.

The site is therefore on track to be compliant with both the National Planning Policy Framework 2021 The Places for Everyone (PfE) - Greater Manchester districts Local policy.

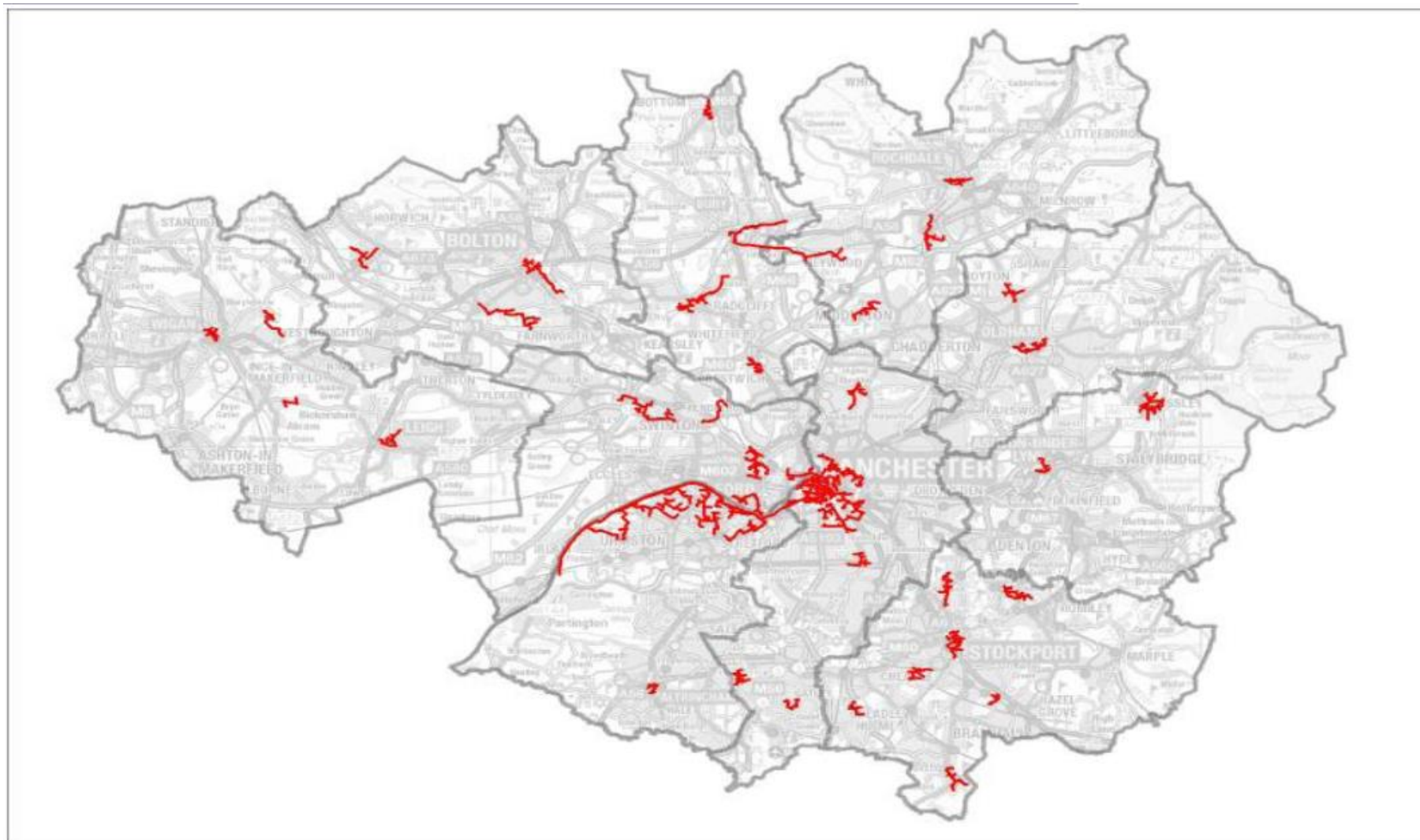
The client will use the best endeavours to incorporate the proposed measures to achieve an operational net zero carbon building / project. However, all renewable and low/zero carbon measures are to be reviewed at the time of construction and are subject to financial budget(s) and practical feasibility where the strategy may be revised.

Appendix A: Sustainability matrix of Be Green technologies

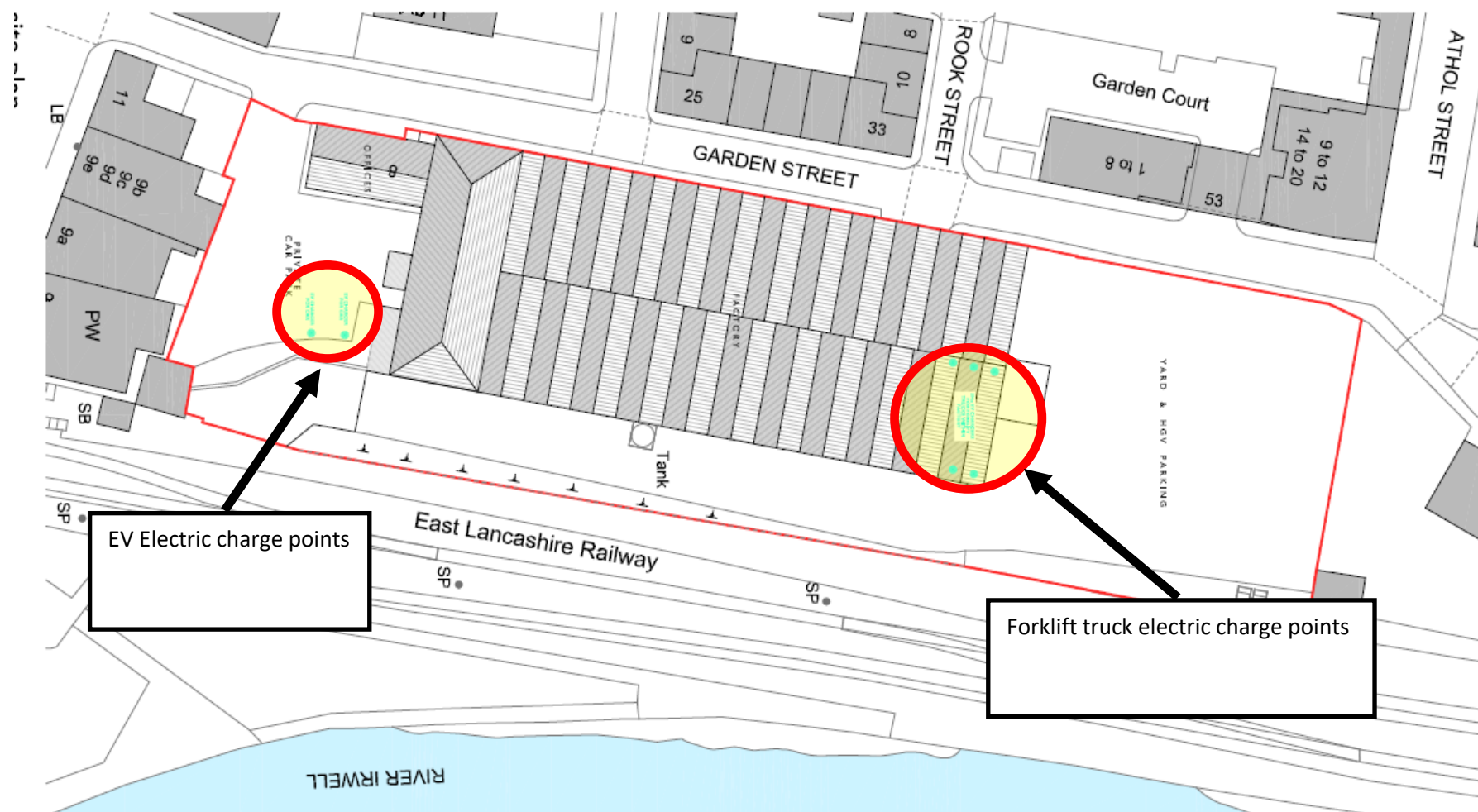
Technology	Description	Pros	Cons	Project Suitability	Included in Proposed Scheme?
Solar Thermal	Solar thermal hot water collectors are panels or evacuated tubes which are typically located on the roof of the buildings. The collectors harness the sun's energy to warm domestic hot water	- Reduced fuel bills and carbon footprint - Low maintenance - Proven technology	- Only compatible with boilers that have hot water storage - Need south facing roofs to optimise efficiency - Carbon saved is low comparative to the savings offered by PV	Solar thermal HW is not deemed suitable for this development due to the nature of the scheme in particular the level of hot water demand thus making the suitability of a system unfeasible.	✗
Solar PV	Solar Photovoltaic (PV) panels work by converting energy from the sun into electricity. This can then be used with the development to offset the electrical usage.	- Reduced bills and carbon footprint - Benefit from the feed in tariff - Proven technology - Relatively maintenance free	PV panels lose efficiency over their lifetime	PV would be suited to this development as it is a simple bolt on technology that will assist with meeting the energy demand of the building and ensure compliance with the local planning policy. However, the scheme would benefit more with the use of an air source heat pump.	✗
Combined Heat & Power (CHP)	CHP is a technology which develops heat and power from the same energy source, typically mains gas. The CHP engine is fed by mains gas which then drives an alternator to provide electricity. CHP is highly energy efficient as the heat and electricity are produced on site, therefore reducing transmission losses. Typical efficiencies are 50% for the heat and 35% for the electric.	- Reduced fuel bills and carbon footprints - Eligible for the feed in tariff. - Proven technology which is in use in many schemes in the UK - Suited to large developments	- Not a true renewable technology - Heating and electricity demand must remain fairly stable to ensure CHP is running at optimum efficiency - Requires a centralised/district heating network - Noise. / Capital intensive	The total size and nature of the development does not lend itself to CHP. It would add to the capital costs of the development making the development not financially viable. For these reasons, CHP has been discounted	✗

Technology	Description	Pros	Cons	Project Suitability	Included in Proposed Scheme?
Air Source Heat Pump	Air source heat pumps extract heat from the external air which can be used to heat radiators/underfloor heating and hot water within a dwelling. ASHP can still extract heat from air as cold as -15 degrees centigrade. ASHP are particularly useful on sites where gas is not available. There are two forms of ASHP – air to air and air to water.	• Can offer lower heating bills and reduce carbon footprints (when compared to electric systems) • Relatively maintenance free • Offers high efficiencies • Can offer heating and cooling depending on system chosen (air to air)	• Requires space to locate the external condenser unit. The unit requires lots of space around it to ensure adequate air flow. • Requires the use of underfloor heating or large radiators due to low grade heat. • Noise issues	Air source heat pumps have been included on this development due to the lower emissions associated with this technology.	
Ground Source Heat Pump	Ground source heat pumps (GSHP) work in a similar way to air source heat pumps, however they extract heat from the ground. A ground loop is buried within the garden and a mixture of water and refrigerant is circulated along the loop. The heat from the ground is then absorbed within the fluid and then passes through a heat exchanger within the GSHP. Ground loops can be laid horizontally at depths of 1-2m or vertically at depths of up to 100m.	• Can offer lower heating bills and reduce carbon footprints (when compared to electric systems). • Relatively maintenance free • Offers high efficiencies	• High capital costs • Requires space for boreholes or trenches to locate ground loops • Requires the use of under floor heating or large radiators due to low grade heat	Ground source heat pumps have been discounted on this development predominantly due to the nature of the development and the lower emissions associated with an air source heat pump.	

Appendix B: Local district and site-wide heat networks



Appendix C: Existing electric car charging points on site



Project name

Appendix D - Formulated Polymer Products Factory Extension - Notional

As designed

Date: Mon Jan 27 09:18:46 2025

Administrative information

Building Details

Address: Garden Street, MANCHESTER, BL0 9BQ

Certifier details

Name:

Telephone number:

Address: , ,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.27

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.27

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

Foundation area [m²]: 2395.15

The CO₂ emission and primary energy rates of the building must not exceed the targets

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

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	7.33
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	41.99
Target primary energy rate (TPER), kWh _{PE} /m ² annum	1.09
Building primary energy rate (BPER), kWh _{PE} /m ² annum	241.36
Do the building's emission and primary energy rates exceed the targets?	BER > TER BPER > TPER

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

Fabric element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.7	0.7	00000006:Surf[2]
Floors	0.18	0.7	0.7	00000006:Surf[0]
Pitched roofs	0.16	0.35	0.35	00000005:Surf[4]
Flat roofs	0.18	0.35	0.35	00000006:Surf[9]
Windows** and roof windows	1.6	-	-	No windows, galzed doors, or roof windows in building
Rooflights***	2.2	2.2	2.2	00000006:Surf[6]
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	1.3	1.3	00000006:Surf[1]
High usage entrance doors	3	-	-	No high usage entrance doors in building
U _{a-Limit} = Limiting area-weighted average U-values [W/(m ² K)] U _{a-Calc} = Calculated area-weighted average U-values [W/(m ² K)] U _{i-Calc} = Calculated maximum individual element U-values [W/(m ² K)] * 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/m ² K NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	15

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- LTHW Heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.93	-	0.2	-	-
Standard value	0.93*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.					

"No HWS in project, or hot water is provided by HVAC system"

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
00-New Factory Extension	95	-	-
00-Existing Office	95	-	-
00-Existing Factory	95	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00-New Factory Extension	YES (+152.1%)	NO
00-Existing Office	N/A	N/A
00-Existing Factory	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	2507	2507
External area [m ²]	8891.6	8891.6
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	15	5
Average conductance [W/K]	5182.85	2669.08
Average U-value [W/m ² K]	0.58	0.3
Alpha value* [%]	25	10

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

Building Use

% Area Building Type

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	181.21	64.54
Cooling	0	0
Auxiliary	1.86	0.08
Lighting	19.21	6.36
Hot water	4.83	4.05
Equipment*	31.19	31.19
TOTAL **	207.1	75.03

* 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	59.01
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>59.01</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	587.12	210.34
Primary energy [kWh _{PE} /m ²]	241.36	1.09
Total emissions [kg/m ²]	41.99	7.33

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	614.5	0	189.7	0	1.9	0.9	0	0.93	0
	Notional	220.2	0	67.6	0	0.1	0.91	0	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	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 SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

Project name

Appendix E - Formulated Polymer Products Factory Extension - Proposed

As designed

Date: Mon Jan 27 09:17:54 2025

Administrative information

Building Details

Address: Garden Street, MANCHESTER, BL0 9BQ

Certifier details

Name:

Telephone number:

Address: , ,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.27

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.27

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

Foundation area [m²]: 2395.15

The CO₂ emission and primary energy rates of the building must not exceed the targets

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

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	7.33
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	41.99
Target primary energy rate (TPER), kWh _{PE} /m ² annum	1.09
Building primary energy rate (BPER), kWh _{PE} /m ² annum	241.36
Do the building's emission and primary energy rates exceed the targets?	BER > TER BPER > TPER

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

Fabric element	U _a -Limit	U _a -Calc	U _i -Calc	First surface with maximum value
Walls*	0.26	0.7	0.7	00000006:Surf[2]
Floors	0.18	0.7	0.7	00000006:Surf[0]
Pitched roofs	0.16	0.35	0.35	00000005:Surf[4]
Flat roofs	0.18	0.35	0.35	00000006:Surf[9]
Windows** and roof windows	1.6	-	-	No windows, galzed doors, or roof windows in building
Rooflights***	2.2	2.2	2.2	00000006:Surf[6]
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	1.3	1.3	00000006:Surf[1]
High usage entrance doors	3	-	-	No high usage entrance doors in building
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)] * 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/m ² K NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	15

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- LTHW Heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.93	-	0.2	-	-
Standard value	0.93*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.					

"No HWS in project, or hot water is provided by HVAC system"

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
00-New Factory Extension	95	-	-
00-Existing Office	95	-	-
00-Existing Factory	95	-	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00-New Factory Extension	YES (+152.1%)	NO
00-Existing Office	N/A	N/A
00-Existing Factory	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	2507	2507
External area [m ²]	8891.6	8891.6
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	15	5
Average conductance [W/K]	5182.85	2669.08
Average U-value [W/m ² K]	0.58	0.3
Alpha value* [%]	25	10

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

Building Use

% Area Building Type

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	181.21	64.54
Cooling	0	0
Auxiliary	1.86	0.08
Lighting	19.21	6.36
Hot water	4.83	4.05
Equipment*	31.19	31.19
TOTAL **	207.1	75.03

* 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	59.01
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>59.01</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
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