



**ELEMENT
SUSTAINABILITY**

**VICTORIA HOUSE, ANCOATS,
MANCHESTER**

**ENVIRONMENTAL STANDARDS
STATEMENT ADDENDUM**

MAY 2020

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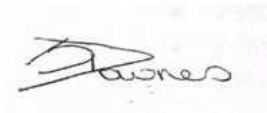
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1. INTRODUCTION

Element Sustainability has been commissioned by Forshaw Land and Property Group to prepare an addendum to the Environmental Standards Statement for the proposed development at Victoria House, Ancoats in Manchester.

This addendum report will provide a detailed review of the Victoria House proposal's contribution towards the Climate Emergency and the (draft) Greater Manchester Spatial Framework (GMSF) which includes policy guidance requiring new development to be 'zero net carbon' from 2038 by following the energy hierarchy (with any residual carbon emissions offset).



2. POLICY REVIEW

2.1 Local Planning Policy

2.1.1 Climate Emergency

A **Climate Emergency** was declared by Manchester City Council on the 10th July 2019 in response to the findings of the Intergovernmental Panel on Climate Change (IPCC) report. The City Council believe that there is serious risk to Manchester's people of climate change affecting economic, social and environmental well-being, supply chains – including food security, financial systems and local weather, among many others. Therefore, the target for becoming a zero-carbon city has been accelerated by 12 years, setting 2038 as the new target for the city. The council has agreed the following:

- To deliver the 2038 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.

Manchester Climate change Framework 2020 – 25 is Manchester's high-level strategy for meeting their commitment on climate change that builds on the **Draft Manchester Zero Carbon Framework 2020-38**, which was published in February 2019 and Manchester City Council's declaration of a climate emergency in July 2019. This was endorsed by MCC at the Executive meeting in March 2020 and will develop over the next five years, in line with changes in policy, climate science, rate of progress and other factors. The framework has set out four objectives to facilitate this:

Objective 1 – Staying within our carbon budgets. This involves taking action in following relevant areas:

- Direct CO₂ emissions: staying within our 15 million tonne carbon budget for 2018-2100, including reducing the CO₂ emitted from our homes, workplaces and ground transport by at least 50% during 2020-25.



- Indirect CO₂ emissions: understanding and taking action on the things that we consume and which generate greenhouse gases through their production, transportation and disposal.

Objective 2 – Climate adaptation and resilience will require the adaption of the city's buildings, infrastructure and natural environment to the changing climate and increasing the climate resilience of our residents and organisations. This includes:

- Increase the amount of urban green infrastructure cover, aiming for a 10% increase by 2038 from 2018 levels, in line with the Greater Manchester aim; and,
- Respond to these risks by incorporating adaptation and resilience within our plans and strategies, and acting to make necessary changes to our buildings, infrastructure and our natural environment.

Objective 3 – Health and wellbeing aims to improve the health and wellbeing of everyone in Manchester through actions that also contribute to our objectives for CO₂ reduction and adaption and resilience:

- Adapt the city's built and natural environment and prepare our residents to become more resilient to these changes. Increasing the amount and quality of green space to enable residents to benefit from the improved physical and mental health that will come as a result; and,
- Improving the energy efficiency of the city's homes and providing access to affordable, secure supplies of renewable energy are essential help get 38,000 Manchester households out of fuel poverty.

Objective 4 – Inclusive, zero carbon and climate resilient economy looks to ensure that Manchester establishes an inclusive, zero carbon and climate resilient economy where everyone can benefit from playing an active role in decarbonising and adapting the city to the changing climate.

Priority Areas

Six priority areas have been established in order to help meet the above objectives and include:

1. Buildings (existing and new);
2. Renewable energy;
3. Transport and flying;
4. Food;
5. The things we buy and throw away; and,
6. Green infrastructure and nature-based solutions.

Urgent Actions Identified to Help Meet the Commitments:

- *New Buildings* – To ensure that new developments in the city do not eat into the limited carbon budgets and add to the already significant retrofit challenge. Developments need to be built and operated to zero carbon standards as soon as possible.
 - The ideal way to do this is through the UK Government establishing a national zero carbon definition and methodology for its implementation, and for Manchester City



Council to implement this standard as quickly as possible through the local planning system.

- This should include applying zero carbon standards to all developments where the Council has additional influence, with a view to all new development needing *to be* zero carbon from 2023 at the latest.
- *Renewable Energy* – The National Grid has been decarbonising in recent years; we need this to continue but at an accelerated rate, with a view to being fully decarbonised as soon as possible.
 - At least 50% of all homes should have the equivalent of 16m² of solar PV panels by 2024.
- *Gas* – The following actions are needed to help reduce the reliance on natural gas:
 - Improve the energy efficiency of our buildings as far as possible to reduce our demand for gas.
 - Replace our natural gas-based heating systems with renewable energy-based heating technologies as soon as possible.
 - Work with Government to ensure that moving to electricity-based heating systems is affordable and doesn't push even more people into fuel poverty.

2.2 Emerging Policies

The Greater Manchester Spatial Framework 2019 (Draft) will set out how Greater Manchester should develop up until 2037 and is currently on hold. However, it contains the following relevant emerging policies:

Policy GM-S 2 Carbon and Energy aims to deliver a carbon neutral Greater Manchester no later than 2038, with a dramatic reduction in greenhouse gas emissions. There is an expectation that new development will:

- a) Be zero net carbon from 2038 by following the energy hierarchy (with any residual carbon emissions offset), which in order of importance seeks to:
 - I. Minimise energy demand;
 - II. Maximise energy efficiency;
 - III. Utilise renewable energy;
 - IV. Utilise low carbon energy; and
 - V. Utilise other energy sources.

With an interim requirement that all new dwellings should seek a 19% carbon reduction against Part L of the 2013 Building Regulations.

- b) Incorporate adequate electric vehicle charging points to meet likely long-term demand;
- c) Where practicable, connect to a renewable/low carbon heat and energy network;



- d) Achieve a minimum 20% reduction in carbon emissions (based on the dwelling emission or building missions rates) through the use of on Site or nearby renewable and / or low carbon technologies; and,
- e) Include a carbon assessment to demonstrate how the design and layout of the development sought to maximise reductions in whole life CO₂ equivalent carbon emissions.

2.3 Regulatory Framework

The Future Homes Standard seeks to introduce an uplift in standards for Part L of the Building Regulations for new buildings, anticipated in October 2020 with the intention of making new homes more energy efficient and to future-proof them in readiness for low carbon heating systems.

SAP¹ 10 revised carbon factors for grid-mix electricity reflect the improved status of the UK grid that has significantly decarbonised since the last update of building regulation Part L1A in April 2014. In July 2018 the Government published updated carbon emission factors (SAP 10) demonstrating this. These new emission factors will however not be incorporated into Part L of the Building Regulations until the Government has consulted on the new Building Regulation, Part L.

¹The Standard Assessment Procedure (SAP) is the methodology used by the Government to assess and compare the energy and environmental performance of dwellings. Its purpose is to provide accurate and reliable assessments of dwelling energy performances that are needed to underpin energy and environmental policy initiatives.



3. CLIMATE CHANGE EMERGENCY

3.1 Contributing to a Net Zero Carbon City

The development proposals for Victoria House respond positively to the aims of emerging Greater Manchester Spatial Framework (GMSF) Policy 2 – Carbon and Energy.

It is acknowledged that there is an expectation for new development to be zero net carbon from 2038 by following the energy hierarchy in addition to interim requirements. In support of this, the developer wishes to highlight the following measures that will form part of the specification of this development:

3.1.1 Key Principles (Construction)

During the construction of the development, the developer commits to the following key principles in order to accommodate the four objectives as set out by Manchester City Council within their Zero Carbon Framework 2020-38:

Whole Life Carbon Analysis



Carry out whole life cycle carbon analysis of all building elements to maximise reductions in whole life CO₂ equivalent carbon emissions.

Sourcing Materials



Ethical and responsible sourcing of materials. Where possible, materials are to be sourced locally minimising emissions from transport.

Minimising Material Use



Minimise materials with high embodied energy impacts i.e. Post tension slab in lieu of traditional concrete slab, potentially reducing the amount of concrete and steel. Off-site manufacturing will also reduce waste.



Off-site Construction



Consider modular off-site construction systems i.e. Unitised glazing panels and bathroom pods.

Local Natural Materials



Promote use of local natural materials i.e. Vegetation selection from native species/ Natural internal materials – timber, wool/ Water based paints where appropriate.

Building Reuse



Design building for disassembly and the circular economy i.e. Re-appropriation of the building and elements of the building to be used elsewhere.

Design Detailing



Detailing to be long life and robust materials used i.e. unitised glazing/brick.

Target Zero Construction Waste



Target zero construction waste diverted to landfill. Designing the scheme to maximise repetition in unit size. A waste management plan will be produced during construction and recycling facilities available during occupation.

Circular Economy



Design building for disassembly and the circular economy.



3.1.2 Key Principles (Operational)

The building is designed to incorporate features that will serve to reduce CO₂ emissions during operation, and in turn, carbon emissions arising from access to the dwellings and building.

Electric Space Heating



The UK's grid is de-carbonising therefore there is potential for the building's emissions to reduce over time as the UK grid CO₂ footprint reduces so will the that of the Victoria House scheme. This development has been proven to take maximum advantage of the decarbonating status of the electricity grid with its full electric heating strategy.

Optimise Solar Gains



The glazing specification (i.e. the g value) 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.

Carbon Sequestration



Carbon sequestration (CO₂ offsetting) from the planting of new trees and the inclusion of a green/brown wall or roof.

Sustainable Urban Drainage Systems (SuDS)



The amenity planting/ roof garden will support the Sustainable Drainage Systems (SuDS) by means of inception and transportation. Through the provision of flow control techniques and surface water attenuation, the volume of surface water run-off will be no greater than existing conditions. The system will also be designed to withstand a 1 in a 100-year storm event plus a 40% allowance for climate change.



Recycling Facilities



Recycling facilities to enable the local authority waste reduction targets, diverting more materials away from landfill and reducing the occupants' carbon footprint further.

Cycle Store



One hundred and seventy-seven secure cycle storage provision.

Travel Options



Travel options, including local access to transport nodes for bus and Metrolink reducing the number of journeys completed by car.

Electric Vehicle



No allowance for car parking in acknowledgment of the excellent sustainable location of the site and will therefore not add to the current car ownership levels of residents in Manchester.

Co-working



Home working options are supported by home-working facilities, enabling residents to develop business connections without having to leave the development.

Proximity to Work, Shops and Amenities



Place of work, local amenities and shops are within easy walking distance of the site, enabling residents to live local and reduced the need for journeys completed by car.

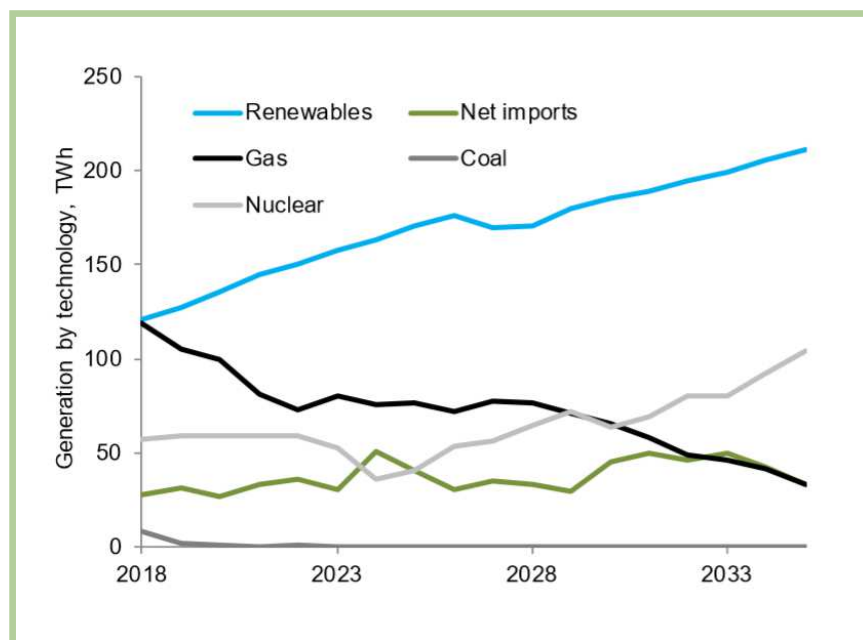


3.1.3 Regulated Energy Demand and Emission Calculations (Residential)

The low carbon share of UK 'grid mix' electricity generation is projected to rise from 22% in 2010 to 65% in 2020. As the UK electricity grid carbon dioxide (CO₂) footprint continues to reduce (see Figure 3.1 sourced from BEIS Energy and Emissions Projections 2018), so too will the carbon dioxide emissions associated with this 'full electric' building services energy strategy.

This would not be the case if the building were heated from fossil fuels (for example, gas boilers and/or CHP).

Figure 3.1 - Energy and Emissions Projections 2018 (BEIS)



Calculations to demonstrate the benefits associated with decarbonisation of the grid have been prepared below with specific reference to the revised SAP10 carbon factors which provide an accurate reflection of the UK's current grid mix electricity.

This demonstrates that the full electric heating strategy will improve upon Manchester's GMSF emerging policy, interim emissions target of -19% relative to Part L 2013. Furthermore, 'full electric' strategies supply electric on demand, are inherently 100% efficient at the point of consumption and only use the quantity of energy required.

When **applying the current and up to date carbon factors** that will be included in the (anticipated) October 2020 update to building regulation Part L1A, the building is seen to **improve upon the Part L1A 2013 compliance standard by 58.39% without the need for any LZC technologies**, in line with the energy hierarchy as per GMSF policy 2 – Carbon and Energy.

The emissions and energy demand performance associated with the proposed 'fabric led' specification for the units within the typical Tower floorplate are presented in Table 3.1.



Table 3.1 – Calculated Regulated Dwelling Emission Rates – SAP 2012 & SAP 10 Data

	SAP 2012 Data	SAP 10 Data
Dwelling DER (kgCO ₂ /m ² /yr.)	19.36	8.70
Dwelling TER (kgCO ₂ /m ² /yr.)	20.91	20.91
% DER Reduction over Part L 2013	7.4	58.39

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 8.7kgCO₂/m², rather than 19.36 kgCO₂/m² as determined by the current and put of data carbon factors applied within the current version of SAP (SAP2012).

This improved carbon dioxide emissions performance reflects the UK's increased electricity generation from renewable sources and the switch away from burning coal in power stations. **The application of SAP10 is recognised to be a more accurate approach to assessing the expected CO₂ performance of new developments².** The applicant will nonetheless, continue to use the current Building Regulations methodology for estimating energy performance against Part L 2013 requirements but the outputs manually converted for the SAP 10 electricity carbon factors clearly demonstrate the actual performance of the proposed scheme is much better than the out dated factors applied in Part L1A 2013.

In line with the MCC's Climate Change Framework, this development has been proven to take maximum advantage of the decarbonised status of the electricity grid with its full electric heating strategy. This is a suitable steppingstone towards zero-carbon standards whilst the UK government establish a national zero carbon definition and methodology for near-future implementation.

Residential Heating Strategy Benefits –

- The residential tower will improve upon the current (stringent) Building Regulation Part L 2013 criteria in terms of dwelling emission rate and fabric energy efficiency;
- 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

² The forthcoming update to building regulation Part L will usher in revisions to the SAP calculation methodology and a number of changes to conventions, calculation procedures, targets/metrics and reporting. Nonetheless, this approach of adjusting the carbon factors associated with the fuel source (as provided within the latest SAP10 calculation procedure) provides a significantly more accurate appraisal of this development's contribution to climate change mitigation than applying the outdated SAP2012 carbon emission factors.



overheating as the hot water remains in the radiators for a considerable time after the heat demand is required;

- 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; and,
- **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.

Energy Hierarchy –

The energy strategy outlined above therefore, aligns fully with the MCC's aims to deliver a carbon neutral Greater Manchester no later than 2038, (**Policy GM-S 2 Carbon and Energy**) by following the energy hierarchy:

First Principle

The following efficiency measures are designed to reduce heat losses and minimise energy demand:

- 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.
- The buildings will be constructed with a material and design specification which far exceeds minimum Building Regulation standards and includes numerous efficiency measures designed to reduce heat losses and minimise energy demand.
- The design air permeability target for the residential units is $3\text{m}^3/\text{hm}^2$ (@50Pa.). This low air permeability target will assist to limit the heat loss through the structure of the building.
- The g value within the building 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.

This 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

The mechanical ventilation with heat recovery systems will also capture much of the heat from the extracted air from these properties. Additionally, the proposed 100% low energy and LED lighting provision and sophisticated control systems for the space and water heating will also ensure that energy consumed by the dwellings, retail and leisure areas is used efficiently, as per the second principle of the Energy Hierarchy.

- All apartments will benefit from high efficiency MVHR that will recover 'waste' heat from the extracted stale air;



- Heating systems will be provided with zonal, programmable thermostatic controls would allow occupants to control zones within their dwellings independently for maximum flexibility;
- Hot water will be separately programmable and high efficiency cylinders with low standing losses will be specified;
- 100% LED provision and sophisticated control systems. Photocell and automatic presence control of the lighting will be specified in order to further improve the efficiency of the lighting system within the communal zones.
- Furthermore, the building is designed to not require active cooling.

This strategy therefore accords with the second principle of the energy hierarchy.

Third Principle

It is not deemed to be necessary to incorporate low carbon, renewable and/or decentralised energy technologies within this development as the Building Regulation Part L 2013 emissions and fabric energy efficiency criteria will be met solely through efficient servicing and a high specification thermal envelope.

Fourth Principle

The space and water heating demand of the scheme will be met electric panel and immersion heaters (100% efficient). This will ensure that fossil fuels consumed for heating purposes will be burnt cleanly and efficiently.

3.1.4 Unregulated Energy Demand and Emission Calculations

Unregulated energy demand (that is, the energy demand associated with 'plug in' appliances and cooking) typically accounts for over half of the total carbon dioxide emissions from modern residential developments such as this. To limit this, the Victoria House scheme will ensure:

- The integrated white goods will have as a minimum an A+ energy rating;
- A welcome pack will be provided to all residents to encourage selection of green energy providers to enable them to make informed decisions; and,
- 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 ongoing).

3.1.5 Embodied Carbon and Benchmarking

Assessing the embodied carbon of the Victoria House development provides a methodology to inform the building design, specification and layout of the development to optimise reductions in whole life CO₂ equivalent carbon emissions. This accords with the Greater Manchester Strategic Framework Policy GM-S 2 Carbon and Energy.



Embodied carbon is a relatively new indicator however, the availability of accurate data on the carbon cost of materials and systems is rapidly evolving. The following approach that will be considered for the Victoria House development to inform design decisions.

LCA Analysis Process -

The design team will utilise Life Cycle Analysis (LCA) software specifically developed for early stage embodied carbon design appraisal – this will require the generation of a virtual building model. Beginning with a relatively simple LCA calculation the process allows the design team to highlight the following based on the Victoria House development proposals:

1. Identify opportunities to reduce the embodied carbon;
2. The materials and systems that contribute the most to the scheme's embodied greenhouse gas emissions can be identified; and,
3. The project team is then able prioritise the materials that make the most difference and highlight material solutions or alternative designs that have the biggest impact.

This process will ensure the construction phase of the development is aligned with the Manchester City Council emerging planning policy direction towards net zero carbon development.

3.1.6 Resource Efficiency

The construction of the Victoria House with shared resident spaces is an environmentally friendly approach to minimising the carbon footprint. However, a more fundamental key environmental benefit achieved through this development is the ability to reduce occupancy energy consumption through the sustainable and responsible introduction of shared spaces such as the residents lounge.

Furthermore, less material and resources are used per person during construction on high density sites, as the site supports larger numbers of people per acre compared to more traditional housing forms currently used for shared living such as suburban homes built for a single family, and even the higher density forms of for sale and build to rent apartments delivered in cities.



3.2 Good Health and Well-being

As per Objective 3 of the Draft Manchester Zero Carbon Framework 2020-38, the Victoria House proposals aim to improve the health and wellbeing of all of its residents. Ideally this would be achieved through increasing the amount and quality of green space available in order to contribute to the objectives for CO₂ reduction, adaption and resilience. However, due to the space constraints of the site, the developer is limited in this respect.

Good health and wellbeing of people is at the core of a sustainable community. Depressive disorders are now the foremost cause of disability in the middle and high-income countries and can be precursors to chronic physical health problems. It is recognised that social interactions and physical exercise improve our mental wellbeing, reducing the need to treat anxiety and mental health conditions.

Health and Wellbeing



Fully equipped resident gym to help improve and maintain mental health and physical wellbeing. Physical exercise keeps the body strong and healthy and improves mental health by decreasing depression, anxiety and loneliness.

Social Value



The residents lounge will enhance the character of the area as a familiar place where people will live and spend their free time, encouraging social interaction and supporting a vibrant, diverse and inclusive community.

