



DN-MEP-01
Energy Report Summary
Rochdale Corner Plot
PA1711

Consulting Engineers

TACE
Portland House
Oak Green
Earl Road
Cheadle Hulme
Cheshire
SK8 6QL

www.tace.co.uk

Ref: PA1711
Revision: A
Date: November 2023

Revision Record					
<i>Rev.</i>	<i>Date</i>	<i>By</i>	<i>Summary of Changes</i>	<i>Chkd</i>	<i>Aprd</i>
A	07/11/23	JM	Initial issue	JM	JM

1.0 Introduction

The UK Government has set an ambitious target to reach zero carbon by 2050. This represents a major shift in policy and a significant challenge to the housebuilding sector. It will require all new homes to have zero or near zero carbon emissions. Councils, housing developers and the construction industry need to meet this challenge and deliver new low carbon communities.

The Corner Plot development in Rochdale will need to rise to these ambitions and demonstrate effective design solutions to meet the required emissions.

The Rochdale Council has developed a comprehensive blueprint for the Rochdale Station Area, outlining a strategy for revitalizing the residential areas surrounding the current Rochdale railway station. This plan highlights significant structures that encompass the proposed Station Square public realm project, notably the 'Corner Plot,' a property owned by the Rochdale Council. Situated at the junction of Station Road and Maclure Road, the 'Corner Plot' consists of two adjacent buildings.



The property sits adjacent to Rochdale Railway Station, positioned at the intersection of Maclure Road and Station Road. It currently accommodates a single-story building with a curved front, alongside a pair of three-story semi-detached brick buildings. These brick structures are situated within the Maclure Road Conservation Area, which encompasses the nearby historic fire station building, St John's RC church, and residential brick buildings initially linked to the fire station.

Its proximity to the train station facilitates convenient travel to both Manchester city center and Rochdale town center, making it an ideal location for commuters.

Rochdale Development Agency want this development to have a low environmental impact and would like to challenge the design team to take the project as near as possible to Zero Carbon in Operation (NZCiO). This short paper intends to provide an insight of the key considerations made to date, with the intention of providing a better understanding around the design choices taken to achieve the project's NZCiO ambitions.

2.0 LETI and Zero Carbon in Design (NZCiD)

The two method assessments used to evaluate the sample project and the subsequent results detailed within this report are CIBSE TM54 calculations, to demonstrate compliance with the LETI standard, and a SAP10 calculation in line with Part L1a of the Building Regulations.

These two standard assessments are independent calculations. The LETI calculation focuses

on carbon consumption once the dwelling is in use. The LETI assessment considers assumptions of how the building will be operated / used. This assessment can be quite subjective as there is no fixed usage profiles for a domestic dwelling as this is down to the dynamic nature of how homes are used in day-to-day use. However, within CIBSE guidance documentation there is an accepted calculation method for the energy use within a dwelling.

This guidance has been adopted in determining the results outlined in this report.

Due to the subjective nature of the LETI calculations, many developers and house builders are using SAP calculations to demonstrate that dwellings are Zero Carbon dwellings. The main reason for this is that the calculation method set out in SAP is consistent across all dwellings and developments where the LETI standard changes from site to site and developer to developer, as they choose their own usage profile. The SAP methodology is a UK national calculation method that sets the standards for compliance with Buildings Regulations. For this report we are attempting to meet both requirements to demonstrate the dwelling is Zero Carbon in both design and operation.

3.0 Methodology

TACE has undertaken a number of computer simulations to determine the indicative project's energy strategy.

To achieve net zero carbon in operation, the development will be designed in line with the energy efficiency hierarchy:

- Be Lean – use less energy
- Be Clean – efficient energy supply
- Be Green – renewable energy
- Be Seen – monitor, verify and report

4.0 Building Fabric

The design has taken a fabric first approach. The performance of the thermal elements will be increased above Building Regulations minimum standards to minimise heat loss during the winter, and heat gains in the summer. This will lead to reduced heating and cooling loads, reducing the carbon dioxide emissions from the building's energy sources, to maintain the required indoor temperatures. The following table sets out the proposed building fabric standards which have been developed

5.0 Building Services

Following on from the original stage 2 MEP specification the systems currently being proposed for both the house types and apartments are as follows:

Air Permeability (m3/(h.m2)@ 50Pa)	U-Value Wall	U-Value Floor	U-Value Roof	U-Value Windows	G-Value Windows	Window Type	Thermal Bridges
1	0.15	0.1	0.09	Door = 1	0.6	uPVC triple Glazed	See notes average Y-value 0.04

Renewable Energy Technologies

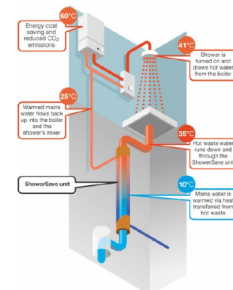
The design team have reviewed options for the use of on-site renewable energy/Low or Zero Carbon. This project has reviewed renewable energy strategy and reviewed the technical and economic feasibility of the following technologies –

- Solar Photovoltaic
- Solar Hot Water
- Ground Source Heat Pumps
- Air Source Heat Pumps / Exhaust Air Heat Pumps
- Micro Wind Power
- Biomass

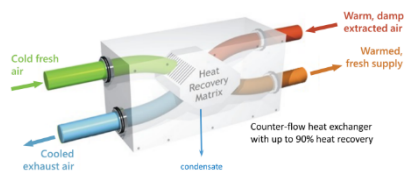
The below details the current design solution proposed, which will reviewed and confirmed in the next stage of design.:-

Waste Water Heat Recovery Systems (WWHRS)

WWHRS has been proven to provide a vital role in saving energy within both commercial and domestic properties. Compared to space heating that has many energy saving technologies in place, hot water has been an area where it has proven difficult to make substantial improvements. There are many significant benefits to using and running waste water heat recovery systems (WWHRS) in a building.



Mechanical Ventilation Heat Recovery (MHHR)



Mechanical Ventilation with Heat Recovery (MVHR) is a balanced and controlled forced air ventilation system commonly known to many as a heat recovery ventilation system. It is a whole house ventilation system that both supplies fresh and extracts stale air throughout a property and recycles the heat generated within it.

Direct Electric Heating

Electric heating means production of heat energy from electrical energy. That means production of heat by electricity. Due to the high thermal performance of this project heat losses need to be minimised to around 17-20watt per m2.

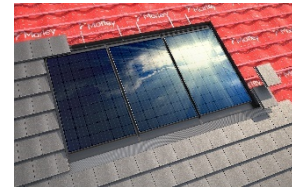
Air Source Heat Pump (Hot water only)

An air source heat pump (ASHP) works by transferring heat absorbed from the outside air to an indoor space. This works to provide domestic hot water. Heat pumps work similarly to a refrigerator: they absorb heat and transfer it to another medium.



Solar PV

Most PV systems are made up of panels that fit on top of your roof, but you can also install on the ground, or fit solar tiles. The electricity generated is direct current (DC), whereas the electricity you use for household appliances is alternating current (AC). An inverter is installed along with the system to convert DC electricity to AC.



6.0 Conclusion

Net zero buildings are set to play a critical role in the UK's ambitious decarbonization objectives by 2050. Despite the lack of explicit guidance outlining the essential requisites for achieving net zero carbon buildings, the practical implications concerning design and costs remain largely unexplored. This report serves as an initial exploration into the alterations and design considerations necessary for buildings to meet the demanding net zero performance benchmarks.

By employing the aforementioned strategies for MEP services and construction u-values, the project team is confident that this development can fulfill the goal of satisfying both LETI Net Zero Carbon in Operation and SAP10 Net Zero Carbon in Design (NZCiD). This can be accomplished through the implementation of high-performance building materials, low air permeability, and a diverse array of energy-efficient and renewable technologies. These technologies include the utilization of air source heat pumps for generating domestic hot water, the integration of mechanical ventilation systems with heat recovery capabilities, and the incorporation of photovoltaic panels for electricity generation.

Next Steps

As part of ongoing detail design work post-planning the following actions will be taken:

- Review TM54 input with customer team.
- Confirm roof areas across the project
- Review apartment block
- Development of RIBA Stages 3-4: Detailed review of design from a performance angle, feeding findings back into the loop before construction works commence.
- Appropriate energy modelling (i.e. modelling for reality as opposed to compliance) to ensure that energy performance is not significantly affected among the many trade-offs that must be made through the design process.