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# ENERGY STATEMENT- Places for Everyone

## SRP Building – William Hulme Grammar School

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**Client:** RWA
**Project Location:** Manchester

**Prepared By:** Seven Consulting Ltd
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**Project No:** 24-1093

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|---|---|---|---|
| D00 | 12/09/2024 | Draft for review – Pre Planning | RWA |
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# Contents

Executive Summary ..... 4
1.0 Introduction ..... 5
2.0 Legislation and Standards ..... 6
3.0 Sustainable Design ..... 8
4.0 EV Charging Points ..... 10
5.0 Heat Networks ..... 11
6.0 Conclusion ..... 12
Appendix A PV Arrangement ..... 13
Appendix B Ventilation Arrangement ..... 14
Appendix C Spec Heating Arrangement ..... 17
Appendix D Design Stage EPC Rating ..... 18
Appendix E Design Stage Building Regulations Part L ..... 19

# Executive Summary

## Places for Everyone – Energy Statement

The proposals for the new SRP building at William Hulme Grammar School achieve high levels of compliance with the 'Places for Everyone' energy and carbon emission planning policies to support Greater Manchester with their vision in becoming a carbon neutral city region by 2038.

This document addresses the Manchester 'Places for Everyone Joint Development Plan' (Adopted 21 March 2024) requirements of 'Policy JP-S1: Sustainable Development' and 'Policy JP-S2: Carbon and Energy' with respect to the new SRP Building at William Hulme Grammar School, off Springbridge Road, Manchester.

The development has been designed to have a low energy demand to address 'Policy JP-S1: 5.17', reducing energy demand via the use of high levels of thermal insulation, low air tightness, passive ventilation and where required, high efficiency ventilation with heat recovery. The insulation levels proposed surpass that of the Part L 2021 notional values.

The proposals utilise electricity for space heating and domestic hot water. This is to align with 'Policy JP-S1', 5.6: Moving away from carbon intensive gas as the prime source of heat. As the electricity grid continues to decarbonise, so will the proposed development, assisting Greater Manchester in its vision to become a Carbon Neutral City Region by 2038.

Further, the proposals have sought to maximise the amount of PV to the development by utilising every available area of the roof space, to assist Greater Manchester to meet its commitment to be carbon Neutral by 2038 and its target to significantly upscale solar Photovoltaic energy (5.5 Policy JP-S1).

As a result, the predicted reduction in CO2 when compared to Part L 2021 is 70%.

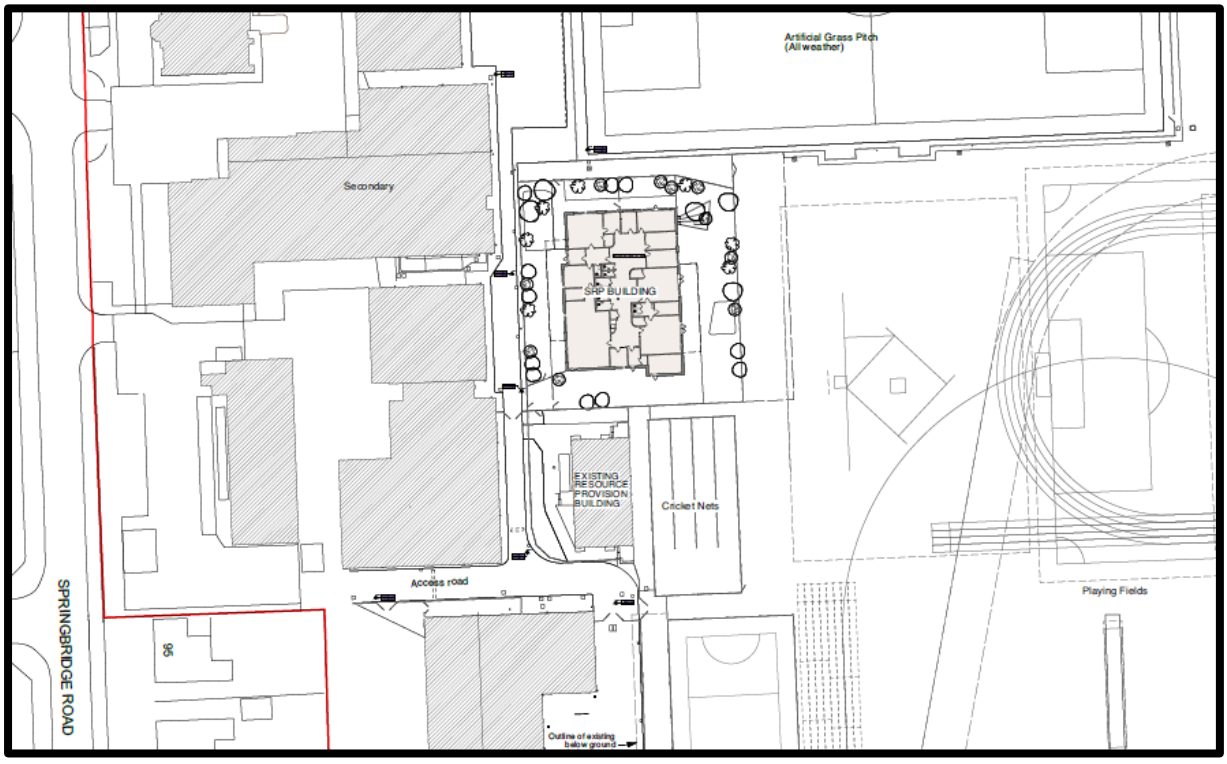
Further details of how policy 'JP-S2: Carbon and Energy' have been met are contained within this report.

# 1.0 Introduction

Seven Consulting have been engaged by RWA to assess the proposals for the new teaching space at William Hulme Grammar School development known as the SRP Building, off Springbridge Road, Manchester.

The SRP Building is located east of the Secondary School and south of the All Weather Pitch.

The proposed scheme comprises a single storey building comprising primary and secondary teaching facilities, quiet rooms and group rooms.



# 2.0 Legislation and Standards

## Places for Everyone – Policy JP-S1 Sustainable Development

Policy JP-S1 sets out Greater Manchester Vision to be a Carbon Neutral City by 2038. With respect to carbon and energy for non residential developments, the policy expects that new developments designed before 2025 will:

- Assist in upscaling solar Photovoltaic Energy
- Reduce heat demand in homes
- Move away from carbon intensive gas
- Meet the requirements of Policy JP-S2
- Seek to achieve Best Practice Space heating energy demand targets
- Consider Provision for EV charging points

## Places for Everyone – Policy JP-S2 Carbon and Energy

Policy JP-S2: Carbon and Energy, expects that new developments submitted to planning before 2025 will:

- Aim to be net zero carbon (UKGBC Definition) in regulated carbon emissions.
- Be consistent with the 2022 Building Regulations (*Should be 2021*)
- Set out how this has been achieved in an energy statement, following the Energy Hierarchy
- Prioritise connection to renewable energy networks where practicable
- Achieve energy demand reductions (space heating and DHW)
- Deliver on site renewable energy generation (prioritising PV)

## Building Regulations Part L

Building regulations Part L 2021 deals with the conservation of fuel and power in new buildings. Part L Vol. 2 addresses the requirements of new build non domestic buildings and the main compliance method is via SBEM calculations.

For non domestic buildings, Part L Vol 2. SBEM calculations set a 'Carbon Target' and an 'Energy Target' that must be met or improved upon. We are not aware of any more onerous targets that must be achieved, other than to meet the minimum Targets set by Part L Vol 2, SBEM.

Building compliance models are built using SBEM software for non domestic schemes. The proposed service and fabric specifications are input into the models and a simulation determines whether or not the proposals meet the Carbon and Energy Targets.

Carbon reductions reported in this document refer to carbon reductions when compared to the Part L 2021 Target Emission Rate.

## National Planning Policy

The NPPF (revised December 2023) sets out the Government's planning policies for England and how these are expected to be applied. The overall emphasis of the NPPF is to reiterate the Government's key objectives, including securing sustainable development.

The NPPF defines the purpose of the planning system as being to contribute to the achievement of sustainable development. It explains at Paragraph 8 that there are three dimensions to sustainable development. These are economic, social and environmental and should be pursued simultaneously through the planning system.

Paragraph 10 states that at the heart of the Framework is a presumption in favour of sustainable development.

# 3.0 Sustainable Design

Policy JP-S2 requires that development proposals should set out how 'net zero operational carbon emissions' have been achieved in an energy statement in accordance with the energy hierarchy. To support Greater Manchester's vision in becoming carbon neutral by 2038, the energy hierarchy ethos has been embedded in the proposals for the proposed SRP building. The Net Zero roadmap and Energy Hierarchy requires that an efficient building fabric is developed, that the energy supplied to the building is clean and that the proposals maximise the opportunity to generate green electricity. The remaining emissions should then be offset:




### Be Lean

The proposed building fabric specified betters the Part L 2021 notional building values and is on a par with 'Passivehaus' insulation levels. The proposed fabric specification can be seen in table 1:

| Elements | U Value | Notes |
|---|---|---|
| Ground Heat Loss Floor | 0.12 W/m2/K | |
| Roof | 0.14 W/m2/K | |
| External Walls | 0.15 W/m2/K | |
| Windows | 1.4 W/m2/K | G = 0.55 |
| Air Permeability | 2.5 $m^3/hm^2$@50Pa | |

Additionally, the majority of classroom ventilation will be provided via high efficiency hybrid ventilation units with the ability to ventilate passively and provide heat recovery. These units are estimated to reduce annual ventilation energy by 90%. Some area's within the building will also benefit from windcatchers which also benefit from passive ventilation with the ability to provide heat recover. These systems also assist with the removal of unwanted heat during the summer months. The Ventilation layout and typical Hybrid ventilation unit can be found in Appendix B

### Be Clean

In line with the Greater Manchester aim of reducing carbon intensive gas as the prime source of heat (Policy JP-S1), the proposals utilise electricity for space heating and domestic hot water.

Specifically, high efficiency Air Source Heat Pumps are proposed to supply LTHW to under floor heating throughout with the exception of the central corridor (heating arrangement can be found in appendix C).

The central corridor is proposed to be served by high efficiency ASHP Split System heating and peak lop cooling.

As the electricity grid continues to decarbonise, so will the proposed development, assisting Greater Manchester in its vision to become a Carbon Neutral City Region by 2038.

To ensure no heat is wasted, high efficiency hybrid ventilation units with heat recovery (HVR units) will operate to maintain adequate air quality and comfort in winter and inter seasons. Openable windows will be operated to provide comfort in the summer..

High efficiency LED lighting will be used throughout the development.

### Be Green

The 'Places for everyone' Policy JP-S2 requires that "For renewable energy generation priority should be given to PV installation where technically feasible". To support Greater Manchester in this aspiration, the proposals have sought maximised the amount of PV that can fit on the roof. An array area of 60-70m2 is possible, which could support an array capacity of 13kWp, potentially providing an estimated 9,645 kWh per annum of green electricity. The dedicated area for the PV array can be found in appendix A.

### Carbon Reduction

As a result of the combined design measures above, the predicted reduction in CO2 when compared to Part L 2021 is 70% and an EPC rating of 3A, almost achieving net zero.

### Carbon Offset

The 'places for everyone' requirement and mechanism for offsetting residual emissions does not come into force until 2025. For the purposes of reporting, the proposed building is calculated to emit 805 kg of CO2 per annum.

# 4.0 EV Charging Points

There is no parking associated with the proposed SRP building. As such, no EV chargers are proposed as a part of this application.

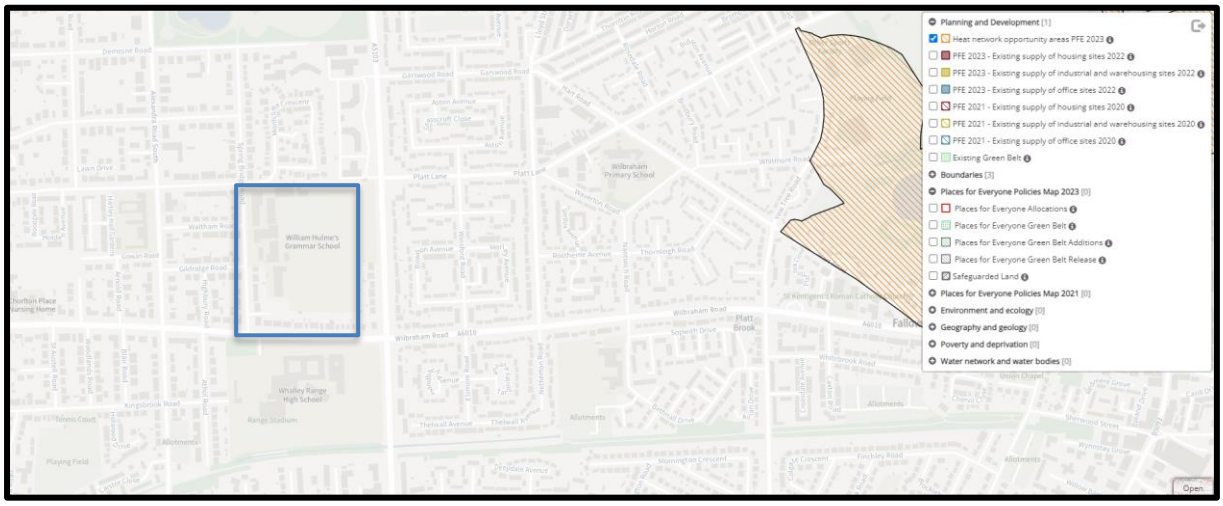
The installation of EV charging points at the school is a part of a wider school review and not limited to a provision solely for this building (one of many on the school site).

# 5.0 Heat Networks

Heat networks as among the technologies/systems offering the highest technical potential to contribute to the reduction in carbon emissions. The dense urban nature of some parts of Greater Manchester and the scale of development proposed in the Plan allocations means that there are opportunities for significant growth of heat networks aligned with, and building out from, strategic development sites.

As such, to comply with policy JP-S3, a heat network assessment is required as part of the energy statement.

The proposed site is not within the 'Heat Networks Opportunity Area'. This is indicated in the map below. It is therefore not practicably viable to connect to a network.



# 6.0 Conclusion

This statement has assessed the proposed WHGS SRP Building against the relevant climate change and sustainability policies and targets, outlined within the Manchester 'places for everyone' planning guidance.

The proposals have been developed using the guiding principles of the energy hierarchy, ensuring a fabric first approach to minimize space heating demand has resulted in dwellings that meet or are very near to achieving the 'best Practice' targets for reducing energy demand, as set out by policy JP-S1.

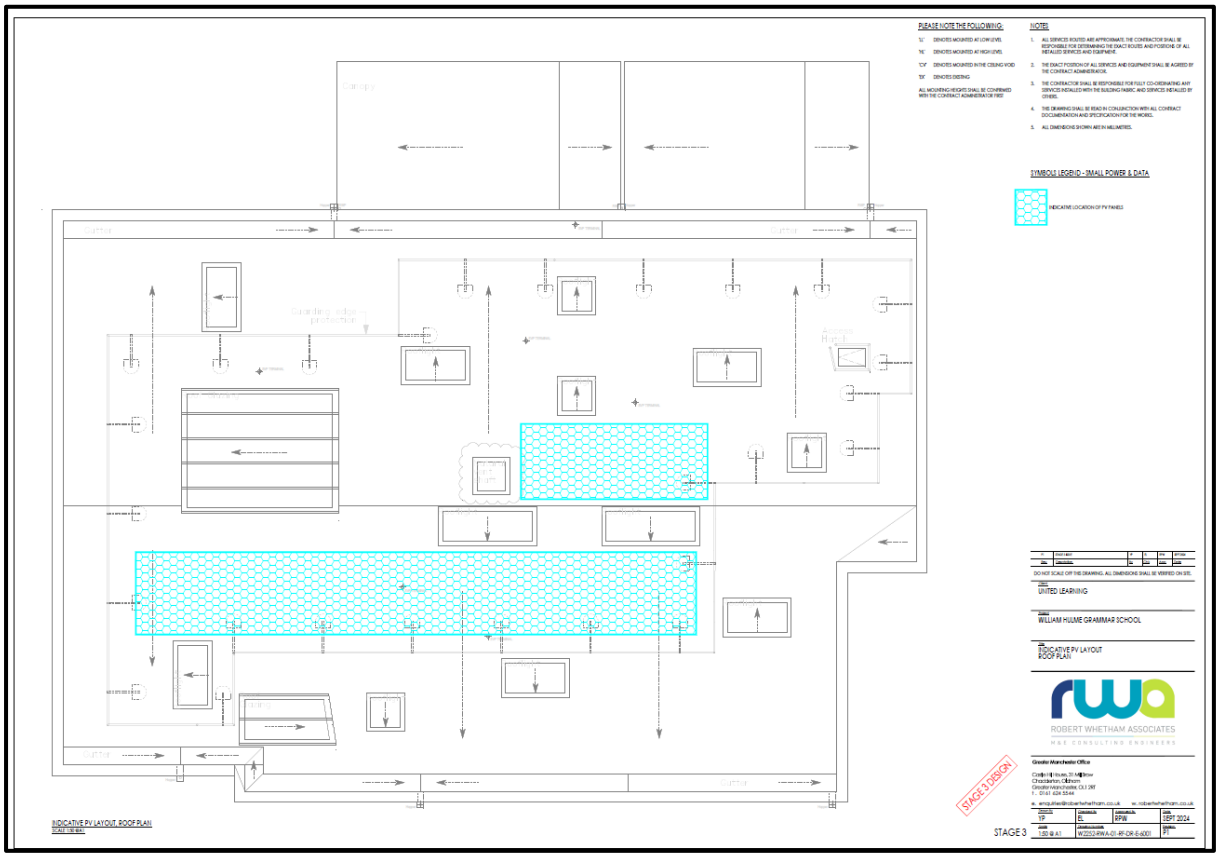
The proposals utilise electricity for space heating and domestic hot water. As the electricity grid continues to decarbonise, so will the proposed development, assisting Greater Manchester in its vision to become a Carbon Neutral City Region by 2038.

The proposals have sought to maximised the amount of PV that can fit on the roof, such that the space available is between 60 and 70m2, enabling a capacity of circa 13kWp of PV panels, potentially generating circa 9,645kWh per annum. This supports Greater Manchester target for renewable energy generation priority to be given to PV installation where technically feasible".

The development proposals aim to achieve high compliance with the Policies JP-S1, JP-S2 and JP-S3 to support Greater Manchester with their vision in becoming a carbon neutral city region by 2038.

# Appendix A PV Arrangement

The available roof area for PV has been marked on the plan between the passive design features such as roof lights and wind catchers. Available space for PV is just over 60-70 m2, which could provide an array of circa 13kWp. We estimate an annual yield of 9,645kWh per annum would be generated by a 13kWp PV array.

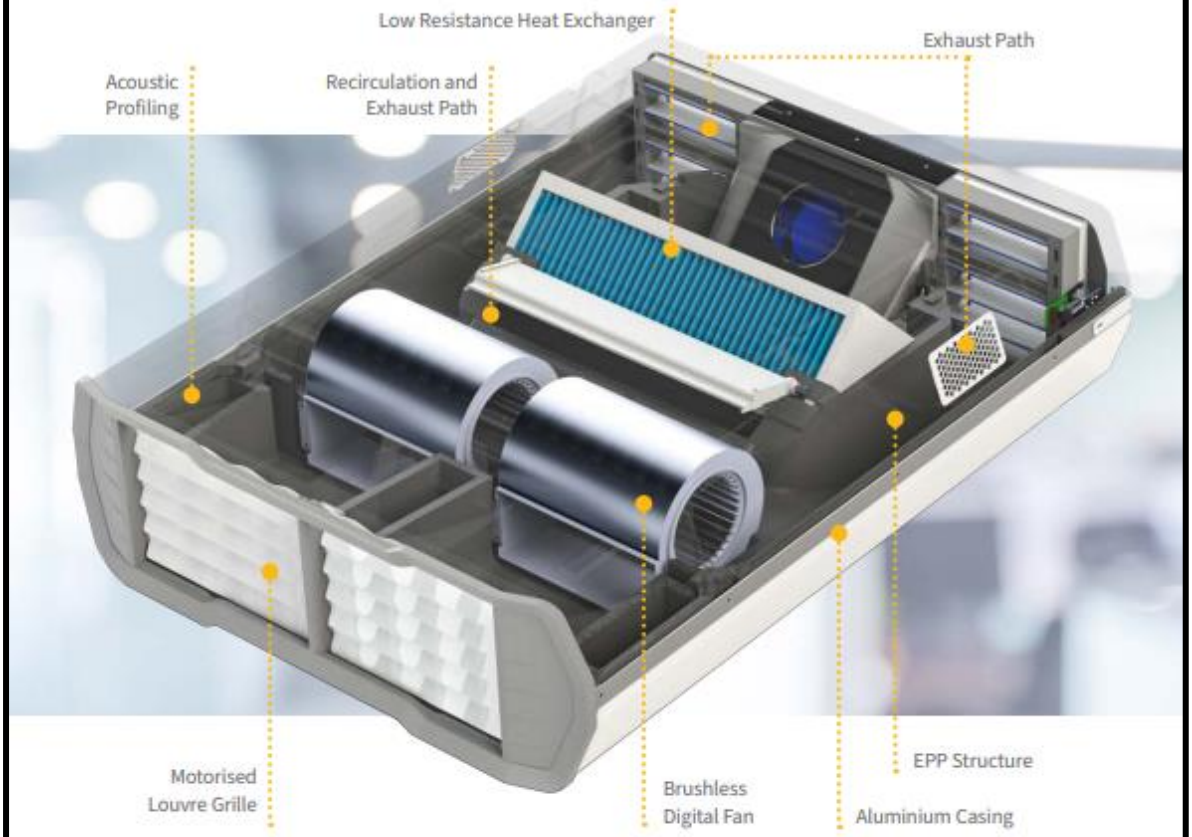


# Appendix B Ventilation Arrangement

The ventilation proposals are designed around the use of hybrid ventilation units to the classrooms. These are ventilation units specially designed for the UK education sector to assist in delivering Net Zero. They utilise passive ventilation when conditions allow and benefit from heat recovery. The units, when set up correctly, are estimated to reduce annual ventilation energy my c. 90% when compared to more traditional MVHR systems.



# CONSTRUCTION FEATURES




- **Acoustic Profiling**

Embedded technologies within the casing reduce fan noise and minimise ventilation air movement noise.
*(Patent application 48039GB)*

- **EPP Structure**

Flame retardant Expanded Polypropylene (EPP) is steam fused to form the complex airflow paths within the system. It provides acoustic and insulative properties and is fully recyclable.

- **Aluminium Casing**

Aluminium sheets are profiled and then coated in industrial layers of white RAL 9003 powder coating.

- **Motorised Louvre Grille**

A louvred grille directs ventilation air within the room. Incorporating metal geared actuators, the louvred grille allows air flow to be automatically varied dependant on season or on user control.

- **Brushless Digital Fan**

High performance brushless digital fan delivers industry leading ventilation performance to power usage ratio. Large flow volume reduces fan speed to a minimum thus reducing noise output.

- **Low Resistance Heat Exchanger**

Hydrophilic coated aluminium cross flow heat exchanger minimises resistance to airflows, lowering running costs and reducing maintenance.

- **Sensors**

Inbuilt temperature sensors continually monitor airflow temperatures and indoor air quality.

- **Ventilation Airways**

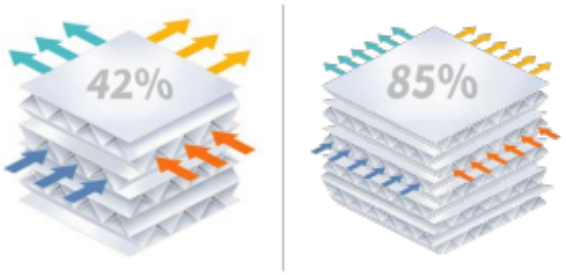
Multiple segregated internal airways allow selectable ventilation strategies from natural ventilation, hybrid ventilation and mechanical heat recovery ventilation.
*(Patent application 48086GB)*

# DESIGNING FOR
# WINTER HEATING PROVISION

Hybrid ventilation has been used in many applications but due to it's high efficiency is often used in schools so when designing for schools BB101, Section 4.3 advises that in highly insulated new buildings "mixing ventilation systems provide heat reuse within the space and can have similar seasonal energy efficiencies, in room based ventilation systems, to heat recovery units with heat exchangers". It goes on to say "the balance point where no heating is required is around 5°C" and explains that the number of occupied hours when the external temperature is below 5°C is small.

## Heat Loss Calculations

HVR Zero provides the lowest year round energy consumption. The system balances very low specific fan powers with optimised heat exchanger efficiencies to ensure the lowest possible energy use for heating and ventilation use within the room that it is serving.

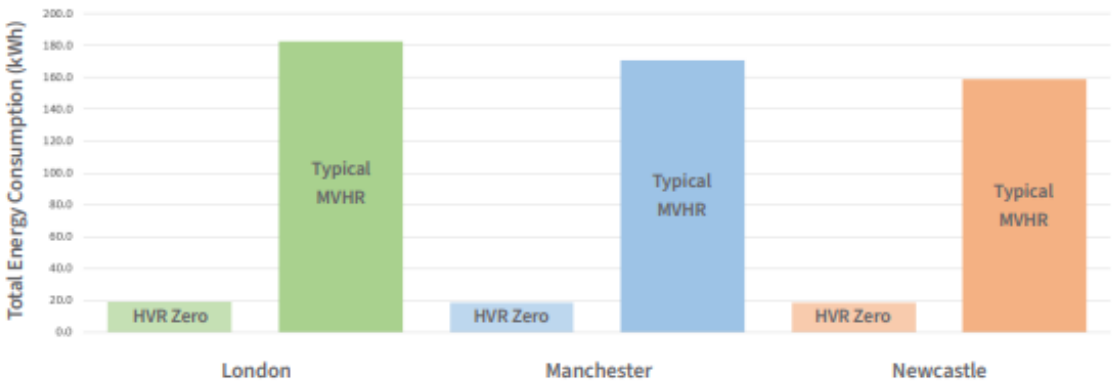



| Location | Quantity of occupied hours below 0°C within CIBSE TRY file | Estimated quantity of hours per year of winter time occupied operation | Estimated quantity of hours per year of normal occupied operation | Estimated quantity of hours per year of night time cooling |
|---|---|---|---|---|
| London | 18 | 95 | 1505 | 360 |
| Manchester | 56 | 125 | 1475 | 300 |
| Newcastle | 68 | 180 | 1420 | 240 |

| HVR Zero | Typical MVHR |
|---|---|
| 0.053 SFP / 6.9W | 0.54 SFP / 70.2W |
| Normal Daytime Operation (@ 130 l/s) | |

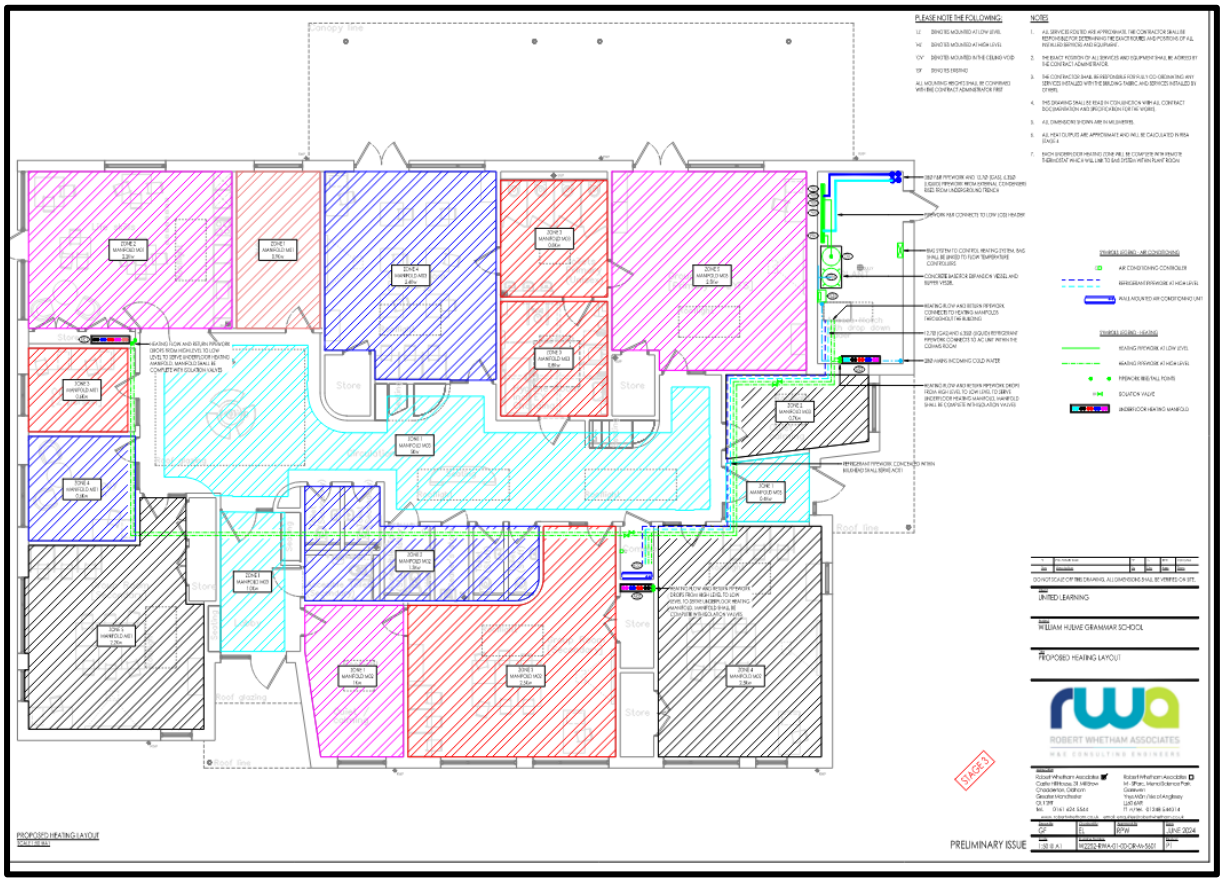
| Location | Ventilation Type | Heat Recovery Efficiency | Winter Time Normal Operation SFP | Winter time daytime energy consumption (kWh) | Normal Daytime Operation SFP | Normal daytime energy consumption (kWh) | Night time cooling SFP | Night time cooling energy consumption (kWh) | TOTAL ESTIMATED ENERGY CONSUMPTION (kWh) |
|---|---|---|---|---|---|---|---|---|---|
| London | HVR Zero X | 42% | 0.21 | 2.6 | 0.053 | 10.4 | 0.13 | 6.1 | 19.0 |
| | Typcial MVHR | 85% | 0.54 | 6.7 | 0.54 | 105.7 | 1.5 | 70.2 | 182.5 |
| Manchester | HVR Zero X | 42% | 0.21 | 3.4 | 0.053 | 10.2 | 0.13 | 5.1 | 18.6 |
| | Typcial MVHR | 85% | 0.54 | 8.8 | 0.54 | 103.5 | 1.5 | 58.5 | 170.8 |
| Newcastle | HVR Zero X | 42% | 0.21 | 4.9 | 0.053 | 9.8 | 0.13 | 4.1 | 18.8 |
| | Typcial MVHR | 85% | 0.54 | 12.6 | 0.54 | 99.7 | 1.5 | 46.8 | 159.1 |

All values based on 130 l/s flow rates



# Appendix C Spec Heating Arrangement

The space heating proposals utilise low carbon Air Source Heat Pump technology to provide low temperature hot water to underfloor heating. Heat pumps generally have space efficiencies (CoP) of between 3 and 5, depending on the selected units and their commissioning. The heating layout is shown below.



# Appendix D Design Stage EPC Rating

## Energy Performance Certificate
Non-Domestic Building

HM Government

**William Hulme's Grammar School**
**Spring Bridge Road**
**Manchester**
**M16 8PR [R12]**

**Certificate Reference Number:**
0695-1864-1317-0692-3487

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government's website at www.gov.uk/government/collections/energy-performance-certificates.

### Energy Performance Asset Rating




### Technical information

| | |
|---|---|
| **Main heating fuel:** | Grid Supplied Electricity |
| **Building environment:** | Heating and Mechanical Ventilation |
| **Total useful floor area ($m^2$):** | 500.6 |
| **Building complexity:** | Level 4 |
| **Building emission rate ($kgCO_2/m^2$ per year):** | 1.61 |
| **Primary energy use ($kWh_{PE}/m^2$ per year):** | 15.12 |

### Benchmarks

**Buildings similar to this one could have ratings as follows:**

11 If newly built

43 If typical of the existing stock

ONLY FOR ILLUSTRATION

# Appendix E Design Stage Building Regulations Part L

## BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

**Project name**

**William Hulme's Grammar School SRP Building** — As designed

Date: Fri Sep 06 15:37:18 2024

### Administrative information

**Building Details**

**Address:** William Hulme's Grammar School, Spring Bridge Road, Manchester, M16 8PR [R12]

**Certifier details**

**Name:** N Duggan

**Telephone number:** 0161 209 3259

**Address:** Peter House, Oxford Street, Manchester, M1 5AN

**Certification tool**

**Calculation engine:** SBEM

**Calculation engine version:** v6.1.e.1

**Interface to calculation engine:** Virtual Environment

**Interface to calculation engine version:** v7.0.26

**BRUKL compliance module version:** v6.1.e.1

**Foundation area [$m^2$]:** 526.95

### The $CO_2$ emission and primary energy rates of the building must not exceed the targets

| | | |
|---|---|---|
| Target $CO_2$ emission rate (TER), $kgCO_2/m^2annum$ | 5.2 | |
| Building $CO_2$ emission rate (BER), $kgCO_2/m^2annum$ | 1.61 | |
| Target primary energy rate (TPER), $kWh_{PE}/m^2annum$ | 55.21 | |
| Building primary energy rate (BPER), $kWh_{PE}/m^2annum$ | 15.12 | |
| Do the building's emission and primary energy rates exceed the targets? | BER =< TER | BPER =< TPER |

### The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

| Fabric element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | First surface with maximum value |
|---|---|---|---|---|
| Walls* | 0.26 | 0.15 | 0.15 | WH000001_W1 |
| Floors | 0.18 | 0.12 | 0.12 | WH000001_F |
| Pitched roofs | 0.16 | 0.14 | 0.14 | WH000015_C |
| Flat roofs | 0.18 | 0.14 | 0.14 | WH000001_C |
| Windows** and roof windows | 1.6 | 1.4 | 1.4 | WH000001_W1_O0 |
| Rooflights*** | 2.2 | 1.4 | 1.4 | WH000001_C_O0 |
| Personnel doors^ | 1.6 | 1.6 | 1.6 | WH00000F_W0_O0 |
| Vehicle access & similar large doors | 1.3 | - | - | No external vehicle access doors |
| High usage entrance doors | 3 | - | - | No external high usage entrance doors |

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 $W/m^2K$

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air permeability | Limiting standard | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 8 | 2.5 |

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