



Energy Statement (with Part L1A SAP Assessment)

Sparkle Street, Manchester

Current version

Suitability	Revision	Date	Notes
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1.0 Introduction

The following statement outlines the energy strategy for the proposed development on Sparkle Street Manchester. The development will provide circa. 359 dwellings.

The purpose of this Statement is to summarise the relevant policy, requirements of Manchester City Council and the National Planning Policy Framework in order to demonstrate how the development will address these aims and comply through careful design considerations.

The following document provides a summary of the design stage Part L 2021 SAP calculations that have been carried out on a modelling sample size of 89 dwellings out of the total 359 dwellings for the Sparkle Street project. The modelling considered typical mid-level floor levels along with those with an exposed floor and roof. This is to provide an overall view on what proposed design would provide block compliance. These are based on the sample floors and a more detailed analysis will be carried out at the next stage of design.

This report reviews the sustainable design features and appraises the energy strategy of the Proposed Development. Details of the design attributes, specifications and characteristics of the Proposed Development are appraised in order to demonstrate how the proposals contribute to sustainable development in Manchester and seek to mitigate the environmental impacts.

2.0 Policy Review

This Energy strategy addresses the planning requirements of Manchester City Council as set out in Manchester's Core Strategy Development plan. There are a number of planning policies both national and local that will apply to the sparkle Street development.

2.1 Policy EN 4 - 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:
- To reduce the need for energy through design features that provide passive heating, natural lighting and cooling.
- To reduce the need for energy through energy efficient features such as improved insulation and glazing.
- 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.

2.2 Policy EN 5 - Strategic Areas 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 Eastland's
- District Centres and associated major development sites
- Airport Strategic Site
- Strategic housing location
- Strategic employment locations

Key Diagram:



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.

2.3 Policy EN 6 - 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:

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 generation area	15% increase on Part L 2010

Table 12.1 from Manchester Core Strategy report

Non-Domestic CO2 emissions reduction targets:

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	+10% increase on Part L 2010
Target 3: Micro generation area	15% increase on Part L 2010

Table 12.2 from Manchester Core Strategy report

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 of the Manchester Core Strategy.

2.4 Policy EN 7 - 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.

2.5 Policy EN 8 - Adaptation 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.

2.6 Building Regulation (Part L) 2022:

All new buildings constructed in the UK must meet the minimum requirements of the UK Buildings Regulations. Specifically, with regards to energy and carbon compliance. All buildings must meet the Building Regulations Part L 'Target Emission Rate' (TER), Target Fabric Energy Efficiency (TFEE) and Target Primary Energy (TPER) requirements for the Part L.

2.7 Places for Everyone

All new buildings to meet the requirements of policy "Places for Everyone"

3.0 Residential Design Parameters

The strategy proposed within this section is to utilise 100% efficiency electric panel heaters, with heat pump domestic hot water cylinders combined with MCHR system to meet Manchester City council's desire for carbon reducing low or zero carbon technology. The development will also utilise PV array to assist in offsetting grid dependence.

Table 1, 2 and 3 within this section present a summary of the parameters used within the SAP calculations. The material specifications used are based on a fabric first approach with the use of high quality facade glazing system to achieve 'U' and 'g' values that reduce solar gains and minimise heat losses. This follows the energy hierarchy design principles as outlined in Policy EN 4 of the Manchester Core Strategy.

The residential façade system is designed to minimise energy requirements and improve thermal comfort. The characteristics of the U-values and air permeability for the Sparkle Street development are significantly better than the minimum standards set out by Part L1A 2021 shown in Table 2 below.

Table 2 compares the applied building fabric values against the Part L1A limiting and notional building parameter

3.1 Building Fabric

U-Values (W/m ² K)	Part L1A Limiting Values	Part L1A Notional Building Parameters	Applied Building Values
External walls	0.26	0.18	0.15
Party wall between apartments/corridors	-	0.0	Fully filled cavity with sealed edges
Heat loss floors	0.18	0.13	0.10
Heat loss roof	0.16	0.11	0.10
Glazing U-value	1.60	1.2	1.2
Glazing G-value	-	-	0.43
Frame factor	-	0.7	0.8
Thermal Mass Parameter	N/A	N/A	Calculated

Design Air Permeability Rate	8 m ³ /hm ² (@50Pa)	3 m ³ /hm ² (@50Pa)	2.5 - 3 m ³ /hm ² (@50Pa)
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Table 1 – Input design parameters for SAP assessment – Building fabric

3.2 Thermal Bridging

All dwellings have been modelled under the assumption that calculated psi values will be used. The psi values have been taken from previously calculated details utilising similar façade system and build ups.

Table 2 compares the default notional (benchmark) and the calculated psi-values.

Junction Type	Default Linear Thermal Transmittance value (Ψ)	Linear Thermal Transmittance value (Ψ)
E2: Other lintels (including other steel lintels)	1	0.053
E3: Sill	0.10	0.053
E4: Jamb	0.1	0.0175
E20: Exposed floor (normal)	0.32	0.32
E7: Party floor between dwellings (in blocks of flats)	0.28	0.129
E18: Party Wall between dwellings	0.24	0.24
E16: Corner (normal)	0.18	0.09
E17: Corner (inverted)	0	-0.09

Table 2 – Anticipated thermal bridging Ψ values for junction details.

3.3 Consideration of Low and Zero Carbon Technologies

The feasibility of available technologies is sensitive to a number of factors, including site constraints, development carbon footprint, surrounding environment, access limitations and development type.

Table 4 shows renewable energy technologies have been investigated to establish their suitability and feasibility for the Sparkle Street development.

Technology	Applicable (Yes/No)	Reasons
Solar Photovoltaic Panels	Yes	Roof mounted PV panels are proposed to supply electricity to all dwellings based on floor area. PV could help reduce the overall building energy consumption and CO ₂ emissions through onsite electricity generation.

Ground Source Heat Pump (GSHP)	No	GSHP systems are excellent low carbon heating systems that are popular due to their high efficiency rate, however, this technology is not financially feasible for this project. This is due to footprint of the development and the surrounding site conditions.
Air Source Heat Pumps (ASHP)	Yes	Individual air source heat pumps will provide water heating to each dwelling.
Biomass	No	There is limited information available of biomass fuel availability in the surrounding area. An installed biomass boiler has ongoing maintenance, running and fuel delivery costs that are not required with other forms of renewable energy.
Wind Turbine	No	Wind turbines normally provide only a very small contribution to the total electrical consumption of buildings in city and urban locations. They can also be visually intrusive for planning and there are concerns that turbines would create unacceptable noise levels during day and night for residents. Therefore, wind turbines are not considered to be viable for this project.
Fuel Cells	No	Fuel cells convert chemical energy directly into electricity by combining hydrogen and oxygen in a controlled reactions. They are expensive and have a high technology risk.
Solar Thermal Collectors	No	There is conflict between the uses of the local ASHP within each dwelling. Due to this and the required roof space which would also reduce available PV capacity this technology is not seen as viable.
All-electric system	Yes	All Electric systems are better for health and safety (no open flames, no carbon monoxide) better for the climate (reduce carbon emissions) and have low maintenance costs and low energy user bills. Space heating will be provided by electric panel heaters.

Table 3 – Summary of Technical Feasibility Assessment of Renewable and Low Carbon Technology Energy options.

All renewable technologies which may be considered feasible for the development have been assessed. From the assessment, the low and zero carbon technologies proposed for residential areas are solar photovoltaic panels and an all-electric heating and DHW system.

Energy sources from district heat network include CHP and geothermal connections. However the feasibility and viability of a connection to the district heat network is related to both the proximity of the network and forecast annual heat demand. It can result in lower carbon factors than traditional food sources and can support renewable targets

However, the nearest district heat network is located in the Civic Quarter approximately 1.25km from the site it is unfeasible to connect into this system and is therefore discounted in favour of an all-electric building heating and cooling system utilising ASHP technology, supplemented by PV

3.4 Building Services

Table 4 presents the design parameters assigned to the base build heating, ventilation and air conditioning (HVAC) systems, lighting and renewable technology (PV).

Sparkle Street – Building Services

System	Specification
Space Heating	Electric Panel, Convector or radiant heaters
Heating Controls	thermostats and programmer
Water Heating	ASHP – Dimplex Edal unit. Current software issues this has been modelled as default SAP values of a COP = 170
Lighting	100% low energy light fittings. 60W and efficacy of 89 lm/W.
Ventilation	Mechanical Ventilation with Heat Recovery (MVHR) – Vent Axia Sentinel Kinetic Plus B
Renewable Technology	Site wide allowance PV capacity of 14.5KwP. To be bio-solar roof to also maximise green space within the development.

Table 4 – Input design parameters for SAP assessment – Building services

4.0 Results

The following tables 5, 6 and 7 outline Sparkle Streets performance against the three Part L 2022 compliance metrics and Policy “Places for Everyone”. Please refer to Appendix A of this report for a breakdown of each of the 89 sampled dwellings performance. As can be seen within Table 4 the proposed design provides required carbon reduction to address Policy EN 6 of the Manchester Core Strategy Plan.

4.1 As Designed Performance

Sparkle Street – DER/TER Performance	
Average DER (kg/m ²)	5.94
Average TER(kg/m ²)	13.25
Compliance	Pass
Percentage Improvement	55.16%

Table 5 – DER/TER Performance

Sparkle Street – DFEE/TFEE Performance	
Average DFEE (kWh/m ²)	24.42
Average TFFE (kWh/m ²)	24.56
Compliance	Pass
Percentage Improvement	0.57

Table 6 – DFEE/TFEE Performance

Sparkle Street – DPER/TPER Performance	
Average DPER (kWh/m ²)	63.06
Average TPER (kWh/m ²)	73.29
Compliance	Pass
Percentage Improvement	13.96

Table 7 – DFEE/TFEE Performance

5.0 Conclusion

This strategy has summarised the requirements for Sparkle Street project to respond to the emission reduction aspirations set out within the Manchester Core Strategy Plan, in particular policies EN4 and EN 6, to implement the use of low carbon and/or renewable technologies.

The Fabric first approach, utilising passive design techniques available within the industry. This is key to ensuring compliance with the updated Part L as the new regulations have been set out so that the fabric energy efficiency target is the toughest aspect to achieve compliance. The façade performance is tight with a pass margin of 0.54% and will be carefully reviewed at the next stage of design. Thermal bridging detail and psi values will be carefully reviewed as the design develops to ensure compliance is maintained.

The development will also incorporate energy efficiency measure through careful selection of the MEP services. The strategy with the space heating for each dwelling being provided by electric panel radiators. The water heating will be provided by a highly efficient air source heat pump that feeds a cylinder housed within the dwelling. The dwellings will also be fitted out with mechanical ventilation (MVHR) which will provide sufficient air changes to mitigate overheating. An overheating assessment has been carried out and the results of this are provided under separate cover. The development also looks to maximise available roof space to install photovoltaic panels with circa 14 kWp of panels proposed. This will be a bio-solar proposal to ensure that the project is also proving as much green roof as possible too.

All three tables show in Section 4 outline block compliance with the 2021 Building Regulations Part L and the minimum energy efficiency targets. Overall the residential aspects of the development provide a **55% Improvement** on Part L through on-site measures. This demonstrates compliance with Policy EN 6 requiring 15% over Part L.

6.0 Appendix A

Plot	DER (kgCO ₂ /yr./m ²)	TER (kgCO ₂ /yr./m ²)	DFEE (kWh/m ² /yr.)	TFEE (kWh/m ² /yr.)	DPER (kWh/m ² /yr.)	TPER (kWh/m ² /yr.)
1	5.17	11.41	28.04	28.95	24.23	62.72
2	5.50	11.97	28.38	28.89	57.79	65.82
3	5.50	11.97	28.38	28.89	57.79	65.83
4	5.01	10.82	29.22	29.84	52.74	59.20
5	5.69	11.74	33.41	33.87	59.41	64.22
6	7.32	15.57	34.74	35.76	76.90	85.70
7	6.33	13.76	27.58	28.43	66.74	75.91
8	6.98	16.15	29.11	29.67	73.65	89.29
9	7.18	15.63	28.21	29.11	75.89	86.40
10	7.59	16.54	28.92	29.63	80.28	91.45
11	6.51	14.17	28.68	29.43	68.62	78.19
12	7.77	16.58	34.88	36.52	81.75	91.38
13	9.32	19.57	42.38	44.43	97.87	107.72
14	7.89	16.04	37.60	38.18	82.78	88.26
15	7.52	15.39	35.15	35.68	79.04	84.72
16	9.32	19.35	37.76	38.48	98.23	106.85
17	6.49	13.96	31.44	32.84	68.27	76.84
18	6.72	14.39	32.91	34.81	70.57	79.13
19	8.45	16.75	41.64	41.71	88.53	92.07
20	9.25	19.38	37.61	38.78	97.56	106.93
21	6.62	14.22	32.25	33.83	69.54	78.19
22	5.54	13.04	17.96	17.80	59.18	72.46
23	5.54	13.04	17.96	17.80	59.18	72.46
25	5.12	11.97	19.51	19.39	54.43	66.29
26	6.41	14.19	29.15	29.33	67.60	78.27
27	5.34	12.52	21.67	21.81	56.66	69.31
28	4.65	10.92	15.21	15.01	49.71	60.65
29	5.54	12.93	14.76	14.40	59.37	71.99
30	5.33	12.51	14.52	14.38	57.10	69.65
31	5.67	13.34	14.63	14.37	60.79	74.24
32	4.66	11.14	15.54	15.26	49.75	61.85
33	5.69	13.28	20.85	21.48	60.56	73.63
34	5.45	13.07	24.38	25.49	57.70	72.28

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35	5.74	12.97	24.57	24.19	60.69	71.76
36	5.51	12.54	23.03	22.63	58.40	69.38
37	6.70	15.72	21.70	21.78	71.54	87.32
38	4.74	11.12	19.89	19.84	50.39	61.54
39	5.57	12.90	18.75	18.54	59.40	71.63
40	5.24	12.08	25.53	24.37	55.43	66.73
41	6.33	13.59	29.34	27.65	66.62	75.05
42	6.58	15.66	21.47	21.61	70.23	86.95
43	4.80	11.35	20.53	20.60	50.98	62.79
44	5.50	13.04	17.58	17.80	58.75	72.46
45	5.54	13.04	17.96	17.80	59.18	72.46
46	5.54	13.04	17.96	17.80	59.18	72.46
47	5.12	11.97	19.51	19.39	54.43	66.29
48	6.41	14.19	29.15	29.33	67.60	78.27
49	5.46	12.78	23.12	23.23	57.91	70.73
50	4.68	10.92	15.49	15.01	50.01	60.65
51	4.35	10.43	14.69	14.49	46.49	57.95
52	4.35	10.43	14.69	14.49	46.49	57.98
53	4.66	11.14	15.51	15.26	49.73	61.85
54	5.69	13.28	20.82	21.48	60.53	73.63
55	5.45	13.07	24.38	25.49	57.70	72.28
56	5.60	12.97	2.25	24.19	59.34	71.76
57	5.59	12.54	23.63	22.63	59.23	69.38
58	6.70	15.72	21.70	21.78	71.54	87.32
59	4.74	11.12	19.89	19.84	50.39	61.54
60	5.57	12.90	18.75	18.54	59.40	71.63
61	5.32	12.08	26.11	24.37	56.25	66.73
62	6.43	13.59	30.06	27.65	67.70	75.05
63	6.58	15.66	21.47	21.61	70.23	86.95
64	4.80	11.35	20.53	20.60	50.98	62.79
197	6.00	12.76	28.91	26.21	63.18	70.43
198	5.75	11.93	28.08	24.14	60.54	65.91
199	5.78	13.28	21.52	21.48	61.43	73.63
200	6.07	12.91	27.05	24.95	64.03	71.35
201	5.93	12.84	25.16	23.60	62.66	71.01
202	4.74	11.12	19.89	19.84	50.39	61.54
203	5.57	12.90	18.75	18.54	59.40	71.63
204	5.25	12.08	25.57	24.37	55.47	66.73
205	6.34	13.59	29.43	27.64	66.76	75.05
206	6.58	15.66	21.47	21.61	70.23	86.95
345	5.78	13.28	21.52	21.48	61.43	73.63
346	5.96	12.91	26.27	24.95	64.03	71.35
347	5.93	12.84	25.16	23.60	62.66	71.01
348	4.74	11.12	19.89	19.84	50.39	61.54

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349	5.57	12.19	18.75	18.54	59.40	71.63
350	6.56	13.66	34.23	31.56	73.60	75.25
351	5.78	13.28	21.52	21.48	61.43	73.63
352	7.23	14.46	34.71	31.97	86.00	79.66
353	7.41	14.62	35.05	31.74	99.00	80.57
354	6.10	12.82	29.36	27.62	70.67	70.67
355	7.06	14.72	29.45	26.93	74.60	81.38
356	6.56	13.66	24.22	31.55	68.87	75.24