



**ELEMENT
SUSTAINABILITY**

TRINITY ISLANDS, MANCHESTER

ENVIRONMENTAL STANDARDS AND ENERGY STATEMENT

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1. INTRODUCTION

Element Sustainability has been commissioned by Renaker Build Limited (Renaker) to review the sustainability performance of the Proposed Development at Trinity Islands, Trinity Way, Manchester.

The purpose of this Statement is to summarise the relevant policy background and requirements of Manchester City Council (MCC) and demonstrate the ways in which Renaker have addressed these aims through their proposals, ensuring all practicable measures have been taken in order to deliver a sustainable development at this site.

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



2. DEVELOPMENT PROPOSALS

2.1 Development Site Description

The Application Site comprises two parcels of land referred to as Site C and Site D, measuring approximately 4.4ha. in total and is current used as a surface level car park. Site C comprises approximately 2.2 acres of brownfield land is bounded by the River Irwell to the north, Trinity Way to the west, Water Street to the south and a railway viaduct to the east. Site D comprises approximately 2.2 acres of brownfield land is bound by the River Irwell plus some limited vegetation to the north and west, Regent Road to the south and Trinity Way to the east. This Statement has been developed on the basis of the 1,950 units proposed for this scheme.

The site lies within a Site of Special Scientific Interest (SSSI) Impact Risk Zone for Rochdale Canal Special Area of Conservation (SAC) and SSSI and is also located on the western boundary of Manchester City Centre within a designated Conservation Area – Castlefield Conservation Area. Furthermore, the Site falls within the St Johns and Water Strategic Regeneration Framework (SRF) Areas.

Figure 2.1 – Pre-development Site



2.2 Development Proposals

The Proposed Development includes for the construction of a high-quality residential scheme providing two residential towers on Site C, known as towers C1 and C2 and two residential towers known as towers D1 and D2 on Site D. The four buildings will vary in height from 39 to 60 residential storeys and will provide a combined total of 1,950 apartments. Each tower provides private amenity and sits above private basement car parking

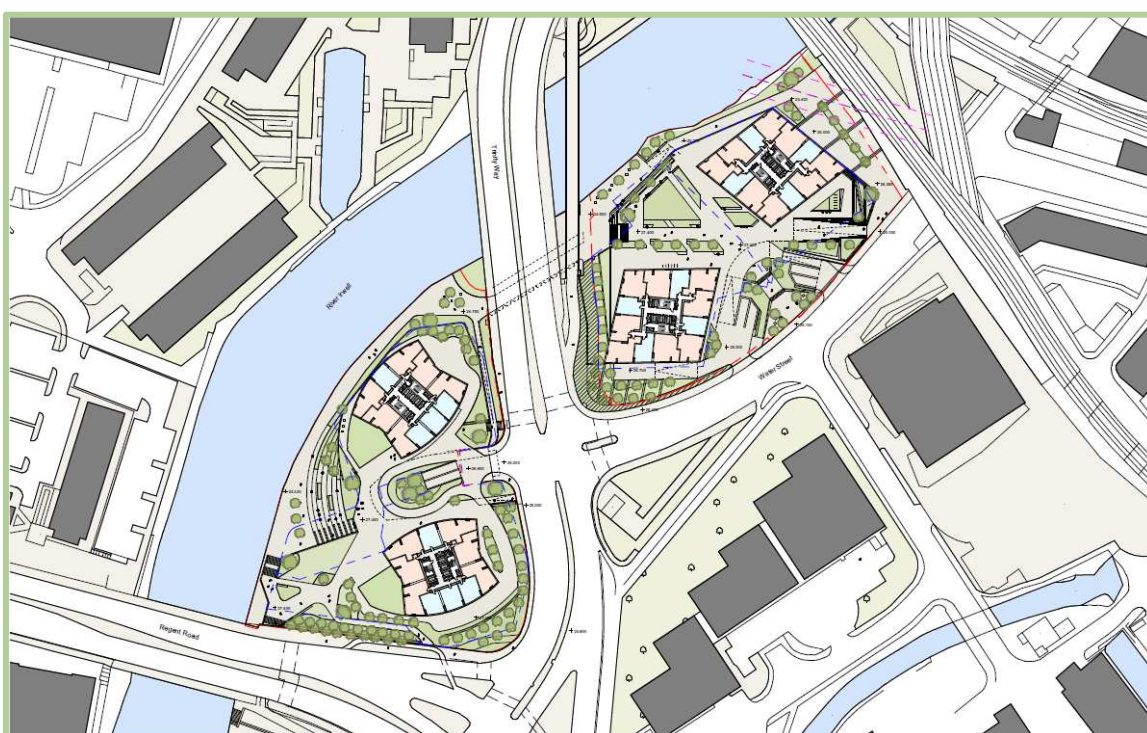


and cycle facilities. Between the towers are large areas. See Table 2.1 for the Accommodation Schedule. The proposed ground floor general arrangement site plan is presented in Figure 2.2.

Table 2.1 –Accommodation Schedule

Dwelling Type	Tower C1 (Apartments)	Tower C2 (Apartments)	Tower D1 (Apartments)	Tower D2 (Apartments)
1 Bed	128	163	176	159
2 Bed	256	326	340	308
3 Bed	8	10	8	8
Penthouses	8	8	8	8
Total	400	507	532	483

Figure 2.2 – Proposed Ground Floor Site Layout



3. POLICY REVIEW

3.1 Local Planning Policy

3.1.1 Manchester Core Strategy

Manchester's Core Strategy (CS) was adopted on 11th July 2012 and is the key Development Plan Document in the Local Development Framework (LDF).

CS Policy DM 1 - Development Management requires all development to have regard to a number of development principles. Subject to scheme viability, developers may be required to demonstrate that new non-domestic development to achieve a BREEAM Rating of 'Very Good' or for domestic development to achieve the Code for Sustainable Homes standard¹.

CS Policy EN 4 - Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development requires all development to 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; and,
- To meet residual energy requirements through the use of low or zero carbon energy generating technologies.

CS Policy EN 5 - Strategic Areas for low and zero carbon decentralised energy infrastructure include:

- The Regional Centre, which also includes the Oxford Road Corridor and Eastlands;
- District Centres and associated major development sites;
- Airport Strategic Site;
- Strategic housing location; and,
- Strategic employment locations.

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 site does fall within the St Johns and Water Street Strategic Regeneration Framework (SRF) Areas.

CS Policy EN 6 - Target Framework for CO₂ Reductions from Low or Zero Carbon Energy Supplies requires applications for residential development of 10 or more units and all other development over 1,000m² to meet, as a minimum, the targets shown in the tables below, unless unviable.

¹ On the 25th March 2015 the Government issued a Written Ministerial Statement setting out the conclusion of the Housing Standards Review. The statement set out a new policy on the application of technical housing standards that applied immediately to all local planning authorities and qualifying bodies. This had a direct effect on the application of existing Code policies, and the setting of new Code policies. The Government elected to remove the Code for Sustainable Homes and incorporate new additional optional Building Regulations on water and access, and a new national space standard.



Table 3.1 – Policy EN6 CO₂ Emissions Reduction Targets; Domestic

Target	% Minimum Requirements
Target One: Network development area	CHP/District heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target Two: Electricity intense buildings	+15% increase on Part L 2010
Target Three: Micro generation area	+15% increase on Part L 2010

The Proposed Development is located within a Target 2: Micro Generation Area and must comply with Part L (2013). The emission reductions targeted within policy EN6 relate to Building Regulation Part L 2010. As a consequence of the reduction in emission rates required by current building regulations (Part L, 2013) relative to Part L 2010, the revised equivalent target CO₂ emission reductions for the residential scheme are presented below:

- Residential - 9% dwelling emission rate reduction over Part L1A 2013.

Please note that the Proposed Development will be compliance checked against the forthcoming Part L1A (2021) Building Regulations. By virtue of complying with these emerging regulations, the scheme commits to reduce dwelling carbon emissions by at least 31% in relation to Building Regulations Part L, 2013 standards.

Further details of the building regulation requirements are provided in the section below.

CS Policy EN 8 – Adaption to Climate Change requires all new development 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 rainwater 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; and,
- The opportunity to provide linked and diverse green space to enhance natural habitats which will assist species adaptation.

CS Policy T 1 – Sustainable Transport aims to deliver a sustainable, high quality, integrated transport system to encourage modal shift away from car travel to public transport, cycling and walking, to support the needs of residents and businesses and to prepare for carbon free modes of transport, the Council will support proposals that:

- Improve choice by developing alternatives to the car;
- Promote regeneration and economic vitality by relieving traffic congestion and improving access to jobs and services, particularly for those most in need and for those without a car;
- Improve access to transport services and facilities in order to enable disabled people and people with mobility impairments to participate fully in public life;
- Improve pedestrian routes and the pedestrian environment;
- Improve and develop further Manchester's cycle network (for example the Manchester Cycleway and the Trans Pennine Trail); and,



- Facilitate modes of transport that reduce carbon emissions e.g by incorporating charging points for electric vehicles, subject to their appropriate design and location.

3.1.2 Guide to Development in Manchester, Supplementary Planning Document

Manchester's Core Strategy requires that all new residential developments should accord with the design guidance set out in the Supplementary Planning Documents (SPD). The Guide to Development in Manchester SPD was adopted on 11th April 2007 and supports and enhances the ongoing shaping of the City by providing a set of reasoned principles which will guide developers, designers and residents. These principles include a number of environmental standards, and includes the following categories which are identified in the SPD:

- Energy efficiency;
- Renewable energy;
- Environmental design;
- Water management and weather resilience;
- Waste management;
- Construction management;
- Biodiversity; and,
- Waterways.



3.1.3 Manchester Residential Quality Guidance

This document provides guidance for building new build dwellings in Manchester. The residential quality guidance demands design excellence in all new housing built in the city, sets minimum space standards, and ensures high environmental standards. The guidance includes the following nine components:

Make it Manchester – developers must understand the city’s unique character, heritage old and new, density and scale in various parts of the city and appreciate how new homes will fit in to what’s already there.

Make it bring people together – new homes must encourage a sense of community and neighbourliness, offering a mix of tenures to promote a mix of people.

Make it animate streets and spaces – understand the relationship between new homes and its environment and create public space.

Make it easy to get around – make sure developments have good transport links, along with good walking and cycling provision.

Make it work with the landscape – development should improve the connection with the local environment with improved biodiversity, as well as greening and water schemes.

Make it practical – dealing with waste, car parking, bike storage and visitors should be made as easy as possible.

Make it future proof – design must anticipate the impacts of climate change and extreme weather with efficient design and adaptability.

Make it a home – sufficient space, natural light, privacy and storage are essential for people to settle down and flourish.

Make it happen – ensuring proposals are delivered, to a high quality, with high design standards and high sustainability.

3.1.4 Manchester’s Great Outdoors

A Green and Blue Infrastructure Strategy for Manchester aims to invest to date in the city’s Green and Blue infrastructure over the next 10 years (by 2025). Four objectives have been established to enable the vision to be achieved:

1. Improve the quality and function of existing green and blue Infrastructure, to maximise the benefits it delivers.
2. Use appropriate green and blue infrastructure as a key component of new developments to help create successful neighbourhoods and support the city’s growth.
3. Improve connectivity and accessibility to green and blue infrastructure within the city and beyond.
4. Improve and promote a wider understanding and awareness of the benefits that green and blue infrastructure provides to residents, the economy and the local environment.



3.1.5 Climate Emergency

On 10 July 2019, a motion asking MCC to formally declare a **climate emergency** was unanimously agreed. The motion declares that climate change is a serious risk to Manchester's future and committed to embedding the issue as an integral part of council decision-making – making sure that all key decisions are taken with the city's target of becoming zero-carbon by 2038 in mind. The council has agreed the following:

- To deliver the 2038 zero carbon target and determine if an earlier target can be possible.
- Encourage involvement in all wards by April 2020 through meetings as part of the Our Manchester strategy.
- Review all policies, processes and procedures to ensure the council can become carbon neutral. Present an action plan by March 2020 detailing how the city can stay within its carbon budget.
- Make climate breakdown and the environment an integral part of activity throughout the council, including all decision making, ensuring key decisions take into account the impact on achieving the zero-carbon target.
- Investigate measures to ensure future procurement is carbon neutral. Increase the percentage of social value with an additional environmental element.
- Work with suppliers to green their supply chains and support local production.
- Investigate and introduce measures to help reach domestic zero carbon levels including addressing fuel poverty and retrofitting existing homes.
- Investigate ways to ensure that future local plans place a mandatory requirement for all new development to be net zero carbon by the earliest possible date.

In March 2020 the Executive adopted the Manchester Climate Change Framework 2020-2025. The five-year framework sets out measures that MCC will take in order to reduce carbon emissions from its buildings, energy use and transport. Measures include retrofitting buildings to improve energy efficiency, increasing the use of Electric Vehicle Vehicles, and seeking 100% renewable energy. Whilst this has also not been formally adopted into planning policy, it is a key consideration for future development proposals.

3.2 Emerging Policies

The Draft 'Places for Everyone' (PfE) Plan is a new long-term plan of nine Greater Manchester districts (Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan) for jobs, new homes, and sustainable growth. It has been prepared by the GMCA on behalf of the nine districts.

The Draft Plan will determine the kind of development that takes place across the city-region, maximising the use of brownfield land and urban spaces while protecting green belt land from the risk of unplanned development. It will also ensure all new developments are sustainably integrated into Greater Manchester's transport network or supported by new infrastructure.



The PfE (Publication version) consultation concluded in October 2021 and that it is now expected to progress to examination. It is therefore considered that the Plan is in an advanced stage of preparation and will hold some weight in the determination of planning applications within Greater Manchester

3.3 National Planning Policy

In addition to the local planning policies, the National Planning Policy Framework (NPPF) 2021 is a material consideration. The NPPF (amended July 2021) replaces all previous PPSs and PPGs.

The NPPF states that the planning system should play an active role in guiding development to sustainable solutions. At the heart of the 2021 updated NPPF lies the ‘presumption’ in favour of sustainable development; the golden thread running through plan-making and decision taking (para. 11). There are three dimensions to sustainable development, as stated within the NPPF: economic, social and environmental. These dimensions give rise to the need for the planning system to perform a number of roles:

An economic role – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;

A social role – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating beautiful and safe places, with accessible local services that reflect the community’s needs and support its health, social and cultural well-being; and

An environmental role – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

These dimensions are considered to be mutually dependent with the NPPF, in its entirety, defining sustainable development. The NPPF states that ‘the purpose of the planning system is to contribute to the achievement of sustainable development’ (paragraph 7). It summarises the objective of sustainable development as meeting the needs of the present without compromising the ability of future generations to meet their needs. It goes on to state that at a similarly high level, members of the United Nations – including the United Kingdom – have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. These address social progress, economic well-being and environmental protection.

3.4 Regulatory Framework

3.4.1 Building Regulations

Building Regulations, Part L - Conservation of Fuel and Power sets the compliance standards for energy demand and carbon dioxide emissions from buildings.

Approved Document L1A addresses the conservation of fuel and power in new dwellings. The Proposed Development is registered against Building Regulations, Part L1A (2013) which requires all newly constructed dwellings need to comply with 5 criteria set out in Approved Document L1A unless exempted through the transitional provisions:

- I. The predicted rate of carbon dioxide emissions from the dwelling (the Dwellings Emission Rate DER) is not greater than the Target Emissions Rate (TER). Additionally, the Dwelling Fabric Energy Efficiency (DFEE) is not greater than the Target Fabric Energy Efficiency (TFEE);



- II. The performance of the building fabric and fixed building services should be no worse than the design limits set out in Table 2 of the Approved Document;
- III. The dwelling has appropriate passive control measures to limit the effect of solar gains on indoor temperatures in summer;
- IV. The performance of the dwelling as built, is consistent with the DER, including site checking that the air permeability is within reasonable limits; and
- V. The necessary provisions for energy efficient operation of the dwelling are put in place including operating and maintenance instructions aimed at achieving economy in the use of fuel and power in a way that householders can understand.

Approved Document L1A (2021) standards will come into effect in June 2022 therefore, the Proposed Development is designed to comply with these emerging targets. Emerging Part L 2021 standards are expected to reduce dwelling carbon emissions by 31% in relation to Building Regulations Part L1A, 2013. The Fabric Energy Efficiency criterion has also become significantly more onerous to achieve relative to current Part L1A (2013) building standards. Furthermore, the Proposed Development is designed to meet the additional criteria for Primary Energy Rate which is a new metric being introduced as part of the upcoming 2021 regulatory update.

It is understood that all energy efficiency targets stipulated under local planning policy will still apply to the proposed development under the prevailing Building Regulations (subject to transitional arrangements). Key dates in the implementation of upcoming Building Regulations are as follows:

- December 2021 – Interim uplift Part L, F and Overheating Regulations are published
- June 2022 – Interim uplift Part L, F and Overheating Regulations come into legislation
- Spring 2023 – Consultation on Future Homes Standard
- 2024 – Future Buildings Standard published
- 2025 – Future Buildings Standard comes into force

3.5 Other Framework

The RIBA joined the global ‘declare’ movement in June 2019 and to ensure that the strong words of the declaration of a climate emergency are matched by actions, the RIBA has set RIBA Chartered Practices a challenge of achieving the following reductions **as soon as possible** but as a minimum for projects in operation in 2030:

1. Reduce operational energy demand by at least 60% from current business as usual baseline figures, before offsetting.
2. Reduce embodied carbon by at least 40% from current business as usual baseline figures, before offsetting.
3. Reduce potable water use by at least 40% from CIRIA benchmark/ Building Regulation figures.
4. Achieve all core health and wellbeing metrics (set out in the table below).

These reductions will also form the basis of RIBA’s recommendations to Government for future Building Regulations requirements.

3.5.1 The Targets v2 (2021)

Originally launched in October 2019, the RIBA 2030 Climate Challenge has now been re-issued as Version 2 (2021) with refined and updated targets that encompass development in the knowledge base of performance trajectories – particularly in the embodied carbon field. The embodied carbon targets in Version 2 are now aligned with LETI, the Whole Life Carbon Network and others, and follow the latest jointly authored guidance.



Version 2 of the Climate Challenge presents ambitious but achievable forward-facing performance outcomes, set against business-as-usual compliance approaches.

As the targets are for performance outcomes of buildings in operation, the RIBA advocates that buildings in design today should, as a *minimum*, adopt the 2025 targets, see Table 3.2.

Table 3.2 – RIBA 2030 Climate Challenge target metrics for domestic / residential

RIBA Sustainable Outcome Metrics	Business as usual (new build, compliance approach)	2025 Targets	2030 Targets	Notes
Operational Energy kWh/m ² /y 	120 kWh/m ² /y	< 60 kWh/m ² /y	< 35 kWh/m ² /y	Targets based on GIA. Figures include regulated & unregulated energy consumption irrespective of source (grid/renewables). BAU based on median all electric across housing typologies in CIBSE benchmarking tool. 1. Use a 'Fabric First' approach 2. Minimise energy demand. Use efficient services and low carbon heat 3. Maximise onsite renewables
Embodied Carbon kgCO ₂ e/m ² 	1200 kgCO ₂ e/m ²	< 800 kgCO ₂ e/m ²	< 625 kgCO ₂ e/m ²	Use RICS Whole Life Carbon (modules A1-A5, B1-B5, C1-C4 incl sequestration). Analysis should include minimum of 95% of cost, include substructure, superstructure, finishes, fixed FF&E, building services and associated refrigerant leakage. 1. Whole Life Carbon Analysis 2. Use circular economy strategies 3. Minimise offsetting & use as last resort. Use accredited, verifiable schemes (see checklist). BAU aligned with LETI band E; 2025 target aligned with LETI band C and 2030 target aligned with LETI band B.
Potable Water Use Litres/person/day 	125 l/p/day (Building Regulations England and Wales)	< 95 l/p/day	< 75 l/p/day	CIBSE Guide G.

3.6 Applicable Targets

Based upon a review of relevant planning policy requirements, legislative drivers, and client priorities, the following list provides a brief precis of the key criteria that should be targeted for this development:

- CS Policy DM 1 - Development Management;
- CS Policy EN 4 – Reducing CO₂ Emissions;
 - Following the principles of the Energy Hierarchy to reducing CO₂ Emissions;
- CS Policy EN 5 - Strategic Areas for low and zero carbon decentralised energy infrastructure;
- CS Policy EN 6 – Target Framework For CO₂ Reductions From Low or Zero Carbon Energy Supplies;
 - Residential - 9% dwelling emission rate reduction over Part L 2013;
- CS Policy EN 8 – Adaption to Climate Change;
- CS Policy T 1 – Sustainable Transport;
- Great Jackson Street Framework (2018) – Key Principles;
- The Guide to Development in Manchester SPD;



- **A Green and Blue Infrastructure Strategy for Manchester;**
- **Approved Document L1A (2013)** will guide the compliance standards for energy demand and carbon dioxide emissions from buildings to ensure compliance with CS Policy EN 6;
- **Upcoming, Approved Document L1A (2021)** – it is acknowledged that the Proposed Development will be assessed against the emerging Part L1A (2021) Building Regulations, subject to the development programme and progression. For this reason, the forthcoming 2021 compliance standards for primary energy demand, and carbon dioxide emissions and fabric energy efficiency will also guide the design of the Proposed Development;
- **RIBA 2030 Climate Challenge target metrics for domestic / residential; and,**
- Guidance within the **Acoustics, Ventilation and Overheating, Residential Design Guide**, (AVO) published by the Association of Noise Consultants and the Institute of Acoustics in January 2020.



4. ENVIRONMENTAL PERFORMANCE

This section provides an appraisal of the development proposals and details the specific approach, design features and specifications which will contribute to reducing the environmental impact of the Proposed Development. This section outlines those commitments that have been made by Renaker to ensure this Proposed Development contributes to sustainable development, meets the council's current policies and examines the following categories identified in the Guide to Development in Manchester, Supplementary Planning Document (SPD):

- Energy efficiency;
- Renewable energy;
- Environmental design;
- Water management and weather resilience;
- Waste management;
- Construction management;
- Biodiversity; and,
- Waterways.

The key specifications, site characteristics and design measures of the Proposed Development are considered below. They will mitigate the environmental impact of the scheme throughout both the construction stage and the future occupation of the scheme.

4.1 Energy

4.1.1 Energy Strategy

- The energy efficiency of the new build apartments and common areas will be improved through the application of a **significantly enhanced material specification, exceeding the criteria of upcoming Approved Document L1A (2021) standards** as well as **improving upon the current criteria of Part L (2013) Building Regulations** to demonstrate compliance with the council's current policy position.
- The proposed approach to emissions reduction for the new build apartments will be through a fabric led energy strategy, in accordance with the principles of the energy hierarchy.
- The specification of the build fabric will be optimised to benefit from solar gain whilst mitigating the propensity to overheat. This will be achieved through a balance of **high-performance u-values, very low air permeability**, ventilation strategy and solar control coatings to the glazing.
- The enhanced material specification will be supplemented with efficient mechanical and electrical systems, incorporating mechanical ventilation with heat recovery.
- The proposed heating strategy for the building will be provided by a **high efficiency, full electric system** to meet the limited energy loads generated by the apartments.
- Whilst it is recognised that the Site is itself located within **the St. Johns and Water Street Strategic Regeneration Framework (SRF) Areas** which includes an aspiration to link to a decentralised energy centre. The proposals respond positively to Core Strategy Policy EN5 by



providing a clear and detailed rationale (see Section 5.3) for utilising a full electric energy strategy which includes the use of low-carbon heat pump technology throughout the non-domestic zones within the scheme.

- A full electric strategy has been adopted in response to the planned decarbonisation of the UK electricity grid which targets 100% zero carbon status by 2035 (with periods of 100% zero carbon electricity by 2025). This means that as the UK's electricity grid decarbonises, the buildings' emissions will reduce over time. As such, this strategy is not compatible with a district heating, 'connection-ready' system which would include a communal wet heating system.

Further details of the proposed approach to reducing the energy demand and associated carbon dioxide emissions of these apartments are presented in the Sections 5 (Energy Strategy) and Section 6 (Climate Emergency).

4.1.2 General Principles

In order to limit energy demand and carbon dioxide (CO₂) emissions from the operation of the new dwellings and non-domestic areas, the following design features will be integrated within the scheme to enable the occupants and building users to lead a low-impact lifestyle:

- **In accordance with MCC's planning policy target provision, electric car charging points will be installed subject to resident take up with electrical capacity for 20% of parking spaces to be provisioned with charging points;**
- Integration of A and A+ rated white goods (where applicable). White goods are graded on a scale from G (the least efficient) up to A++ (the most efficient) under the EU energy efficiency labelling scheme;
- Provision of EU energy efficiency labelling scheme details to assist in the purchasing of energy efficient white goods;
- **Heat recovery systems** and mechanical extract dwelling to maintain a healthy living environment;
- **100% low energy** and/or LED internal lighting;
- All external space lighting to be provided by dedicated **energy efficient fittings and controls**; and,
- To encourage the use of sustainable modes of transport:
 - At least **one cycle storage space per residential apartment** will be provided across the basement levels of the Site plus visitor cycle parking will be provided at ground floor level within the public realm; and,
 - There will be capacity for 10% of parking bays to **feature active electric vehicle (EV) charging points** (subject to resident take-up). The Proposed Development has also been designed to have the capacity to increase the provision of electric vehicle charging in the future.



4.2 Water

The new apartments will be designed to reduce mains/potable water consumption and will include water efficient devices and equipment.

- A water efficiency strategy will be determined for the development. This will **include 'A' rated appliances** (where provided);
- Specification of efficient **water fixtures throughout the scheme** (low flow taps and showers, dual flush WCs and low volume baths);
- In order to reduce water demand, the sanitary fixtures will be specified to achieve a calculated daily consumption of <105litres/person/day; and,
- The landscaped areas of the development will be irrigated solely by precipitation throughout all seasons of the year, with the exception of the green walls, to reduce unregulated water consumption.

4.3 Resource Management and Pollution

4.3.1 Efficient Use of Land

- The re-use of a previously developed brownfield site in a highly accessible, city-centre location such as Trinity Islands will provide a development that inherently **supports a sustainable community while creating opportunities for employment and amenity**;
- The proposals include for the redevelopment of a previously developed, brownfield site as promoted by national and local planning policy; and,
- The redevelopment of the brownfield Site represents an efficient use of land with a large accommodation density within the two, fifty-one storey buildings.

4.3.2 Pollution Control

Air Quality

The proposed scheme is situated within Greater Manchester Air Quality Management Area (AQMA). As such, pollution mitigation measures will include for:

- Filters within the supply air inlet ductwork will minimise the impacts of airborne pollution within the development;
- Ventilation systems will be designed in rooms to meet the target noise levels stated within available Acoustic design specifications; and
- Recirculating cooker hoods will be provided complete with carbon filtration;



The significant landscaping scheme which forms part of the proposals including tree planting, will also contribute to carbon sequestration and help to improve local air quality. This is discussed in further detail within Section 4.8. To further reduce emissions of gases with high global warming potential (GWP) and NO_x into the atmosphere, the development will be specified with:

- Insulating materials that have a GWP of less than 5 throughout the development to reduce the construction phase impact of this scheme upon climate change; and,
- **A full electric energy strategy, therefore, there will be no local NO_x emissions associated with this development.**

Sound

Excess noise can have a significant impact on local ecology as well as human physical and psychological health therefore, a Noise and Vibration chapter of the Environmental Statement has been prepared by Fisher Acoustics and identifies the measures that will need to be incorporated in the building to achieve appropriate noise levels within the proposed dwellings. The chapter concludes that

- The impact of sound at and around the occupied development will be mitigated by the design and specification of the dwellings;
- In order to meet the relevant internal noise levels within the proposed residential units, the unitised curtain wall that forms the building façade must achieve a certain minimum sound insulation performance;
- Noise limits for building services plant and amplified sound have also been specified to ensure that residential amenity is maintained;
- Tactile vibration and re-radiated noise are not expected to be an issue at the site; and,
- Noise pollution with respect to purge venting has been minimised as far as possible, with only 15 living rooms out of a total of 907 apartments within the assessment requiring purge vents to be open during a time period that may experience noise levels slightly greater than the target of 50dB LAeq,16 hrs.

Acoustic, Ventilation and Openings (AVO)

The design of the Proposed Development has been refined in response to the application of up-to-date technical guidance provided within AVO 2020. This design seeks to achieve:

- Facades which satisfy strict sound insulation criteria which has been established in consultation with the Local Authority and the acoustic consultant.
- Apartments which will not suffer from overheating, as demonstrated through the dynamic thermal modelling and TM59 analysis (see Section 5.6 for further detail on overheating).
- Internal noise levels which are reduced as far as possible in all conditions.



The mitigation measures concerning AVO are detailed within the AVO Assessment, prepared by Fisher Acoustics, and the AVO design note, prepared by SimpsonHaugh. These measures have been reflected in the residential energy models completed as part of this statement.

Additional Measures

Additionally, the following measures will be implemented:

- Pollution Prevention Guidance will be adhered to in respects of air (dust) and water (ground and surface) pollution during the demolition and construction phase;
- External light fittings will be controlled through a time switch, or daylight sensor, to prevent operation during daylight hours to **limit the impact of artificial lighting for the development's residents and surrounding environment**;
- The development site is within the vicinity of the River Irwell. Where necessary, temporary drainage and pollution prevention measures will be in place on site, this may include, for example, bunded areas and spill kits to prevent harmful chemicals / materials from draining to natural watercourses; and silt traps to ensure that suspended solids are removed from the drainage water; and,
- Dust suppression measures will also be put in place as part of the **Main Contractor's Environmental Management Plan**, such that any potential risks to watercourses or the neighbouring properties are minimised.

4.3.3 Materials

This development will contribute towards making more efficient use of non-renewable material resources and to reducing the lifecycle impact of materials used in construction. This is demonstrated by the selection of:

- **Materials with low environmental impact throughout their lifecycle;**
- **Materials responsibly sourced from suppliers** operating an Environmental Management System or procuring timber verified by either the Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification standard (PEFC);
- **Local sourcing of construction materials** where feasible and viable, which will minimise the impact of carbon dioxide emissions associated with the transportation of materials; and,
- Robust materials such as block paving and stone will be utilised for hard landscaping therefore, minimising the frequency of replacement and maximising materials optimisation and extending replacement intervals. Furthermore, materials such as brick, concrete and aluminium will be used in the construction to reflect the local vernacular.

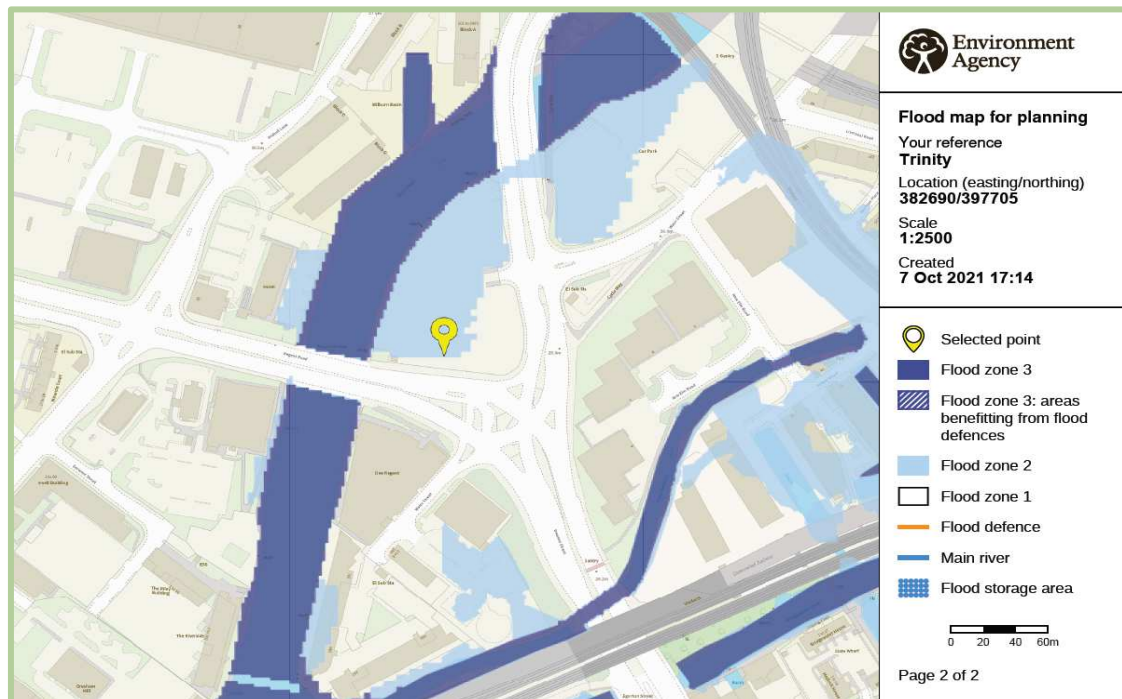


4.4 Surface Water Run-off

4.4.1 Flood Risk

The Site is located within a Critical Drainage Area however, the site also benefits from being located in a Low Flood Risk Zone. Data provided on the Environment Agency website confirms the development has a low probability of flooding and lies within Zone 1 (see Figure 4.1).

Figure 4.1 – Flood Risk Map



4.4.2 On Site Surface Water Management -

To minimise the risk and impact of localised flooding on and off-site, watercourse pollution and other environmental damage, a site-specific Flood Risk Assessment and Drainage Strategy Report has been prepared by Curtins Limited which confirms the following:

- The Proposed Development will be designed in order to **reduce the post development surface water run-off to at least 50%** of the existing surface-water brownfield runoff rates. It has been concluded that the only practical solution for the discharge of surface water is into the River Medlock;
- It is anticipated that surface water will discharge into the River Irwell at an un-restricted rate (l/s), however the velocity of the flow is likely to be limited and will be confirmed later into the development. The proposed outfalls will be fitted and controlled such that it doesn't breach the existing riverbanks or encourage back flows from the canal into the development's drainage network.



- The drainage strategy will be designed to withstand a 1 in a 100-year storm event plus at least a 30% allowance for climate change; and,
- The drainage strategy will incorporate Sustainable Drainage Systems (SuDS), where appropriate, throughout the Site such as permeable paving. The significant landscaping proposals will help to temporarily store the residual volume of surface water while it percolates through the growing media and filter layers below which treat the water before it is collected via a network of perforated pipes and then discharged to the proposed site outfall. Opportunities are currently being explored to incorporate the use of permeable sub-base to encourage sustainable rainwater collection but requires further co-ordination with landscaping, slab levels and services.

4.5 Waste

4.5.1 Construction Waste

- Best practice techniques will be adopted to prevent and minimise waste arising during the design and construction phases of the development in accordance with the principles of the waste hierarchy, as follows: This scheme will promote the minimisation of waste arisings on site through efficient design and procurement processes;
- Where feasible to do so, the design team has identified opportunities to maximise the use of recycled materials in construction; and,

- A target of **50% of waste to be diverted away from landfill** will be established for the construction phase of the development

4.5.2 Domestic Waste

The development will provide infrastructure and facilities that meet the need of the residents and building occupants for segregated waste storage, thereby optimising the ability to recycle waste:

- **A Site Waste Management Strategy has been developed** by Vectos Transport Planning Specialists, ensuring that adequately sized bin storage areas for each residential dwelling, access for collection personnel and vehicles will be established and other aspects of waste management will be designed into the development at an early stage of the design.
- The strategy will allow for storage of general waste, recyclable materials and food waste in order to **optimise the recycling rates achieved by Manchester City Council**; and,
- Communal bin storage provisions would enable residents and building users to make full use of Local Authority recycling services.



4.6 Health and Wellbeing

To enable the occupants of the proposed development to lead lower impact lifestyles and enhance their quality of life, the following measures will be delivered:

- The landscaped area will **facilitate natural surveillance** and create busy, overlooked routes at the Site to reduce the opportunity for crime, **creating a safer and more secure environment**. Furthermore, residents will benefit from the **improved physical and mental health** that will come as a result from the **enhancement in amount and quality of green space in line with MCC's Climate Change Framework**
- **Good levels of natural day lighting** will be achieved within the dwellings to reduce the need for energy to light the homes and improve occupant wellbeing;
- The combined residential and public elements of the development will enhance the character of the area as a familiar neighbourhood where people will live and spend their free time, supporting a vibrant and diverse community. Furthermore, **the mix of dwellings including one, two- and three-bedroom apartments, as well as a selection of penthouses will also contribute to housing diversity in the local area and help to address any housing imbalance** that may be apparent;
- Community 'grow zones' will provide the opportunity for people to learn about and grow their own produce. As well as the environmental benefits, this will strengthen the scheme as an inclusive and social development where people maintain long occupancies, thereby ensuring a strong local community;
- The security needs of the development will be considered to **achieve Secure by Design accreditation and adopt crime prevention measures** to assist in reducing the opportunity for, and fear of crime. Furthermore, the development will benefit from 24-hour on-site concierge/management staff in each tower; and,
- All dwellings will comply with National Space Standards to ensure that all dwellings are of a sufficient size and provide more flexibility and comfort for the future occupants.

4.7 Biodiversity

4.7.1 Protection and Enhancement of Ecology

Both brownfield sites are located within an urban area of Manchester and are chiefly composed of hard standing. The sites are separated by the A6042 road. There are areas of unmanaged grassland located within Site C, and an area of scrub vegetation is present at the southern end of Site D. Both sites are adjacent to the River Irwell at their north-western boundaries.

An Ecological Survey and Assessment of the Site has been undertaken by ERAP Limited to present the ecological, biodiversity and nature conservation status of the Site. The appraisal presents the results of a Licensed Bat Survey carried out at the Site.

The Ecological Survey and Assessment concludes that the Site is of low ecological value and that no protected species have been detected within the Site. However, the redevelopment at the Site will



provide an opportunity to **secure ecological enhancement for wildlife to provide a net gain in biodiversity.**

The Ecological Survey and Assessment recommends the implementation of reasonable actions for the **protection and long-term conservation** of fauna such as roosting bats, nesting birds and commuting/foraging bats associated with the Site. These recommendations are appropriate to the geographical area and take into consideration the end use of the Site as a residential development in order to support a sustainable development and are as follows:

- The landscape planting will be specified in order to **improve the Site's biodiversity potential**. Native planting and trees and shrubs of local provenance that support blossoms and fruit to support invertebrates will be selected. This will also encourage foraging birds and bats;
- During the construction phase, temporary protective demarcation fencing will be used to protect the trees and shrubs that are to be retained. Replacement tree planting is proposed which represents a replacement ratio of 3:1 as recommended by Manchester City Council.
- All lighting to be used at the Site during construction will be directional and screened where possible as lighting overspill may deter use by wildlife such as foraging bats;
- Installation of at least two non-species-specific nest boxes and two swift nesting boxes within the development. It is further recommended that bird boxes suitable for a variety of species are installed; and,
- If breeding birds are detected the ecologist will issue guidance in relation to the protection of the nesting birds in conjunction with the scheduled works.

4.7.2 Landscaping

A landscaping scheme has been completed by TPM Landscape. Other enhancement measures identified are as follows:

- The ground level landscaping scheme including publicly accessible garden areas and walkways (see Figures 4.2 and 4.3), will provide further opportunity for the planting of shrubs and grasses of native species to attract insects (pollinators) and in turn birds and bats. Furthermore, the sites are located at traffic dominated 'Islands'. The soft landscaping will assist with air and noise pollution and the proposed tree planting will assist in **offsetting CO₂ to create a high-quality development**
- Additional benefits in terms of shading and reduced local temperatures as a result of **evapotranspiration will be realised by the extensive tree planting** proposed for this site; and,
- The scheme proposals also include for a green 'Sedum' roof and green walls along the river walkways. There are numerous advantages that these bring in terms of **increased biodiversity**, as well as **improving shading** which will **help to reduce Urban Heat Island Effects**.



Figure 4.2 – Site C: Ground Floor Landscaping Scheme*Figure 4.3 – Tower F2: Ground Floor Private Garden*

4.8 Transport

The proposed development is located in Manchester city centre, which is **one of the most sustainable locations in the northwest**, particularly in relation to key pedestrian, rail, Metrolink and bus transport routes. Accessibility by sustainable modes of travel is excellent and is reflected by the Greater Manchester Accessibility Level 8.

To further enhance the sustainable credentials of the proposals, a Transport Assessment has been prepared by Vectos Limited. The Assessment concludes that future residents and building occupants will have a variety of sustainable travel options that will reduce reliance on the car. Overall, **the development will provide improvements to enhance the environment for all road users, most notably pedestrians and cyclists** including accessibility enhancement measures along Water Street and Trinity Way.

Transport Links –

- The site benefits from **excellent sustainable access opportunities** and is well connected by existing walking routes to key trip attractors. Bus and train can also be used to easily access the site;
 - Bus – The nearest standard bus stops are located along Bridge Street, approximately 550m from the Proposed Development which connects the site to Eccles, Brookhouse and Wigan Residents could also walk c.6000m to the bus stops along Whitworth Street West and opposite the Deansgate rail station which offers more services and the number 2 Free Bus. The Free Bus is a service providing direct access (every 10-minutes) to the Deansgate and Oxford Road railway stations along with key city center locations. There are 3 No. free bus services that run close to the site.
 - Rail – The nearest railway station is Deansgate which is approximately an 8-minute walk to the south of the development site. The station provides services to Manchester Airport, Liverpool, Blackpool and other regional locations. Salford Central is also a 10-minute walk away from the site. This station has been improved to provide a main commuting station for the western part of the conurbation leading to a greater variety of services using the station.
 - Metrolink – The nearest Metrolink station is Deansgate Castlefield which is just an eight-minute walk from the Site. This provides regular services to destinations including Bury, Oldham, Ashton-Under-Lyne, East Didsbury and Manchester Airport.
 - Car Clubs – A number of Enterprise Car Club cars and spaces will be provided at convenient locations close to the site, providing a socially inclusive, low emission and low-cost alternative to private car dependency.

A suitable level of parking is proposed to meet demand yet reflect the highly accessible location of the Site in terms of opportunities for active and sustainable travel. The proposals include for the provision of 558 car parking spaces to support the residential development. There will be capacity for up to 20%, demand-led Electric Vehicle Charge (EVC) provision (7kW each). Spaces will be future proofed with containment channels that enable cable connections to be installed as and when required.

The proposed development will offer **100% cycle parking provision** provided in secure, internal locations across the basement levels, in addition to 56 cycle spaces for visitors across the public realm to encourage the use of sustainable modes of transport.



Local Amenity Access -

- Residents are able to walk to local amenities and shops that are proposed to be situated on the ground floor of the Site.
- The site benefits from very good links to local amenity space and recreational facilities in support of a vibrant, diverse and inclusive community, these include:
 - Recreational Space – The River Irwell is within the locality of the development Site. Hulme Park is located a 15-minute walk to the south of the Site;
 - Education – Manchester Metropolitan University, the University of Manchester and the University of Salford are located within 1.7km of the Site. There is also a diverse range of educational facilities such as Primrose Hill Primary School, St Phillip's CofE Primary School and Bright eyes Day Nursery, all within 1.7km of the development site; and,
 - Cultural – There are a multiplicity of cultural institutions such as the Science and Industry Museum, numerous theatre and art venues and Manchester's City Library only a short distance from the Site.

Disability Access -

- Disabled access provision within the scheme itself will be in accordance with Building Regulation, Part M criteria as far as possible as outlined within the Design and Access Statement;
- There will be 29 accessible spaces provided on site, which equates to approximately 10% provision. This exceeds MCC's minimum requirement of 5%; and,
- Lift access will be provided to all floors.

4.9 Green and Blue Infrastructure Strategy

The River Irwell runs close to the development site providing an attractive setting for apartments and associated amenities. This will provide an opportunity **to encourage access to part of the city centre's Blue Infrastructure.**

The towers will be developed within an attractive parkland setting with the aim of changing the nature of the traffic dominated environment. The formation of gardens with **seating areas and greenery spread throughout the development** will be a key component as it will draw people through the development and to help create successful neighbourhoods and support the city's growth.

The under-utilised River Irwell will be made accessible to create new walkways and routes to create an attractive urban riverside environment. The proposed public realm and **community grow zones will also help to promote this 'healthy walk' along the river corridor**, providing a further steppingstone to overall improve connectivity and accessibility to Green and Blue Infrastructure within the city.

Pollution Prevention Guidance will be adhered to by the main contractor in respects to air (dust) and water (ground and surface) pollution during the construction phase to prevent any degradation of existing Blue Infrastructure features local to the development site. Pollution prevention measures may include, but are not limited to the following:



- Bunded tanks;
- Dampening down of materials;
- Oil-water separators; and
- Gully traps.

The landscaping proposals will also bring environmental benefits such as **improved air quality and reduced noise pollution**. There are also active benefits to the community to be reaped from such infrastructure. These include:

- Space for children to interact with nature;
- Positive impacts on mental wellbeing;
- Increase in social interaction; and,
- Reducing antisocial behaviour, isolation and stress.



5. ENERGY STRATEGY

Details of the proposed energy strategy for this development, which include an enhanced 'fabric led' approach to dwelling emission rate reduction combined with efficient mechanical and electrical servicing are reviewed below.

A combination of enhanced building fabric specification (significantly beyond the current regulatory compliance standard) allied to efficient mechanical and electrical systems and controls will achieve compliance with the emission reduction targets stipulated by MCC's adopted planning policy, Building Regulation Part L (2013) and forthcoming Building Regulation Part L (2021) requirements.

Priority is given to achieving the energy and carbon emissions targets by means of on-site measures applying the principles of the energy hierarchy.

5.1 Build Fabric and Thermal Performance

The standard measurement of heat transfer through a given building material or construction type is the U-value (W/m^2K). In buildings, heat loss generally occurs through the following areas and elements of the construction:

- Ground Floor;
- External Walls;
- Roofs;
- Doors and windows;
- Thermal (cold) Bridging (heat loss through construction joints); and
- Uncontrolled ventilation.

The lower the U-value, the more slowly heat transfers and is lost out of a building. Table 5.1 presents the proposed material specification that will be incorporated to limit heat loss and ensure efficient operation of the Proposed Development.

Table 5.1 – Proposed Building Specification

Item	Specification
Ground Floor	$U=0.12W/m^2K$
Unitised Curtain Wall	$U=0.90W/m^2K$ (area weighted average)
Party wall	$U=0.00W/m^2K$ (full fill & seal)
Corridor Wall	$U=0.00W/m^2K$ (full fill & seal) – heated corridor
Roof	$U=0.12W/m^2K$
Windows & Glazed Doors	As per curtain wall specification; $g=0.40$
Purge Vents	As per curtain wall specification; $g=0.20$
Air Permeability	$2.75m^3/hm^2$ (@50Pa.) – 1-bedroom apartments $2.50m^3/hm^2$ (@50Pa.) – 2- and 3-bedroom apartments
Cold Bridge	Bespoke values, assessed for each plot for concrete frame construction



These specifications and design attributes will provide the following benefits:

- **High performance thermal insulation** throughout the building envelope (ensuring very low U-values for all heat loss elements) and thermally efficient windows and doors will minimise heat loss through the main building elements;
- **Thermally efficient, triple glazed windows** will be specified with argon gas fill and low emissivity coatings to limit heat loss through the panes. The glazing g-value will be specified to optimise beneficial solar gains but limit the propensity for the dwellings to overheat;
- **Very low air permeability** of at least $2.75\text{m}^3/\text{hm}^2$ (@50Pa.) is targeted for this build in order to minimise uncontrolled ventilation. This will further reduce heat losses and provide high levels of occupant comfort (in combination with the proposed mechanical ventilation strategy). Focus on the quality of the build is vital to deliver such airtight buildings;
- **Optimised cold bridging junctions** including the provision of insulation to reduce heat and limit heat losses that occur at the junctions between building elements and around openings and will significantly improve the emission rate of the dwellings; and,
- **Efficient Form** - apartments are an inherently efficient form of construction, both in terms of the materials required to build the dwellings and the ongoing heat energy demand. This is a result of relatively low areas of external heat loss elements associated with such layouts which enhance the energy efficiency of the dwellings and guarantees low energy demand throughout their occupation.

This specification will help to deliver an energy efficient development that achieves an emission rate reduction and fabric energy efficiency performance that satisfy the requirements set by building regulation Part L1, (2013). This fabric specification will also ensure compliance with the significantly more onerous fabric energy efficiency target stipulated by forthcoming Part L 1A (2021) regulations.

5.2 Building Services Specification

The buildings will utilise a **'full electric' energy strategy**. The proposed mechanical and electrical specification that will be incorporated to ensure efficient servicing of the residential dwellings and non-domestic areas is presented in Tables 5.2 and 5.3 respectively.

Table 5.2 – Proposed Mechanical and Electrical Specification; Residential Zones

Item	Specification
Ventilation	High efficiency MVHR, insulated ductwork (<i>Brookvent Aircycle 1.2 - SFP 0.74 or better / 91% efficiency</i>)
Lighting	100% 'Low E' or LED (<i>At least 80 lumens/circuit Watt</i>)
Space Heating	Electric Panel Heaters
Water Heating	High efficiency immersion cylinders <i>Capacity varying dependant on apartment size as follows:</i> <i>1 Bed Flat – 120 Litres, 0.96 kWh standing losses</i> <i>2 Bed Flat – 150 Litres, 1.13 kWh standing losses</i>
Heating Controls	Programmer and appliance thermostat



Table 5.3 – Proposed Mechanical and Electrical Specification' Non-domestic Zones

Item	Specification
Ventilation	MVHR (>80% heat recovery)
Lighting	100% 'Low E' or LED
Space Heating	Split system, Variable Refrigerant Flow Air Source Heat Pump
Water Heating	High efficiency immersion cylinders served by heat pump

This mechanical and electrical specification will deliver a Building Regulation Part L1A (2013), Part L2A (2013) and Part L1A (2021) compliant scheme for all aspects of the Proposed Development and will provide the following benefits:

- **Mechanical ventilation with heat recovery (MVHR)** systems will be specified in each dwelling to maintain a healthy living environment and further reduce the heat losses and the energy demand of the dwellings. The proposed MVHR system can recover over 90% of heat from the extracted stale air from the dwelling by using a counter flow heat exchanger which 'pre-heats' cool incoming, fresh air. The outgoing and incoming air pass next to each other, but do not mix. The design air permeability of 2.50m³/hm² (@50Pa.) for the dwellings will virtually eliminate uncontrolled ventilation and ensure that the majority of the expelled stale air will pass across the heat exchanger, thereby boosting the energy reduction potential of these systems;
- **No mechanical cooling required for the dwellings.** Dynamic simulation energy model (DSM) calculations (applying the CIBSE TM59 assessment procedure) for these buildings have been completed to demonstrate that the dwellings are not considered to be at risk from overheating. This is due to optimisation of the glazing's solar transmission (g value) which (currently applied as g=0.40) limits unwanted, excess solar gain whilst allowing useful heat from the sun to enter the dwellings coupled with the proposed MVHR systems which incorporate a summer by-pass function to provide cool air within the dwelling during warm days;
- **Low energy and LED lighting** will be specified throughout the Site in order to maximise operational efficiencies and lifespan of the fittings. LEDs operate with an estimated energy efficiency of up to 90% when compared to traditional lighting and conventional light bulbs. This means that about c.90% of the electrical energy is converted to light, rather than wasted heat as in conventional bulbs. Common areas and non-domestic zones will also benefit from PIR control and photocell dimming controls;
- **High efficiency hot water storage** will be specified within the apartments by means of low standing (heat) loss immersion cylinders reducing hot water energy loads. To further limit energy demand for hot water, dwellings will be provided with water-efficient fixtures and fittings, to limit overall water consumption to <105 liters per person per day;
- **Sophisticated heating controls** including appliance programmer and room thermostats will ensure the efficient delivery of heat from electric panel heaters to further reduce the dwellings' energy demand; and,
- **Split system heat pumps** benefit from high seasonal efficiencies for both heating and cooling modes and are proposed for the non-domestic zones. Additionally, these systems allow precise control of the necessary refrigerant circulation amount required according to the system load



facilitating a comfortable environment in the non-domestic zones by use of smooth capacity control.

5.3 Rationale

The proposed energy strategy will provide a number of benefits in terms of energy efficiency, deliverability and viability of the scheme as a whole. The advantages of the proposed full electric servicing option for the Proposed Development are reviewed below:

Residential Heating Strategy Benefits –

- The scheme will improve upon the current Building Regulation Part L (2013) criteria in terms of dwelling emission rate and fabric energy efficiency and will also provide a betterment over the upcoming, stringent, Part L 2021 Building Regulation standards. These systems will also ensure **high levels of occupant comfort coupled with low heating bills**;
- There will be **no local emissions associated with the proposed electric heating strategy**, including Nitrogen Oxide which is known to be a significant pollutant in inner city areas;
- Electrical panel heating generates a **reduced overheating potential** – electric space heating delivers virtually instantaneous heating at the location it is required. Unlike a ‘wet system’ associated with communal gas boilers which inherently have a long lag time for the heat to be generated and then dissipated when no longer needed. This lag time can lead to the dwellings overheating as the hot water remains in the radiators for a considerable time after the heat demand is required;
- Optimised use of space as less space is required within risers therefore allowing for more **generous dwelling dimensions** to be realised. A fully electric heating system also negates the need for mid-tower height plant rooms, as pumping water to the upper storeys of the building requires the introduction of mid-height plant rooms to boost the water pressure. A fully electric heating system is much **more cost effective in terms of installation than communal gas and requires much lower maintenance**. This will therefore keep service charges down for the building’s occupants;
- Electric heating, as proposed for the dwellings, is 100% efficient at the point of consumption. The heat pumps which are to be specified in the non-domestic zones will operate with approximately >350% efficiency. The proposed full electric energy strategy is not compatible with a district heating, ‘connection-ready’ system. Provision of infrastructure for a potential future connection to a planned DHN would limit the current building heating and hot water designs to a complex centralised system plus, there is no existing heat networks local to the Site. Furthermore, provision of infrastructure for a potential future connection to a DHN would add significant additional capital costs as a consequence of metering and distribution network requirements, a reduction in net floor areas, increased building management and ongoing maintenance costs; none of which are required for the proposed decentralised all electric heating and hot water solution. Given the trajectory of the UK electricity grid towards zero carbon power within the next ten to fifteen years, the relative environmental benefit of ‘full electric’ to district heat networks is unclear. It has therefore, been determined that including provision for future connection to a district heat network is an unviable, high-risk option for this scheme and will not therefore, be pursued. **This full electric strategy aligns with MCC’s Climate Change Framework actions to eliminate the demand for natural gas and replace with renewable and electricity-based heating systems;** and,
- The UK government is committed to reducing the country’s emissions and has legislated to do so within the Climate Change Act. **As the UK’s grid becomes less carbon intense over time the carbon emissions associated with full electric heating will become less** – please see calculations in Section 5.5.2 which reflect the current status of the UK’s decarbonised grid.



5.4 Low and Zero Carbon Energy Provision

A number of alternative renewable energy options have been considered as part of the site-wide energy strategy to ensure the selection of the most appropriate solution is proposed. The following technologies have been assessed:

- District Heating;
- Solar Hot Water (SHW);
- Photovoltaics (PV);
- Wind;
- Ground Source Heat Pumps (GSHP);
- Biomass heating.

A review of the development proposals and Site location concludes that none of these options are deemed to be feasible for this scheme, as detailed below:

✖ **District Heating** systems provide multiple buildings or dwellings with heat and hot water from a central boiler house, or 'energy centre'. The system can provide heating or cooling which is transferred from the energy centre through a network of highly insulated pipes carrying the heated water to each dwelling. It has been determined that there are no existing heat networks / energy centres within a moderate radius from the development and there are no existing networks local to the Site

✖ **Solar Hot Water** utilises the energy in sunlight and diffuse daylight to heat water for use in buildings. The main component of any solar water heating system is the collector, which absorbs the radiant energy of the sun and converts it to heat energy. This technology is not considered to be a feasible option for this Site because, there is limited available roof space to accommodate this technology and these solar thermal technologies make only a relatively limited contribution to reducing the building's energy demand and carbon dioxide emissions. Furthermore, there are potential problems associated with routing the pipework through the dwellings.

✖ **Photovoltaic (PV)** panels harness solar thermal energy and convert it into electricity which can then be used within a building. The panels are typically orientated in a southerly direction in tilted arrays, thereby enabling this technology to operate efficiently. This technology is not however considered to be a viable option for this Site as a consequence of limited roof areas for PV location and the remaining area within the application Site is allocated for public realm, which doesn't lend itself to renewable energy plant.

✖ **Wind Turbines** are considered unsuitable for this Site due to a poor wind resource. In order to operate efficiently a wind speed of at least 6m/s is typically required. The NOABL wind speed database records a wind speed of approximately 4.9m/s at 10m above ground level for this Site (see Figure 5.1) for this Site (Trinity Way).

Figure 5.1 - Wind Speed Data for the Proposed Development Site

Wind Speed at 10m	4.4m/s
Wind Speed at 25m	5.3m/s
Wind Speed at 45m	5.8 m/s

✖ **Ground Source Heat Pumps** collect low-grade heat from the ground to supply useful heat for space and water heating requirements. By applying additional energy input (in the form of electricity), it is possible to raise the temperature of the source heat to the temperature required. Such technology is considered unsuitable for this Site due to an insufficient area (based upon indicative layouts) to install a horizontal ground collector and the prohibitive costs of installing vertical boreholes on a development of this scale.

✖ **Air Source Heat Pumps** collect low-grade heat from the air to supply useful heat for space and water heating requirements. They operate in the same way as a ground source heat pump, by applying additional energy input (in the form of electricity), it is possible to raise the temperature of the source heat to the temperature required. Whilst technically feasible, such technology is considered unsuitable for this site due to prohibitive costs.



✖ **Biomass heating** would be capable of delivering the target CO₂ emission reductions but is considered inappropriate for this type of development in an urban location due to the high NO_x emissions associated with this technology and the need to frequent, large fuel deliveries to the Site and storage of the biomass fuel.

5.5 Energy Performance Calculations

5.5.1 Methodology

The developer commits to achieve the MCC's Core Strategy Policy EN6 CO₂ targets. Energy modelling has been undertaken to provide assurance that the proposed design and principles of the building services strategy will deliver energy efficient buildings that achieve the requisite carbon dioxide emissions reduction targets. The exact build specification may however differ as the design progresses through the RIBA Plan of Work, into RIBA Stage 4 (technical Design) and procurement.

To ensure that the assessment of this scheme fully reflects the regulated carbon emissions associated with their expected operation, the representative energy demand models have been completed using SAP2012 and SAP10 beta software^[1] (Design SAP 10 Beta 1.03r03) concurrently. *Using SAP 10 software is considered more accurate as this reflects the more up-to-date carbon factors that are c.74% lower than the out-of-date factors currently being applied for building regulation compliance purposes:*

- SAP 10 Beta software calculates the primary energy demand of the dwellings, regulated carbon dioxide emissions and fabric energy efficiency, in accordance with the requirements of emerging Building Regulation, Part L1A (2021) that the Proposed Development will be constructed in compliance with.
- Approved SAP 2012 software (Design SAP 2012 4.14r16) has also been used to calculate regulated energy demand models, representative of all dwellings within the scheme, in order to demonstrate that the adopted planning policy requirements of MCC have been met through the proposed design. Additional calculations will be required post-planning to support building regulation submissions.

Block compliance (multi dwelling) SAP calculations have been applied to the Proposed Development with respect to both sets of calculations in accordance with guidance provided within Approved Document L1A. Representative SAP models have been calculated for ten apartments within tower D1 and for twelve apartments in D2 (see Appendix A for the SAP data). These units have been selected for assessment as they constitute a typical floor plate of dwellings within the scheme and are representative of the entire Site in terms of their size, layout and orientation (see Figures 5.1 and 5.2). The layout of the apartments on these floorplates are repeated through the majority of all four towers therefore, this sample provides a robust indication of the overall performance of the residential element of the proposals throughout the entire Trinity Islands development.

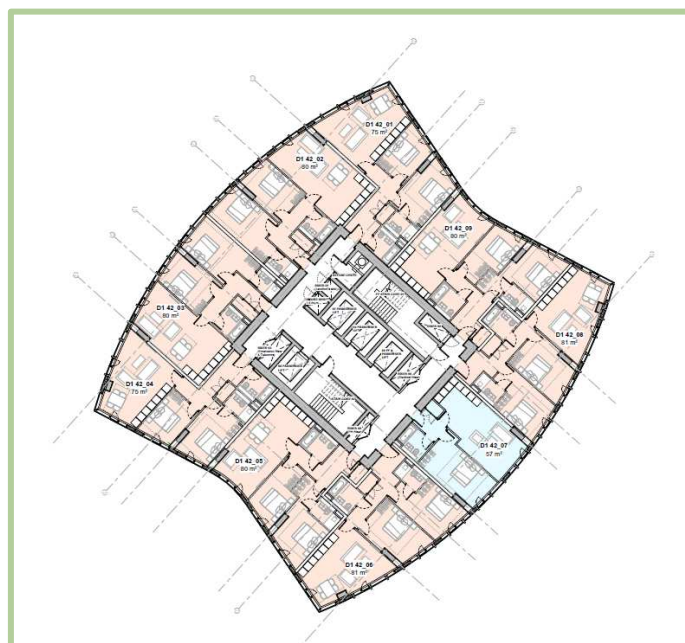
^[1] The beta version of SAP10 Design SAP is based upon the BRE SAP 10.1 software. We anticipate there will be a further update to SAP (to version 10.2) following consultations, prior to its official use.



Figure 5.1 –Typical Floor Plan Layout – Tower C2



Figure 5.2 –Typical Floor Plan Layout – Tower D1



5.5.2 Regulated Energy Demand and Emission Calculations

The development targets the MCC Core Strategy Policy EN6 requirement for at least 15% reduction in Part L1A 2010 carbon emissions. The revised equivalent target CO₂ emission reductions for the Site is a 9% dwelling emission rate reduction relative to the current building regulation Part L1A (2013) standards.

The emissions and energy demand performance associated with the proposed 'fabric led' specification for the units within the typical floorplates are presented in Tables 5.4 to 5.7.



Table 5.4 – Calculated Regulated Dwelling Emission Rate – Tower D1

	SAP 10
Dwelling DER (kgCO ₂ /m ² /yr.)	5.67
Dwelling TER (kgCO ₂ /m ² /yr.)	12.18
% DER Reduction over Part L	53.43%

Table 5.5 – Calculated Regulated Dwelling Emission Rate – Tower C2

	SAP 2012	SAP 10
Dwelling DER (kgCO ₂ /m ² /yr.)	20.57	5.57
Dwelling TER (kgCO ₂ /m ² /yr.)	22.85	12.10
% DER Reduction over Part L	9.98%	53.95%

The Dwelling Emission Rate (DER) reduction for tower C2 is shown to be 9.98% better than that Building Regulation Part L1A (2013) compliance standards, therefore a commitment is made to meeting the MCC Core Strategy Policy EN6 targets. The marginal difference in SAP 10 emissions rate between towers D1 and C2 indicates that the specification is representative of how all four towers would perform against current 2013 building regulations hence only building type has been modelled for this purpose.

When applying the current and up to date carbon factors through the use of SAP 10 Beta software, the buildings are seen to improve upon the Part L1A (2021) carbon dioxide compliance standard by at least 50%.

This reflects the benefits associated with increased grid mix electricity generation from low carbon and renewable technologies and the switch away from burning fossil fuels in power stations. The application of SAP10 is considered to be a more accurate approach to assessing the expected carbon performance of new developments.

Applying the revised carbon factors to the building's Dwelling Emission Rate (DER) shows that the 'full electric' energy strategy proposed for the dwellings will actually provide a DER of no more than 5.67kgCO₂/m².

In line with the MCC Climate Change Framework, this development has been proven to take maximum advantage of the decarbonised grid mix electricity due to the proposed full electric heating strategy.

This provides a steppingstone towards zero-carbon operational standards whilst the UK government establish a national zero carbon definition and methodology for near-future implementation.

5.5.3 Fabric Energy Efficiency Calculations

The recent publication of the responses to the Future Homes Standard consultation (2021) confirmed the Fabric Energy Efficiency Standard (FEES) 'Option 1' would be retained as a compliance metric for new dwellings in Part L1A (2021).



Table 5.6 – Calculated Fabric Energy Efficiency – Tower D1

	SAP 10 – FEE Option 1
Dwelling DFEE (kWh/m ² /yr.)	25.34
Dwelling TFEE (kWh/m ² /yr.)	26.03
% DFEE Reduction over Part L	2.65%

Table 5.7 – Calculated Fabric Energy Efficiency – Tower C2

	SAP 2012	SAP 10 – FEE Option 1
Dwelling DFEE (kWh/m ² /yr.)	28.01	24.19
Dwelling TFEE (kWh/m ² /yr.)	37.08	25.20
% DFEE Reduction over Part L	22.01%	3.99%

The Dwelling Fabric Energy Efficiency reduction for the Proposed Development is at least 22% when assessed against Part L1A (2013) Standards.

The results presented in Tables 5.6 and 5.7 demonstrate a **betterment of at least 2.65%** will be achieved across the Site in relation to the expected Dwelling Fabric Energy Efficiency (Option 1) reduction target required by Building Regulation Part L1A (2021).

5.5.4 Primary Energy Demand Calculations

Following the publication of the Future Homes Standard consultation (2021), a new Primary Energy Rate metric has been introduced which accounts for the efficiency of a dwelling's heating system, including any upstream energy efficiency losses such as power station generation efficiencies, transportation, distribution and transmission losses.

Table 5.8 demonstrates the performance of the Proposed Development with respect to Primary Energy Rate and the scheme is expected to achieve at least a 7.46% reduction over Part L1A (2021) standards.

Table 5.5 – Calculated Primary Energy Rates – Towers D1 and C2

	Tower D1	Tower C2
Dwelling DPER (kWh/m ² /yr.)	62.58	61.52
Dwelling TPER (kWh/m ² /yr.)	67.62	67.40
% DPER Reduction over Part L 2021	7.46%	8.72

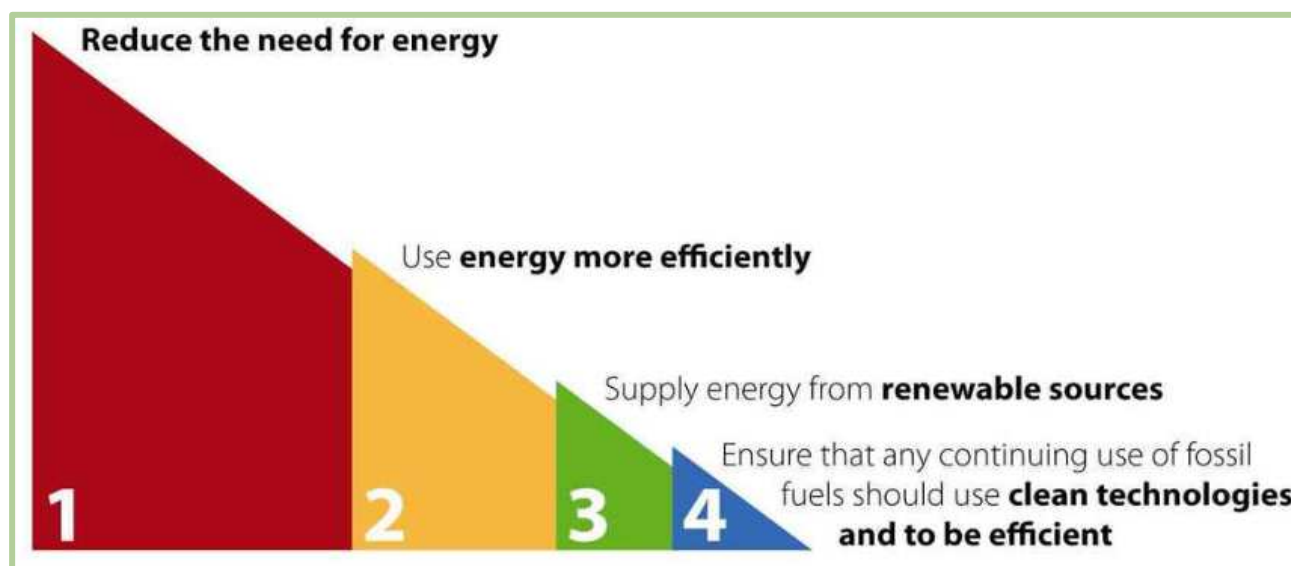
5.6 Energy Hierarchy

The Energy Hierarchy provides a framework to guide energy policy and decision making to achieve practical and cost-effective carbon emission reductions. The hierarchy prioritises demand-side activities to reduce wastage and improve efficiency (see Figure 5.2).



The scheme will incorporate a **significantly enhanced material specification along with high quality design and construction standards** in order to improve the energy efficiency of the whole building through a ‘fabric led’ energy strategy. The construction, design and specification proposed for this scheme will deliver dwellings that are inherently efficient and cost-effective during occupation.

Figure 5.2 – The Energy Hierarchy



First Principle

The building will be constructed with a **material and design specification which far exceed the prevailing minimum Building Regulation standards** and includes numerous efficiency measures designed to reduce heat losses and minimise energy demand, as follows:

- Enhanced levels of insulation to achieve very low u values, plus a triple glazed curtain wall façade system;
- The design air permeability targets for the residential units are 2.5m³/hm² (@50Pa.) and 2.75 m³/hm² (@50Pa.) for two/three-bed and one-bed apartment types respectively. This very low design air permeability target will virtually eliminate any uncontrolled ventilation and assist to limit heat loss through the structure of the build; and,
- The g value of the glazing within the development will be optimised to control solar gain in the summer months and allow beneficial gains in the winter season so as to minimise the overheating risk and limit the heating energy demand within the properties.
 - The g value is determined by CIBSE TM59 thermal comfort analysis of representative apartments throughout the scheme.

This ‘fabric led’ approach to minimising energy demand and associated carbon dioxide emissions is aligned with the first principle of the energy hierarchy which states that reduction in energy demand should be achieved initially by energy efficiency.



Second Principle

Proposed mechanical ventilation with **heat recovery systems will capture much of the heat from the extracted air** from the properties and non-domestic areas. The proposed 100% low energy lighting provision and sophisticated control systems for the space and water heating within the dwellings will also ensure the energy consumed by the dwellings is used efficiently.

Third Principle

Renewable energy systems are not currently proposed for this development. A number of renewable energy technologies were assessed (in section 5.4 above) and none of them were considered to be feasible. The Applicant's preference is to focus on **quality construction and thermally efficient materials** to meet the building regulation criteria (both current Part L 2013 and the *significantly more onerous emerging Part L1A (2021) Building Regulations*) without the need to integrate 'bolt on' renewable energy solutions.

High efficiency heat pumps will supply heating and cooling on demand to all non-domestic zones.

Fourth Principle

100% efficient electric panel heaters will provide all space heating within the apartments. This will ensure that fossil fuels consumed by the dwellings for heating purposes will be burnt cleanly and efficiently. Furthermore, the insulated distribution pipework will minimise energy losses from the hot water systems, often referred to as 'standing losses'.

The Proposed Development is therefore, aligned with the energy hierarchy promoted within the Manchester Core Strategy.

5.7 Overheating Assessment

The representative SAP calculations demonstrate that the buildings comply with building regulation Part L Criterion 3, overheating risk.

To further refine the buildings' energy strategy with regard to control of overheating, a CIBSE TM59 (Design methodology for the assessment of overheating risk in homes) thermal analysis has been carried out on the development by WSP Ltd. to ascertain any issues with summertime overheating.

Informed by the TM59 assessment and modelling, the SAP energy calculations reported within this statement utilise a g value of 0.40 for clear vision panels and g=0.20 for purge vent glazing to ensure a robust set of results were attained from this initial modelling exercise. **All rooms were found to comply with the overheating criteria.**



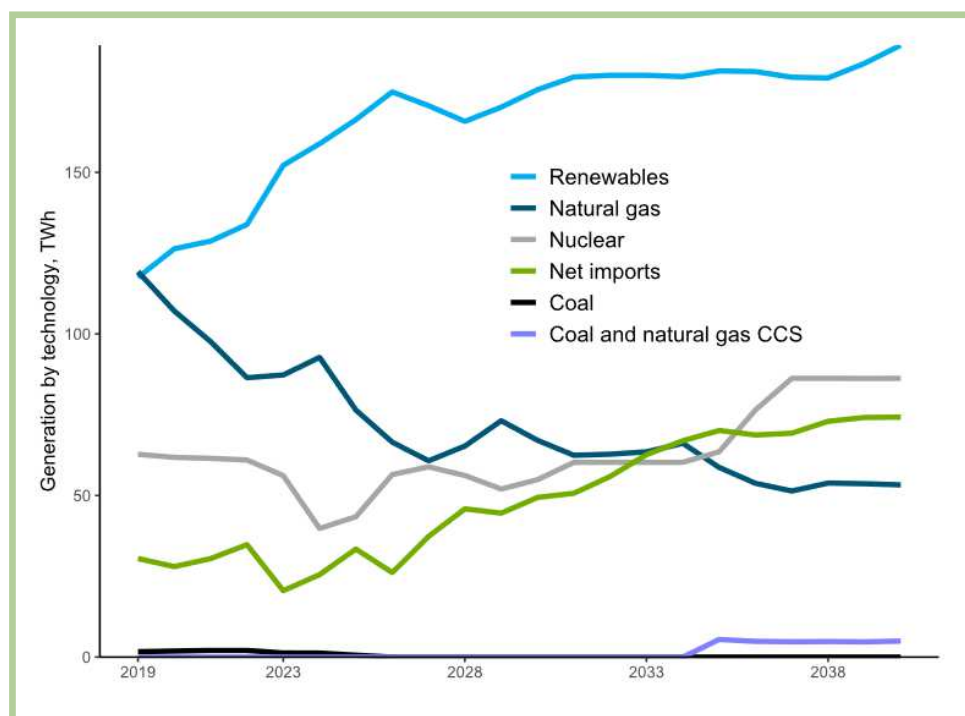
6. CLIMATE CHANGE EMERGENCY

6.1 Key Principles

A Climate Emergency was declared by Manchester City Council on 10th July 2019, with a target to make Manchester carbon neutral by 2038. In support of this imperative for action, the Applicant wishes to highlight the following measures that will form part of the specification of this development:

- An energy strategy that delivers the current Core Strategy carbon dioxide emission reduction targets and aligns with emerging Building Regulation standards;
 - In securing compliance with the emerging (stringent) Building Regulation Part L, 2021 targets, a commitment is made to construct a **high specification, energy efficient thermal envelopes** thereby **minimising demand side energy loads** – in accordance with the principles of the Energy Hierarchy;
 - The SAP calculations show a **53.95% reduction in dwelling emissions compared to emerging Part L 2021 Building Regulations**;
 - The low carbon share of electricity generation is projected to rise to 83% by 2040. As the UK electricity grid CO₂ footprint continues to reduce (see Figure 6.1 sourced from BEIS Energy and Emissions Projections 2019), so too will the carbon dioxide emissions associated with this **‘fully electric’ buildings’ services energy strategy**. This would not be the case if the buildings were heated from fossil fuels, for example, gas boilers and/or CHP;

Figure 6.1 - Energy and Emissions Projections 2019 (BEIS)



- Furthermore, ‘electric’ strategies supply heat on demand, are 100% efficient and only use the power as required which **reduces overheating potential of the buildings**;
- Air source heat pumps will be utilised in the non-domestic zones, delivering **high efficiency heating**; and,



- Calculations to demonstrate the benefits associated with decarbonisation of the grid have been prepared (see Section 5.4), with specific reference to the revised SAP10 carbon factors and forthcoming Part L1A (2021) regulatory compliance.
- Unregulated energy demand (that is, the energy demand associated with appliances and cooking) typically accounts for approximately a quarter of the regulated building emissions from modern residential developments such as this. To limit this:
 - The integrated white goods will have as a **minimum an A+ energy rating**;
 - All landlord supply will be supplied by '**low carbon**' **electricity tariffs**, containing high percentage of renewables, above that supplied within the standard grid mix (the facilities manager will be required to ensure this is maintained going forward); and,
 - A welcome pack will be provided to all residents to encourage selection of green energy providers to enable them to make informed decisions.
- There is a fine balance between the solar gain, overheating calculations which require an element of heat loss and energy models that require heat insulation. In essence, there is a limit to fabric enhancements such as increased insulation and improved air tightness as this yields a higher overheating risk and as a consequence, the building has the potential to require increased cooling loads, which are to be avoided. The design of this development balances both requirements and incorporates **a building specification intended to avoid cooling requirement**. Measures beyond building regulation requirements have been applied to quantify the overheating risk:
 - CIBSE TM59 'assessment of overheating risk in homes' analysis has been undertaken to refine the dwelling specification. This considers future weather data sets to account for the anticipated rise in summer temperatures as a result of climate change. Therefore, mitigation strategies can be reviewed if required whilst also **optimising the building design and specification to benefit from the useful solar gains** whilst limiting the propensity to overheat;
 - The glazing proportions, ventilation system and solar control glazing are designed to optimise solar gains within the building yet limit the propensity to overheat. The provisions for purge ventilation (e.g. openable purge panels) can also be used to improve thermal comfort, thus, **these dwellings do not require active cooling** which further limits the energy demand of the development.
- It is anticipated that more severe, short term weather events such as extreme flooding, storms, droughts and heat waves will become more frequent. This development will be resilient to potential climate change effects in the following ways:

- **An increase in tree cover and therefore shade, over the entire area;**

 - The height massing of this scheme has been specifically designed to allow for the movement of air throughout the development and surrounding area, thereby reducing the urban heat island effect; and,
 - Evapotranspiration from the trees and planting will also mitigate the urban heat island effect.
- The Proposed Development will demonstrate resilience to potential climate change effects through the management of surface water:
 - This system will be designed such that the total peak run-off rates from the site will be reduced to **provide an overall betterment of 50%**;



- The system will be designed to withstand a 1 in a 100-year storm event plus a 30% allowance for climate change; and,
 - **The extensive landscaped areas and newly planted trees will serve to increase the short-term water storage within the site** and attenuate the rate and volume of surface water movements off site, thereby relieving potential for flash flood risk and pollution within the water catchment.
- The design of the proposed public realm has been considered in relation to mitigating impacts on climate change and improving biodiversity, as follows:
 - **Carbon sequestration (CO₂ offsetting) from the planting of new trees;** and,
 - The planting and provision of public amenity space will support the Sustainable Drainage Systems (SuDS), by means of interception and transpiration.
 - Waste is a misuse of natural resources and also contributes a large proportion of the UK's carbon footprint;
 - Waste minimisation during construction will reduce raw materials demand, **thereby reducing the buildings' embodied carbon footprint;** and,
 - During occupation, the building will benefit from recycling facilities to enable the local authority waste reduction targets, **diverting more materials away from landfill** and reducing the occupants' carbon footprint further
 - The Site's location will enable a low carbon, sustainable lifestyles. Located minutes away from several major railway stations, the residents have the option to utilise various sustainable modes of transport. This is facilitated by basic infrastructure provided for future connections such:
 - Secure cycle storage on site (100% provision) and up to **20% active electric vehicle charging provision** within the resident's car park to facilitate the increasing, widespread transition to electric car usage and ultimately help to support a growing sustainable community;
 - Travel options, including local access to transport nodes for bus and Metrolink;
 - Local amenities are within easy walking distance of the site, **enabling residents to live local with a reduced need to travel;** and,
 - Home working options are supported by the **generous apartment dimensions** and **very good levels of natural daylighting.**
 - The buildings are designed to incorporate features that will serve to reduce energy demand, and in turn, carbon emissions arising from access to the dwellings:
 - The lighting provision within the common areas will include active sensors;
 - **Mechanical ventilation with heat recovery systems will be specified throughout the development** to maintain a healthy living environment and further reduce the heat losses and the energy demand of the dwellings; and,
 - The fit-out specification of the dwellings will minimise water demand. Water efficiency measures (such as dual flush toilets, flow restrictors and reduced volume baths) will limit potable water demand to <105litres/person/day. This will reduce water heating energy loads and also cut the process energy required to supply clean drinking water.

These commitments, in combination, seek to work towards the carbon reduction target of no more than 1.5°C global temperature increase and assist Manchester City Council in meeting their Climate Change Emergency.



6.2 Life Cycle Assessment

With the goal of informing design decisions and guiding the proposed scheme contributing towards a Net Zero Carbon development, WSP Limited have prepared a Life Cycle Assessment (LCA). The emissions sources, described as elements with their associated Lifecycle Stage during the Proposed Development's lifespan, have been identified in Table 6.1.

Table 6.1 – Scope of the LCA

Element	Phase	Justification
Product stage (manufacture and transport of raw materials to suppliers) A1-3	Construction	Raw materials required for the Proposed Development will result in embodied emissions and have the potential to be large.
Transport of materials to site A4	Construction	Construction stage emissions from fuel / energy consumption due to the delivery of material to site have the potential to be large.
Plant and equipment use during construction A5	Construction	Fuel / energy consumption of plant and equipment used during construction would generate GHG emissions.
Disposal of waste A5	Construction	Emissions from the disposal of waste are unlikely to be large, due to a large proportion of construction waste being inert.
Replacement and refurbishment B2-5	Operation	The replacement and refurbishment of the Proposed Development would release a potentially large magnitude of emissions.
Operational Energy Use B6	Operation	In-use electricity emissions will be released on an annual basis due to the building use.
End-user emissions (regional traffic flows) – traffic B9/D	Operation	Changes to regional traffic flows are expected and this has the potential to result in a large change in GHG emissions.
Decommissioning process C1-C4	End of Life	Any emissions arising from decommissioning, stripping out, disassembly, deconstruction and demolition operations as well as from transport, processing and disposal of materials at the end of life of the project.

The environmental effects assessed are:

- **Whole Life Embodied emissions:** This includes embodied carbon emissions related to materials and construction process throughout the lifespan of the building, including upfront emissions during constructions, construction transport emissions, emissions from replacements/repairs during the operational phase and end-of-life emissions.
- **Operational Building emissions** (from energy use): This includes emission related to the energy consumption of the building, throughout its operational phase.
- **Operational Transport emissions:** This includes emission related to the transport, throughout its operational phase

The LCA will enable the project team to:



- ✓ **Understand** the sourcing and processing of materials and products. In turn, the team can then prioritise the materials that make the most difference and highlight materials solutions or alternative designs that have the biggest impact. The LCA, shows the majority of embodied carbon emissions are related to the product and materials stage (over 54%). Therefore, the raw material supply, transport and manufacturing selection is an important element of mitigation. For example, the team have considered the contribution of concrete to the scheme's embodied carbon and determined that the concrete supply will be from the Great Jackson St batching plant due to its very close proximity to the site, minimising transport emissions as well as disruption to the road network. This should be considered due to the urban location of the development site where increased particulate emissions could have a greater negative impact on the local population.
- ✓ **Consider** long term, post completion factors such as maintenance, durability and lifespan. The replacement of building elements over the lifetime of the development equates to 77% and therefore plays a major contribution to the scheme's total operational carbon emissions. As such, the scheme will be designed to minimise maintenance and repair intervals in order to limit the global warming impact of materials.
- ✓ **Evaluate** the carbon value of the proposed build fabric and identify materials or systems that contribute the most to a building's embodied greenhouse gas emissions. Through careful evaluation, the LCA concludes that the project is shown to have a reduced environmental impact when compared to the RIBA 2025 Climate Challenge targets in relation to embodied and operational carbon emissions as detailed within Table 6.2.

Table 6.2 – Comparison of total embodied and operational carbon emissions with RIBA Climate Challenge target

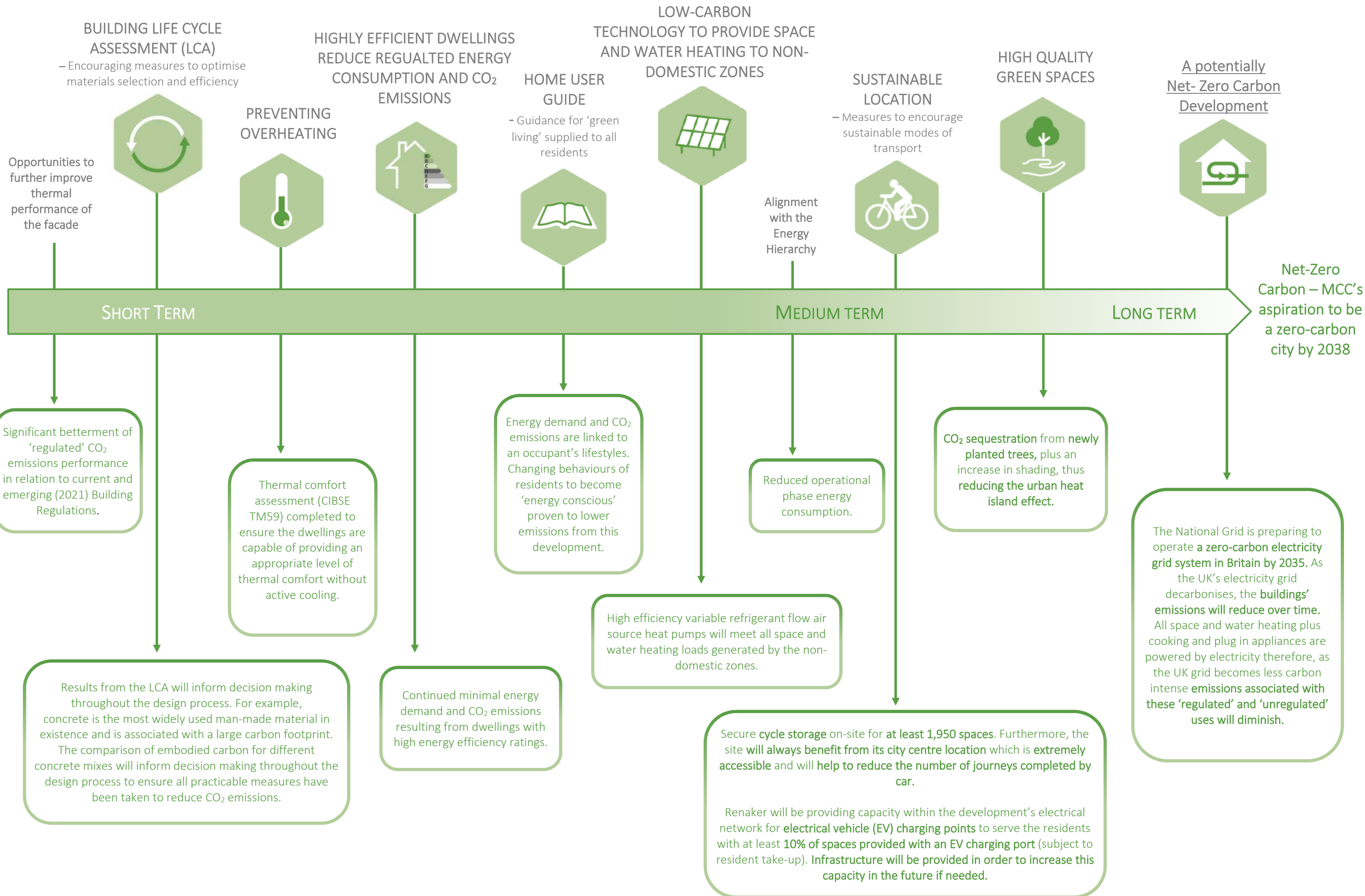
RIBA Sustainable Outcome Metrics	Carbon Emissions - Trinity Islands Development (kgCO _{2e} /m ²)	RIBA Climate Challenge 2025 Targets	RIBA Climate Challenge 2030 Targets
Whole life Embodied emissions (kgCO _{2e} /m ²)	708.5	< 800	< 625
Operational Energy (kWh/m ² /y)	53.9	< 60	< 35

At this design stage, the analysis has been undertaken by the design team in relation to the carbon impact of estimated quantities of building materials in the assigned building. The carbon emissions generated from energy usage, water consumption, and construction site operations may be fully integrated into the LCA once established by the design and construction teams.

6.3 Journey to Net Zero Carbon.....

The following timeline demonstrates an overview of the path towards a Net-Zero Carbon development through a series of short, medium and long-term, carbon mitigation measures and actions.





7. CONCLUSION

The Statement has reviewed the environmental performance of the Proposed Development Site at Trinity Islands, Trinity Way, Manchester against national and local planning policies and regulations.

Energy Strategy –

Full compliance with the key criteria of the Manchester Core Strategy have been achieved by the proposed energy strategy while responding positively to the council's declaration of a Climate Emergency, as follows:

- The proposed scheme has been demonstrated to significantly improve upon the current Part L1A (2013) compliance standards in accordance with adopted Core Strategy Policy EN 6:
 - When **applying the current and up to date carbon (CO₂) factors** (for UK grid mix electricity), that will be included in the planned 2021 update to Building Regulation Part L1A, the buildings are calculated to **improve upon the Part L1A (2021) carbon dioxide emissions compliance standard by at least 50%.**
 - The Dwelling Emission Rate (DER) reduction for the residential element of the scheme is **over 9% relative to Part L 2013.**
- The development will be designed and **specified in accordance with the principles of the energy hierarchy in line with the adopted Core Strategy Policy EN 4** and seeks to directly support the council in **achieving its aims by reaching Net Zero Carbon by 2038.**
- In accordance with Core Strategy Policy EN5 and EN8, **low-carbon technology forms part of the proposals including high efficiency heat pumps** that will meet the space and hot water loads for all non-domestic areas.
- In accordance with Core Strategy Policy EN 8, minimising the impacts of climate change is a key element of the proposed design, as follows:
 - Significant design iterations and energy demand calculations having been undertaken to ensure **the proposed energy strategy will incorporate an enhanced 'fabric led' material specification** (benefiting from very low air permeability and optimised glazing provision allied to high specification u values), along with high quality design and exemplary construction standards to improve the energy efficiency of the scheme.
 - The design of this development also incorporates **a building specification intended to avoid cooling requirement**, as per the results of the CIBSE TM59 Overheating Assessment.
 - This development has been proven to take maximum advantage of the decarbonating status of the electricity grid with its full electric heating strategy, **ultimately facilitating a 'near-zero' or zero carbon scheme, as the grid mix electricity supply is decarbonised over time**, in line with MCC's Climate Change Framework; and,
 - Minimising the impact of climate change is realised through a future proofed design featuring an all-electric system which will positively respond to the continued decarbonisation of the grid.

In summary, these proposals will deliver a **scheme that is inherently efficient and cost-effective during occupation and that accords with the adopted Core Strategy Policy EN 4, EN 6 and the Supplementary Planning Document (SPD) criteria** while taking into account Manchester's declaration of a Climate Emergency.



Sustainability Performance -

The key issues of Manchester City Council's Supplementary Planning Document (Environmental Standards) in accordance with Core Strategy Policies DM 1, EN 8 and T 1 have been achieved by the proposals. These are as follows:

- Water consumption of the development will be minimised. The internal water strategy will exceed the regulatory standard specified to achieve a calculated daily consumption of <105litres/person/day through the specification of **efficient water fixtures**.
- The development Site is located within Flood Risk Zone 1. **The Site drainage strategy will be designed to withstand a 1 in a 100-year storm event plus a 30% allowance for climate change.** Post development surface water run-off rates will be limited to at least 50% of the existing surface-water brownfield runoff rates through SuDs and onsite attenuation.
- Waste arising during construction and occupation/operation will be minimised and **a target of 50% of waste to be diverted away from landfill will be established** for the construction phase of the development. A **site waste management plan will be adopted** during construction and will accord with the local authority recycling scheme ensuring that adequately sized bin storage areas for the Site (including provision for the non-domestic areas) are provided.
- Construction site management procedures will minimise adverse impacts on the environment and control pollution generated during the construction phase. These include **a waste management strategy to reduce the quantity of waste generated, and to increase re-use and recycling of materials.**
- The impact of sound associated with the development will be mitigated by the design/specification of the buildings including; **upgraded triple glazing for the entire development and mechanical ventilation with heat recovery systems for all apartments** coupled with purge venting. Sound insulation will be specified to comply with acoustic performance compliance standards and mitigation measures will be implemented, where required, to reduce the noise arising from the residential development.
- The redevelopment will provide an opportunity to **secure ecological enhancement for both flora and fauna to secure a net gain in biodiversity.** The **landscaping scheme** will be designed to positively enhance the ecological value of the Site in addition to the **significant tree planting which will assist in offsetting CO₂ and reducing local temperatures,** as a result of evapo-transpiration, to create a high-quality public realm.
- Residents will benefit from the **improved physical and mental health** that will come as a result from the **enhancement in amount and quality of green space in line with MCC's Climate Change Framework Objectives.**
- The highly sustainable location of the proposed development will encourage the use of more sustainable forms of transport. The development will be provided with a **significant number of cycle storage spaces** (at least one space per residential apartment) and up to 578 car parking spaces within the basement levels to support the residential development. Provide up to 20% of all parking spaces with **electrical vehicle charging points to facilitate the increasing, widespread transition to electric car usage.**
- Materials are proposed to be responsibly sourced, **materials with low environmental impact will be selected** and local suppliers will be prioritised. In combination this procurement strategy will **minimise,**



and conserve energy associated with transportation and waste generation. This meets the council's objectives in addressing the declared Climate Emergency.

- **Significant investment into the public realm** will provide a further steppingstone to overall improve connectivity and accessibility to Green and Blue Infrastructure within the city.
- The **formation of gardens**, with public seating and greenery spread throughout the Site will be a key component as it will draw people through the development and to help **create successful neighbourhoods and support the city's growth** in accordance with Manchester's Green and Blue Infrastructure Strategy.

Furthermore, the proposals accord with the aims of the National Planning Policy Framework, as follows:

- The proposal includes the redevelopment of a previously developed Site and represents a very efficient use of land. The **highly accessible**, city-centre location will provide a development that **supports a sustainable community while creating opportunities for employment** and enjoyment.
- Construction practices that minimise adverse impacts on the environment will be adhered to including a waste management strategy to **reduce the quantity of waste generated**, and to **increase re-use and recycling**, a commitment will be made to **minimise waste and pollution**; and,
- Exceeding the regulatory compliance criteria, Part L1A, 2013 and emerging Part L 2021 Regulations will assist in mitigating the impact of climate change and its environmental impact.

The scheme has also been assessed against RIBA2030 Climate Challenge targets that are used for benchmarking and include both regulated and unregulated loads. The Proposed Development complies with the RIBA 2025 Climate Challenge targets for Whole Life Embodied Emissions and Operational Building Carbon.

In conclusion, the proposals reviewed within this statement for the scheme at Trinity Islands, Trinity Way, Manchester will deliver an efficient and sustainable scheme, providing a quality development that accords with the guidance provided within the Manchester City Councils adopted policies.



APPENDIX A – SAP 2012 DATA (BLOCK COMPLIANCE REPORT)



BLOCK COMPLIANCE

Calculation Type: New Build (As Designed)

Block Reference	Trinity Block C	Issued on Date	
Block Name			
Assessor Details	Mr. Laurie Wills, Element Sustainability Limited, Tel: 01829 733444, laurie@elementsustainability.co.uk	Assessor ID	H367-0001
Client			

Block Compliance Report - DER

Block Reference: Trinity Block C		Block Name:			
Property-Assessment Reference	Multiplier	Floor Area (m ²)	DER (kgCO ₂ /m ²)	TER (kgCO ₂ /m ²)	% DER/TER
Trinity Way C001-TWC01	1	74	21.51	22.47	4.26 %
Trinity Way C002-TWC02	1	51	20.67	24.61	16.00 %
Trinity Way C003-TWC03	1	71	18.58	22.71	18.17 %
Trinity Way C004-TWC04	1	76	24.41	25.15	2.92 %
Trinity Way C005-TWC05	1	53	21.32	25.67	16.94 %
Trinity Way C006-TWC06	1	81	18.93	22.66	16.46 %
Trinity Way C007-TWC07	1	74	23.43	24.79	5.47 %
Trinity Way C008-TWC08	1	52	20.88	23.39	10.73 %
Trinity Way C009-TWC09	1	74	19.08	21.43	10.98 %
Trinity Way C010-TWC010	1	76	22.04	22.51	2.10 %
Trinity Way C011-TWC011	1	54	19.07	21.43	11.01 %
Trinity Way C012-TWC012	1	81	17.15	18.87	9.10 %
Totals:	12	817	247.07	275.67	
Average DER = 20.57 kgCO ₂ /m ²		% DER/TER	PASS		
Average TER = 22.85 kgCO ₂ /m ²		9.98 %			

Block Compliance Report - DFEE

Block Reference: Trinity Block C		Block Name:			
Property-Assessment Reference	Multiplier	Floor Area (m ²)	DFEE (kWh/m ² /yr)	TFEE (kWh/m ² /yr)	% DFEE/TFEE
Trinity Way C001-TWC01	1	74	31.94	38.10	16.18 %
Trinity Way C002-TWC02	1	51	22.62	36.53	38.08 %
Trinity Way C003-TWC03	1	71	23.86	38.35	37.78 %
Trinity Way C004-TWC04	1	76	39.39	47.51	17.09 %
Trinity Way C005-TWC05	1	53	27.08	40.28	32.79 %
Trinity Way C006-TWC06	1	81	28.98	39.84	27.25 %
Trinity Way C007-TWC07	1	74	36.93	45.67	19.14 %
Trinity Way C008-TWC08	1	52	26.03	31.54	17.47 %
Trinity Way C009-TWC09	1	74	27.39	33.73	18.79 %
Trinity Way C010-TWC010	1	76	33.63	38.89	13.53 %
Trinity Way C011-TWC011	1	54	20.30	24.99	18.73 %
Trinity Way C012-TWC012	1	81	23.08	25.82	10.60 %
Totals:	12	817	341.25	441.27	
Average DFEE = 28.92 kWh/m ² /yr		% DFEE/TFEE	PASS		
Average TFEE = 37.08 kWh/m ² /yr		22.01 %			

APPENDIX B – SAP 10 DATA

Trinity Way Block D1 - SAP 10 Data

	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	TOTALS
SAP Rating	C73	C80	B81	C80	C76	C79	C78	B82	C77	C78	
CO2 Emissions t/yr	0.45	0.27	0.28	0.27	0.42	0.37	0.4	0.27	0.42	0.4	
DER Kg/CO2/yr/m2	6.69	5.77	5.41	5.77	6.13	5.13	5.44	4.98	5.7	5.57	3889.47
TER KgCO2/yr/m2	13.44	13.46	13.55	13.46	11.88	10.19	11.36	11.52	12.03	12.06	8352.11
DER<TER	50.22%	57.13%	60.07%	57.13%	48.40%	49.66%	52.11%	56.77%	52.62%	53.81%	53.43
DFEE 1 KWh/yr/m2	35.01	22.65	21.28	22.59	29.78	22.02	25.48	14.6	28.46	26.16	17381.25
TFEE 1 KWh/yr/m2	33.89	25.22	28.12	25.22	26.73	18.49	25.69	18.25	28.74	28.24	17854.83
DFEE1<TFEE1	3.30%	10.17%	24.34%	10.41%	11.41%	19.13%	0.83%	19.99%	1.00%	7.35%	2.65
DPER KWh/m2/yr	73.83	63.7	59.73	63.63	67.71	56.57	60.04	54.94	62.92	61.49	42927.12
TPER KWh/m2/yr	74.29	74.95	75.3	74.95	65.93	56.87	63.01	64.36	66.61	66.81	46386.02
DPER<TPER	0.62%	15.00%	20.68%	15.10%	2.69%	0.53%	4.71%	14.64%	5.54%	7.96%	7.46
Floor Area (M2)	75.00	51.00	57.00	51.00	75.00	80.00	80.00	57.00	80.00	80.00	686.00

Trinity Way Block C2 - SAP 10 Data

	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11	Plot 12	TOTALS
SAP Rating	C77	B81	C80	C74	B81	C79	C75	B81	C79	C76	B82	B81	
CO2 Emissions t/yr	0.39	0.27	0.34	0.45	0.27	0.37	0.42	0.27	0.35	0.41	0.27	0.35	
DER Kg/CO2/yr/m2	5.79	5.66	5.17	6.59	5.62	5.16	6.35	5.61	5.21	5.85	5.18	4.71	4553.84
TER KgCO2/yr/m2	12.04	13.22	12.00	13.36	13.68	11.82	13.15	12.50	11.24	11.93	11.50	9.76	9888.10
DER<TER	51.91%	57.19%	56.92%	50.67%	58.92%	56.35%	51.71%	55.12%	53.65%	50.96%	54.96%	51.74%	53.95
DFEE 1 KWh/yr/m2	27.10	20.04	21.52	34.55	21.42	23.31	32.06	20.71	22.23	28.39	15.76	18.02	19767.21
TFEE 1 KWh/yr/m2	27.00	24.65	26.27	33.54	26.95	26.91	32.00	20.49	22.45	27.00	15.75	16.23	20589.33
DFEE1<TFEE1	0.35%	18.69%	18.08%	3.00%	20.52%	13.37%	0.20%	1.08%	1.00%	5.12%	0.06%	11.03%	3.99
DPER KWh/m2/yr	63.93	62.42	57.11	72.70	62.07	56.91	70.07	61.92	57.49	64.61	57.12	52.00	50259.79
TPER KWh/m2/yr	66.93	73.79	66.76	74.00	76.19	65.65	72.90	69.97	62.68	66.32	64.52	54.71	55063.06
DPER<TPER	4.49%	15.40%	14.46%	1.76%	18.53%	13.31%	3.89%	11.51%	8.28%	2.57%	11.46%	4.95%	8.72
Floor Area (M2)	74.00	51.00	71.00	76.00	53.00	81.00	74.00	52.00	74.00	76.00	54.00	81.00	817.00