



Energy and Climate Change Adaptation Statement.

Sir Isaac Newton Way,
Rochdale

19th December 2023

Quality Management



Issue/ Revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	First issue	Updated following comments		
Date	14/12/2023	19/12/2023		
Prepared by	Hannah Morris	Hannah Morris		
Signed				
Checked by	Molly McHarg	Rhyann Sutton		
Signed				
Project Number	1208	1208		



Contents

1.0	Executive Summary.....	1
2.0	Background	2
3.0	Proposed Development.....	3
4.0	Policy & Legislative Context.....	5
5.0	Meeting Policy G1: Tackling and Adapting to Climate Change	7
6.0	Meeting Policy G2: Energy and New Development.....	10
7.0	Conclusion	14
	Appendix A: GI Scoring Sheet.....	15

1.0 Executive Summary

- 1.1 This report outlines the sustainability policy responses to Rochdale Borough Council's Core Strategy.¹
- 1.2 The development proposes a drive through restaurant, drive through tea shop, and petrol filling station with a total site area of 13,910sqm.
- 1.3 This report has considered sustainable design factors and illustrates how the proposed development will meet the sustainability requirements to help tackle climate change and its impacts, set out in Policies G1 and G2 of Rochdale's Core Strategy.
- 1.3 This report confirms the proposal meets the requirements of Policies G1 and G2 of Rochdale's Core Strategy.

¹ <https://www.rochdale.gov.uk/local-planning-policy/core-strategy-local-plan/2>

2.0 Background

- 2.1 RedSix were commissioned to prepare an Energy and Climate Change Adaptation Statement, for the proposed development at Sir Isaac Newtown Way, Rochdale. This statement will demonstrate how the proposed project will meet the applicable requirements of G1 (Tackling and Adapting to Climate Change) and G2 (Energy and New Development) from the Rochdale's Core Strategy.
- 2.2 This report aims to support sustainable construction in this region, including measures to adapt to climate change and positively impact the community.
- 2.3 This report outlines the features that have been incorporated into the design proposals which aim to reduce the energy demand, energy use, resultant carbon dioxide emissions and therefore environmental impact of the scheme. In addition to demand reduction and energy efficient design the report assesses the application of low or zero carbon technologies (LZCs) to the proposed development.
- 2.4 The purpose of the Energy and Climate Change Adaptation Statement is to provide an independent verification that the design of the proposed development is in accordance with objectives of relevant planning policy, at all levels, and is an example of good practice in low energy design. This statement reports the performance of the proposed development using local, regional, and national level guidance on sustainable construction.
- 2.5 The Statement begins by giving an overview of the proposal before addressing the policy and legislative context. Subsequently, Policy G1 will be addressed in reference to the proposal, followed by Policy G2.
- 2.6 This appraisal has been undertaken at an early stage to directly inform building design and ensure that the building delivers a certified high quality sustainable development.

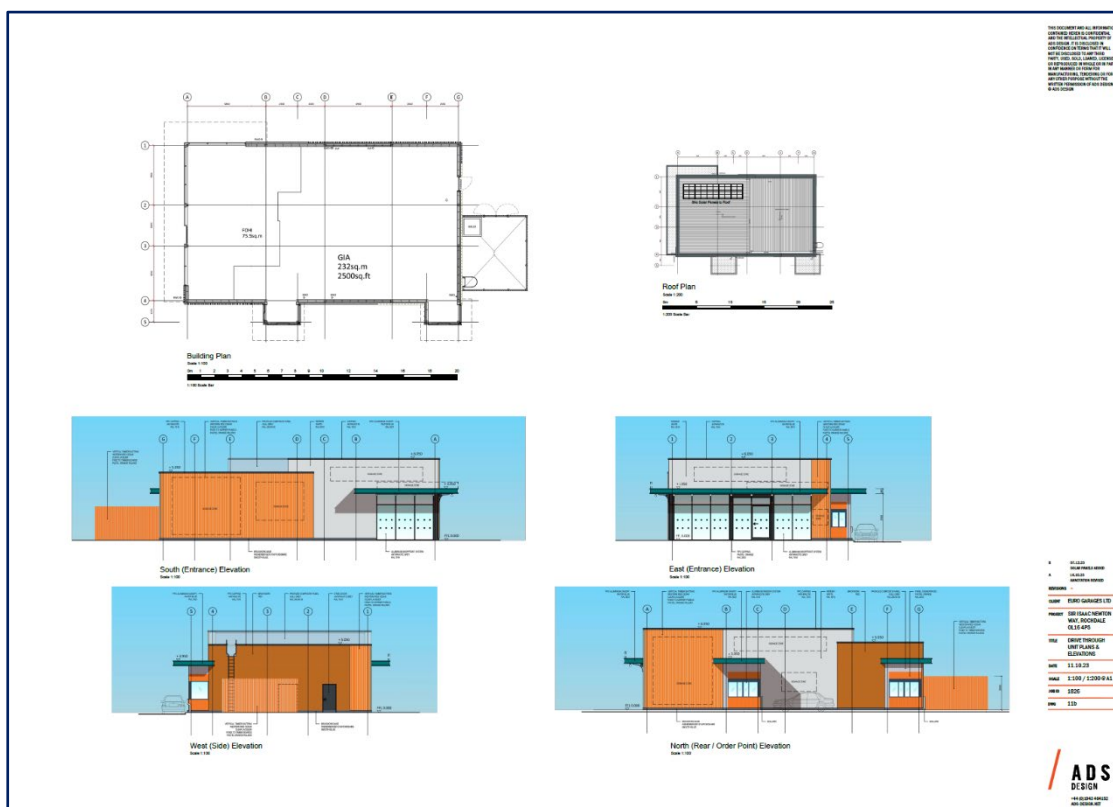
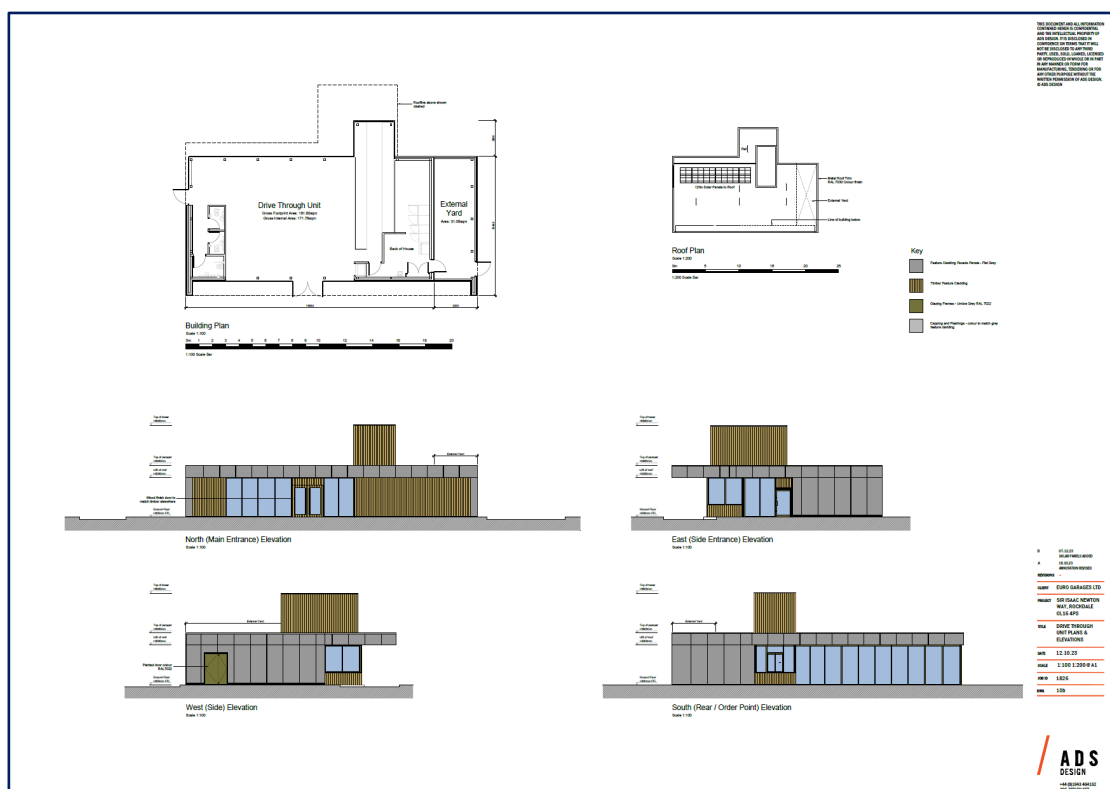
3.0 Proposed Development

- 3.1 The application site is found at Sir Isaac Newton Way, Rochdale and includes the development of two drive through units and a petrol filling station. The total site boundary is 3.437 acres with a total of 13,910.8sqm (see Figure 1).



Figure 1: Proposed Site Layout Plan (1824 8e, December 2023)

- 3.2 Figures 2 and 3 below illustrate the proposed units which illustrate the Photovoltaic systems proposed.



4.0 Policy & Legislative Context

- 4.1 Adopted in October 2016, the Rochdale Borough Council recognises the urgent need to tackle climate change, committing to eliminate carbon. Through SO4 (Promoting a greener environment) of the Core Strategy, the Council recognise that the natural environment is one of its strongest assets. The Council is working towards tackling climate change and its impacts and protecting and enhancing the natural environment.
- 4.2 A supplementary planning document (Climate Change Adaptation Supplementary Planning Document) has been developed to provide detailed guidance on the application of policies G1 and G2, aiding the delivery of highly sustainable forms of development in Rochdale.

4.3 Policy G1

Policy G1 ensures *“that all new development minimises its contribution to climate change, and also adapts to its impacts, will make sure the borough plays its part in delivering national targets in respect of climate change”*.

All new developments will be expected to:

- a. *Be zero carbon in line with national targets and definitions;*
- b. *Adhere to the ‘energy hierarchy’ as outlined in policy G2, being designed in such a way that ensures that buildings require the minimum amount of energy to function over their lifetime;*
- c. *Reduce CO2 emissions through the use of renewable and low carbon decentralised energy technologies and networks. This will be through both on-site provision in new developments and through connection to local networks;*
- d. *Address the impacts of climate change by incorporating comprehensive adaptation measures, including:*
 - i. *Suitable measures, such as urban greening, for tackling the ‘urban heat island’ effect;*
 - ii. *Where possible, the opening up of covered and culverted sections of waterways and provision of new water features, to help cooling and provide biodiversity, landscape and flood prevention benefits;*
 - iii. *The incorporation of appropriate water conservation and management measures, such as Sustainable Drainage Systems (SuDS), including ensuring that the rate of run-off on greenfield sites is not increased and on ‘brownfield’ sites is significantly reduced, and avoiding the use of impermeable surfaces;*
 - iv. *The retention of existing trees wherever possible and the taking of all appropriate opportunities to plant trees and other suitable vegetation on site; and*
 - v. *The incorporation of ‘green roofs’ wherever possible, such as with flat roofs.*

4.4 Policy G2

Policy G2 recognises that *“reducing carbon emissions from new buildings will not only help to tackle climate change, it will also help to alleviate fuel poverty in the borough and contribute to the country’s fuel security”*.

All new development will be expected to adhere to the following energy hierarchy.

1. **Demand Reduction** – *Achieve the maximum possible reduction in demand for energy through building design (i.e. the use of passive systems). At the design stage of new developments, every effort should be made to ensure that buildings use as little energy as possible throughout their lifetimes, using siting, orientation, layout, construction and landscaping to optimise use of natural passive systems such as solar gain and natural lighting, shading, ventilation and cooling to minimise heating, cooling and lighting demands. Green roofs and green walls should be incorporated into developments wherever feasible.*
2. **Energy Efficiency and low / zero carbon technologies and networks** – *Design to maximize energy efficiency, and use on-site or linked low and zero carbon technologies or direct connection to a low or zero carbon heat source (not necessarily on-site).*
3. **Allowable solutions** – *use wider energy efficiency / CO2 reduction measures, which would include developer contributions, to compensate for ‘residual emissions’ not addressed by 1 or 2 above.*

5.0 Meeting Policy G1: Tackling and Adapting to Climate Change

5.1 *Be zero carbon in line with national targets and definitions.*

The United Kingdom Government has committed to achieving Net Zero by 2050. The strategies to achieve this is set out in HM Government 'Net Zero Strategy: Build Back Greener 2021' Report.²

Annual average UK temperature was 0.9°C higher during the period 2005-2014 compared with 1961-1990. Moreover, sea levels around the UK have risen by 15-20 centimetres since 1900. These figures are forecast to continue to change as a result of climate change. At the same time, there are upward trends in rainfall across the UK. Higher levels of winter rainfall have been experienced often in increasingly heavy rainfall events leading to more flooding and damage to buildings and infrastructure. These patterns are consistent with projections of more and heavier rainfall for the UK in a warmer global atmosphere.

These changes increase health and safety risks to people and the built environment, increasing costs and disruption for repair and adaptation. The building stock will largely remain as it currently is for the next 50 to 60 years, given the relatively low levels of replacement that are likely to occur. Therefore, the proposed development will aim to mitigate the impact of these events to ensure the buildings are designed and constructed to minimise future risks, while avoiding over specification and resource use in the meantime, to achieve the following principles:

- Maximum asset resilience and value through consideration of the likely impacts of future climate change on the project.
- Reduce future risk to end user safety arising from extreme weather events and climate change.
- Contribute to business continuity, planning in response to the risks of extreme weather events and climate change.
- Reduce the need for future adaptation, maintenance and disruption associated with responding to climate change and extreme weather events/patterns.

Through the above, the proposed development will make contributions to energy efficiency and reducing CO2 emissions where required in line with Policy G2.

5.2 *Adhere to the 'energy hierarchy' as outlined in policy G2, being designed in such a way that ensures that buildings require the minimum amount of energy to function over their lifetime.*

Please refer to section 6 of this report.

5.3 *Reduce CO2 emissions through the use of renewable and low carbon decentralised energy technologies and networks. This will be through both on-site provision in new developments and through connection to local networks.*

Please refer to section 6.1.2 of this report.

² <https://www.gov.uk/government/publications/net-zero-strategy>

5.1 *Suitable measures, such as urban greening, for tackling the 'urban heat island' effect.*

An urban heat island is a metropolitan area that is warmer than the surrounding rural areas. Urban heat islands are created by energy from the high density of buildings, people, transport, and infrastructure.

To tackle these problems, a commonly proposed strategy is to implement urban greening in our cities in the form of green roofs, living walls, vegetated urban spaces or parks.

The proposed development has planned for this urban greening through proposed native trees, proposed ornamental feature trees, proposed shrub beds, proposed native woodland mix, proposed native hedge mix and species rich lawn mix (Planting Plan Drawing, 5236, DEP Landscape Architecture Ltd). Tree cover reduces heat risk through its creation of shaded spaces.

Additionally, the buildings have a canopy that will shade the buildings and manage the entry of solar heat and light. This therefore reduces energy use through passive cooling. Please refer to Proposed Site Elevations Drawing (1826 10b, December 2023, 1826, 11b, December 2023).

5.2 *Where possible, the opening up of covered and culverted sections of waterways and provision of new water features, to help cooling and provide biodiversity, landscape and flood prevention benefits.*

An Extended Phase 1 Habitat Survey was undertaken by Rachel Hacking Ecology. The desk study identified that the site is located within the Impact Risk Zone of Rochdale Canal Site of Special Scientific Interest (SSSI). However, the proposed development will not require the Local Planning Authority to consult with Natural England.

Please refer to the Extended Phase 1 Habitat Survey (Rachel Hacking Ecology, 2023) for further details.

5.3 *The incorporation of appropriate water conservation and management measures, such as Sustainable Drainage Systems (SuDS), including ensuring that the rate of run-off on greenfield sites is not increased and on 'brownfield' sites is significantly reduced, and avoiding the use of impermeable surfaces.*

iStruct Consultants Ltd were instructed to undertake a Drainage Strategy Report and Flood Risk Assessment. The report states that the drainage solution proposed for the new development has been designed in accordance with the principles of sustainable drainage to a restricted discharge of 2.0l/s in line with the minimum recommended flow rate by the estimation tool to avoid blockage at the discharge point.

Please refer to the Drainage Strategy Report and Flood Risk Assessment (iStruct consultants ltd, December 2023) for further details, including the report for Discharge Rate Estimation (Greenfield runoff rate).

- 5.4 *The retention of existing trees wherever possible and the taking of all appropriate opportunities to plant trees and other suitable vegetation on site.*

The proposed development has the following suitable vegetation on the site: native trees, proposed ornamental feature trees, proposed shrub beds, proposed native woodland mix, proposed native hedge mix and species rich lawn mix (see Planting Plan Drawing, 5236, DEP Landscape Architecture Ltd).

- 5.6 *The incorporation of 'green roofs' wherever possible, such as with flat roofs.*

With the suggested Photovoltaic System on the roofs of the proposed development, it is therefore not recommended that a green roof is explored for this development, with provision of renewable energy and reduction of CO₂ taking priority.

6.0 Meeting Policy G2: Energy and New Development

6.1 Energy Hierarchy

The proposal has adopted the Energy Hierarchy to guide design development and decisions regarding energy, balanced with the need to optimise environmental and economic benefits. This is summarised in the following three stages:

1. **Demand Reduction:** Using less energy, in particular by adopting sustainable design and construction measures (passive design measures);
2. **Energy Efficiency and low / zero carbon technologies and networks:** Supplying energy efficiency, in particular by prioritising decentralised energy generation; and
3. **Allowable Solutions** – use wider energy efficiency / CO₂ reduction measures, which could include developer contributions, to compensate for ‘residual emissions’ not addressed by 1 or 2 above.

6.1.1 Demand Reduction.

To ensure that the proposed development complies with 2022 Building Regulations Part L2a (Vol2) and improves upon the baseline compliance threshold for CO₂ emissions and energy demand, specific measures to make the building energy efficient must be incorporated within the scheme design and construction.

Figure 4 outlines the key energy efficiency design measures assumed, to reduce emissions and energy demand in order to meet Part L2a of the Building Regulations:

New Fabric Elements	
External walls	0.26 W/m ² k
Ground Floor	0.18 W/m ² k
Roof	0.18 W/m ² k
Glazing	1.6 W/m ² k
Vehicle Access Doors	1.3 W/m ² k
Personnel Doors	1.6 W/m ² k
Air Permeability	5 m ³ /h/m ² @ 50Pa

Figure 4: Fabric U-Values

6.1.2 Energy Efficiency and Low / Zero Carbon Technologies

In response to the second tier of the Energy Hierarchy a preliminary investigation into the adjacent heat loads and infrastructure has been undertaken.

The feasibility of connecting into an existing heating network or providing the building with its own combined heat and power plant has been assessed through the use of the UK CHP Development Map. Figure 5 below illustrates that there is no decentralised energy network available and in particular a district heating network in the proximity of the proposed development site that would allow the development to connect to such a network.

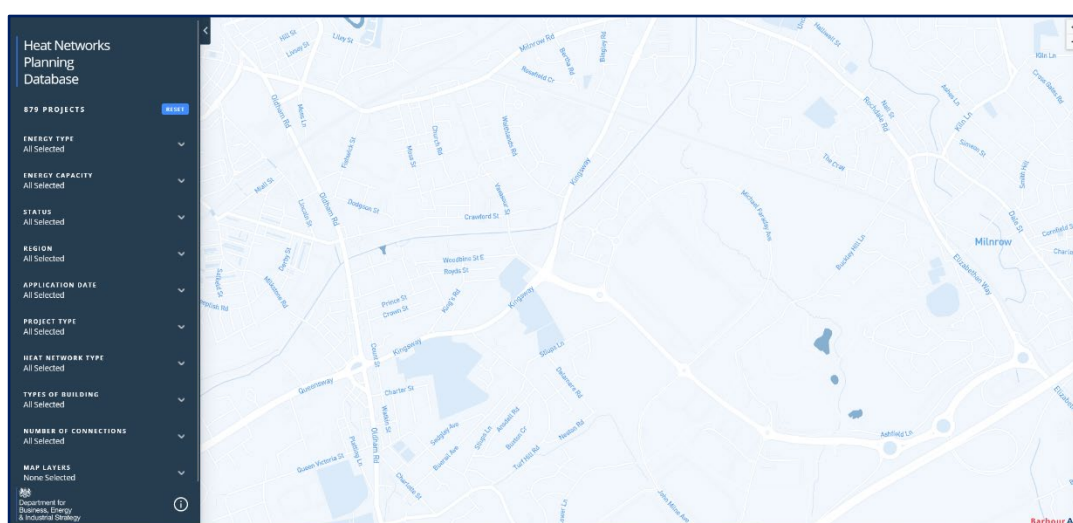


Figure 5: Map from the Department for Business, Energy, and Industrial Strategy.³

Therefore, as the proposal is outside of a district heat network, it is therefore currently not feasible to consider connection to an existing district heating network.

An initial outline assessment of feasible renewable and low carbon energy sources has also been carried out and the results are detailed below.

Solar Photovoltaics (PVs) are solar panels which generate electricity through photon-to-electron energy transfer, which takes place in the dielectric materials that make up the cells. The cells are made up from layers of semi-conducting silicon material which, when illuminated by the sun, produces an electrical field which generates an electrical current. PVs can generate electricity even on overcast days, requiring daylight, rather than direct sunlight. This makes them viable even in the UK, although peak output is obtained at midday on a sunny summer's day. PVs offer a simple, proven solution to generating renewable electricity.

The main types of commercially available PV panels on offer in the UK are constructed from cells as described below:

- Monocrystalline silicon cells are the most efficient of the PV technologies with a conversion efficiency of between 15-18% (available solar energy to electricity produced). They are cut from single ingots of silicon, have an unbroken crystal lattice and are the most expensive of PVs;
- Polycrystalline silicon cells have a conversion efficiency of between 13-16%. They are less expensive than monocrystalline cells, are constructed of a number of smaller crystals and are recognisable from a visible 'grain' on the panel.

A solar PV array is a technology that should be considered and can be mounted south facing, it is expected the building energy demand will be predominantly electricity led

³ https://data.barbour-abi.com/smart-map/repd/beis/?type=heat_network

and therefore PV is a viable option. The development is currently proposing a solar PV array. Please refer to Proposed Site Elevations Drawing (1826 10b, December 2023, 1826, 11b, December 2023).

Wind Turbines: The wind speeds and frequencies in urban areas are not expected to yield any significant carbon reductions. For these reasons the application of a wind turbine for the project has not been considered.

Ground Source Heating: Ground source heat pumps (GSHP) extract heat from the ground. GSHPs work on the principle that the below ground temperature is more constant compared to above ground. In the winter months, the below-ground temperature is warmer than above ground and the heat carrier fluid circulating within the absorber pipes absorbs the heat. This heat energy is then raised by a compressor (using the compression cycle) and through a heat exchanger, distributed via a low temperature distribution system such as under floor heating, to satisfy a proportion of space heating requirements. GSHP systems are not suitable for satisfying high temperature hot water demands.

In the summer months, the below-ground temperature is colder than above ground and heat carrier fluid circulating within the buried pipes rejects building heat. This heat rejecting capacity is then raised by a compressor (using the compression cycle), and through a heat exchanger, is then distributed via a chilled water distribution system to satisfy a proportion of space cooling requirements.

There are a number of configurations for GSHP systems, however the installation of a vertical collector system or horizontal collector system is not considered technically feasible for the project, given the restricted areas available for their installation and the potential heavily trafficked external delivery and manoeuvring areas.

Biomass: Biomass boilers replace conventionally powered boilers with an almost carbon neutral fuel such as wood pellets or wood chips. The fuel is classed as almost carbon neutral because the CO₂ released during the burning of biomass is balanced by that absorbed by the plants during their growth.

The existing site layout does allow for the adequate biomass fuel storage and safe delivery.

Although many biomass burners will meet Clean Air Act requirements, combustion of wood biomass releases higher quantities of NO_x, SO_x and particulates (PM₁₀ and PM_{2.5}) compared to a comparable system fuelled by natural gas, which can adversely affect local air quality.

Biomass could technically be burned at the application site but is not preferred given the management burden of fuel deliveries, regular removal of ash and the potential impact on local air quality. For these reasons Biomass has been deemed unfeasible for the project.

Air Source Heat Pump System: Variable refrigerant flow (VRF) heat pumps typically save energy due to better part-load efficiencies, heat recovery, and reducing or eliminating duct losses. This is due to the ability to serve multiple zones in a building, each with a different heating and cooling requirements. The VRF system is assumed to provide both heating and cooling (simultaneously) and reduces carbon emissions through 100% electricity use.

VRF systems can be cost-effective in new construction developments and offers control for demand response, operations, and maintenance.

Therefore, VRF Electric Heat Pump system represents a non-combustion, technically feasible LDC system for the project.

LDC Appraisal Summary: To summarise, the renewable and/or low carbon technology considered to be most feasible for the proposed project and subject to further detail are a Solar Photovoltaics array coupled with electric ASHP system.

6.1.3 Allowable Solutions

It is expected all energy efficiency / CO₂ reduction measures would be implemented at the building and site level and no developer contributions are proposed.

7.0 Conclusion

- 7.1 This energy and climate change adaptation statement has demonstrated how the proposed development has been designed to maximise the potential sustainability measures in line with Policies G1 and G2.
- 7.2 G1: This report illustrates that the proposal meets all the requirements set out in G1 with considerations of future national net zero targets, urban greening, sustainable drainage systems, and vegetation cover.
- 7.3 G2: This report has illustrated that the development is outside of a district heat network is therefore currently not feasible to consider connection to an existing district heating network. However, the proposal will meet energy efficiency and renewable energy measures through utilising the Energy Hierarchy and Low and Zero Carbon Technologies considered as feasible.
- 7.3 G2: After reviewing multiple Low and Zero Carbon Technologies, it is advised that a solar PV and ASHP system are the most feasible and appropriate measures to be installed. This will assist with meeting future national targets for net zero carbon 2050 and reducing overall reliance on fossil fuels.
- 7.4 The statement has reviewed the proposal against the relevant Rochdale County Council Policies and illustrates that the proposal encompasses carbon reduction and adaptation to changes in climate.

Overall, this statement confirms that the development conforms to achieving sustainable forms of development in the County in accordance with Policies G1 and G2.

Appendix A: Green Infrastructure (GI) Scoring Sheet

All new developments will be required to reach a certain level of green cover which will be measured by a scoring system related to changes in different surfaces (e.g. vegetation, open water, green roofs, green walls, trees, shrubs, permeable paving and non-permeable paving) pre-development and for the planned development calculated using the GI toolkit provided below:

1	2	3	4	5	6
Non-overlapping surface types	GI factor	Area Before Proposed development (m2)	Area before Proposed development x GI Factor	Area After Proposed development (m2)	Area After Proposed development x GI Factor
B2	0.0				
B3	0.0				
B4	0.2				
B5	0.4				
C1	1.0	13031	$13031 \times 1.0 = 13031$	5549	$5549 \times 1.0 = 5549$
C2	0.6				
C3	0.4				
D	1.0				
Total area entered (m2)			X = 13031		Y = 5549
1	2	3	4	5	6
Non-overlapping surface types	GI factor	Area Before Proposed development (m2)	Area before Proposed development x GI Factor	Area After Proposed development (m2)	Area After Proposed development x GI Factor
		to total development site?		to total development site?	
E: Shrubs and hedges. N.B. Should not exceed development 0.3 site area. Can overlap surfaces A1-D and F.	0.3	89	$89 \times 0.3 = 26.70$	3690	$3690 \times 0.3 = 1107$
F: Trees (canopy cover area). N.B. should not exceed 0.4 development site area. Can overlap surfaces A1-D and E.	0.4	582	$582 \times 0.4 = 232.80$	800	$800 \times 0.4 = 3200$
G: Green walls (area up to a height limit of 10 m)	0.6				
			X1 = 259.5		Y1 = 4307
			Before proposed development		After proposed development
GI Score			1.0		0.7
			$(13031+259.5)/13904$		$(5549+4307)/13904$
			(X+X1)/ site area		(Y+Y1)/ site area

The requirement for all new developments is to achieve a score of 'Very Good'.

The GI score of the planned development is 0.7. In order to achieve a score of 'Very Good', a minimum of 0.6 is required, therefore this development has reached the required score for this rating.