



Bridgewater House, Manchester

Environmental Standards Statement

28th June 2022

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1 INTRODUCTION

This report addresses the approach to and the satisfaction of the planning criteria as set by Manchester City Council, and details the approach to carbon reduction and the compliance with the energy efficiency requirements of the current building regulations of Part L, Volume 1 2021 for the Bridgewater House development in Manchester.

To show compliance with the regulations, Standard Assessment Procedure (SAP) calculations have been carried out for each proposed dwelling using the FSAP 10 online software, which uses SAP version 10.2. SAP has been adopted by the Government as the UK methodology for calculating the energy performance of new dwellings from June 2022.

The SAP calculations are based on the energy consumption associated with a dwelling's space heating, water heating, ventilation and lighting, less savings from energy generation technologies. It is adjusted for floor area so that it is essentially independent of dwelling size for a given built form. The main purpose of the calculation is to demonstrate that a dwelling, or block of dwellings, achieve a Dwelling Carbon Dioxide Emission Rate (DER) less than the calculated Target Carbon Dioxide Emission Rate (TER), a Dwelling Fabric Energy Efficiency (DFEE) less than the calculated Target Fabric Energy Efficiency (TFEE) and a Dwelling Primary Energy Rating (DPER) less than the calculated Target Primary Energy Rating (TPER).

2 **RESPONSES TO THE PLANNING CRITERIA NEW BUILD**

2.1 **25% reduction in CO₂**

In compliance with the Manchester City Council planning criteria, outlined in Chapter 4 (section 4.5) of the Guide to Development in Manchester Supplementary Planning Document and Planning Guidance, a 25% reduction in the CO₂ emissions of the building, over the Part L1A (2006), is required. The building will achieve this with the improvements of the DER over the TER under the SAP analysis. To demonstrate this improvement a comparison was undertaken using the 2006 compliant SAP(SAP2012) against the current Compliant SAP (SAP10).

Calculated TER under SAP2012 (kgCO ₂ /m ²)	Calculated DER under SAP10 (kgCO ₂ /m ²)	Percentage Reduction Against SAP2012 TER (%)	Compliance with 25% reduction in CO ₂ emissions
29.52	4.35	85.26%	Yes

Table 1: Comparison of SAP2012 TER to SAP10 DER

As demonstrated by the results outlined in table 1, the calculated SAP 10 DER is improved by well over 25% in comparison with the SAP2012 TER, thus demonstrating compliance

2.2 **20% Onsite Renewable Energy**

Also, in Chapter 4 (section 4.6) of the Manchester City Council planning regulations there is a requirement for onsite generation of 20% of the final site energy demands from renewable technologies to reduce the reliance of the building on the nationwide grid infrastructure. The development intends to achieve this with the use of renewable technologies such as Air Source Heat Pumps (ASHP) to within the new build. The heating and hot water demand within the new build is to be met using ASHP technology to remove the reliance on Natural gas services and combustion technology, this in turn will satisfy the requirement for renewable use to meet energy demand. Given the nature of the refurbishment of a listed building, it is difficult to fully assess the energy usage of the dwellings, therefore a W/m² assessment has been used for this stage.

Total Energy use for Site (kWh/year)	Energy demand for Heating and Hot Water met by ASHP (kWh/year)	Percentage of Sitewide Energy Demand met by ASHP
230144	52920	23%

Table 2: Onsite Generation from Renewable Technology

2.3 **Fabric Analysis**

Utilising a ‘fabric first’ approach to the design of the new build properties, the design team have reduced the U-values of the property, in comparison to the Part L 1 2021 guidance. This will reduce the reliance on heat generating technology and will reduce the requirement for energy use within the building. Alongside the improvements to the U-Values the thermal bridging details shall be to match accredited construction details.

Building Fabric	
External Wall U-Value	0.14 W/m ² K (as per architect proposal)
Party Wall U-Value	0.0 W/m ² K (as per architect proposal). There are no common areas that require heating
Roof U-Value	0.1 W/m ² K (as per architect proposal)
Ground Floor U-Value	0.11 W/m ² K (as per architect proposal)
Windows/Doors U-Value	1.0 W/m ² K (as per architect proposal)
Glazing	U-Value as above, build up details to be confirmed by the architect.
Thermal Bridging	Accredited ‘approved’ Table K1 construction details (as per architect proposal).
Thermal Mass Parameter	Indicative: Medium

Table 3: Review of Proposed Building Fabric U-Values

2.4 **Additional Considerations**

Soft landscaping has been considered with trees being included within the central courtyard to reduce the summertime solar gains to the refurbished property and to provide some natural insulation around the new buildings. Further information can be found in the Architect’s design and access statement.

Due to the private nature of the proposed rental agreements, the use of microgeneration (CHP) and community heating has been considered and is not viable for this site.

The layout of the site and the orientation of the properties has been arranged in such a way that the properties are maximising the amount of daylight and early morning and evening solar gains, while the properties located near the site reduce the solar gains at the peak which assists with the prevention of overheating.

All appliances installed as part of the construction shall be specified to have an energy efficiency rating of no less than “A” and all water outlets shall be specified as low flow rate to reduce the demand for water within the buildings.

3 **RESPONSES TO THE PLANNING CRITERIA EXISTING BUILDING**

3.1 **Fabric Analysis**

Within Part L volume 1 for the refurbishments of the existing buildings the requirement for compliance is an incremental improvement over the existing dwelling. Given that the building was last used as offices, there is a material change of use for the building, as such the requirement for full compliance with the three criteria from Part L does not apply. However, there are improvements to U-Values that must be made under Part L 1 section 11.7:

'If there is a material change of use and/or a change to energy status, elements should satisfy all of the following.

a. Existing thermal elements should meet the limiting standards in Table 4.3, following the guidance in paragraphs 4.11 and 4.12.

b. If both of the following apply to existing windows, roof windows, rooflights and doors (controlled fittings), they should be replaced to meet the limiting standards in Table 4.2.

i. They separate a conditioned space from an unconditioned space or the external environment.

ii. They have a U-value higher than either of the following.

• For windows, roof windows and doors – $3.30\text{W}/(\text{m}^2 \cdot \text{K})$.

• For rooflights – $3.80\text{W}/(\text{m}^2 \cdot \text{K})$, calculated by following paragraph 4.5.

In addition, all of the following should be met.

a. New or replaced thermal elements should meet the standards in Table 4.2, following the guidance in paragraphs 4.7 and 4.8.

b. New or replaced windows, roof windows, rooflights and doors (controlled fittings) should meet the standards in Table 4.2.

c. The area of openings in the newly created dwelling should not be more than 25% of the total floor area. In buildings that contain more than one dwelling a larger percentage area of openings may be achieved by following the guidance in paragraph 11.8.

d. Any fixed building services including building automation and control systems and/or on-site electricity generation that are provided or extended should meet the standards in Sections 5 and 6'

Alongside the new build, the existing building is included within the requirement for onsite generation of 20% of the final site energy demands from renewable technologies. This has been detailed within the calculations above for the final energy use of the site, with relation to the mixed renewable technology.

Utilising a 'fabric first' approach to the design of the refurbished properties, the design team have improved the U-values of the property, against the existing with the addition of Kingspan internal cladding. This will reduce the reliance on heat generating technology and will reduce the requirement for energy use within the building. Windows, which are to be replaced are to be replaced to meet more modern standards than the existing with wooden frame and improved U-Values. Additional roof insulation is to be included within the roof replacement to improve the values to a suitable level.

Building Fabric	
External Wall U-Value	0.14 W/m ² K (as per architect proposal)
Party Wall U-Value	0.0 W/m ² K (as per architect proposal). There are no common areas that require heating
Roof U-Value	0.1 W/m ² K (as per architect proposal)
Windows/Doors U-Value	1.0 W/m ² K (as per architect proposal)
Glazing	U-Value as above, build up details to be confirmed by the architect.

Table 4: Review of Proposed Building Fabric U-Values

3.2 **Additional Considerations**

Soft landscaping has been considered with trees being included within the central courtyard to reduce the summertime solar gains to the refurbished property and to provide some natural insulation around the new buildings. Further information can be found in the design and access statement.

Due to the private nature of the proposed rental agreements, the use of microgeneration (CHP) and community heating has been considered and is not viable for this site.

All new appliances installed as part of the renovation shall be specified to have an energy efficiency rating of no less than “A” and all water outlets shall be specified as low flow rate to reduce the demand for water within the buildings.

4 **SAP CALCULATION SET-UP**

The following parameters have been input into the SAP calculations for each of the proposed dwellings at Bridgewater House, Manchester.

General	
Orientation	Various, as per layouts
Dwelling Configurations	Single-Storey Flat (Ground, First, Second and Third Floor)
Lighting	100% Low Energy Lighting
Ventilation	
Design Air Permeability	3.0 m ³ /(hr.m ²) at 50Pa (as per architect proposal) (Requires pre-completion pressure test at post construction)
Ventilation System	Centralised Balanced with Heat Recovery (MVHR) SFP = 0.56 W/l/s. (details for fan taken from SAP Database for Nuaire MRXBOX95-WM2 as this is representative of the proposed strategy).
Heating	
System	Main Heating: Air Source Heat pumps with systems such as radiators. (Details for the ASHP taken from DAIKIN Altherma Efficiency)
Fuel	Grid supplied electricity.
Controls	Temperature Zone Control
Water Heating	From main heating system (Cylinder as Heatrae Sadia Megaflo Eco Direct Cylinder). 150 litres of storage. Storage losses as per manufacturer's confirmation = 1.2kWh/day
Low Carbon Design	
Renewable Technology	No PV has been included in this project

Table 5: SAP Inputs

5 DWELLING GEOMETRY

The site consists of two blocks, one block of new build flats/apartments to the south of the site and one block of refurbished apartments to the north of the site. The new build block consists of thirty-two single storey dwellings. These proposed one/two-bedroom dwellings range in floor area from 42m² to 63m² and the dwellings are labelled 0-01 to 3-08. The refurbished block consists of twenty single storey apartment buildings ranging from 35.9m² to 82.9m².

The following plan mark-ups outline the dwelling references and their locations.

Figure 1a - Dwelling Mark-up, Block 1 Ground Floor

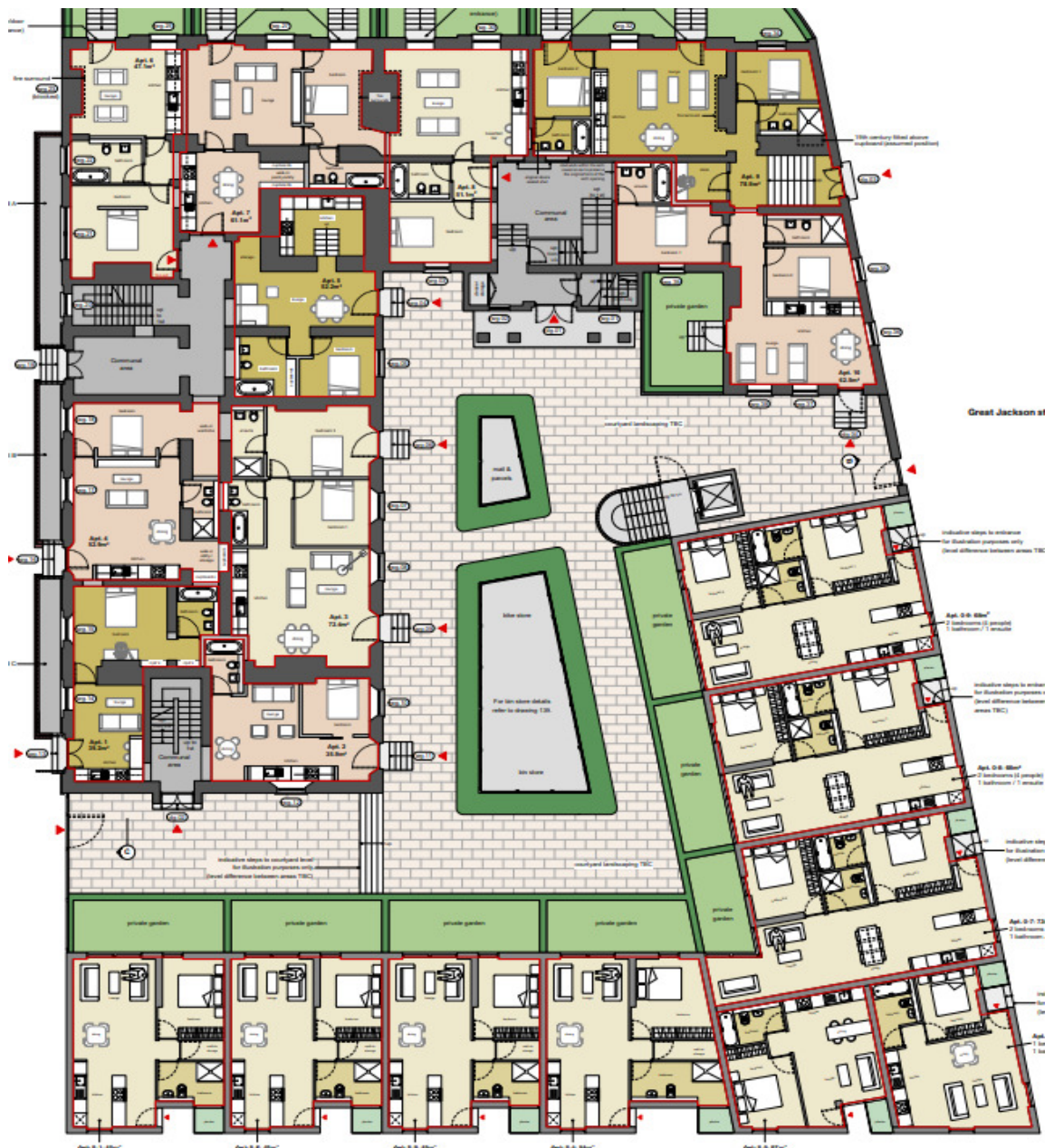


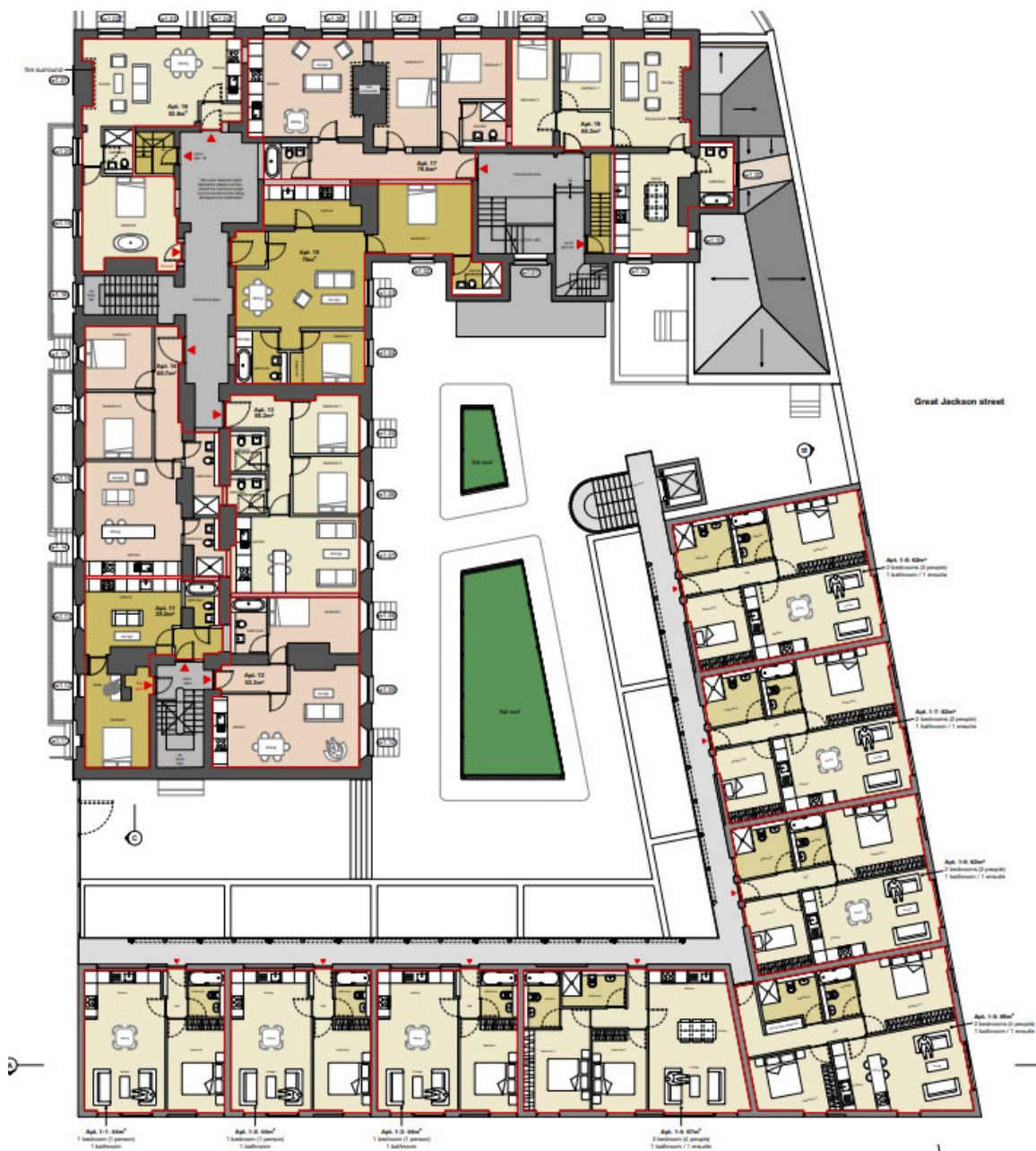
Figure 1b – Dwelling Mark-up, Block 1 First Floor

Figure 1c - Dwelling Mark-up, Block 1 Second Floor

Figure 1d - Dwelling Mark-up, Block 1 Third Floor

6 SAP CALCULATION RESULTS – PART L NEW BUILD

The tables below detail the results of the SAP calculations with respect to compliance with Part L volume 1 of the Domestic English Building Regulations 2021.

Criterion 1

Calculated TER (kgCO ₂ /m ²)	Calculated DER (kgCO ₂ /m ²)	Percentage Reduction Against TER (%)	Compliance with Criterion 1 Part L1
14.81	4.35	70.7	Yes

Criterion 2

Calculated TFEE (kWh /year)	Calculated DFEE (kWh/year)	Percentage Reduction Against TFEE (%)	Compliance with Criterion 2 Part L1
57.5	45.5	20.9	Yes

Criterion 3

Calculated TPER (kWh /year)	Calculated DPER (kWh/year)	Percentage Reduction Against TPER (%)	Compliance with Criterion 2 Part L1
77.3	51.2	33.8	Yes

Results Summary

Compliance with Criterion 1 Part L1	Compliance with Criterion 2 Part L1	Compliance with Criterion 3 Part L1	Overall SAP Calculation Compliance Pass?
Yes	Yes	Yes	Pass

Note: The block has been analysed on an entire block basis as per the guidance within Part L1 Section 2.7 of the domestic building regulations. The guidance states the following;

‘The average dwelling primary energy rate, dwelling emission rate and dwelling fabric energy efficiency rate are the floor-area-weighted averages of the individual dwelling primary energy rate, dwelling emission rate and dwelling fabric energy efficiency rate for all the dwellings in the building. The average dwelling primary energy rate, dwelling emission rate and dwelling fabric energy efficiency rate should be calculated using the same averaging methodology’.

7 **Summary**

The above presented SAP results show that the proposed new build dwellings at Bridgewater House, Manchester, which the 'Dwelling CO₂ Emission Rate' is less than the 'Target CO₂ Emission Rate', the 'Dwelling Fabric Energy Efficiency' is less than the 'Target Fabric Energy Efficiency' and the Dwelling Primary Energy Rating 'DPER' is less than the calculated Target Primary Energy Rating 'TPER'. Thus, results have shown that the proposed design strategy for the dwelling at Bridgewater House, as outlined within the sections above, is in line with the energy efficiency standards and compliance requirements of Part L1 2021 of the Domestic English Building Regulations, Criteria 1, 2 and 3.

The above has also demonstrated that the requirement for 20% of the site energy demand is met using ASHP as a renewable technology.

The above also demonstrates that for the refurbished building, the change of use of the building from offices to dwellings and the listed nature of the building, mean that full compliance is not necessary.

Please note, any deviation from the parameters as outlined within this report could result in increased carbon emissions which could, in turn, result in non-compliance with the building regulations.

Concluding Remarks

The results given in this report are based on the output of SAP calculations, which take account of the following design criteria:

- Architect's Drawings
- Location Weather Data
- Simulation Software
- Internal Conditions
- Construction Materials
- Space Conditioning System Efficiency

Any output from the SAP calculations is only as accurate as the input of the variables associated with the above criteria.

It is essential that all parties understand and accept the various criteria, as these 'drive' the performance of the dwellings.