

Ask Real Estate MBP Limited

Manchester Business Park, Aviator
Way

Energy and Carbon Statement

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0.0 Executive Summary

This Energy and Carbon Statement has been prepared to support the full planning application for the proposed Manchester Business Park, Aviator Way development (proposed development) located at Unit 2000, Aviator Way, near Manchester Airport, Greater Manchester, M22 1GE.

This statement demonstrates how the proposed development has been designed to maximise its environmental performance by reducing energy use and carbon emissions in accordance with the local energy and climate change policy requirements, including those of the Greater Manchester Combined Authority (GMCA).

0.1 Energy and Carbon Proforma

The Energy and Carbon Proforma have been submitted alongside this statement to support the full planning application for the proposed development in accordance with the recently published GMCA Net Zero Carbon Design guidance. The guidance sets out how applicants should demonstrate compliance with Policies JP-S2 Carbon and Energy and SP-S3 Low Carbon Heat of the Places for Everyone (PfE) Joint Development Plan (adopted March 2024). See the extract of the proforma below, populated with the relevant environmental performance indicators for the development.

Energy and Carbon Proforma		GMCA GREATER MANCHESTER COMBINED AUTHORITY						
Non-residential								
Major development (>1,000m ²)								
Version 1.0								
Project Name: Manchester Business Park, Aviator Way								
Application ref:								
Date:								
		Ref. name	Unit 1A	Unit 1B	Unit 2A	Unit 2B	Unit 2C	
		Area (m ² GIA)	1706	1978	925	579	580	
		Target values	Building 1	Building 2	Building 3	Building 4	Building 5	+
Minimise energy demand	Space heating demand (kWh/m ² GIA/yr)	≤ 15	7.78	7.5	8.47	7.35	9.15	
	Space cooling demand (kWh/m ² GIA/yr)	≤ 15	0.57	0.56	0.56	0.72	0.76	
	Calculation methodology used to calculate space heating demand and confirmation that this covers all homes/blocks	Predictive energy model	DSM	DSM	DSM	DSM	DSM	
	Form factor per building	≤ 2	4.27	3.79	3.77	3.93	3.93	
	Average external wall U-value (W/m ² K)	≤ 0.16	0.16	0.16	0.16	0.16	0.16	
	Average window U-value (W/m ² K)	≤ 1 (triple)	1.4	1.4	1.4	1.4	1.4	
	Air permeability rate (m ³ /h/m ² @ 50 Pa)	≤ 1	3	3	3	3	3	
Maximise energy efficiency	BREEAM Ene 01 rating	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	
	Energy use intensity (kWh/m ² GIA/yr)	-	74.67	74.71	76.55	75.05	76.9	
	Calculation methodology used to calculate energy use intensity and confirmation that this covers all homes/blocks	Predictive energy model	DSM	DSM	DSM	DSM	DSM	
Use renewable energy	PV footprint area (% of ground floor space)	-	6%	7%	7%	8%	8%	
	Annual renewable energy generation (kWh/m ² building footprint/yr)	-	9.65	9.67	10.56	11.73	11.68	
	Renewable energy balance (%)	-	21.49	21.99	21.56	22.13	20.78	
	Total energy used (kWh/yr)	-	66650	76190	39080	25235	26875	
	Total energy generated on-site (kWh/yr)	-	14,324	16756	8426	5585	5585	
Use low carbon energy	Fossil fuel free (yes/no)	Yes	Yes	Yes	Yes	Yes	Yes	
	Heat source	Electric	Electric	Electric	Electric	Electric	Electric	
	Low Carbon Heat Appraisal completed	Yes	Yes	Yes	Yes	Yes	Yes	
	Heat network suitability	-	No	No	No	No	No	
	Exemption requested	-	N/A	N/A	N/A	N/A	N/A	
	Efficiency of heating system (SCOP)	≥ 3.6	3.5	3.5	3.5	3.5	3.5	
	Carbon content of heat (gCO ₂ /kWh)	≤ 100	8.93	8.93	8.93	8.93	8.93	
Reduce overheating risk	Has CIBSE TMS2 been used to calculate overheating and does the building pass?	Yes	No	No	No	No	No	
	What percentage of spaces are cooled? (% of GIA)	-	4.73	4.08	6.62	10.48	10.55	
	Has a CIBSE TMS2 assessment been carried out using DSY2 and DSY3 weather files? Have any additional passive measures been included as a result?	Yes	No	No	No	No	No	
Minimise embodied carbon	Upfront embodied carbon (kgCO ₂ e/m ² GIA)	-	655 (project total consideration)					
	List top three materials with the highest upfront embodied carbon emissions (kgCO ₂ e/m ² GIA): Material 1	-	House structural steel					
	Material 2	-	PVs					
	Material 3	-	Warehouse floor finish					
	Lifecycle embodied carbon (kgCO ₂ e/m ² GIA) - for large major developments only	-	610 (project total consideration)					
Offset	Offset contribution (£)	-						

Copy of Energy and Carbon Proforma.

0.2 Project Overview

The proposed development comprises 9 no. Commercial B2 (General Industry) and B8 (Storage and distribution) units to form light industrial and ancillary office space, with associated landscaping works, access and car parking.

The site is bounded to the north by residential housing along Thornsgreen Road, to the east by existing Manchester Business Park office units, to the south by Aviator Way and the A555 Ringway Road West, and to the west by Woodhouse Lane and existing Manchester Business Park units beyond this.

Part L modelling using the Dynamic Simulation Modelling (DSM) methodology has been carried out using current design information for each of the 9 units that comprise the proposed development. The following environmental performance indicators outlined within this statement are therefore representative of the estimated performance of the proposed development based on the current, early-stage design scenario.

A site plan of the buildings that comprise the proposed development is provided below.



Proposed Site Plan.

1.0 Building Fabric and Ventilation

The design of Manchester Business Park, Aviator Way seeks to minimise its operational energy demand by applying design strategies that consider energy efficient fabric and ventilation in accordance with Policy JP-S2 of the PfE. The following section demonstrates how the principles of the energy hierarchy have been implemented throughout its design to reduce the space heating demand.

1.1 Building form and heat loss envelope

Each of the 4 buildings are simple portal frame structures, consisting of an unheated warehouse space generally, and a heated office at first floor, plus heated office entrance at ground floor.

The office facades (i.e. the heated facades) consist predominantly of a combination of a curtain wall system and an insulated built-up profiled wall cladding system, with insulated composite wall panels internally.

The warehouse space, whilst not heated, typically has either an insulated built-up profiled wall cladding system or insulated composite panels. The roof will consist of insulated built-up profiled roof cladding.

The form factor of each unit has been calculated as follows, using the methodology of dividing the exposed external surface area by the gross internal floor area.

FORM FACTOR CALCULATION	
Unit 1A	4.27
Unit 1B	3.79
Unit 2A	3.77
Unit 2B	3.93
Unit 2C	3.93
Unit 3A	3.85
Unit 3B	3.77
Unit 3C	3.93
Unit 4	3.78

1.2 Elevation design and window proportions

The elevation design of the office facades consists predominantly of a curtain wall system, with a solid spandrel panel between 0-900mm, glazing between 900-2700mm with brise soleil fins to the top half of this, and louvre panels for mechanical ventilation between 2700-3600mm.

Above this curtain wall system will be an insulated built-up profiled wall cladding system, as illustrated in the drawings provided in Appendix 2.

The warehouse facades are typically either an insulated built-up profiled wall cladding system or insulated composite panels with no windows.

The glazing-to-wall ratio figures for each elevation of each unit are shown in the table below.

GLAZING-TO-WALL RATIO				
Unit	Northern Elevation	Eastern Elevation	Southern Elevation	Western Elevation
Unit 1A	-	-	39%	42%
Unit 1B	-	42%	37%	-
Unit 2A	-	-	39%	-
Unit 2B	-	-	41%	-
Unit 2C	-	-	41%	-
Unit 3A	-	-	39%	-
Unit 3B	-	-	39%	-
Unit 3C	-	-	41%	-
Unit 4	-	30%	38%	45%

1.3 Heated and unheated spaces

As above, each of the 4 buildings consist of an unheated warehouse space, and a heated office at first floor, plus heated office entrance at ground floor. Whilst the warehouse spaces are not heated, they still have a continuous thermally insulated envelope line to allow for potential heating in the future.

Drawings are provided in Appendix 2, illustrating the thermal envelope for each building in plan and section views.

1.4 Building fabric specifications and airtightness

A fabric-first approach to improving the performance of the building envelope has been applied using the 2021 'Notional Building' as the target for the construction of the development to ensure compliance with the 2021 Part L Building Regulations. A summary of the as-designed performance specifications for the building envelope is provided in the table below.

Specification	Fabric Performance	Notes
Airtightness (m³/hm²) at 50 Pa	3	
Average U-values W/m2K		U-values consistent with GMCA Net Zero Design Guidance for industrial buildings.
Floor	0.15	
External Wall	0.18	
Roof	0.13	
Window U-value W/m2K	1.4	
External Door U-value W/m2K	1.6	U-value representative of external personnel doors.
Glazing g-value	0.29	
Shading	All of the office windows are south facing and therefore incorporate brise soleil fins integrated into the window system. The fins are to be provided to the top 50% of the window (1800-2700mm).	
Thermal bridging W/mK		Information on Y-values is not available at this stage.
Overall Total -Value	-	

1.5 Ventilation system

Fresh air ventilation to the open plan office areas shall be provided by local ceiling void mounted mechanical heat recovery ventilation systems.

1.6 Space heating demand

A dynamic simulation model (DSM) has been created using IES Virtual Environment (2025) to predict the development’s energy consumption for heating and demonstrate compliance with Part L Vol 2 of the Building Regulations.

SPACE HEATING DEMAND (kWh/m ² /yr)	
Unit 1A	7.78
Unit 1B	7.5
Unit 2A	8.47
Unit 2B	7.35
Unit 2C	9.15
Unit 3A	7.86
Unit 3B	6.99
Unit 3C	8.97
Unit 4	8.27



SDH target for major developments.

2.0 Maximise Energy Efficiency

The design of Manchester Business Park, Aviator Way seeks to decrease its operational energy consumption further by exploring opportunities to integrate high-efficiency systems, thereby reducing wasted resources and illustrating how the energy hierarchy has been applied to maximise energy efficiency. The following section describes how the proposed development works towards achieving challenging targets for total energy use and considers both regulated and unregulated energy.

2.1 Energy use intensity for residential non-residential developments

The EUI of the units that comprise the proposed development has not been calculated using predictive energy modelling at this early stage of design, as the flexible warehouse spaces have been designed to a shell-only standard to account for fit-out works by a future incoming occupier(s). Unregulated energy loads have therefore not been estimated for these areas, as the occupier and end-use are not known.

A DSM has been created using IES Virtual Environment (2025) to provide predicted Energy Performance Certificates (EPCs) for the development and confirm compliance with Part L Vol 2 of the Building Regulations. All units achieve an EPC rating of 'A', demonstrating a high standard of energy performance.

An estimated EUI figure has been calculated using the total energy consumption figure from the Part L modelling outputs, which considers regulated energy loads and equipment energy only at this early design stage, due to the units being speculative in nature. An assumption that the warehouse areas will be heated has been made within the model to account for a 'worst case' scenario in terms of regulated energy use, as their function is not known. Further modelling may be carried out to update this figure as the design progresses.

ENERGY USE INTENSITY (kWh/m²/yr)	
Unit 1A	74.67
Unit 1B	74.71
Unit 2A	76.55
Unit 2B	75.07
Unit 2C	76.9
Unit 3A	75.52
Unit 3B	74.87
Unit 3C	76.22
Unit 4	74.61

In accordance with Policy JP-S2, the minimum standard for BREEAM “Excellent” has been achieved for the Ene-01 Reduction of energy use and carbon emissions BREEAM issue for each building at the early planning stage. The energy performance ratio (EPR) achieved for each building is shown below.

BREEAM ENE 01 ENERGY PERFORMANCE RATIO	
Minimum Standard (Excellent)	0.400
Unit 1A	0.574
Unit 1B	0.578
Unit 2A	0.599
Unit 2B	0.511
Unit 2C	0.528
Unit 3A	0.594
Unit 3B	0.547
Unit 3C	0.546
Unit 4	0.599

2.2 Efforts to reduce energy use of equipment

Opportunities to further reduce the operational energy beyond what can be achieved through minimising regulated energy use include specifying energy-efficient equipment and appliances, in line with the degree of fit-out in the base build, to reduce energy consumption per use. Minimising unregulated energy can be explored further by the future building occupier(s).



EUI target for major developments.

3.0 Renewable Energy Generation

The proposed development aims to maximise the generation of on-site renewable energy by considering opportunities to integrate low carbon and renewable technologies into the design where appropriate. The following section describes how the design of Manchester Business Park, Aviator Way advances towards balancing predicted annual energy use with annual renewable energy generation in accordance with the energy hierarchy.

3.1 Proposed renewable energy generation system

Solar PV is the renewable energy generation system proposed for inclusion in the development. A large solar PV array will be provided on the roof of each building to generate low carbon electricity, which will contribute towards reducing operational carbon emissions in accordance with Policy JP-S2 of the PfE and lessen reliance on grid electricity. The solar PV system proposed for each unit has been modelled at this early design stage.

The capacity of the system varies per unit, with Unit 1B having the highest peak output of 21.62kWp as demonstrated in the table on the following page.

The expected annual renewable electricity generation of the total PV system across all units is 88,631kWh/yr.

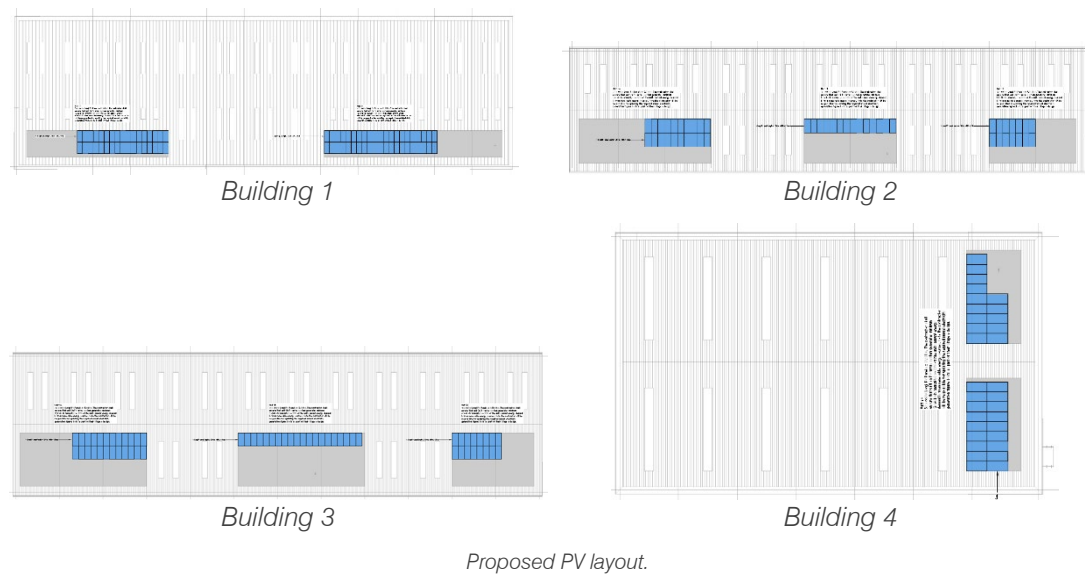
The table below provides further details of the proposed solar PV system for each unit based on early-stage modelling results.

	Solar PV								
	Unit 1A	Unit 1B	Unit 2A	Unit 2B	Unit 2C	Unit 3A	Unit 3B	Unit 3C	Unit 4
Orientation from south	45°	45°	45°	45°	45°	45°	45°	45°	45°
Tilt	10°	10°	10°	10°	10°	10°	10°	10°	10°
Peak output (kWp)	18.48	21.62	10.87	7.21	7.21	13.05	10.30	8.24	17.40
Panel (maximum output, type of inverters)	640W Leno PV Panel or equal								
PV area as percentage of roof area	6.20%	6.52%	6.77%	7.98%	7.95%	6.52%	6.78%	7.20%	6.25%
Expected annual renewable energy generation kWh/yr	14,324	16,756	8,426	5,585	5,585	10,111	7,979	6,383	13,482
Annual renewable energy generation per m ² (GIA) kWh/m ² (GIA)/yr	8.40	8.47	9.11	9.65	9.63	8.79	8.64	9.09	8.30
Annual renewable energy generation per m ² (building footprint) kWh/m ² (building footprint),yr	9.65	9.67	10.56	11.73	11.68	10.14	10.02	10.69	9.69
Balance between total energy use and renewable energy generation	21.49%	21.99%	21.56%	22.13%	20.78%	21.73%	21.45%	20.71%	20.81%
Shading constraints?	No localised shading. Shading factor used = 1.								

3.2 PV footprint area

The opportunities for on-site electricity generation from solar technologies have been maximised by installing panels on the available roof area. The proposed PV arrangement covers an area equivalent to 7% of the total ground floor footprint of all units, used as a proxy for roof area, when accounting for total panel area.

The roof layouts provided in Appendix 3 illustrate the proposed arrangement of solar PV across the available roof area of each building and demonstrate how the panel area has accounted for other roof-mounted equipment, skylights, access for maintenance and any overshadowed areas, where applicable.



3.3 Renewable energy balance

The renewable energy balance describes the proportion of the total annual energy used for the development that will be balanced by the total annual generation of renewable energy on site.

Based on early-stage predictions of operational energy use, the total renewable energy balance for the proposed development has been calculated as 21%.

This has been achieved by applying the principles of the energy hierarchy in accordance with Policy JP-S2 of the PfE to minimise operational energy use and maximise onsite renewable energy generation to reduce operational carbon emissions.

$$21.44\% = \frac{88,631 \text{ kWh/yr (Annual electricity yield)}}{413,335 \text{ kWh/yr (Final energy demand)}} \times 100$$

The renewable energy balance per unit is shown below.

RENEWABLE ENERGY BALANCE*			
	Annual Electricity Yield kWh/yr	Final Energy Demand (regulated) kWh/yr	Renewable Energy Balance %
Unit 1A	14,324	66,650	21.49
Unit 1B	16,756	76,190	21.99
Unit 2A	8,426	39,080	21.56
Unit 2B	5,585	25,235	22.13
Unit 2C	5,585	26,875	20.78
Unit 3A	10,111	46,520	21.73
Unit 3B	7,979	37,190	21.45
Unit 3C	6,383	30,820	20.71
Unit 4	13,482	64,775	20.81
Total	88,631	413,335	21.44

**The operational energy use estimates used to calculate the renewable energy balance have been informed by early design stage Part L modelling results, correct at the time of writing, which exclude equipment energy estimates and account for regulated energy only. Exact values may be subject to further Part L and PV modelling.*

4.0 Low Carbon Heating

The proposed development has been designed to reduce its contribution to climate change by minimising carbon emissions and mitigating local air pollution through the integration of low carbon heating systems in accordance with Policies JP-S2 and JP-S3 of the PfE. The following section demonstrates how a variety of heating systems have been considered for implementation in the development, and the best heating option chosen to deliver low carbon heat, which is affordable to building occupiers and cost effective.

4.1 Fossil fuel free

The development is an all-electric scheme and does not rely on burning fossil fuels (gas/other) on-site for heating, hot water, cooking or back up-generation.

4.2 Proposed systems for heating and hot water

In accordance with Policy JP-S3, Hannan Associates has conducted a low carbon heat appraisal for the proposed development which assesses the suitability of different low carbon heating systems against four key performance indicators:

- Environmental performance
- Impact on residents
- Impact on viability
- Infrastructure development

Based on an assessment of the location of the proposed development and the low carbon heat networks map provided within the GMCA Low Carbon Heating guidance, the development falls within the case type 4 location. Case 4 reflects developments that are located more than 500m away from any low carbon heat networks (existing or planned) and not within a Heat and Energy Network Opportunity Area.

The proposed system for heating and hot water is an individual heating system in which space heating and domestic hot water are provided separately. Heating within the open plan office areas shall be provided by a DX/VRF system, using ceiling concealed ducted fan coil units with a SCOP of 3.5. External condensers to be located externally, local to the open plan office areas served.

WCs and secondary stairs shall be heated via wall-mounted electric panel heaters.

Domestic hot water to sinks, WHB's, etc., in all areas, shall be generated via local electric water heaters.

A copy of the low carbon heat appraisal is provided in Appendix 4, with a summary presented in the table below.

Systems Considered	Carbon Emissions gCO ₂ /kWh (heat delivered)	Cost of Heat £/dwelling/year	Capital Cost £/unit	Overall Suitability
Notional Low Carbon Heat Network	100	12,452.82	1,085,927	• <i>Future proofed technology</i> • <i>Reliable heating compared to individual systems</i> • <i>Purchase energy in bulk, potentially securing better prices</i> • <i>Constrained by the lack of existing networks in the area to enable an immediate connection</i>
VRF + Direct Electric + Local Electric Hot Water Heaters	31.25 (space heating and hot water systems) 8.93 (VRF space heating system)	37,562.83	171,000	• <i>No external units required</i> • <i>Low distribution losses</i> • <i>Low impact on overheating</i> • <i>Zero carbon ready</i>
Biomass Boiler	113.2	7,299.42	512,973	• <i>Purchase fuel in bulk, potentially securing better prices</i> • <i>Negative impact on local air quality</i> • <i>High capital cost</i>

4.4 Proposed system for cooling

The proposed development has been designed to incorporate cooling within the open plan office areas. Mechanical cooling shall be provided by a DX/VRF system, using ceiling concealed ducted fan coil unit. External condensers to be located externally, local to the open plan office areas served.

5.0 Overheating Risk

Climate change is expected to increase the frequency of periods of hot weather in the UK, and at more extreme temperatures, creating challenges that will affect infrastructure, health and wellbeing. As such, it is important to consider how increased temperatures will affect the risk of overheating within a new development to ensure occupant comfort. The design of Manchester Business Park, Aviator Way seeks to minimise the risk of overheating by considering passive design and shading strategies, and mechanical cooling, as described in the following section.

5.1 Overheating risk assessment

A TM52 overheating risk assessment has not been carried out at this early stage of design however, consideration has still been given to limit overheating risk. All spaces have appropriate passive design measures to limit solar gain in the summer due to the use of improved performance glazing and brise-soleil.

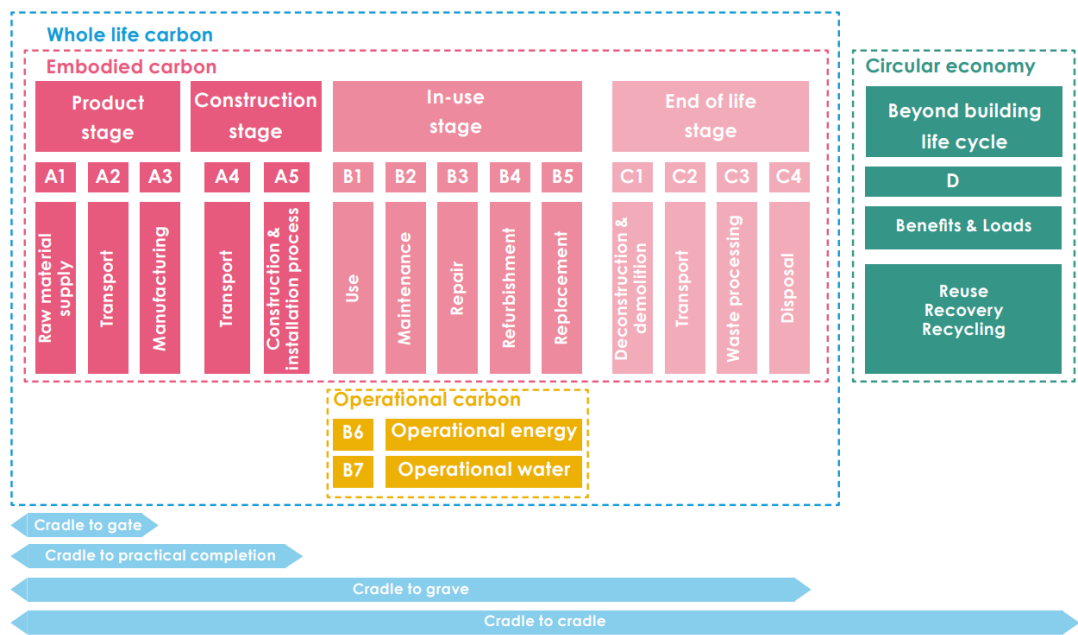
Mechanical cooling will be provided to the office and reception areas to mitigate overheating risk. The percentage of spaces that will be cooled has been calculated for each unit as shown in the table below.

PERCENTAGE OF COOLED SPACES			
	Total GIA (m ²)	Area of Cooled Spaces (m ²)	Percentage of Cooled Spaces (%)
Unit 1A	1,706	80.63	4.73
Unit 1B	1,978	80.63	4.08
Unit 2A	925	61.2	6.62
Unit 2B	579	60.69	10.48
Unit 2C	580	61.2	10.55
Unit 3A	1,150	65.47	5.69
Unit 3B	923	64.97	7.04
Unit 3C	702	65.55	9.34
Unit 4	1,624	95.38	5.87

6.0 Materials

Further to reducing operational carbon emissions as far as practicably feasible, the design of Manchester Business Park, Aviator Way seeks to consider and reduce the embodied carbon associated with its construction and building materials through efficient design and low carbon material selection. This will reduce the building’s whole life carbon impacts which account for both operational and embodied carbon in accordance with Policy JP-S2.

A whole life carbon (WLC) assessment has been carried out by L.C.D Consulting using early-stage design information and materials quantities to estimate the life cycle embodied carbon associated with the developments’ ‘upfront’, ‘in-use’ and ‘end-of-life’ emissions. These consider separately the building’s construction and production of materials; in-use maintenance, repair or replacement of materials; and the eventual deconstruction and disposal of building materials, comprising modules A1-C4 as demonstrated in the diagram below.



Life Cycle Carbon Modules. Source : LETI.

A copy of this WLC assessment is provided in Appendix 5, and results have been calculated following the approach of RICS Whole Life Carbon Assessment 2nd Edition (2023). This assessment has considered the embodied carbon of the whole development, including Buildings 1, 2, 3 and 4 and all associated hard landscaping.

6.1 Upfront embodied carbon

The life cycle stages included in an assessment of upfront carbon are as follows:

- Product Stage (Modules A1-A3)
- Construction Stage (Modules A4-A5)

In accordance with the GMCA Net Zero Design Guidance, the UK Net Zero Carbon Building Standard Pilot version has been referenced to obtain target values for upfront embodied carbon. As such, performance is measured against the target for new storage and distribution buildings with a date of commencement on site of 2026.

Embodied Carbon (kgCO ₂ e)				
GMCA Target (upfront embodied carbon only)	Upfront	In-Use	End-of-Life	Lifecycle
605	635	206	32	873

The predicted upfront embodied carbon calculated for the proposed development is 635kgCO₂/m². The total upfront embodied carbon value for the proposed development shows that the design of Manchester Business Park, Aviator Way is working towards the target for large major developments, with a 5% difference.

This has been achieved through consideration of efficient design strategies and low carbon material selections from an early design stage, as described in the sections below. Implementation of these design options, and to what extent, is subject to further structural and cost consideration and will be confirmed as the design progresses.

6.1.1 Structural lean design

The following design options have been recommended to be considered to explore opportunities to reduce the upfront embodied carbon associated with the development's structure and minimise overall material use.

- Utilising 30% fly ash as a cement alternative in concrete foundations
- Exploring opportunities to utilise recycled steel in the steel frame
- Utilising 60% GGBS as a cement alternative in the lowest ground floor construction

6.1.2 Architectural lean design

The following design choices have been recommended to be considered to reduce the upfront embodied carbon associated with the building façade and other architectural elements.

- Use of hybrid timber-aluminium windows
- Use of low carbon roof cladding system
- Exploring opportunities to utilise a recycled raised access flooring system to office areas
- Use of timber internal wall studs

6.1.3 Building services lean design

Benchmark data has been used to quantify the upfront embodied carbon associated with the development's building services at this early design stage. Options that may reduce the upfront embodied carbon from building services, such as passive measures, duct design and refrigerant specification, will be explored further as design progresses.

6.2 Life cycle embodied carbon

In addition to the development's upfront embodied carbon, life cycle carbon considers emissions attributable to the following life cycle stages:

- In-Use Stage (Modules B1-B7)
- End-of-Life (Modules C1-C4)

As the proposed development is a large major development comprising over 5000m² of non-residential space, life cycle carbon should be calculated and reported.

The predicted life cycle embodied carbon calculated for the development is 873kgCO₂/m².

7.0 Offsetting

7.1 Offsetting

Based on early-stage predictions of operational energy use, the renewable energy balance for the proposed development has been calculated as 21.44%. The remaining 78.56% of the development's energy use will be met using grid electricity.

As the UK grid continues to decarbonise towards the government's 'Clean Power by 2030' target – five years from now, the operational carbon emissions from the development will continue to decrease towards net zero based on its all-electric energy strategy. It is considered that the inclusion of photovoltaics into the design of Manchester Business Park, Aviator Way will contribute towards mitigating residual operational carbon emissions in the interim.

1.0 National Policy

The National Planning Policy Framework (NPPF) (December 2024 revision) sets out the government's planning policies for England and guidance on how these are expected to be applied. The NPPF states that the purpose of the planning system is to contribute to the achievement of sustainable development, which is defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs. This includes the provision of homes, commercial development and supporting infrastructure in a sustainable manner.

Section 2 describes the three overarching objectives of the NPPF that are intended to be pursued in mutually supportive ways and delivered through the preparation of plans and application of the policies within the Framework. These are:

- a) An economic objective – to help build a strong, responsive and competitive economy;
- b) A social objective – to support strong, vibrant and healthy communities; and;
- c) An environmental objective – to protect and enhance our natural, built and historic environment.

To facilitate the advancement of sustainable development in a positive way, paragraph 10 states that at the heart of the NPPF is a presumption in favour of sustainable development for plans and decisions.

The NPPF supports the transition to a low-carbon future in a changing climate, taking full account of flood risk and coastal change. It aims to help shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

Section 14 outlines the energy and climate change policies and states that plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures. New development should be planned for in ways that:

- a) Avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and;
- b) Can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.

To help increase the use and supply of renewable and low carbon energy and heat, plans should:

- a) Provide a positive strategy for energy from these sources, which maximises the potential for suitable development, and their future re-powering and life extension, while ensuring that adverse impacts are addressed appropriately (including cumulative landscape and visual impacts);
- b) Consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and;
- c) Identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

When determining planning applications, the NPPF states that local planning authorities should expect new development to:

- a) Comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and.

- b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

When determining planning applications for renewable and low carbon development, local planning authorities should:

- a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to significantly cutting greenhouse gas emissions;
- b) approve the application if its impacts are (or can be made) acceptable. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas; and;
- c) in the case of applications for the repowering and life-extension of existing renewable sites, give significant weight to the benefits of utilising an established site, and approve the proposal if its impacts are or can be made acceptable.

Section 9 of the NPPF outlines the sustainable transport policies supports and encourages transport issues to be considered from the earliest stages of plan-making and development proposals.

The NPPF states that applications for development should:

- a) give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;
- b) address the needs of people with disabilities and reduced mobility in relation to all modes of transport;
- c) create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;
- d) allow for the efficient delivery of goods, and access by service and emergency vehicles; and;
- e) be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.

2.0 Regional Policy

The Places for Everyone (PfE) plan was formally adopted in March 2024 and forms part of a suite of documents that comprise the Manchester Local Plan. The PfE was prepared by the Greater Manchester Combined Authority (GMCA) and sets out the long-term plan for jobs, new homes and sustainable growth across nine of Manchester's Metropolitan Districts including Salford.

The policies within the PfE plan aim to support the delivery of a carbon neutral Greater Manchester by 2038, following the declaration of a Climate Emergency in July 2019 by the GMCA by encouraging a range of measures that contribute to reducing greenhouse gas emissions from new development in the area.

Objective 7: Playing our part in ensuring that Greater Manchester is a more resilient and carbon neutral city-region states that the GMCA will:

- Promote carbon neutrality of new development by 2028;
- Promote sustainable patterns of development that minimise the need to travel and contribute to cleaner air;
- Locate and design development to reduce car dependency;
- Facilitate provision of infrastructure for cleaner vehicles;
- Improve energy efficiency and the generation of renewable and low carbon energy.

Policy JP-S1: Sustainable Development

Policy JP-S1: Sustainable Development states that development should aim to maximise its economic, social and environmental benefits simultaneously, and minimise its adverse impacts, to help tackle climate change. Preference will be given to using previously developed (brownfield) land and vacant buildings to meet development needs. In bringing forward previously developed sites for development, particular attention will be paid to tackling land contamination and stability issues, ensuring that appropriate mitigation and remediation is implemented to enable sites to be brought back into use effectively.

Policy JP-S2: Carbon and Energy

Policy JP-S2: Carbon and Energy aims to support the delivery of a carbon neutral Greater Manchester no later than 2038 through a range of measures including:

1. Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling;
2. Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured;
3. Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;
4. Increasing the range of nature-based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree-planting and natural flood management techniques;

Policy JP-S2 states that there is an expectation that new developments will unless it can be demonstrated that it is not practicable or financially viable;

- a) 'Be net zero carbon which applies:
 - from adoption– to regulated operational carbon emissions;
 - from 2028 - to all emissions 'in construction'.

From 2025 development should also calculate and minimise carbon emissions from unregulated emissions alongside regulated emissions.

Development proposals should set out how this has been achieved in an energy statement in accordance with the energy hierarchy.

From 2025 any residual carbon emissions that cannot be fully mitigated on-site should be offset, in agreement with the relevant local planning authority through a financial contribution to a carbon offset fund. As an interim measure, development should be consistent with the 2022 Part L Building Regulations unless superseded by changes to building regulations and/or national or local planning policies;

- b) Incorporate adequate electric vehicle charging points, in line with Part S of the Building Regulations, unless superseded by relevant Local Plan policies, to future proof for the likely long-term demand, taking account of the potential maximum energy demand for the site;
- c) Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date;
- d) In residential developments, achieve energy demand reductions in terms of space heat demand, hot water energy demand and the delivery of on-site renewable energy generation; in accordance with Table 5.1.

Table 5.1 Best Practice Thresholds for Reducing Energy Demand and Onsite Renewable Energy Generation within residential developments

-	Space Heat Demand ²⁵	Hot Water Energy Demand ²⁶	Renewable Energy Generation Targets
2021 - 2025	Houses (30kWh/m2) Flats (25kWh/m2)	20% energy demand reduction in the total heat required for water heating	*Photovoltaic installation: 20% ground floorspace
2025 - onwards	Houses (20kWh/m2) Flats (15kWh/m2)	^20% energy demand reduction in the total heat required for water heating	*Photovoltaic installation: 40% ground floorspace
*Ground floorspace used as a proxy for available roof area.	-	-	-
^will need to be reviewed with Future Homes Standard 2025 to determine if savings already embedded.	-	-	-

For renewable energy generation priority should be given to PV installation where technically feasible, alternative technologies will be appropriate where the equivalent generation is evidenced.

- f) For non-residential developments, achieve at least BREEAM excellent standard (or equivalent) for the 'Ene 01 – reduction of energy use and carbon emissions' category rising to 'BREEAM outstanding' equivalent for ENE 01 from 2028.
- g) Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets, including the minimisation of overheating risks and appropriate measures for post occupancy evaluation. Whole life cycle emissions should be considered where possible.

Districts may set out specific carbon emission reduction and energy demand targets within Local Plans.

Policy JP-S3: Heat and Energy Networks

The provision of decentralised energy infrastructure is critical to the delivery of our objectives for low carbon growth, carbon reductions and an increase in local energy generation. The following measures will help to achieve this:

1. Delivery of renewable and low carbon energy schemes will be supported with particular emphasis on the use of decentralised energy networks in areas identified as “Heat and Energy Network Opportunity Areas”. These have been identified where:
 - a) Existing heat/energy networks are operational or have been commissioned;
 - b) Proposals for new heat networks/energy networks are being progressed, or future opportunities have been identified in city-region master planning;
 - c) Sufficient density of existing heat demand occurs; and
 - d) Significant future development is proposed at the strategic development locations.
2. Within the identified “Heat and Energy Network Opportunity Areas”, unless it can be demonstrated that there are more effective alternatives for minimising carbon emissions or such connection is not practicable or financially viable, it is expected that:
 - a) New residential developments that are '10 dwellings or more' or other developments over 1,000 m2 floorspace shall:
 - i. Connect to an existing or planned heat/energy network or be designed to enable future connection (where within 500m of such a network); and/or
 - ii. Install a site-wide or communal heat/energy network solution
 - b) An expectation that new industrial development will demonstrate that opportunities for using waste heat locally have been fully examined, and included in proposals;
 - c) An expectation that where publicly owned buildings and assets adjoin new major development sites, opportunities for these buildings and assets to connect to site-wide proposals will be considered; and
 - d) An expectation that any site-wide networks will be designed so as to enable future expansion to adjoining buildings or assets as appropriate.

3.0 Local Policy

3.1 Manchester Core Strategy

Manchester City Council's Core Strategy (2012-2027) was adopted in July 2012 and comprises the key document in the Manchester Local Plan. Following the recent adoption of GMCA's PFE by Manchester City Council, the Core Strategy was updated in March 2024. It sets out the long term strategic policies for Manchester's future development and forms the framework that planning applications will be assessed against. The following policies from the Core Strategy have been replaced by Policy JP-S2 of the PFE however will still be considered within this Statement.

Policy EN4 Reducing CO2 Emissions by Enabling Low and Zero Carbon Development

The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO2 emissions, and rising fossil fuel prices, through the following actions:

- All development must 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
 - to meet residual energy requirements through the use of low or zero carbon energy generating technologies
- Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies.
- Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings.
- Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.
- The use of building materials with low embodied carbon in new development and refurbishment schemes.

Policy EN6 Target Framework for CO2 Reductions from Low or Zero Carbon Energy Supplies

Applications for residential development of 10 or more units and all other development over 1,000 sq m will be expected as a minimum to meet the target shown in Tables 12.1 or 12.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO2 emissions for all phases of the development.

Developments smaller than the above threshold, but involving the erection of a building or substantial improvement to an existing building will also be expected to meet the minimum target, where viable, but will not be expected to submit an energy statement.

The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows:

- Target 1 Network development areas: Locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling).
- Target 2 Electricity intense areas: Locations where the predominant building type has an all-electric fit-out such as retail units and leisure complexes.
- Target 3 Micro-generation areas: Locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical.

Domestic CO₂ emissions reduction targets

Table 12.1

Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target 2: Electricity intense buildings	+15% increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

Non-domestic CO₂ emissions reduction targets

Table 12.2

Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible, a 15% increase on Part L 2010
Target 2: Electricity intense buildings (Applies to commercial uses with a high proportion of emissions from electricity use (>45 kg CO ₂ /m ²))	+10% increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

Where the CO₂ emissions reduction required under any future revision to Part L of the building regulations becomes greater than the '% Minimum requirement', the reduction required under building regulations would apply.

Where the Council identifies an 'allowable solution', for example within an energy proposals plan, that would produce higher carbon reductions at no extra cost than that of achieving the '% Minimum requirement' (or required under building regulations if greater) the higher percentage reduction will be required. The cost comparison is based on the cost of incorporating the 'allowable solution' at design stage.

The energy statement will be required to be submitted at the outset of any proposed development (outline application or before). Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO₂ mitigation, subject to the energy statement incorporating evidence such as modelling to demonstrate compliance.

3.2 A Guide to Development in Manchester

The Guide to Development in Manchester was formally adopted by Manchester City Council in April 2007 and acts as a Supplementary Planning Document and Planning Guidance that reflects the growing recognition of the importance of attractive, well-designed, well-maintained neighbourhoods in supporting sustainable development and 'neighbourliness'. The Guide aims to support and enhance the ongoing shaping of the City by providing a set of reasoned principles that can guide developers, designers and residents to the sort of development that is wanted in Manchester.

The Guide sets out a number of Environmental Standards that are expected to be achieved by developers and demonstrated within an Environmental Standards Statement.

The 'UDP' discussed in the following Environmental Standards refers to the Manchester's Unitary Development Plan (UDP) which was adopted by in July 1995. The UDP provided the guidelines for all development in Manchester and provided the frameworks from which to base decisions about planning applications on, however was superseded by the adoption of Manchester's Core Strategy in 2012 and subsequent policies within the PfE.

Energy Efficiency

Part 1 Policy E1.5 encourages high standards of energy efficiency in new development. In the Environmental Standards Statement, developers should show how they have considered the steps necessary to reduce energy demand at the earliest stages of design. Developers should aim to reduce CO2 emissions by at least 25% more than the requirements of the current Building Regulations, which at present are Building Regulations: Approved Document L (2006) – 'Conservation of Fuel and Power.' The following design principles will assist developers in achieving energy efficiency targets:

- Minimise reliance on energy-using equipment for heating, cooling, lighting and natural ventilation
- Position trees and soft landscaping on and around the development and within buildings to provide natural shading, insulation and air conditioning
- Integrate energy efficient micro-generation and community heating schemes, such as combined heat and power (CHP)
- Site layout and building design principles should maximise the capture and use of daylight and passive solar energy, whilst avoiding excessive solar gain in summer
- Specify energy and water efficient appliances and systems.

Renewable Energy

To reduce energy demand and the harmful impact of using energy from non-renewables, in line with UDP Part 1 Policy E1.5, developers should aim for at least 20% of final site energy demand to be met by on-site renewable energy technologies. Renewable energy targets can be achieved more readily by undertaking the measures suggested above to reduce the total energy demand of the building. It is possible to produce developments that use 50% and even 100% energy from renewable sources. To achieve this, developers should:

- Assess opportunities for integrating small and large scale renewable energy generation systems (i) to improve the energy security of occupants and the neighbourhood, including siting of energy generation businesses on-site and export of surplus energy
- Use a mix of technologies to help generation patterns match demand Investigate energy generation opportunities before designing building envelopes or fixing their location, to optimise utilisation of wind, solar and geothermal resources
- Consider final energy demand rather than building energy consumption in the selection and sizing of generation equipment
- Explore opportunities to tackle waste and energy issues collectively through use of anaerobic digesters linked to CHPs (Combined Heat and Power devices)

- Consider private wire networks as an alternative to grid connection and availability charges on larger developments.

Environmental Design

Developers must demonstrate energy efficiency in line with UDP Part 1 Policy E1.5. For residential developments, this should be through the use of the Department for Communities and Local Government's 'Code for Sustainable Homes'. (In the short-term, compliance is voluntary but home builders are encouraged to follow the principles set out in the Code because the Government is considering making assessment under Code standards mandatory in the future). This Code builds on and replaces the EcoHomes system. Any developer in the process of achieving an EcoHomes assessment should discuss the transition to the Code for Sustainability with the relevant planning case officer. Whilst the City Council considers that new homes should achieve at least a three star sustainability rating under the Code for Sustainable Homes, developers should be aware that the Government target is for new homes to have a six star rating under the Code by 2016. The City Council would expect developers to be working towards meeting this six star rating. However, using alternative modelling tools that enable the developer to exceed the requirements of the Code is also encouraged.

To demonstrate energy efficiency in non-residential developments, the City Council would encourage developers to use the Building Research Establishment Environmental Assessment Method (BREEAM) which is used to assess environmental performance. Developments should be achieving a design and post-construction rating of "very good." However, using alternative modelling tools that enable the developer to exceed the requirements of BREEAM is also encouraged.

Water Management and Weather Resilience

UDP Part 1 Policy E1.3 states that the Council will promote measures to decrease the level of pollution in the City's watercourses, and groundwater sources. UDP Development Control Policy DC21.1 refers to development not normally being permitted where it would be at risk from flooding or increase the risk of flooding elsewhere. The environmental standards statement should therefore show how water is to be managed in the most environmentally effective way.

- New developments and the conversion of existing properties can both result in the removal of areas of soakaway, which can result in high volumes of surface water run-off, burdening the local sewer system and increasing pollution and the risk of flooding. Sustainable drainage systems (SUDS) should be included, and the amount of hard surfacing minimised, for example by providing on site capture and soakaway of all rainwater on site. Examples of SUDS options would include, rainwater harvesting systems, pervious surfaces, green roofs, filter drains, filter strips, swales, infiltration devices, bio-retention areas, basins, ponds and wetland. The use of gardens as a surface water management resource should not be underestimated.
- Localised flooding incidents are becoming increasingly frequent and problematic as we see the effects of climate change taking hold across the UK. Developers will be expected to prepare a Flood Risk Assessment for proposals in an area of identified flood risk.
- New developments should seek to use water efficiently, through specification of water efficient devices and through the use of rainwater harvesting and grey water recycling.

Waste Management

UDP Development Control Policy DC27.1 sets out how the City Council will deal with applications for development involving the disposal or recycling of waste materials. All development is likely to involve the production of waste to a greater or lesser extent. Greater emphasis is now being placed on the importance of the reduction and recycling of waste at source (PPS10). Developers will be increasingly required to consider how this issue will be tackled on-site.

All developments should have a waste management strategy included in the Environmental Standards Statement. This will ensure that adequately sized bin storage areas, access for collection crews and vehicles, and other aspects of waste management are designed into the development at the earliest stage.

Construction Management

UDP Part 1 Policy E1.6 requires the building materials used in new development and refurbishment schemes to be environmentally friendly wherever possible, and encourages the use of recycled building materials, which is also energy efficient. Site waste management plans should, therefore, be implemented to reduce the quantity of waste generated, and to increase re-use and recycling. Opportunities for reuse of existing structures should be explored, and where this is not appropriate, materials should be reused on site and incorporated into the new design where practicable. Materials that are environmentally friendly, of low embodied energy, locally sourced, and can be recycled or reclaimed when the building comes to the end of its life should be prioritised. Materials that contain environmentally damaging chemicals should be avoided.

In addition, activities carried out during the construction of new developments have the potential to cause significant environmental impact. In order to avoid such impacts, it is important that appropriate measures are put in place to manage and control the waste generated, the amount of water and energy used, and any potential releases to water, land and air. Use of the Considerate Constructor scheme is recommended.

Biodiversity

UDP Part 1 Policies E2.3 and E2.4 require the protection of wildlife, wildlife habitats, and where possible, the creation of new nature reserves and features which will sustain wildlife. Part 1 Policy E2.6 states that the City Council wishes to prevent the loss of existing trees. Developers will need to contribute to Manchester's Biodiversity Strategy by demonstrating in their Environment Standards Statement how they have taken full account of the effect of their proposed development on biodiversity. This should highlight how existing species and habitats would be protected and how the proposed development would enhance the ecological value of the site. Mature trees and hedges should be retained on site wherever possible. Where this is not possible, developers will be expected to agree an appropriate scheme for replanting with the Development Control case officers.

Developments should result in no net loss in overall biodiversity value and maximise opportunities to meet and exceed our target to achieve a 10% net increase in tree cover across new developments. In exceptional cases, where planting is unachievable on site, permission may be granted to plant elsewhere in the City to ensure no overall net loss in tree resources. Existing green links across the site should be maintained and the opportunity taken to create new links as appropriate. Landscaping and new planting should include species appropriate for the proposed development that will encourage wildlife. Full plans should be included in the report showing retained, enhanced and new ecological features, the number of on-site trees pre and post development, and a 5 year management plan. Wood and wood products should come from Forest Stewardship Council sources. Tropical hardwoods should be avoided.

Waterways

The waterways are a major asset for the City and provide significant opportunities to raise perceptions and economic values through links to regeneration, the environment and transportation. This is recognised in UDP Part 1 Policies E1.3 which seeks to promote measures to reduce pollution in the City's watercourses and E3.4 which sees the waterways as an important part of a recreational network where measures will be taken to improve access and protect and enhance wildlife. Developers working in close proximity to the City's waterways should demonstrate, in line with the above mentioned UDP Policies and Manchester's Waterways Strategy, how public access, environment and management will be enhanced. Developers should landscape to ensure that site run-off and blown waste does not enter watercourses, even during extreme weather conditions.

Scale Bars		TO BE USED ONLY AS GUIDANCE	
1:100	mm	0 1000 2000 3000 4000	
1:200	mm	0 500 1000 1500 2000	
1:500	M	0 5 10 15 20 25	
1:1250	M	0 10 20 30 40 50 60 70	

NOTES

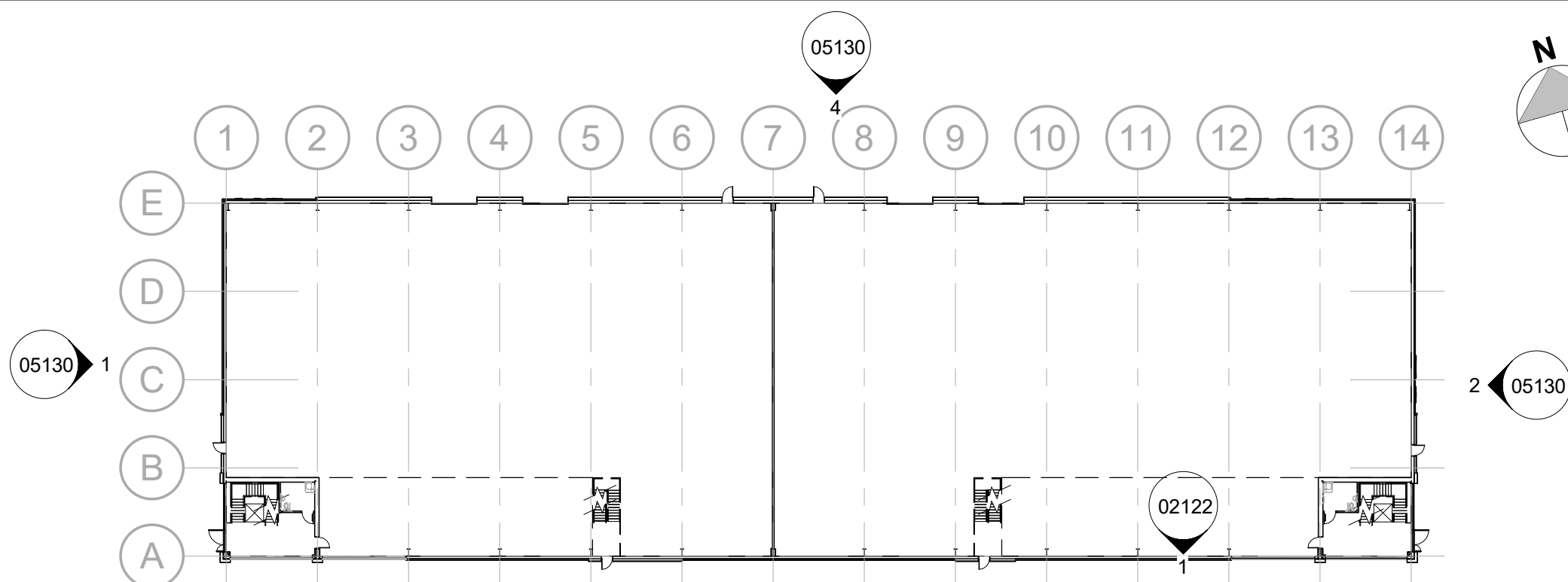
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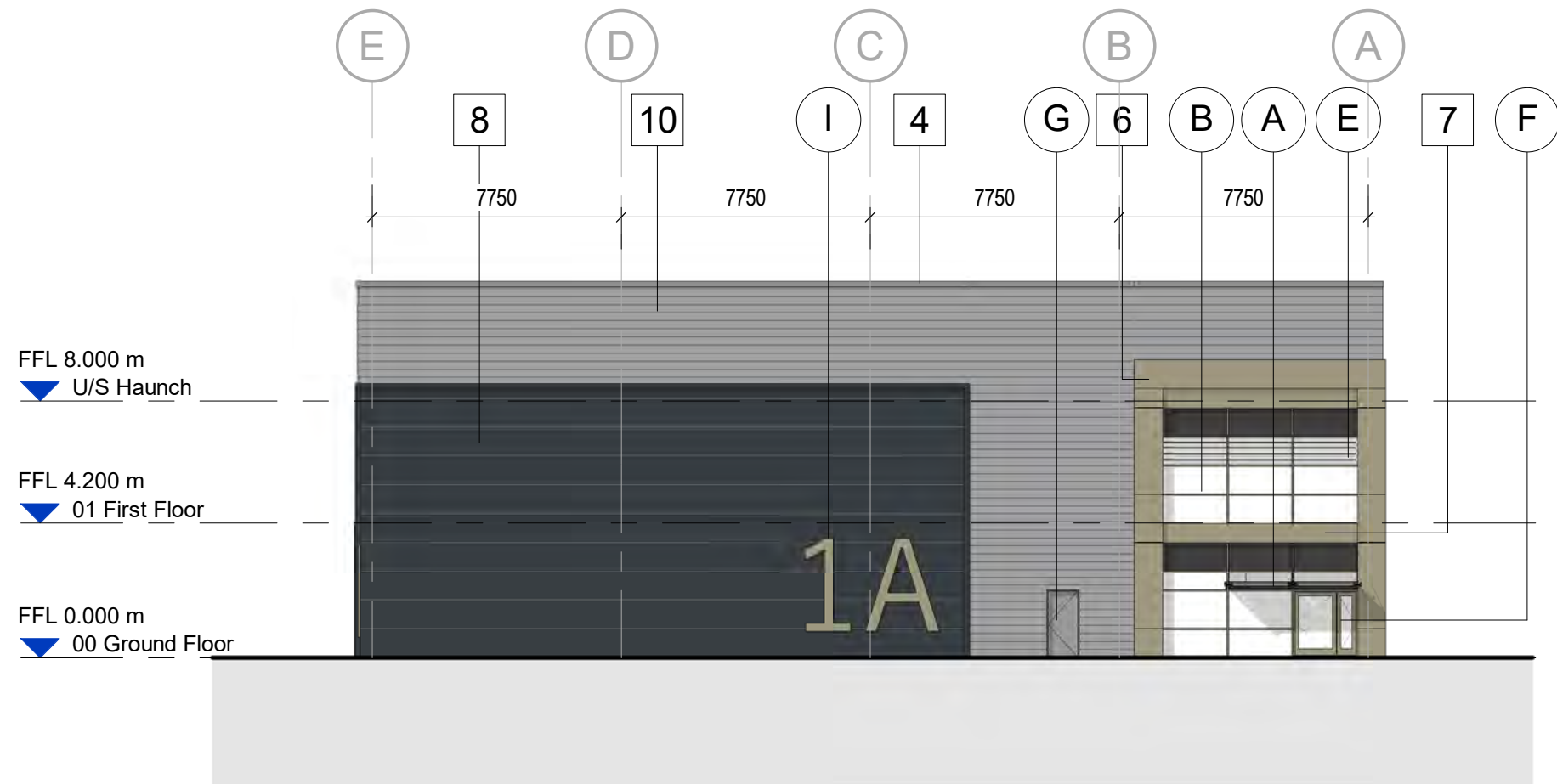
BUILDING FABRIC - MATERIAL SCHEDULE

- | | | | |
|----|---|---|--|
| 1 | Roof Cladding
Trapezoidal profile, insulated, built up system, min pitch 6° with Colourcoat HPS200 Ultra finish or similar in light grey | A | Office Entrance - Canopy
Cantilevered glazed canopy with PPC steel arm supports in colour to match curtain walling |
| 2 | Photo Voltaic Panel area
Refer to M&E details for specification and exact number / area | B | Glazing - Entrances
PPC thermally broken aluminium curtain wall system with bronze mullions and transoms. Top panes to be ceramic backed glass spandrel units in dark grey with mineral wool insulation backing panel. All other panes to be sealed double glazed units |
| 3 | Rainwater Goods & Gutters
Internal downpipes and insulated gutters in galvanised steel with membrane lining to gutters | C | Glazing - Offices
PPC thermally broken aluminium curtain wall system with bronze mullions and transoms. Bottom panes to be ceramic backed glass spandrel units in dark grey with mineral wool insulation backing panel. Top panes to be aluminium louvre panels in dark grey. Central panes to be sealed double glazed units |
| 4 | Parapet and Cladding Flashings
Plastisol coated pressed metal flashings in colour to match adjacent cladding | D | Windows
PPC thermally broken window system with bronze mullions and transoms and sealed double glazed units |
| 5 | Rooflights
GRP, in-plane, non-fragile, triple skinned translucent rooflights | E | Brise Soleil
PPC aluminium brise soleil fins to be provided as part of the curtain wall system in same colour as mullions / transoms |
| 6 | Portico entrance feature
Pressed metal flashing with PPC finish in bronze | F | Main Entrance Doors
PPC thermally broken aluminium swing doors to be colour matched and integrated within the curtain wall system with sealed double glazed units. |
| 7 | Feature banding
Pressed metal flashing with PPC finish in bronze | G | Personnel Access / Escape Doors
PPC Galvanised Steel doors with thermally insulated core in colour to match surrounding cladding. |
| 8 | Wall Type 1
Horizontally laid insulated composite cladding panels with flat finish such as Kingspan Spectrum or similar in dark grey | H | Level Access Doors
Insulated sectional overhead doors Shutter with vision panels and PPC finish or similar in dark grey |
| 9 | Wall Type 2
Horizontally laid aluminium rainscreen cladding on insulated liner panel with PPC finish in bronze | I | Signage
PPC aluminium signage / numbering in bronze shown indicatively only |
| 10 | Wall Type 3
Twin-skinned, built-up trapezoidal profile metal cladding system laid horizontally with mineral wool insulation and Colourcoat HPS200 Ultra finish or similar in light grey | | |
| 11 | Wall Type 4
Twin-skinned, built-up trapezoidal profile metal cladding system laid vertically with mineral wool insulation and Colourcoat HPS200 Ultra finish or similar in mid grey | | |
| 12 | Ground bearing concrete slab
To be laid on suitable DPM / gas membrane (and insulation where required), all to Structural Engineer's details | | |
| 13 | Raised Access Floor
To provide 150mm service void above concrete slab | | |



Key Plan

Scale @ 1 : 500



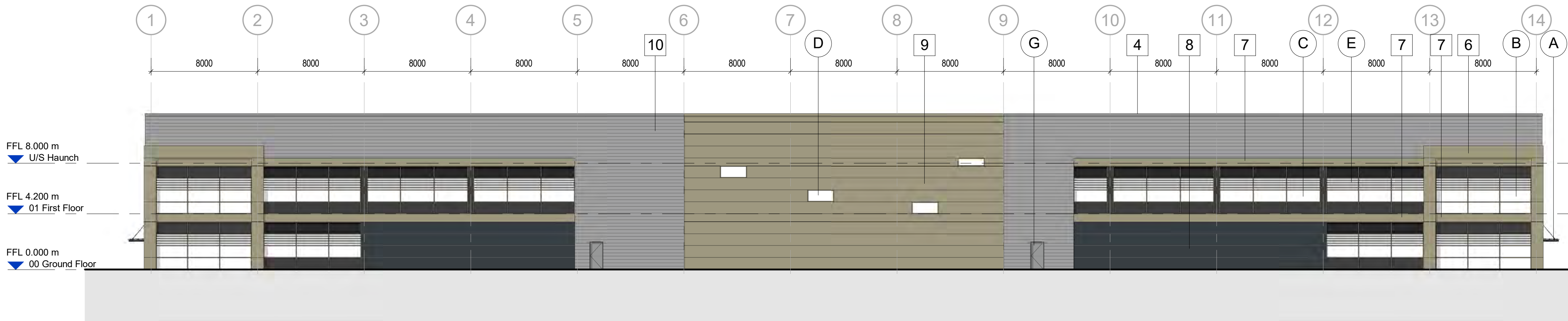
1 Proposed West Elevation

Scale @ 1 : 200



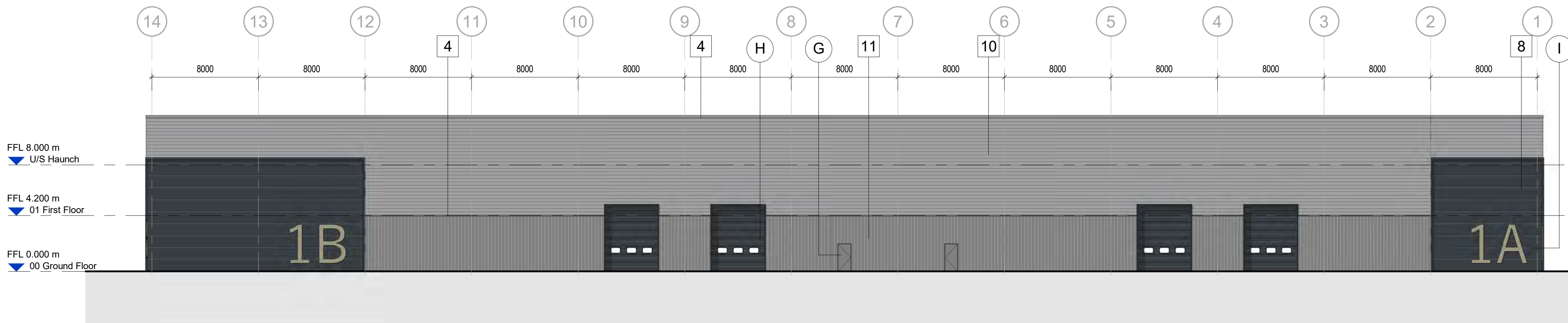
2 Proposed East Elevation

Scale @ 1 : 200



3 Proposed South Elevation

Scale @ 1 : 200



4 Proposed North Elevation

Scale @ 1 : 200

P03	24/11/25	Planning Issue	AW	AS
P02	05/11/25	Material schedule added	AW	CF
P01	31/10/25	Initial Issue	AW	CF
Rev	Date	Description	Drawn by	Checked By

Status	Purpose of Issue
S2	For Information

drawing stage **Planning**

client **Ask Real Estate Ltd**

project **Manchester Business Park**

drawing title **Unit 1 - Proposed GA Elevations**

date	10/24/25	drawn	AW
scale @ A1	As indicated	checked	CF

Rev

P03

13502-AEW-B1-ZZ-DR-A-05130

Draw No

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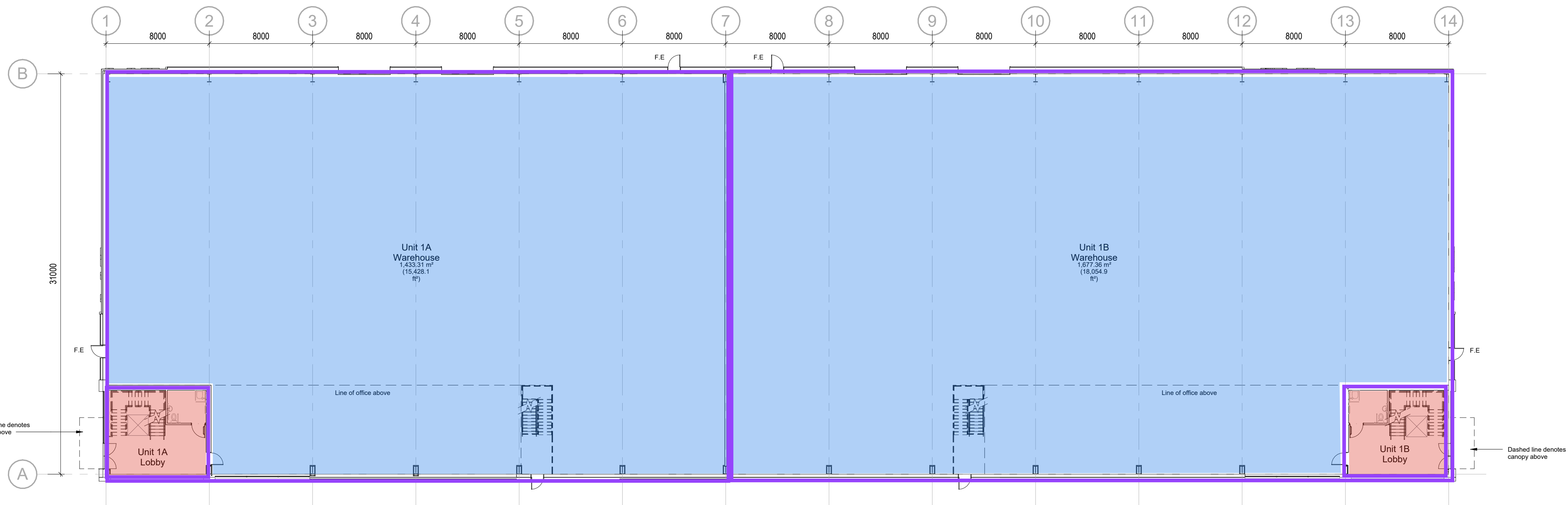
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2 Unit 1 Overall First Floor Plan
Scale @ 1 : 200

- Thermal envelope / continuous insulation
- Heated Space
- Unheated Space



1 Unit 1 Overall Ground Floor Plan
Scale @ 1 : 200

NOTES

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Rev	Date	Description	Initial Issue	AW	CF
				Drawn by	Checked By

Status	Purpose of Issue
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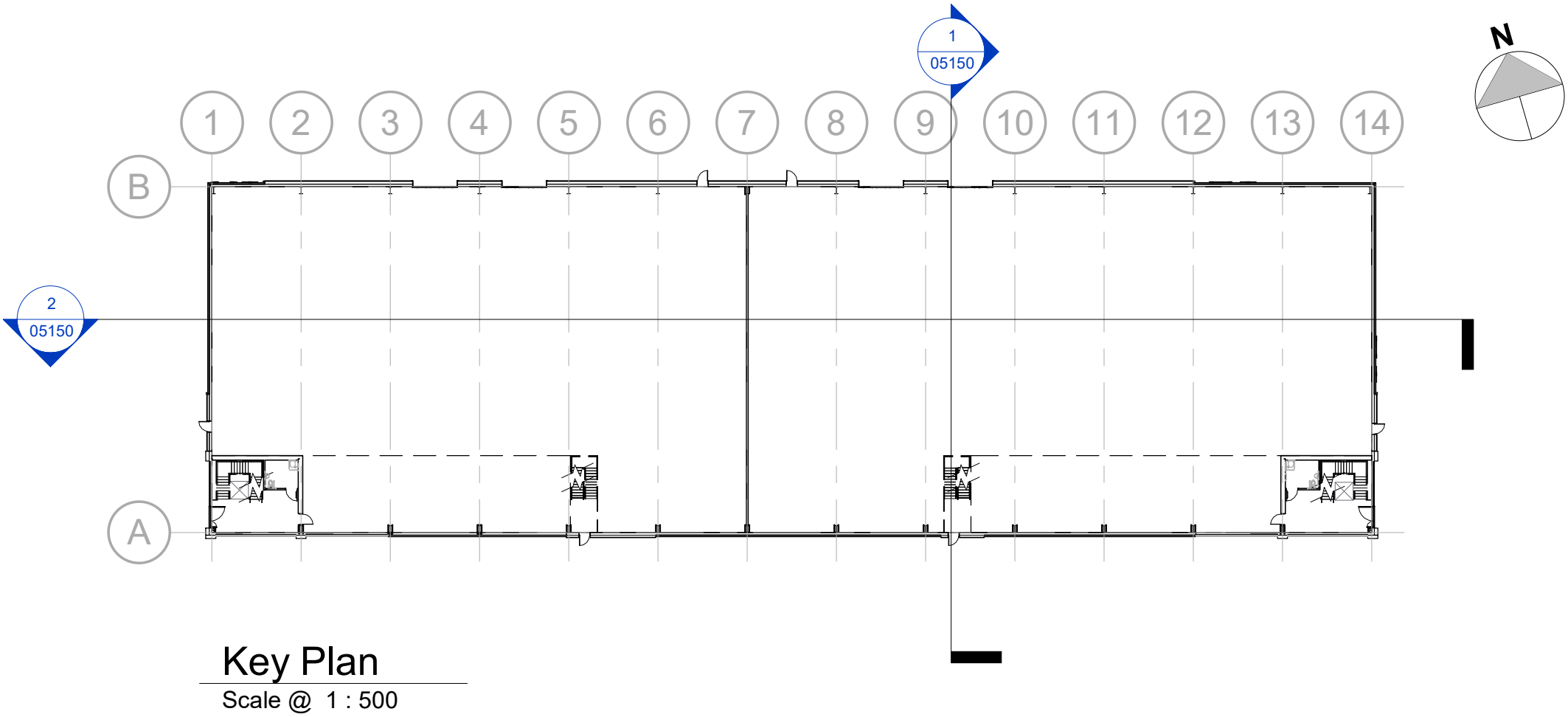
drawing stage	Planning
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client	Ask Real Estate Ltd
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project	Manchester Business Park
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drawing title	Unit 1 Proposed Overall GA Plans
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date	Sept 2025	drawn	AG
scale @ A1	1 : 200	checked	AS



Key Plan
Scale @ 1 : 500

Scale Bars TO BE USED ONLY AS GUIDANCE

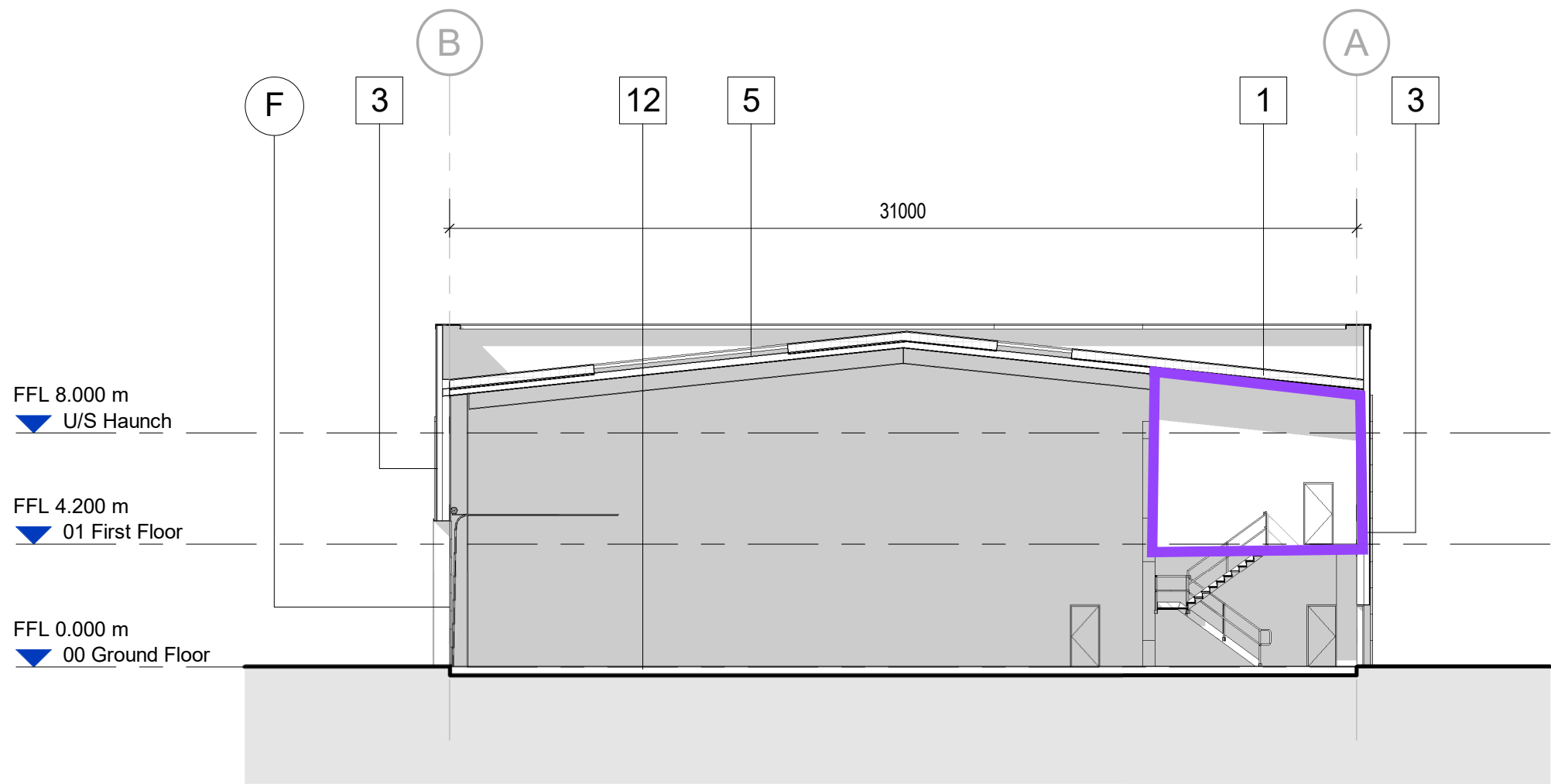
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1:200	2000	2	6	24
1:500	5000	5	15	60
1:1250	12500	12.5	37.5	150

NOTES

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This drawing contains the following model files :-

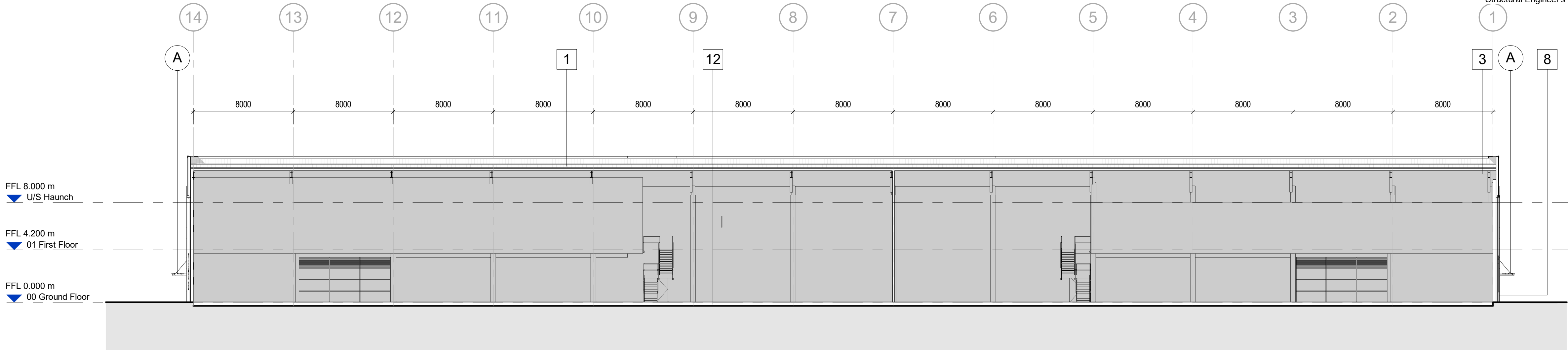
13502-AEW-B1-ZZ-M3-A-01100



1 Proposed Section AA
Scale @ 1 : 200

Thermal envelope / continuous insulation

Note: only shown to heated spaces, refer to plans for unheated spaces



2 Proposed Section BB
Scale @ 1 : 200

BUILDING FABRIC - MATERIAL SCHEDULE

- | | | | |
|----|--|----|--|
| 1 | Roof Cladding - Trapezoidal Profile Insulated, built up system, min pitch 4° Colourcoat HPS200 Ultra - in light grey | A | Office Entrance - Canopy Cantilvered glazing to match curtain walling Steel arm supports, PPC aluminium bronze |
| 2 | Photo Voltaic Panel area. Refer to M&E details for specification and exact number / area | B | Glazing PPC aluminium glazed curtain wall system to be thermally broken. Integrated spandrel to be ceramic backed matte units with mineral wool insulation backing panel. Louvre panels: Dark Grey Spandrel colour: Dark grey Mullion / transom colour: PPC aluminium bronze |
| 3 | Rainwater Goods & Gutters Internal, galvanised steel with membrane lining | C | Windows PPC aluminium glazed windows to be thermally broken. Mullion / transom colour: PPC aluminium bronze |
| 4 | Parapet and Cladding Flashing Profiled plasticol coated pressed metal Colour: Light grey to match below cladding | D | Main Entrance Doors PPC aluminium thermally broken doors, suitable for wheelchair accessibility. Doors to be integrated within the curtain wall system and consist of automatic swing and double glazing. Colour: PPC aluminium bronze |
| 5 | Rooflights GRP, in-plane, non-fragile, triple skinned Translucent | E1 | Personnel Access / Escape Doorset Type 1 PPC Galvanised Steel Thermally insulated core to specialist sub-contractor details. Colour: Light grey to match cladding behind |
| 6 | Horizontal Fins Profiled plasticol coated pressed metal Colour PPC aluminium bronze | E2 | Personnel Access / Escape Doorset Type 2 PPC aluminium bronze |
| 7 | Portico (to offices) and feature banding Profiled plasticol coated pressed metal in PPC aluminium bronze | F | Operational Door Level Access Sectional Insulated Shutter with vision panel Plasticol Coated finish in PPC aluminium bronze |
| 8 | Wall Type 1 - Horizontally laid composite cladding panel with smooth finish in dark grey | G | Signage PPC aluminium numbering bronze |
| 9 | Wall Type 2 - Horizontally laid rainscreen cladding with in PPC aluminium bronze | | |
| 10 | Wall Type 3 - Twin-skinned, built-up profiled metal laid horizontally with mineral wool insulation Colour: light grey | | |
| 11 | Wall Type 4 - Twin-skinned, built-up profiled metal laid vertically with mineral wool insulation Colour: mid grey | | |
| 12 | Ground bearing concrete slab laid on suitable DPM / gas membrane (and insulation where required), all to Structural Engineer's details | | |

P01	05/11/25	Initial Issue	AW	CF
Rev	Date	Description	Drawn by	Checked By
Status	Purpose of Issue			
S2	For Information			
drawing stage	Planning			
client	Ask Real Estate Ltd			
project	Manchester Business Park			
drawing title	Unit 1 - Proposed GA Sections			
date	10/24/25	drawn	AW	
scale @ A1	As indicated	checked	CF	

Scale Bars		TO BE USED ONLY AS GUIDANCE	
1:100	mm	0 1000 2000 3000 4000 5000	
1:200	mm	0 500 1000 1500 2000 2500 3000	
1:500	M	0 5 10 15 20 25	
1:1250	M	0 10 20 30 40 50 60 70	

NOTES

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This drawing contains the following model files :-

13502-AEW-B2-XX-M3-A-0002

BUILDING FABRIC - MATERIAL SCHEDULE

- | | | | |
|----|---|---|--|
| 1 | Roof Cladding
Trapezoidal profile, insulated, built up system, min pitch 6° with Colourcoat HPS200 Ultra finish or similar in light grey | A | Office Entrance - Canopy
Cantilevered glazed canopy with PPC steel arm supports in colour to match curtain walling |
| 2 | Photo Voltaic Panel area
Refer to M&E details for specification and exact number / area | B | Glazing - Entrances
PPC thermally broken aluminium curtain wall system with bronze mullions and transoms. Top panes to be ceramic backed glass spandrel units in dark grey with mineral wool insulation backing panel. All other panes to be sealed double glazed units |
| 3 | Rainwater Goods & Gutters
Internal downpipes and insulated gutters in galvanised steel with membrane lining to gutters | C | Glazing - Offices
PPC thermally broken aluminium curtain wall system with bronze mullions and transoms. Bottom panes to be ceramic backed glass spandrel units in dark grey with mineral wool insulation backing panel. Top panes to be aluminium louvre panels in dark grey. Central panes to be sealed double glazed units |
| 4 | Parapet and Cladding Flashings
Plastisol coated pressed metal flashings in colour to match adjacent cladding | D | Windows
PPC thermally broken window system with bronze mullions and transoms and sealed double glazed units |
| 5 | Rooflights
GRP, in-plane, non-fragile, triple skinned translucent rooflights | E | Brise Soleil
PPC aluminium brise soleil fins to be provided as part of the curtain wall system in same colour as mullions / transoms |
| 6 | Portico entrance feature
Pressed metal flashing with PPC finish in bronze | F | Main Entrance Doors
PPC thermally broken aluminium swing doors to be colour matched and integrated within the curtain wall system with sealed double glazed units. |
| 7 | Feature banding
Pressed metal flashing with PPC finish in bronze | G | Personnel Access / Escape Doors
PPC Galvanised Steel doors with thermally insulated core in colour to match surrounding cladding. |
| 8 | Wall Type 1
Horizontally laid insulated composite cladding panels with flat finish such as Kingspan Spectrum or similar in dark grey | H | Level Access Doors
Insulated sectional overhead doors Shutter with vision panels and PPC finish or similar in dark grey |
| 9 | Wall Type 2
Horizontally laid aluminium rainscreen cladding on insulated liner panel with PPC finish in bronze | I | Signage
PPC aluminium signage / numbering in bronze shown indicatively only |
| 10 | Wall Type 3
Twin-skinned, built-up trapezoidal profile metal cladding system laid horizontally with mineral wool insulation and Colourcoat HPS200 Ultra finish or similar in light grey | | |
| 11 | Wall Type 4
Twin-skinned, built-up trapezoidal profile metal cladding system laid vertically with mineral wool insulation and Colourcoat HPS200 Ultra finish or similar in mid grey | | |
| 12 | Ground bearing concrete slab
To be laid on suitable DPM / gas membrane (and insulation where required), all to Structural Engineer's details | | |
| 13 | Concrete metal deck
to Structural Engineer's details | | |

P03	24/11/25	Planning Issue	AW	AS
P02	05/11/25	Material schedule added and updates made as per Client Comments	AW	CF
P01	31/10/25	Initial Issue	AW	CF
Rev	Date	Description	Drawn by	Checked By

Status Purpose of Issue
S2 For Information

drawing stage **Planning**

client

Ask Real Estate Ltd

project

Manchester Business Park

drawing title

Unit 2 - Proposed GA Elevations

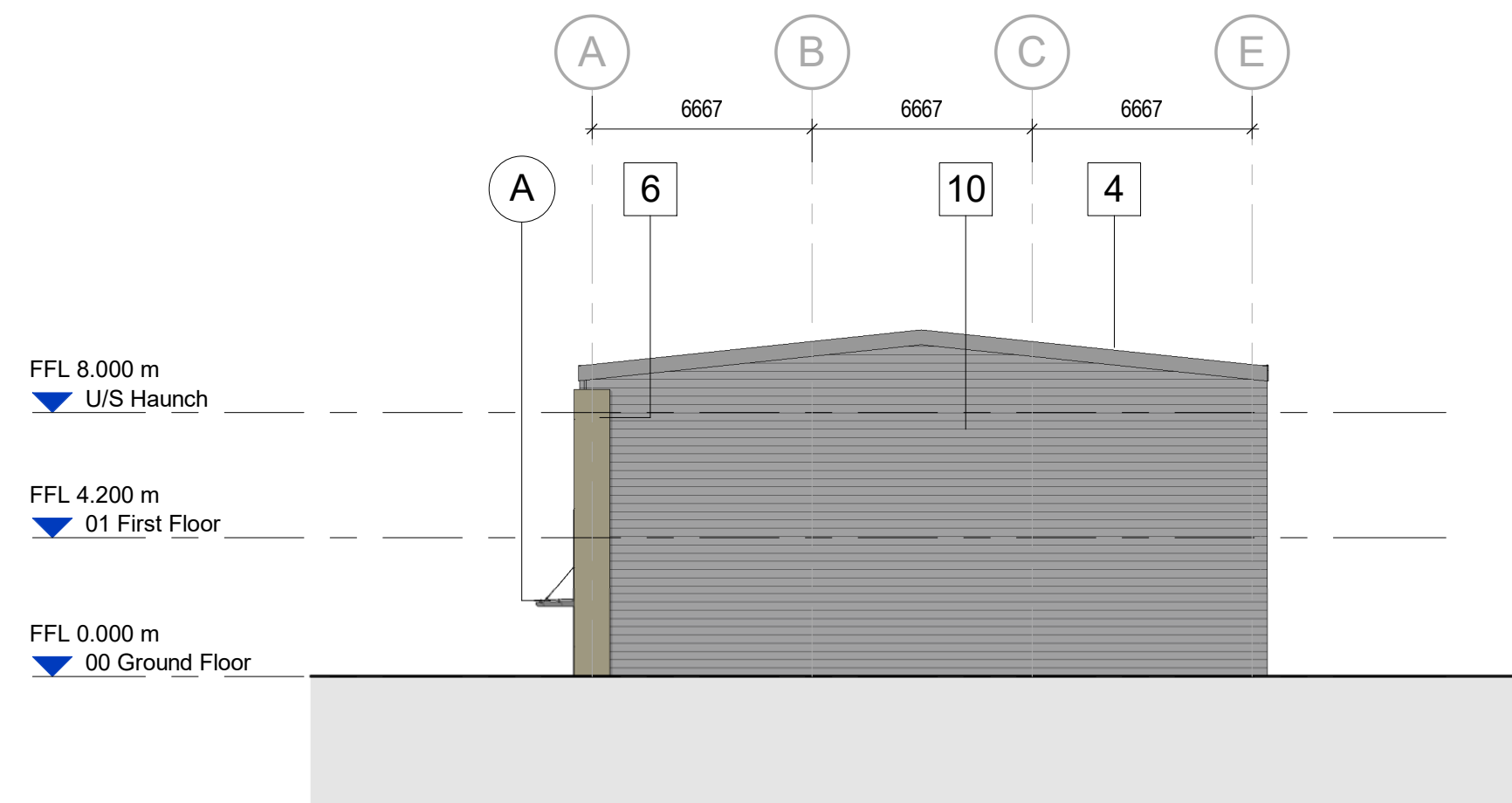
date	10/29/25	drawn	AW
scale @ A1	As indicated	checked	CF

Rev
P03

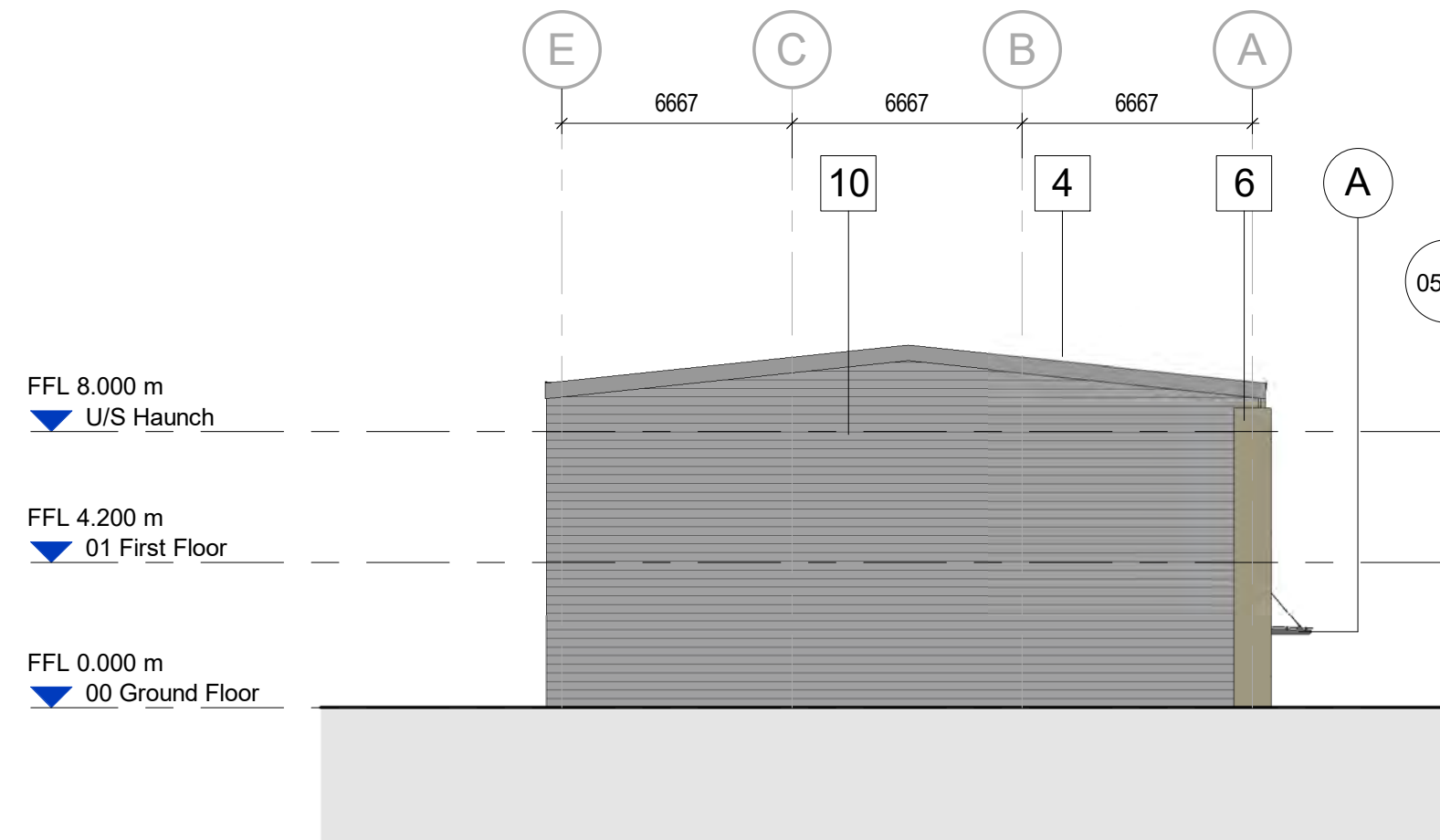
13502-AEW-B2-ZZ-DR-A-05230

aew architects
0161 214 4370
www.aewarchitects.com
AEW

AEW Internal Ref Number: 13502



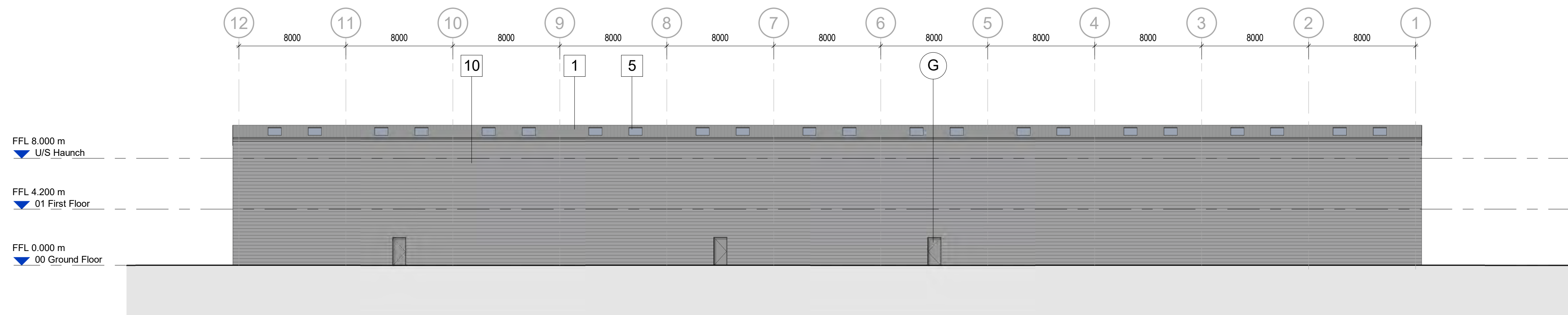
1 Proposed East Elevation
Scale @ 1 : 200



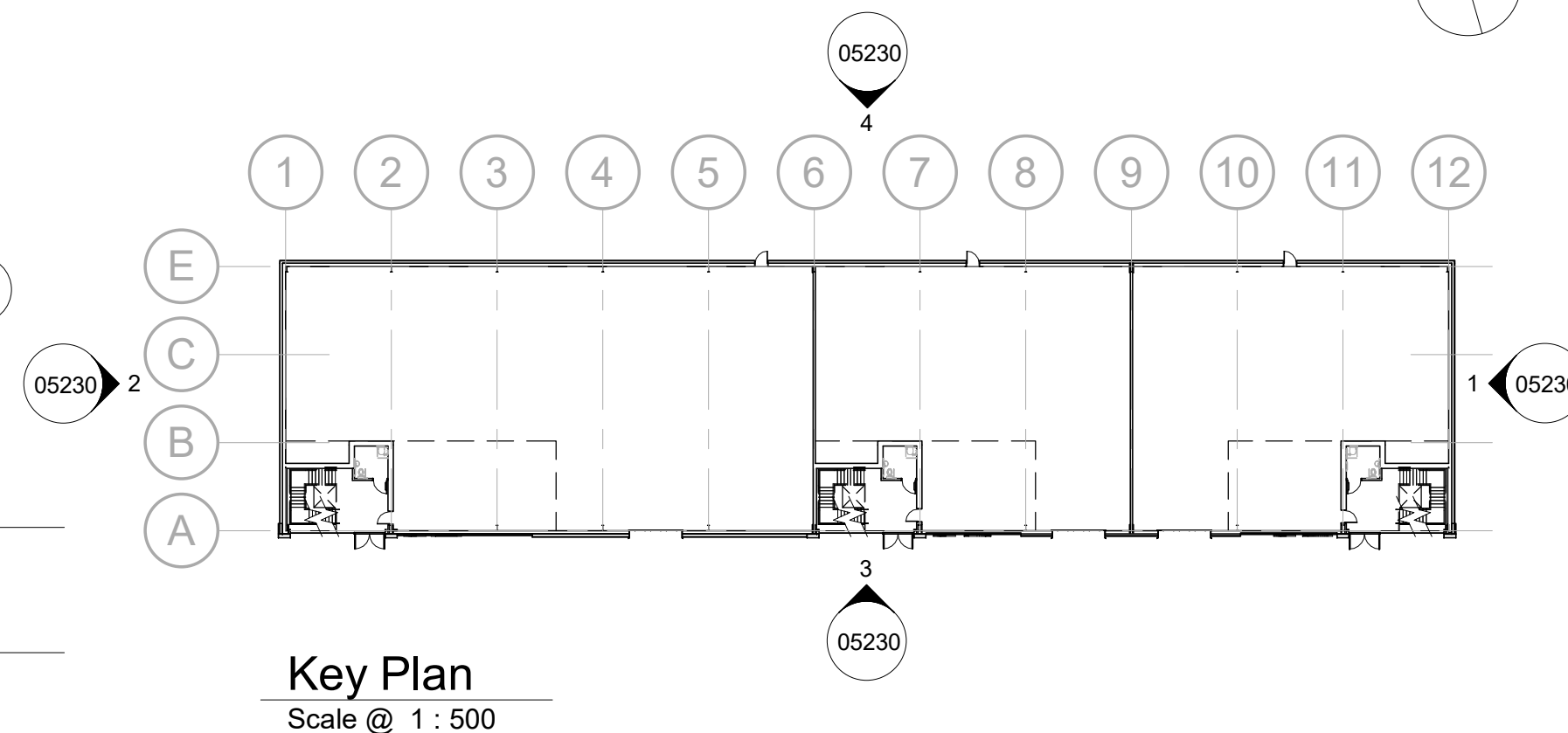
2 Proposed West Elevation
Scale @ 1 : 200



3 Proposed South Elevation
Scale @ 1 : 200



4 Proposed North Elevation
Scale @ 1 : 200

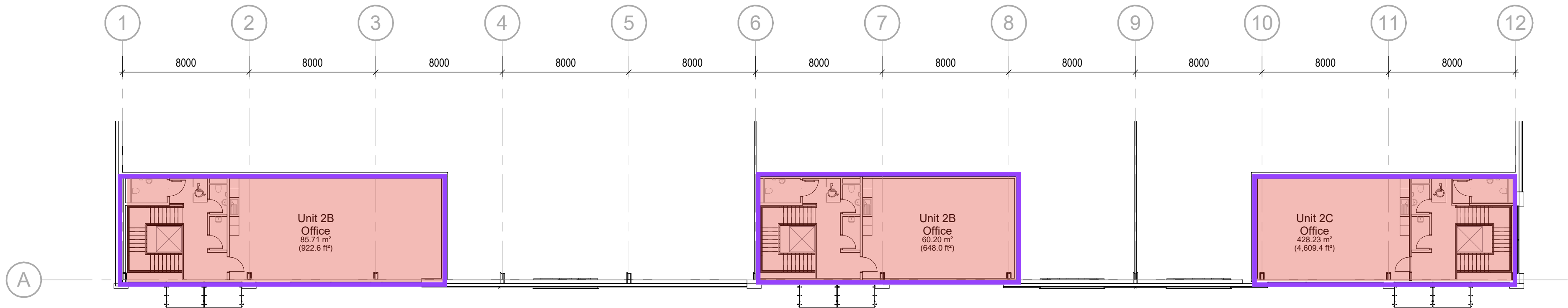


Key Plan
Scale @ 1 : 500

NOTES

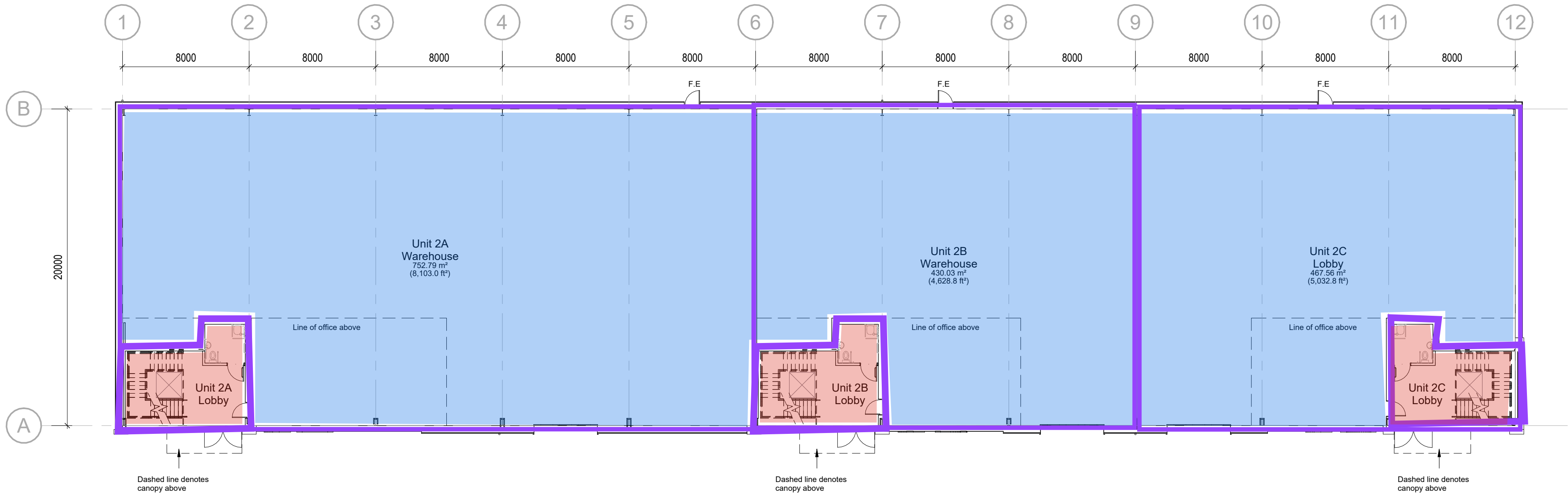
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This drawing contains the following model files: -
13502-AEW-B2-ZX-M3-A-0002



2 Unit 2 Overall First Floor Plan
Scale @ 1 : 200

- Thermal envelope / continuous insulation
- Heated Space
- Unheated Space



1 Unit 2 Overall Ground Floor Plan
Scale @ 1 : 200

Rev	Date	Initial Issue	CF	AS
P01	16/09/25	Initial Issue	CF	AS
Rev	Date	Description	Drawn by	Checked By
Status	Purpose of Issue			
S2	For Information			
drawing stage	Planning			
client	Ask Real Estate Ltd			
project	Manchester Business Park			
drawing title	Unit 2 - Proposed Overall GA Plans			
date	Sept 2025	drawn	TW	
scale @ A1	1 : 200	checked	CF	

Rev

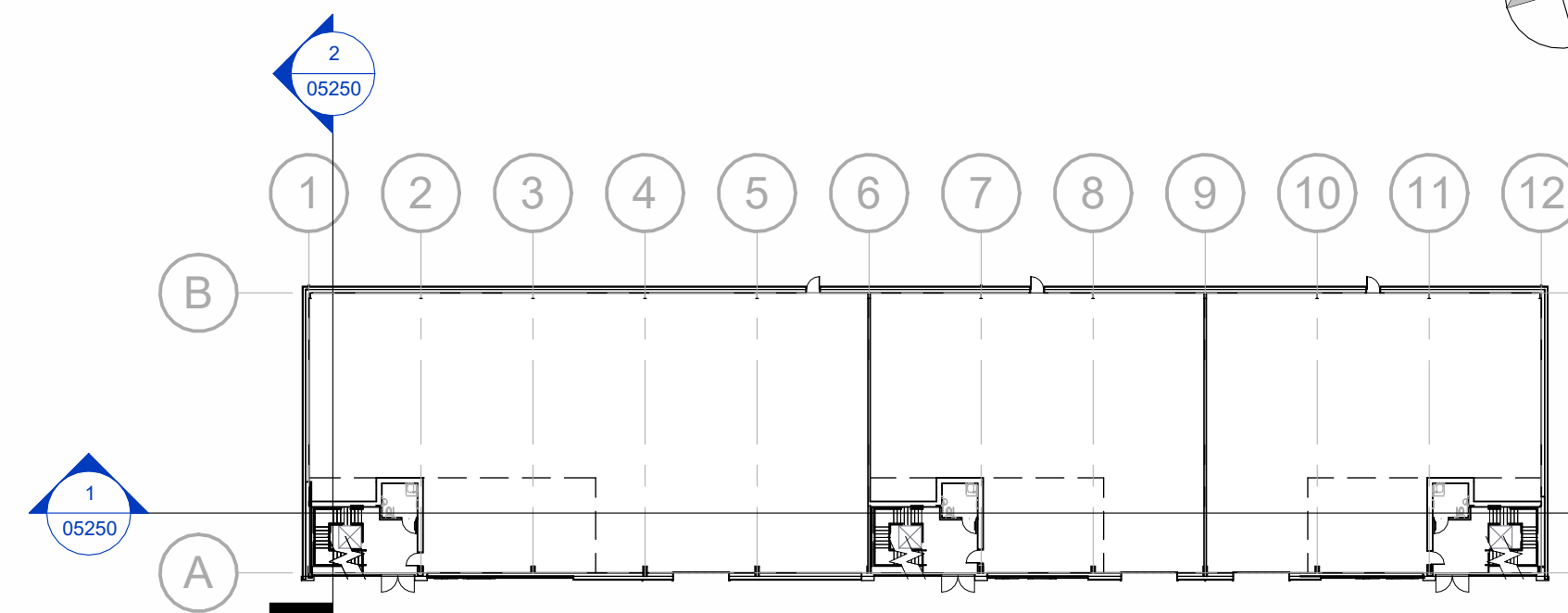
P01

Dwg No
13502-AEW-B2-ZZ-DR-A-05220

aew architects
0161 214 4370
www.aewarchitects.com

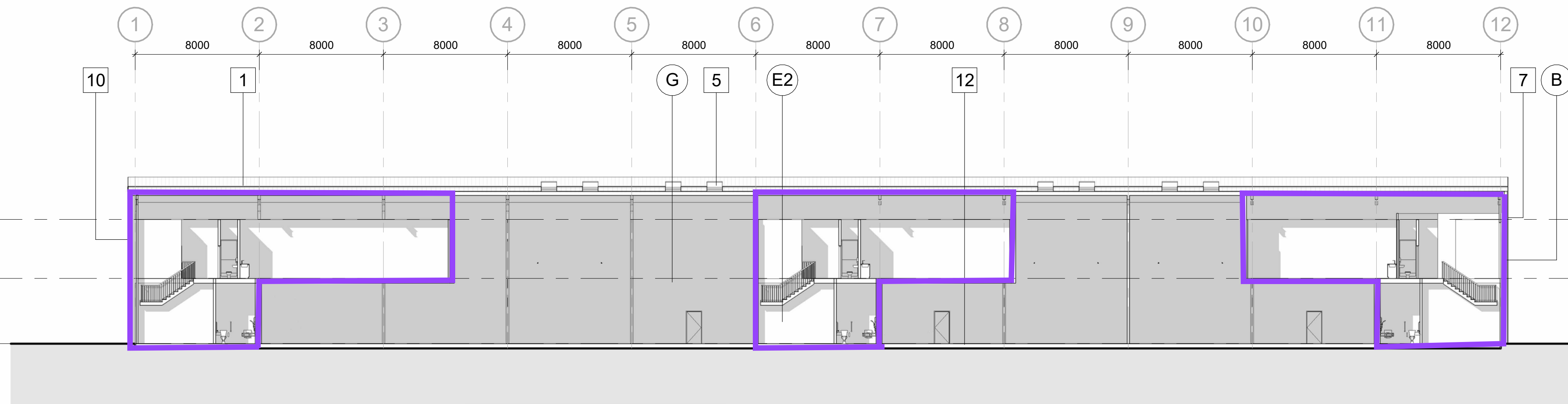
Scale Bars		TO BE USED ONLY AS GUIDANCE	
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1:200	mm	0 2000 4000 6000 8000 10000	
1:500	M	0 10 20 30 40 50 60 70	
1:1250	M	0 10 20 30 40 50 60 70	

- NOTES**
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- 13502-AEW-B2-XX-M3-A-0002



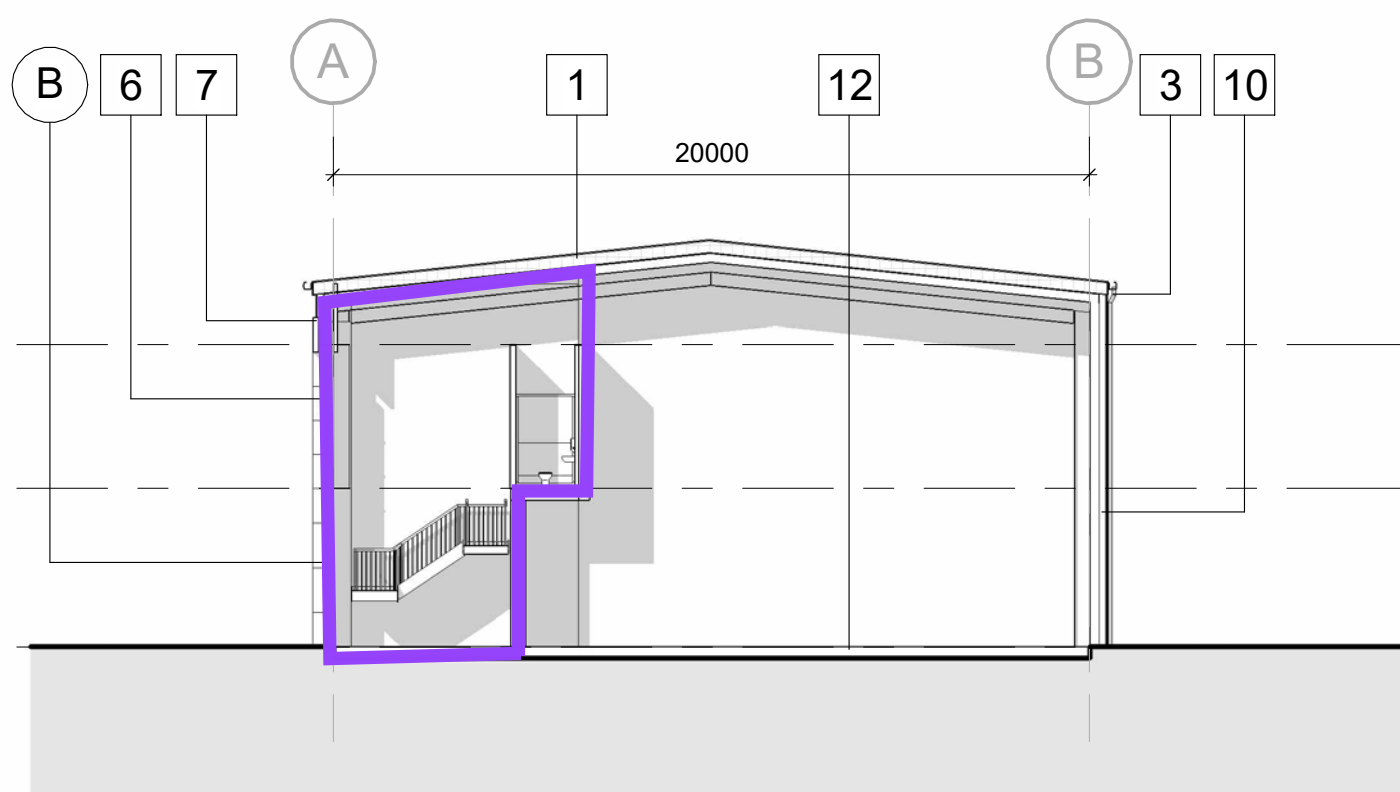
Key Plan

Scale @ 1 : 500



1 Proposed Section AA

Scale @ 1 : 200



2 Proposed Section BB

Scale @ 1 : 200



Thermal envelope / continuous insulation

Note: only shown to heated spaces,
refer to plans for unheated spaces

BUILDING FABRIC - MATERIAL SCHEDULE

- | | | | |
|----|---|---|---|
| 1 | Roof Cladding - Trapezoidal Profile Insulated, built up system, min pitch 4° Colourcoat HPS200 Ultra - in light grey | A | Office Entrance - Canopy Cantilvered glazing to match curtain walling Steel arm supports, PPC aluminium bronze |
| 2 | Photo Voltaic Panel area. Refer to M&E details for specification and exact number / area | B | Glazing PPC aluminium glazed curtain wall system to be thermally broken. Integrated spandrel to be ceramic backed matte units with mineral wool insulation backing panel, Louvre panels: Dark Grey Spandrel colour: Dark grey Mullion / transom colour: PPC aluminium bronze |
| 3 | Rainwater Goods & Gutters Internal, galvanised steel with membrane lining | C | Windows PPC aluminium glazed windows to be thermally broken. Mullion / transom colour: PPC aluminium bronze |
| 4 | Cladding Flashing Profiled plasticol coated pressed metal Colour: Light grey to match below cladding | D | Main Entrance Doors PPC aluminium thermally broken doors, suitable for wheelchair accessibility. Doors to be integrated within the curtain wall system and consist of automatic swing and double glazing. Colour: PPC aluminium bronze |
| 5 | Rooflights GRP, in-plane, non-fragile, triple skinned Translucent | E | Personnel Access / Escape Doorset Type 1 PPC Galvanised Steel Thermally insulated core to specialist sub-contractor details. Colour: Light grey to match cladding behind |
| 6 | Horizontal Fins Profiled plasticol coated pressed metal Colour PPC aluminium bronze | F | Operational Door Level Access Sectional Insulated Shutter with vision panel Plasticol Coated finish in PPC aluminium bronze |
| 7 | Portico (to offices) Profiled plasticol coated pressed metal in PPC aluminium bronze | G | Signage PPC numbering in PPC aluminium bronze |
| 8 | Wall Type 1 - Horizontally laid composite cladding panel with smooth finish in dark grey | | |
| 9 | Wall Type 2 - Horizontally laid rainscreen cladding with in PPC aluminium bronze | | |
| 10 | Wall Type 3 - Twin-skinned, built-up profiled metal laid horizontally with mineral wool insulation Colour: Light grey | | |
| 11 | Wall Type 4 - Twin-skinned, built-up profiled metal laid vertically with mineral wool insulation Colour: Mid grey | | |
| 12 | Ground bearing concrete slab laid on suitable DPM / gas membrane (and insulation where required), all to Structural Engineer's details | | |

Rev	Date	Description	AW	CF
			Drawn by	Checked By
Status	Purpose of Issue			
S2	For Information			

drawing stage **Planning**

client

Ask Real Estate Ltd

project

Manchester Business Park

drawing title

Unit 2 - Proposed GA Sections

date	10/29/25	drawn	AW
scale @ A1	As indicated	checked	CF

Rev

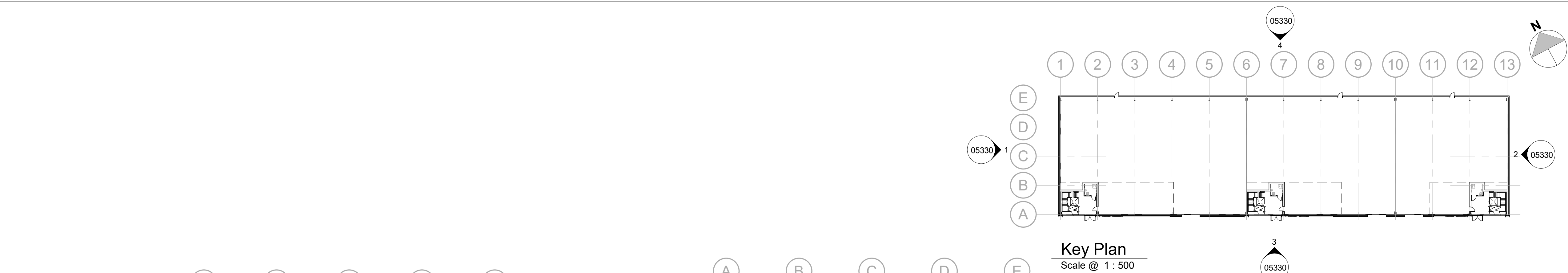
P01

13502-AEW-B2-ZZ-DR-A-05250

Dwg No

aw architects
0161 214 4370
www.aewarchitects.com

aw



Scale Bars TO BE USED ONLY AS GUIDANCE

1:100	mm	1000	2000	5000
1:200	mm	1000	2000	5000
1:500	M	5	10	25
1:1250	M	10	30	70

NOTES

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This drawing contains the following model files: -

13502-AEW-B3-ZZ-M3-A-01300

BUILDING FABRIC - MATERIAL SCHEDULE

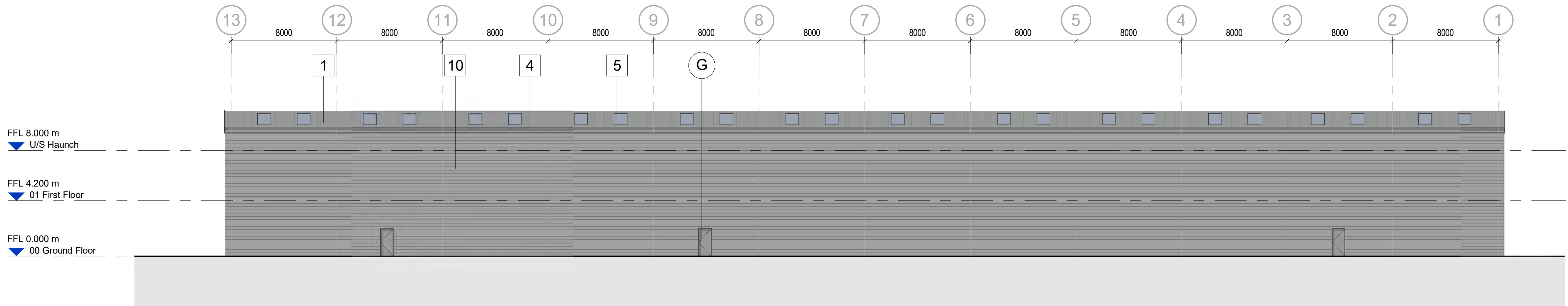
- | | | | |
|----|---|---|--|
| 1 | Roof Cladding
Trapezoidal profile, insulated, built up system, min pitch 6° with Colourcoat HPS200 Ultra finish or similar in light grey | A | Office Entrance - Canopy
Cantilevered glazed canopy with PPC steel arm supports in colour to match curtain walling |
| 2 | Photo Voltaic Panel area
Refer to M&E details for specification and exact number / area | B | Glazing - Entrances
PPC thermally broken aluminium curtain wall system with bronze mullions and transoms. Top panes to be ceramic backed glass spandrel units in dark grey with mineral wool insulation backing panel. All other panes to be sealed double glazed units |
| 3 | Rainwater Goods & Gutters
Internal downpipes and insulated gutters in galvanised steel with membrane lining to gutters | C | Glazing - Offices
PPC thermally broken aluminium curtain wall system with bronze mullions and transoms. Bottom panes to be ceramic backed glass spandrel units in dark grey with mineral wool insulation backing panel. Top panes to be aluminium louvre panels in dark grey. Central panes to be sealed double glazed units |
| 4 | Parapet and Cladding Flashings
Plastisol coated pressed metal flashings in colour to match adjacent cladding | D | Windows
PPC thermally broken window system with bronze mullions and transoms and sealed double glazed units |
| 5 | Rooflights
GRP, in-plane, non-fragile, triple skinned translucent rooflights | E | Brise Soleil
PPC aluminium brise soleil fins to be provided as part of the curtain wall system in same colour as mullions / transoms |
| 6 | Portico entrance feature
Pressed metal flashing with PPC finish in bronze | F | Main Entrance Doors
PPC thermally broken aluminium swing doors to be colour matched and integrated within the curtain wall system with sealed double glazed units. |
| 7 | Feature banding
Pressed metal flashing with PPC finish in bronze | G | Personnel Access / Escape Doors
PPC Galvanised Steel doors with thermally insulated core in colour to match surrounding cladding. |
| 8 | Wall Type 1
Horizontally laid insulated composite cladding panels with flat finish such as Kingspan Spectrum or similar in dark grey | H | Level Access Doors
Insulated sectional overhead doors Shutter with vision panels and PPC finish or similar in dark grey |
| 9 | Wall Type 2
Horizontally laid aluminium rainscreen cladding on insulated liner panel with PPC finish in bronze | I | Signage
PPC aluminium signage / numbering in bronze shown indicatively only |
| 10 | Wall Type 3
Twin-skinned, built-up trapezoidal profile metal cladding system laid horizontally with mineral wool insulation and Colourcoat HPS200 Ultra finish or similar in light grey | | |
| 11 | Wall Type 4
Twin-skinned, built-up trapezoidal profile metal cladding system laid vertically with mineral wool insulation and Colourcoat HPS200 Ultra finish or similar in mid grey | | |
| 12 | Ground bearing concrete slab
To be laid on suitable DPM / gas membrane (and insulation where required), all to Structural Engineer's details | | |
| 13 | Concrete metal deck
To Structural Engineer's details | | |

1 Proposed West Elevation
Scale @ 1 : 200

2 Proposed East Elevation
Scale @ 1 : 200

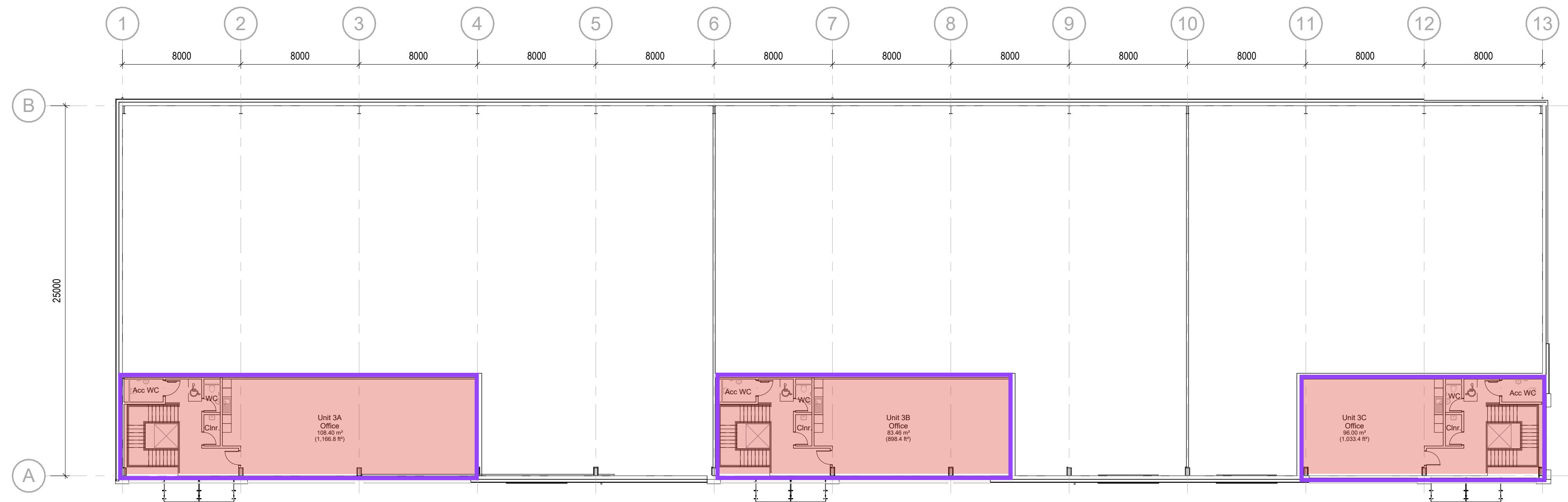


3 Proposed South Elevation
Scale @ 1 : 200

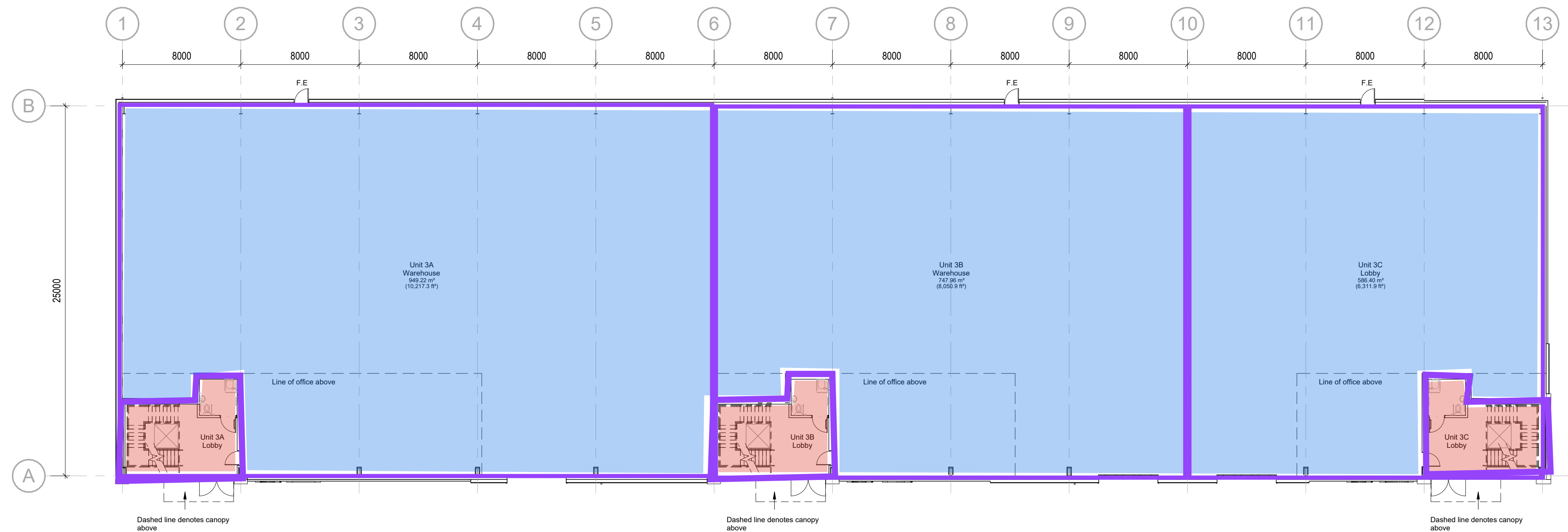


4 Proposed North Elevation
Scale @ 1 : 200

P03	24/11/25	Planning Issue	AW	AS
P02	05/11/25	Material schedule added and updates made as per Client comments	AW	CF
P01	31/10/25	Initial Issue	AW	CF
Rev	Date	Description	Drawn by	Checked By
Status	Purpose of Issue			
S2	For Information			
drawing stage	Planning			
client	Ask Real Estate Ltd			
project	Manchester Business Park			
drawing title	Unit 3 - Proposed GA Elevations			
date	10/29/25	drawn	Author	
scale @ A1	As indicated	checked	Checker	



2 Unit 3 Overall First Floor Plan
Scale @ 1 : 200



1 Unit 3 Overall Ground Floor Plan
Scale @ 1 : 200

NOTES

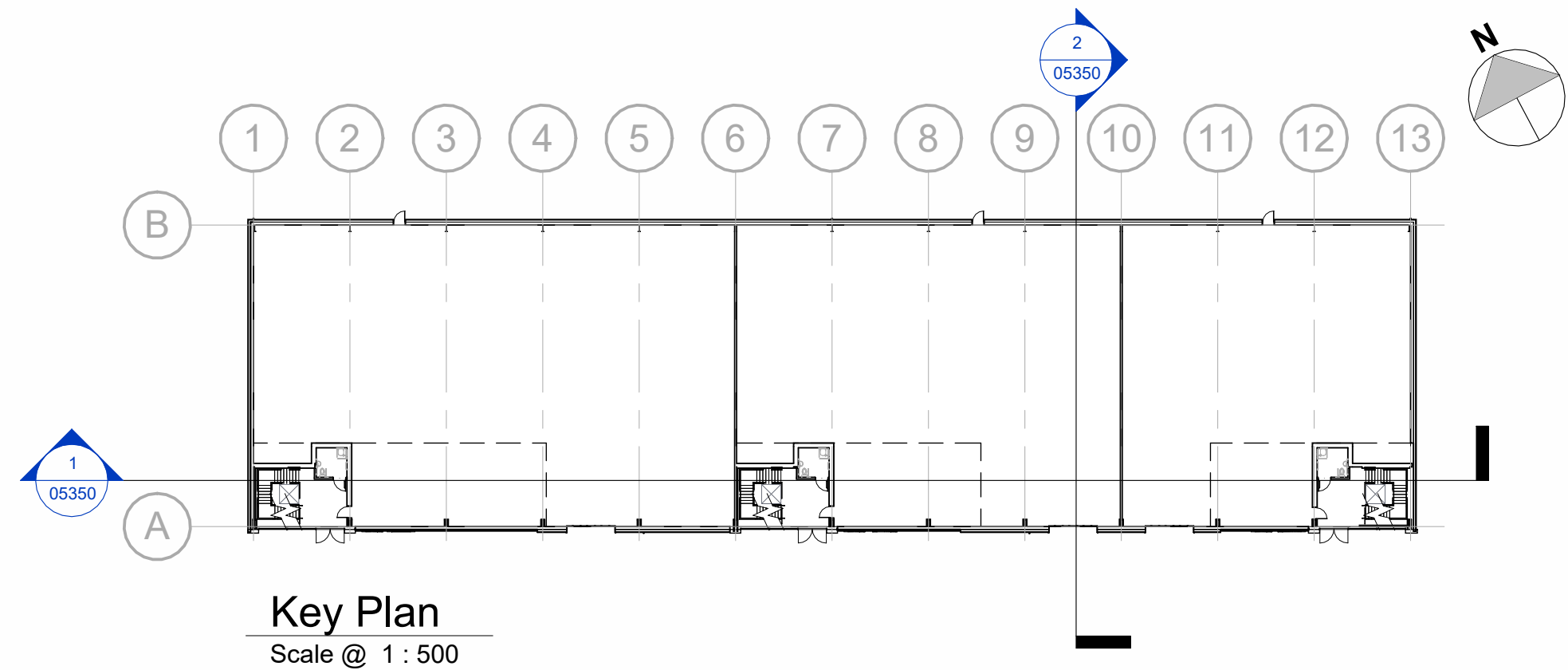
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This drawing contains the following model files: -

13502-AEW-B3-ZZ-M3-A-01300

- Thermal envelope / continuous insulation
- Heated Space
- Unheated Space

P01	31/10/25	Initial Issue	AW	CF
Rev	Date	Description	Drawn by	Checked By
Status	Purpose of Issue			
S2	For Information			
drawing stage	Planning			
client	Ask Real Estate Ltd			
project	Manchester Business Park			
drawing title	Unit 3 Proposed Overall GA Plans			
date	Sept 2025	drawn	TW	
scale @ A1	1 : 200	checked	CF	



Scale Bars TO BE USED ONLY AS GUIDANCE

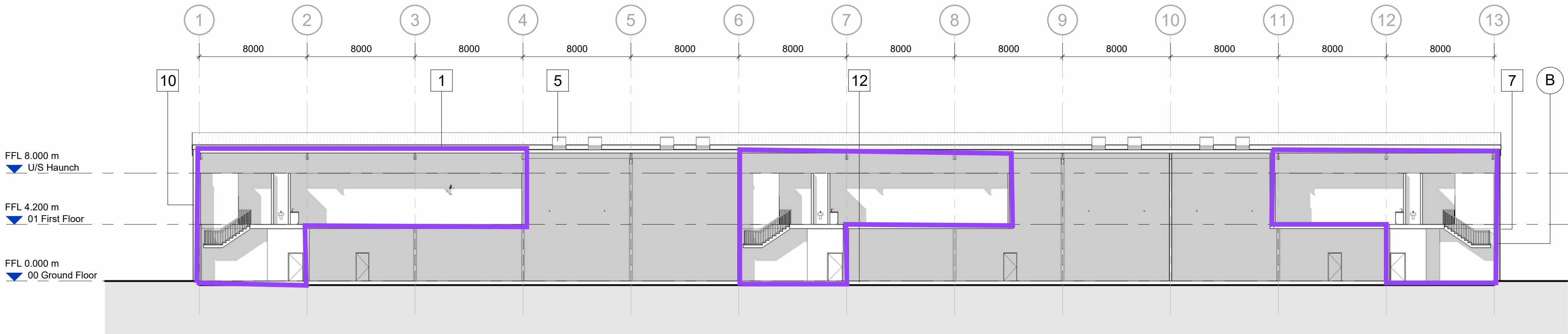
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NOTES

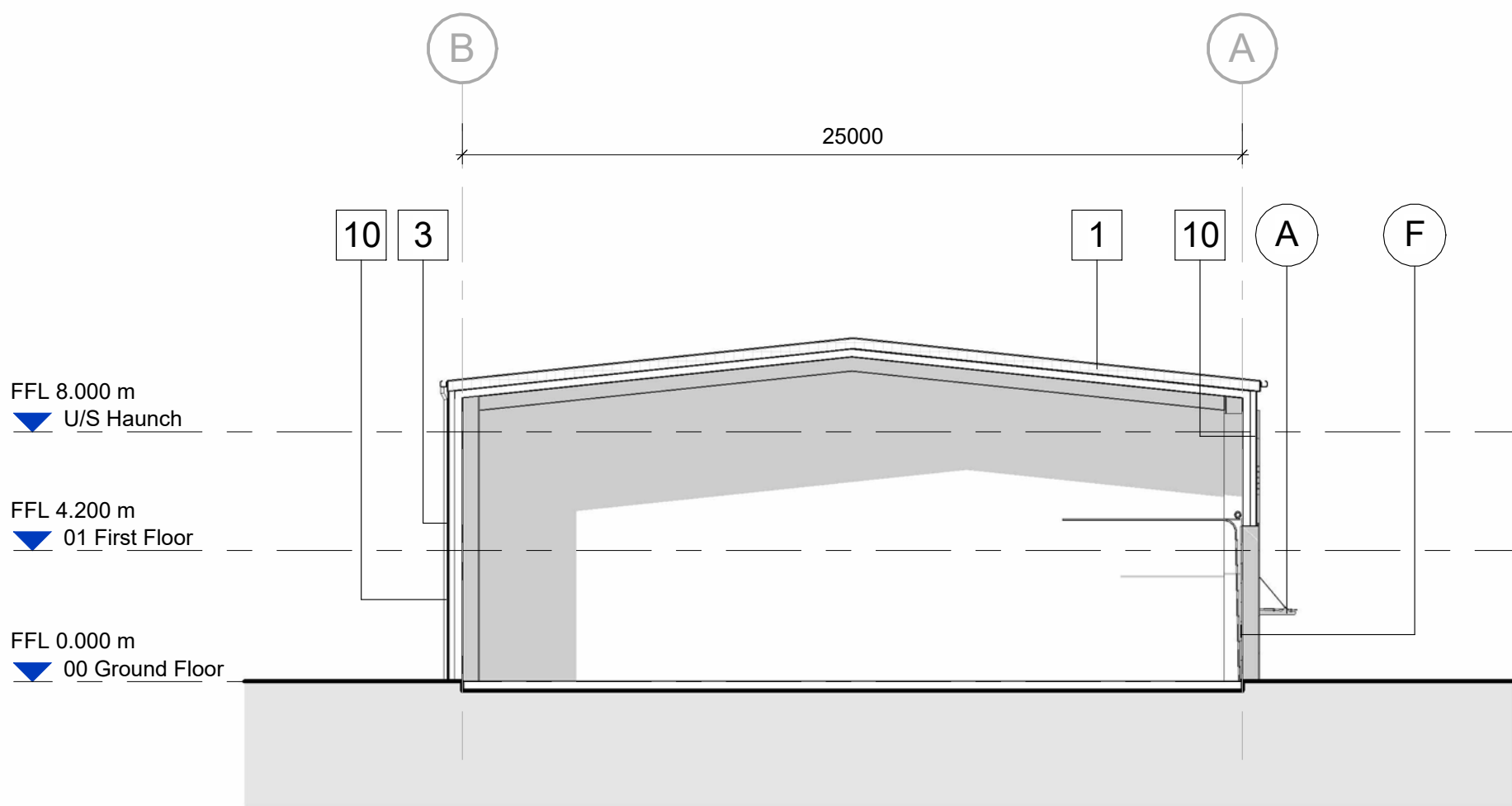
- All dimensions and levels are to be checked on site.
- Any discrepancies are to be reported to the architect before any work commences.
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This drawing contains the following model files: -

13502-AEW-B3-ZZ-M3-A-01300



1 Proposed Section AA
Scale @ 1 : 200



2 Proposed Section BB
Scale @ 1 : 200

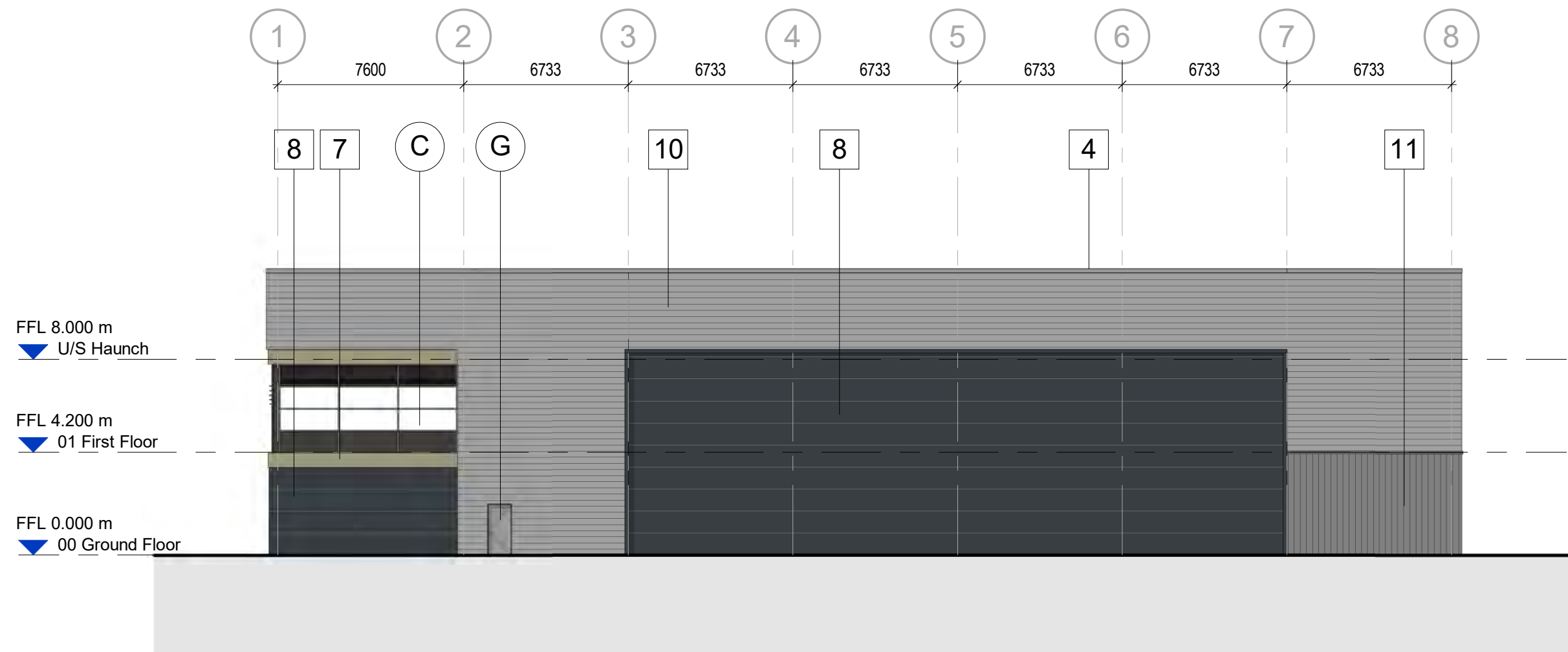
Thermal envelope / continuous insulation

Note: only shown to heated spaces, refer to plans for unheated spaces

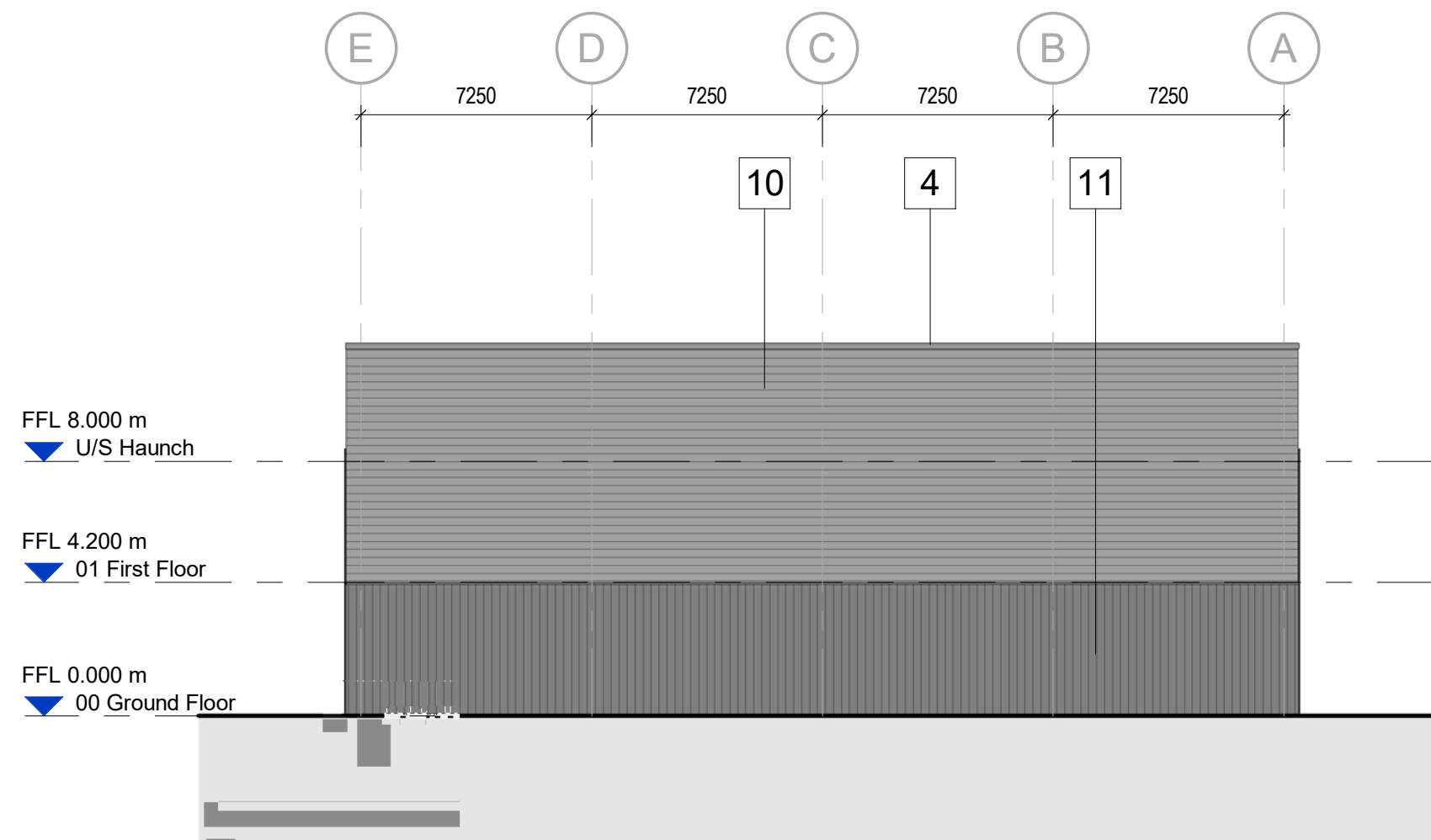
BUILDING FABRIC - MATERIAL SCHEDULE

- | | | | |
|----|--|---|---|
| 1 | Roof Cladding - Trapezoidal Profile Insulated, built up system, min pitch 4° Colourcoat HPS200 Ultra - in light grey | A | Office Entrance - Canopy
Cantilvered glazing to match curtain walling
Steel arm supports, PPC aluminium bronze |
| 2 | Photo Voltaic Panel area. Refer to M&E details for specification and exact number / area | B | Glazing
PPC aluminium glazed curtain wall system to be thermally broken.
Integrated spandrel to be ceramic backed matte units with mineral wool insulation backing panel.
Louvre panels: Dark Grey
Spandrel colour: Dark grey
Mullion / transom colour: PPC aluminium bronze |
| 3 | Rainwater Goods & Gutters
Internal, galvanised steel with membrane lining | C | Windows
PPC aluminium glazed windows to be thermally broken.
Mullion / transom colour: PPC aluminium bronze |
| 4 | Cladding Flashing
Profiled plasticoat coated pressed metal
Colour: Light grey to match below cladding | D | Main Entrance Doors
PPC aluminium thermally broken doors, suitable for wheelchair accessibility.
Doors to be integrated within the curtain wall system and consist of automatic swing and double glazing.
Colour: PPC aluminium bronze |
| 5 | Rooflights
GRP, in-plane, non-fragile, triple skinned
Translucent | E | Personnel Access / Escape Doorset
Type 1
PPC Galvanised Steel
Thermally insulated core to specialist sub-contractor details.
Colour: Light grey to match cladding behind |
| 6 | Horizontal Fins
Profiled plasticoat coated pressed metal
Colour PPC aluminium bronze | F | Operational Door
Level Access Sectional Insulated Shutter with vision panel
Plasticoat Coated finish in PPC aluminium bronze |
| 7 | Portico (to offices) and feature banding
Profiled plasticoat coated pressed metal in PPC aluminium bronze | G | Signage
PPC aluminium numbering in bronze |
| 8 | Wall Type 1 - Horizontally laid composite cladding panel with smooth finish in dark grey | | |
| 9 | Wall Type 2 - Horizontally laid rainscreen cladding with in PPC aluminium bronze | | |
| 10 | Wall Type 3 - Twin-skinned, built-up profiled metal laid horizontally with mineral wool insulation
Colour: Light grey | | |
| 11 | Wall Type 4 - Twin-skinned, built-up profiled metal laid vertically with mineral wool insulation
Colour: mid grey | | |
| 12 | Ground bearing concrete slab laid on suitable DPM / gas membrane (and insulation where required), all to Structural Engineer's details | | |

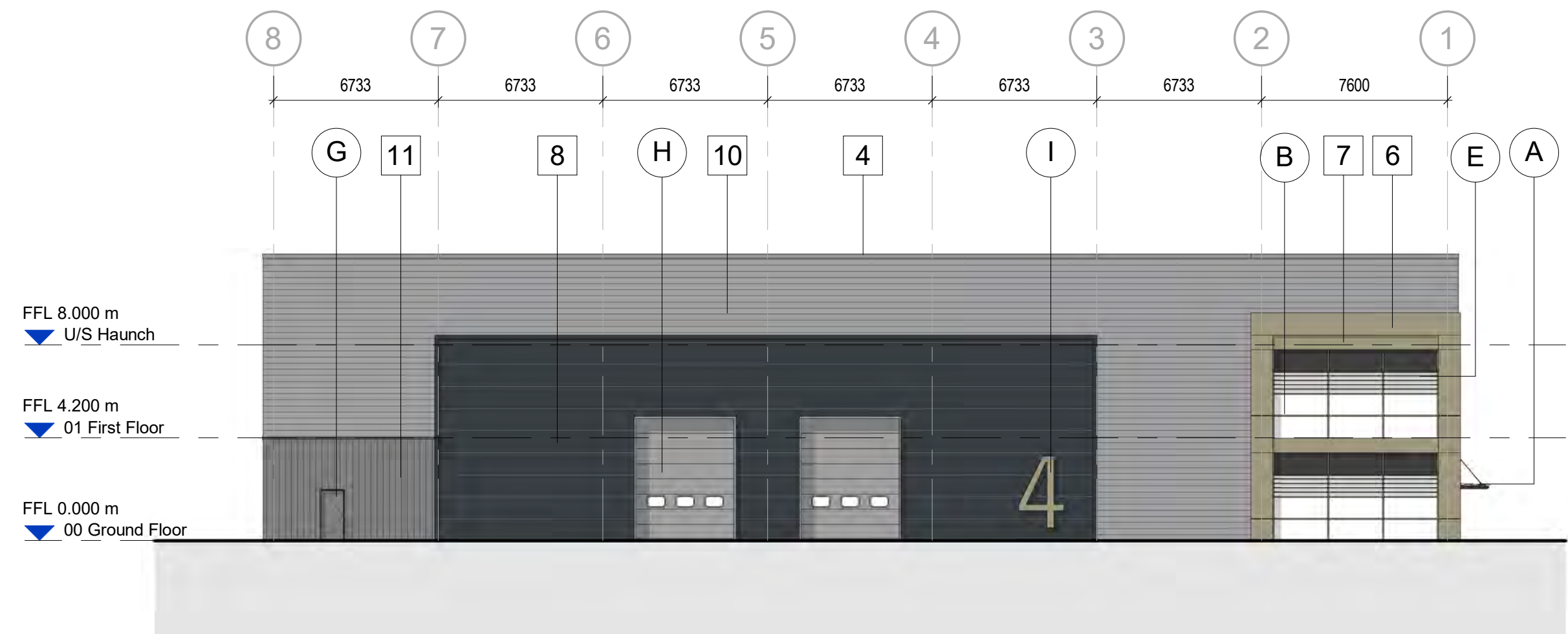
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Rev	Date	Description	Drawn by	Checked By
Status	Purpose of Issue			
S2	For Information			
drawing stage	Planning			
client	Ask Real Estate Ltd			
project	Manchester Business Park			
drawing title	Unit 3 - Proposed GA Sections			
date	10/29/25	drawn	AW	
scale @ A1	As indicated	checked	CF	



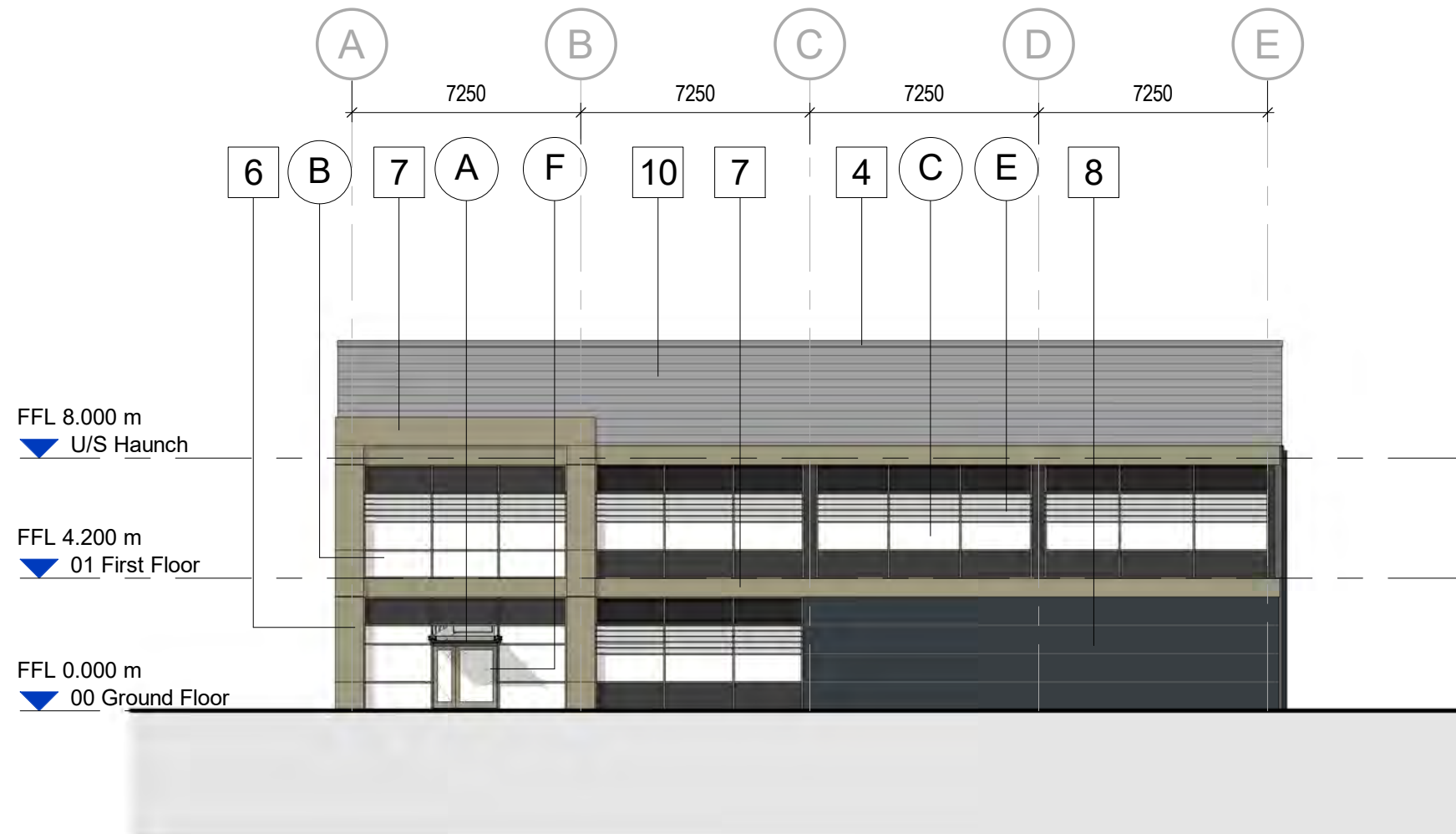
1 Proposed East Elevation
Scale @ 1 : 200



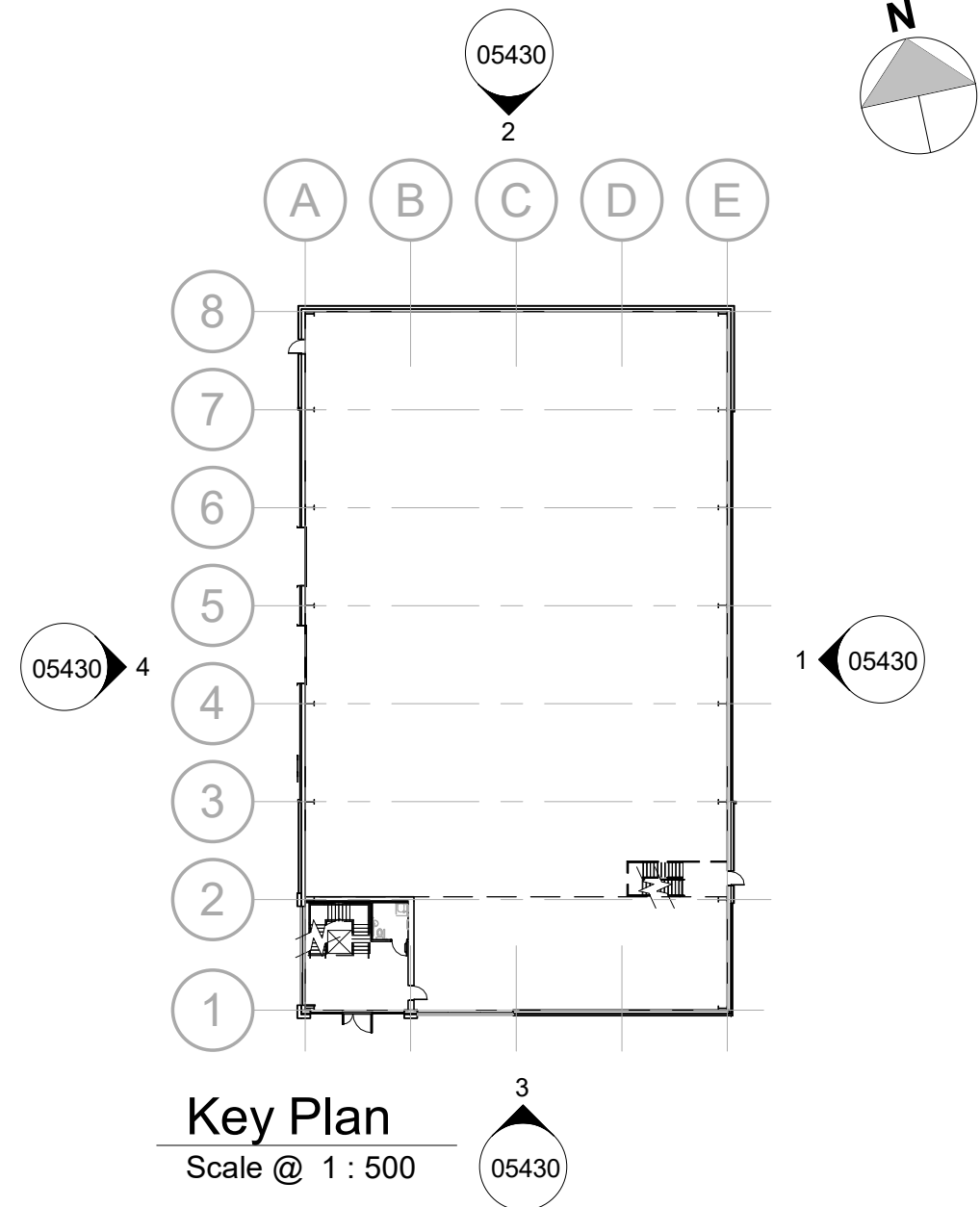
2 Proposed North Elevation
Scale @ 1 : 200



4 Proposed West Elevation
Scale @ 1 : 200



3 Proposed South Elevation
Scale @ 1 : 200



Key Plan
Scale @ 1 : 500

Scale Bars		TO BE USED ONLY AS GUIDANCE	
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1:200	mm	5000	10000
1:500	M	10	25
1:1250	M	10	25

NOTES

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- This drawing contains the following model files : -
- 13502-AEW-B4-ZZ-M3-A-01400

BUILDING FABRIC - MATERIAL SCHEDULE

- | | | | |
|----|---|---|--|
| 1 | Roof Cladding
Trapezoidal profile, insulated, built up system, min pitch 6° with Colourcoat HPS200 Ultra finish or similar in light grey | A | Office Entrance - Canopy
Cantilevered glazed canopy with PPC steel arm supports in colour to match curtain walling |
| 2 | Photo Voltaic Panel area
Refer to M&E details for specification and exact number / area | B | Glazing - Entrances
PPC thermally broken aluminium curtain wall system with bronze mullions and transoms. Top panes to be ceramic backed glass spandrel units in dark grey with mineral wool insulation backing panel. All other panes to be sealed double glazed units |
| 3 | Rainwater Goods & Gutters
Internal downpipes and insulated gutters in galvanised steel with membrane lining to gutters | C | Glazing - Offices
PPC thermally broken aluminium curtain wall system with bronze mullions and transoms. Bottom panes to be ceramic backed glass spandrel units in dark grey with mineral wool insulation backing panel. Top panes to be aluminium louvre panels in dark grey. Central panes to be sealed double glazed units |
| 4 | Parapet and Cladding Flashings
Plastisol coated pressed metal flashings in colour to match adjacent cladding | D | Windows
PPC thermally broken window system with bronze mullions and transoms and sealed double glazed units |
| 5 | Rooflights
GRP, in-plane, non-fragile, triple skinned translucent rooflights | E | Brise Soleil
PPC aluminium brise soleil fins to be provided as part of the curtain wall system in same colour as mullions / transoms |
| 6 | Portico entrance feature
Pressed metal flashing with PPC finish in bronze | F | Main Entrance Doors
PPC thermally broken aluminium swing doors to be colour matched and integrated within the curtain wall system with sealed double glazed units. |
| 7 | Feature banding
Pressed metal flashing with PPC finish in bronze | G | Personnel Access / Escape Doors
PPC Galvanised Steel doors with thermally insulated core in colour to match surrounding cladding. |
| 8 | Wall Type 1
Horizontally laid insulated composite cladding panels with flat finish such as Kingspan Spectrum or similar in dark grey | H | Level Access Doors
Insulated sectional overhead doors Shutter with vision panels and PPC finish or similar in light grey |
| 9 | Wall Type 2
Horizontally laid aluminium rainscreen cladding on insulated liner panel with PPC finish in bronze | I | Signage
PPC aluminium signage / numbering in bronze shown indicatively only |
| 10 | Wall Type 3
Twin-skinned, built-up trapezoidal profile metal cladding system laid horizontally with mineral wool insulation and Colourcoat HPS200 Ultra finish or similar in light grey | | |
| 11 | Wall Type 4
Twin-skinned, built-up trapezoidal profile metal cladding system laid vertically with mineral wool insulation and Colourcoat HPS200 Ultra finish or similar in mid grey | | |
| 12 | Ground bearing concrete slab
To be laid on suitable DPM / gas membrane (and insulation where required), all to Structural Engineer's details | | |
| 13 | Raised Access Floor
To provide 150mm service void above concrete slab | | |

P04	24/11/25	Planning Issue	AW	AS
P03	12/11/25	Minor updates to gable end glazing	AW	CF
P02	05/11/25	Material schedule added	AW	CF
P01	31/10/25	Initial Issue	AW	CF
Rev	Date	Description	Drawn by	Checked By

Status	Purpose of Issue
S2	For Information

drawing stage **Planning**

client

Ask Real Estate Ltd

project

Manchester Business Park

drawing title

Unit 4 - Proposed GA Elevations

date	10/15/25	drawn	AW
scale @ A1	As indicated	checked	CF

Rev

P04

Dwg No

13502-AEW-B4-ZZ-DR-A-05430

Dwg No

13502-AEW-B4-ZZ-DR-A-05430

project

Manchester Business Park

drawing title

Unit 4 - Proposed GA Elevations

date

10/15/25

drawn

AW

scale @ A1

As indicated

checked

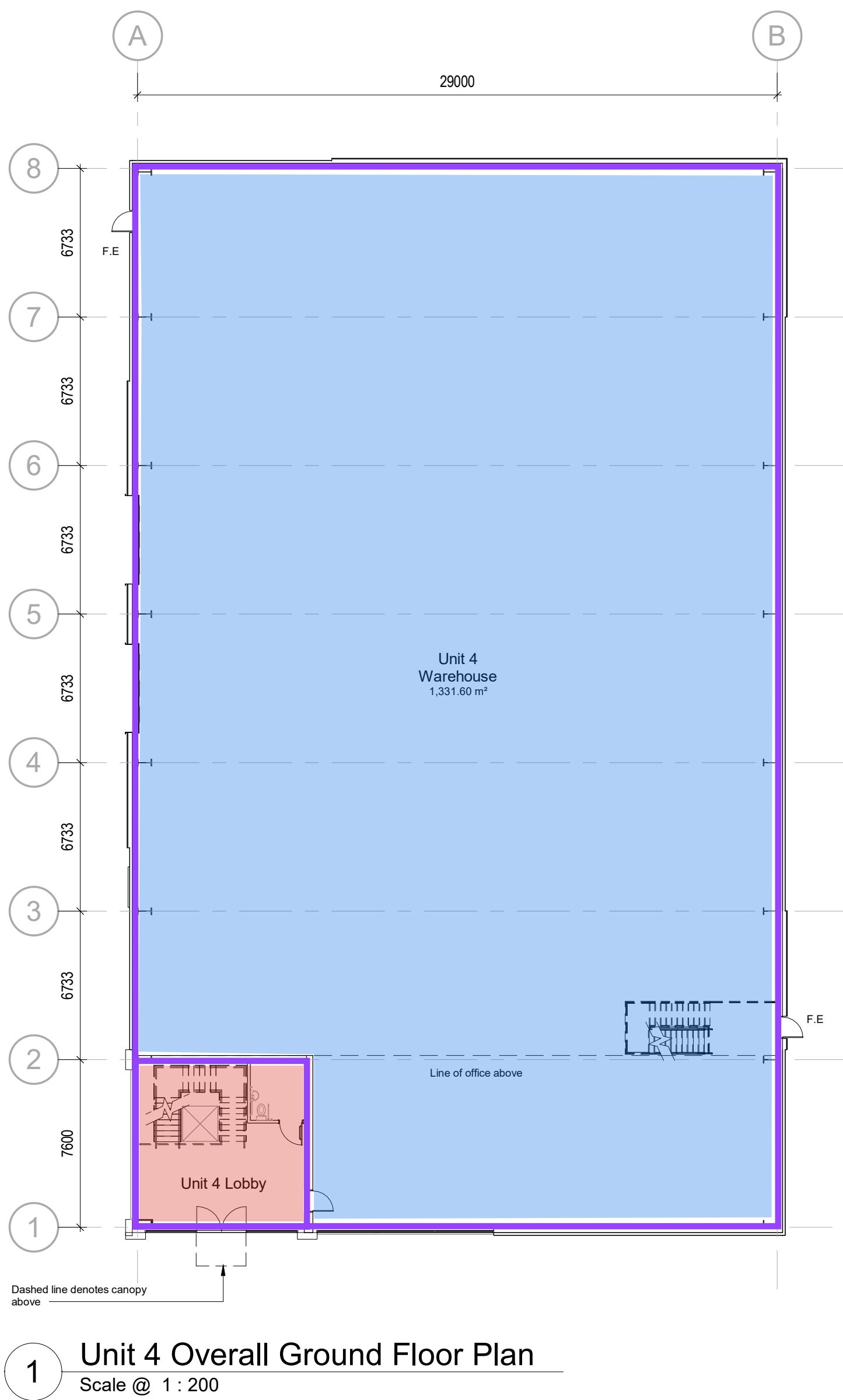
CF

aeu architects

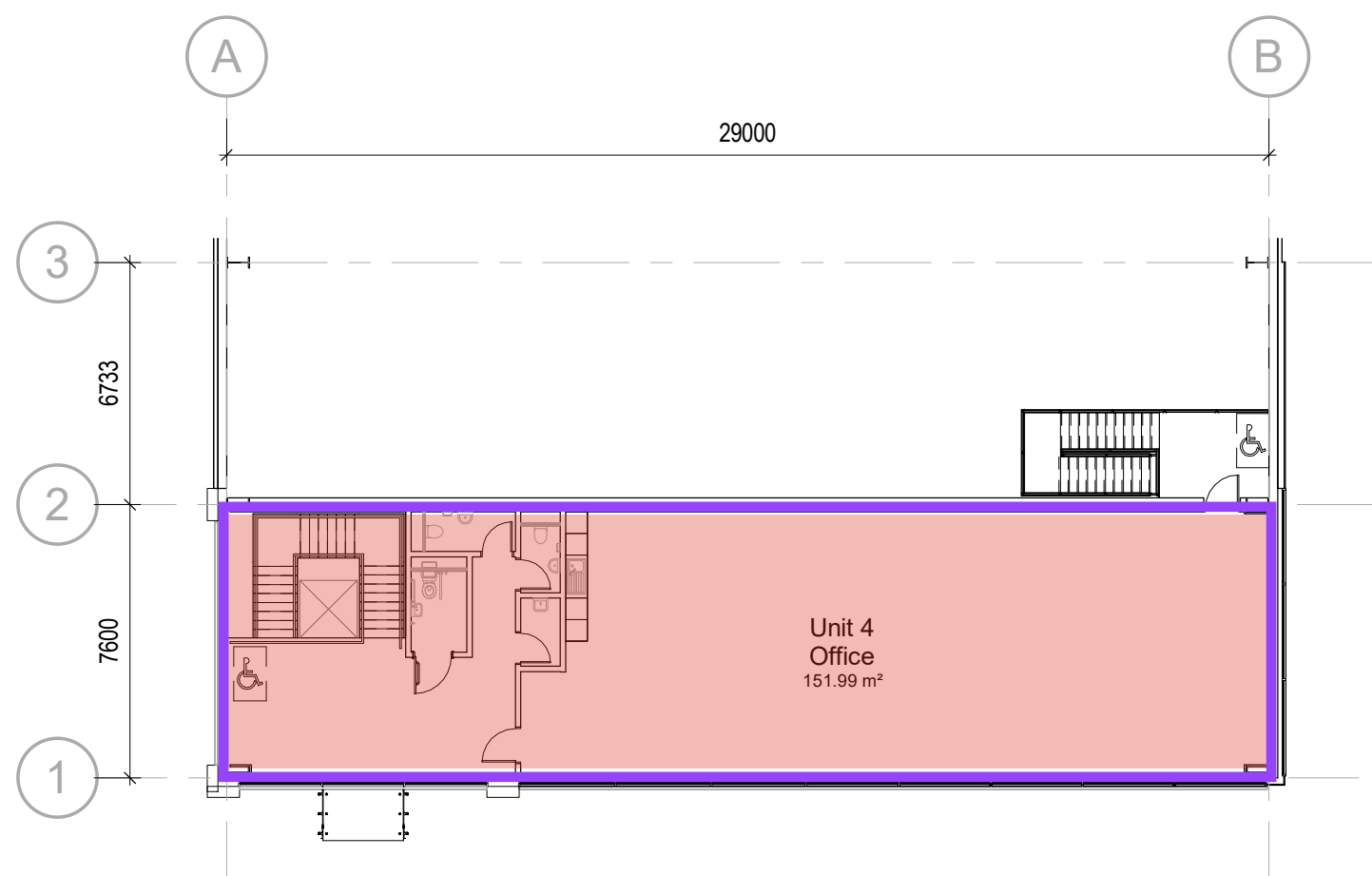
0161 214 4370

www.aeuarchitects.com

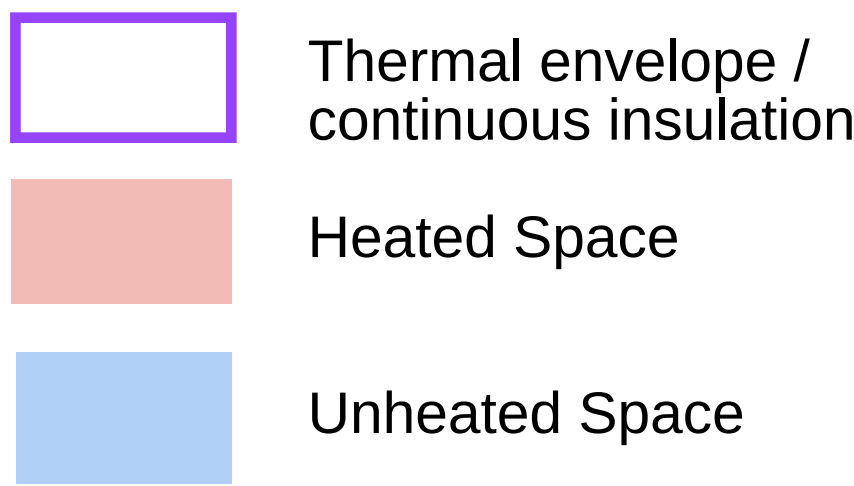
aeu



1 Unit 4 Overall Ground Floor Plan
Scale @ 1 : 200

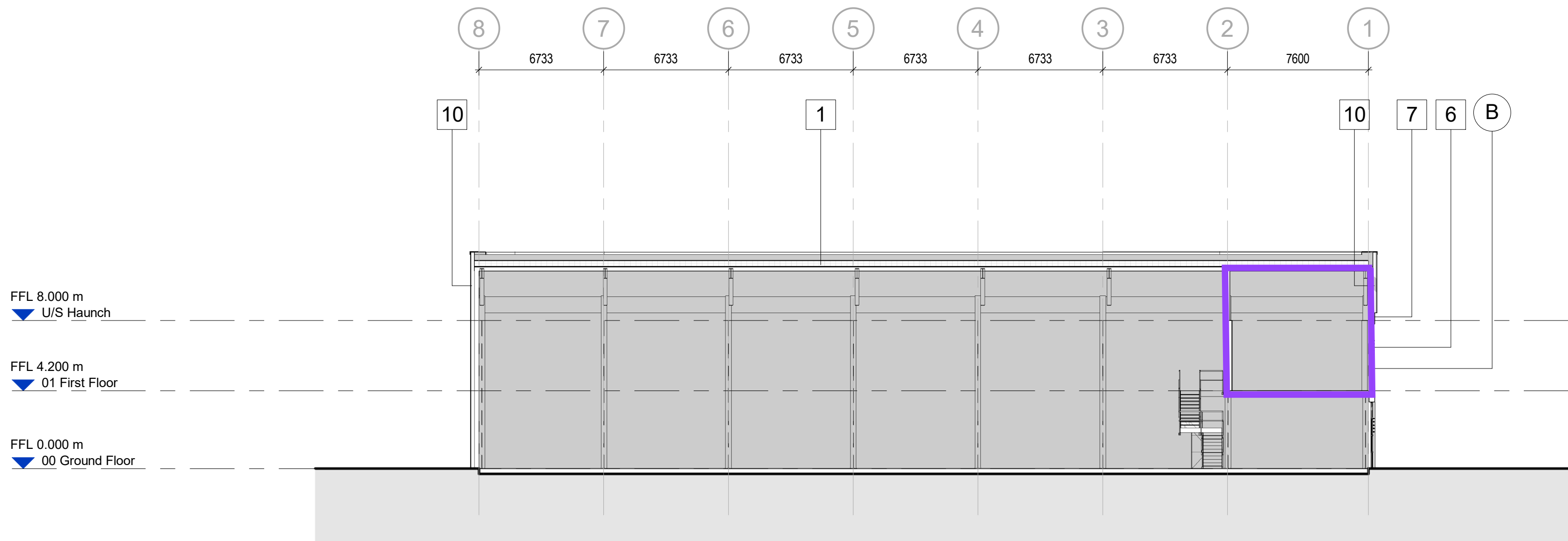


2 Unit 4 Overall First Floor Plan
Scale @ 1 : 200

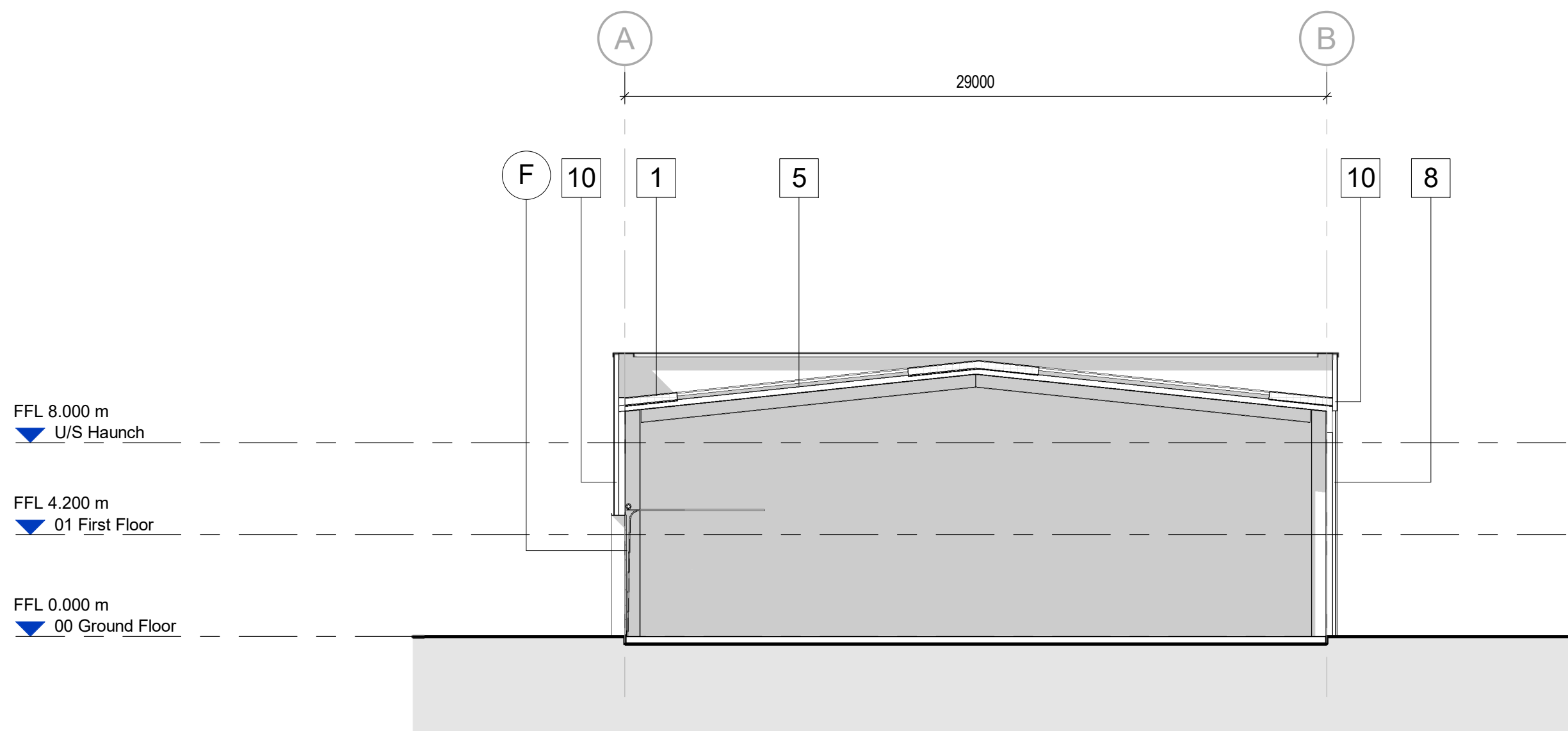


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P01	31/10/25	Initial Issue	AW	CF
Rev	Date	Description	Drawn by	Checked By
Status	Purpose of Issue			
S2	For Information			
drawing stage	Planning			
client	Ask Real Estate Ltd			
project	Manchester Business Park			
drawing title	Unit 4 - Proposed GA Floor Plan			
date	Sept 2025	drawn	TW	
scale @ A1	1 : 200	checked	CF	

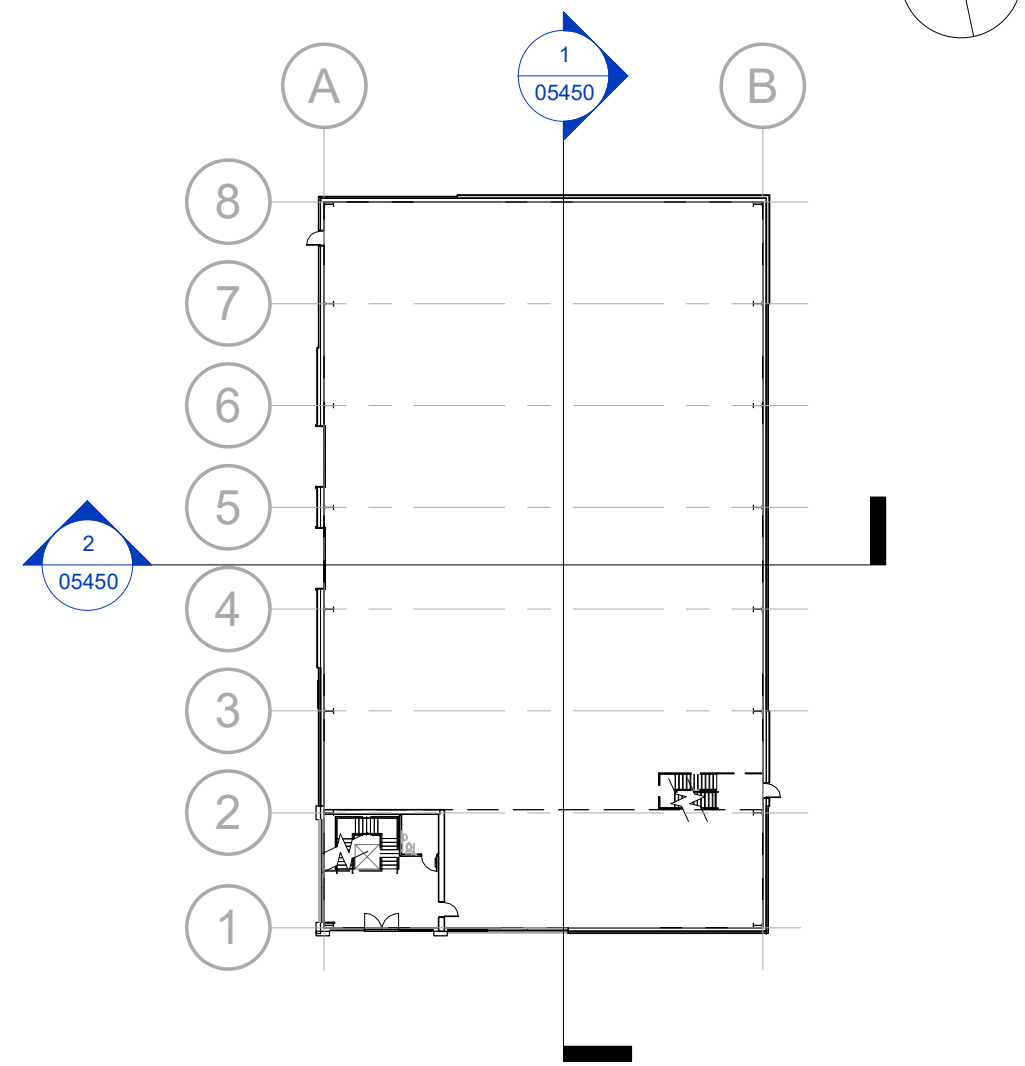


1 Proposed Section AA
Scale @ 1 : 200



2 Proposed Section BB
Scale @ 1 : 200

Thermal envelope / continuous insulation
Note: only shown to heated spaces,
refer to plans for unheated spaces



Key Plan
Scale @ 1 : 500

BUILDING FABRIC - MATERIAL SCHEDULE

- | | | | |
|----|--|----|---|
| 1 | Roof Cladding - Trapezoidal Profile Insulated, built up system, min pitch 4° Colourcoat HPS200 Ultra - in light grey | A | Office Entrance - Canopy
Cantilvered glazing to match curtain walling
Steel arm supports, PPC aluminium bronze |
| 2 | Photo Voltaic Panel area. Refer to M&E details for specification and exact number / area | B | Glazing
PPC aluminium glazed curtain wall system to be thermally broken.
Integrated spandrel to be ceramic backed matte units with mineral wool insulation backing panel.
Louvre panels: Dark Grey
Spandrel colour: Dark grey
Mullion / transom colour: PPC aluminium bronze |
| 3 | Rainwater Goods & Gutters
Internal, galvanised steel with membrane lining | C | Windows
PPC aluminium glazed windows to be thermally broken.
Mullion / transom colour: PPC aluminium bronze |
| 4 | Parapet and Cladding Flashing
Profiled plasticol coated pressed metal
Colour: Light grey to match below cladding | D | Main Entrance Doors
PPC aluminium thermally broken doors, suitable for wheelchair accessibility.
Doors to be integrated within the curtain wall system and consist of automatic swing and double glazing.
Colour: PPC aluminium bronze |
| 5 | Rooflights
GRP, in-plane, non-fragile, triple skinned
Translucent | E1 | Personnel Access / Escape Doorset Type 1
PPC Galvanised Steel
Thermally insulated core to specialist sub-contractor details.
Colour: Light grey to match cladding behind |
| 6 | Horizontal Fins
Profiled plasticol coated pressed metal
Colour PPC aluminium bronze | E2 | Personnel Access / Escape Doorset Type 2
Colour: Dark grey to match cladding behind |
| 7 | Portico (to offices) and feature banding
Profiled plasticol coated pressed metal in PPC aluminium bronze | F | Operational Door
Level Access Sectional Insulated Shutter with vision panel
Plasticol Coated finish in PPC aluminium bronze |
| 8 | Wall Type 1 - Horizontally laid composite cladding panel with smooth finish in dark grey | G | Signage
PPC aluminium numbering bronze |
| 9 | Wall Type 2 - Horizontally laid rainscreen cladding with in PPC aluminium bronze | | |
| 10 | Wall Type 3 - Twin-skinned, built-up profiled metal laid horizontally with mineral wool insulation
Colour: light grey | | |
| 11 | Wall Type 4 - Twin-skinned, built-up profiled metal laid vertically with mineral wool insulation
Colour: mid grey | | |
| 12 | Ground bearing concrete slab laid on suitable DPM / gas membrane (and insulation where required), all to Structural Engineer's details | | |

Scale Bars TO BE USED ONLY AS GUIDANCE

1:100	mm	1000	2000	3000	4000	5000
1:200	mm	1000	2000	3000	4000	5000
1:500	M	5	10	15	20	25
1:1250	M	10	20	30	40	50

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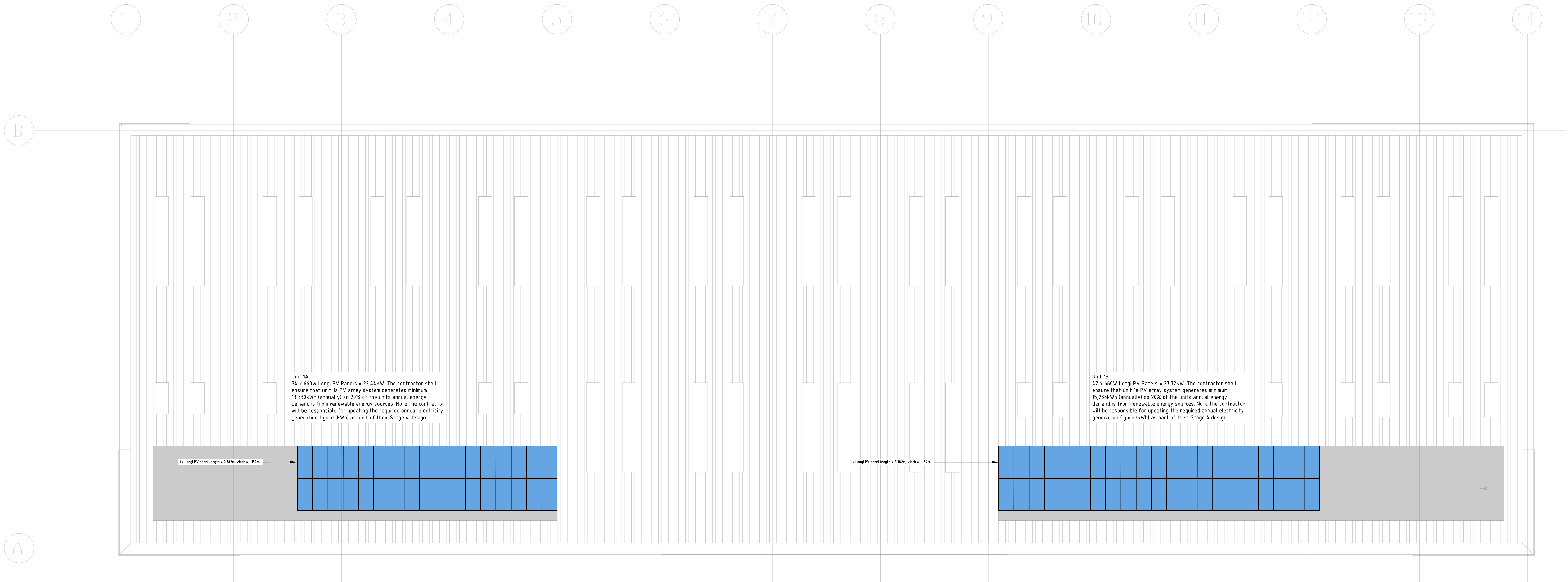
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Rev	Date	Description	Drawn by	Checked By
Status	Purpose of Issue			
S2	For Information			
drawing stage	Planning			
client	Ask Real Estate Ltd			
project	Manchester Business Park			
drawing title	Unit 4 - Proposed GA Sections			
date	10/15/25	drawn	AW	
scale @ A1	As indicated	checked	CF	

PV Strategy Key:
 PV Array Available Area

- Notes:
1. This drawing is to be read in conjunction with the Hannan Associates Stage 3 report.
 2. The solar PV design is to be verified by the contractor at Stage 4 prior to installation on site.



Rev	27	Planning Issue.	BS	JW
Rev	11			
Rev	25			
Rev	11	Description	Rev	Rev

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Tel : +44 (0)161 337 2200
Email : info@hannan.co.uk
Web : www.hannan.co.uk

Client:
Ask Real Estate Limited

Project:
Manchester Business Park
Unit 1

Design Stage:
Design Stage 3

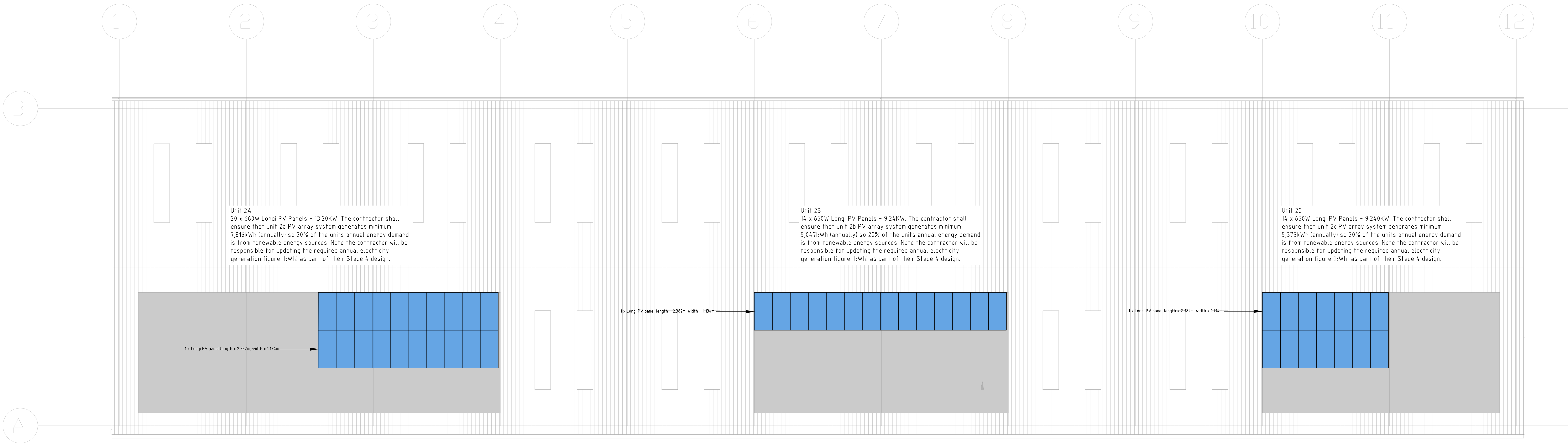
Drawing Title:
Building 1 (Unit 1a & 1b)
Solar PV Strategy

Rev'd Project Number: 4080 Scale @ A3: 1:150

Drawing Number:
13502 - HAN - B1 - RF - DR - E - 06901

PV Strategy Key:
PV Array Available Area

- Notes:
- This drawing is to be read in conjunction with the Hannan Associates Stage 3 report.
 - This solar PV design is to be verified by the contractor at Stage 4 prior to installation on site.



Rev	27	Planning Issue.	BS	JW
	11	Description		



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Web : www.hannan-uk.com

Client
Ask Real Estate Limited

Project
Manchester Business Park
Unit 2

Design Stage
Design Stage 3

Drawing Title
Building 2 (Unit 2a, 2b, 2c)
Solar PV Strategy

Drawn Project Number
4080

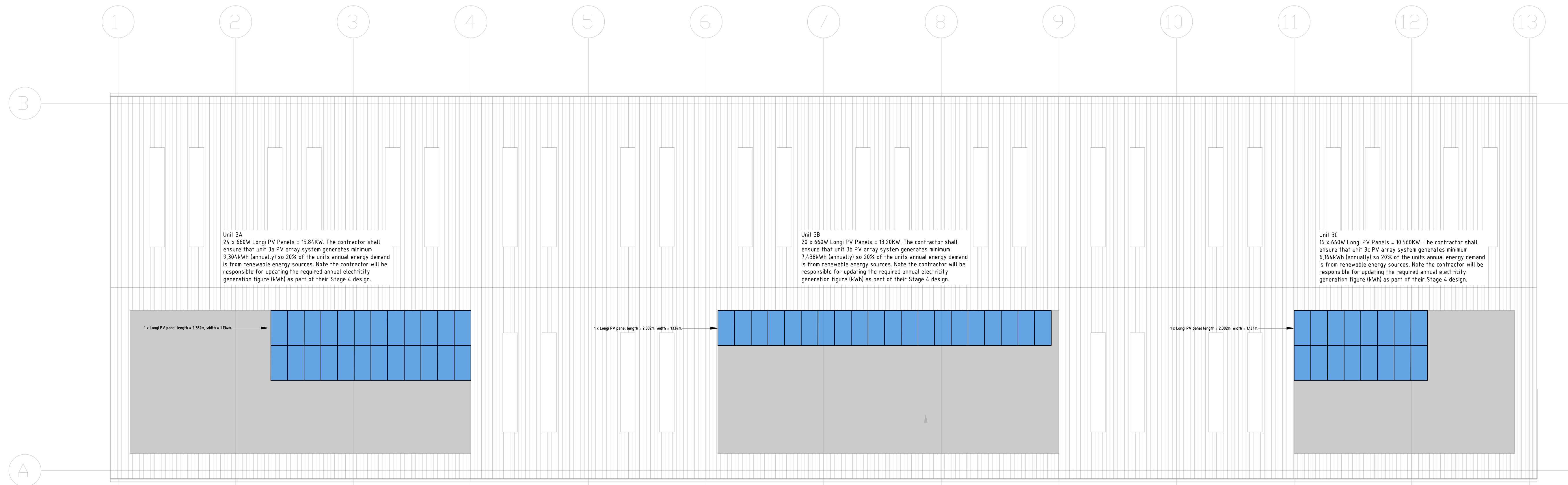
Scale @ Rev
1:100

Drawing Number
13502 - HAN - B2 - RF - DR - E - 06901

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PV Array Available Area

- Notes:
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 - The solar PV design is to be verified by the contractor at Stage 4 prior to installation on site.

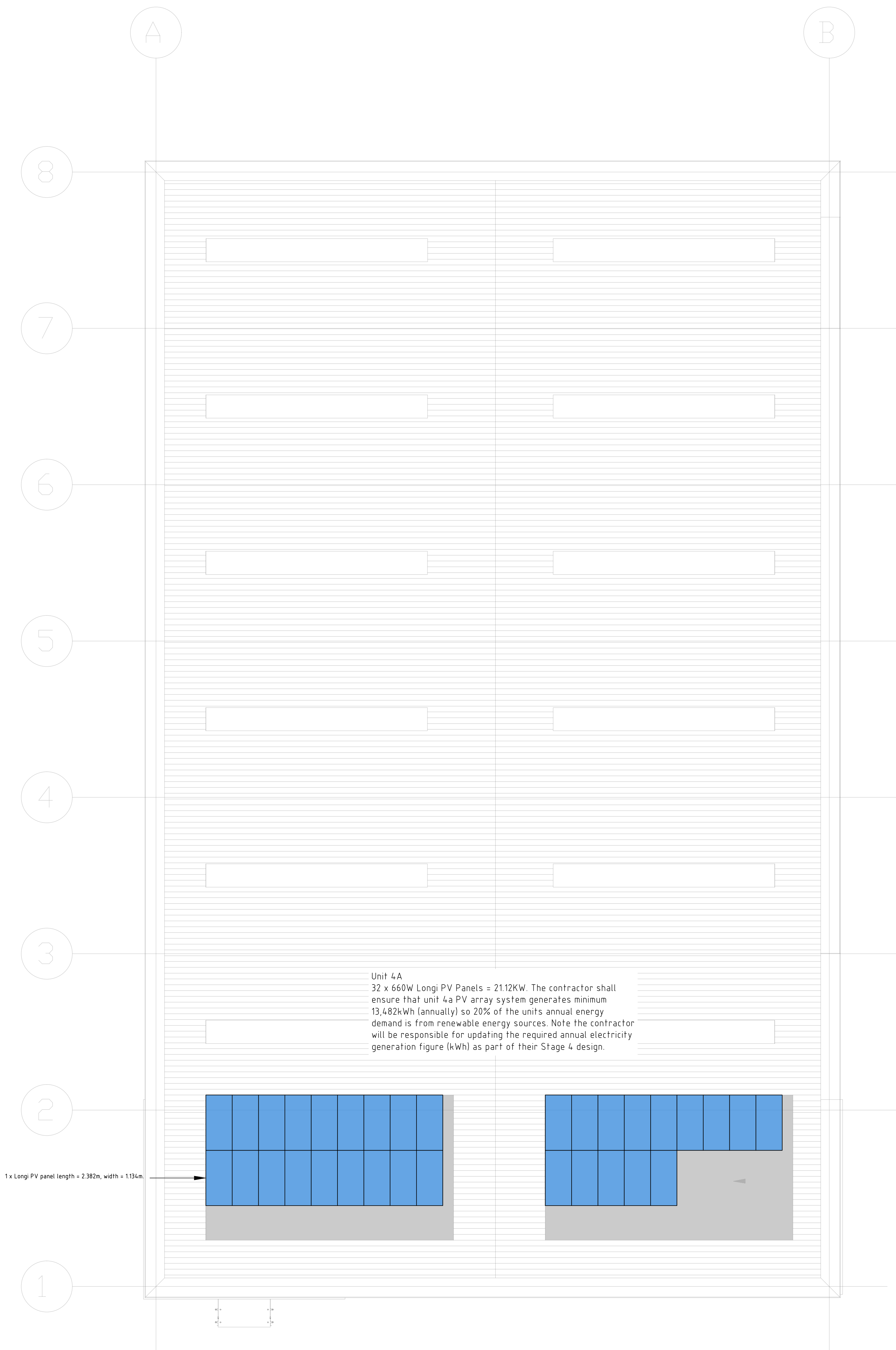


Rev	27	Planning Issue.	BS
Rev	11		
Rev	25		
Rev	11	Description	
Rev	25		
			
Hannan Associates MEP Design Solutions		Hannan Associates Ltd Bent House Alphagate Drive Manchester Road Denton M16 9SH Tel : +44 (0)161 337 2200 Email : info@hannan.co.uk Web : www.hannan.co.uk	
Client			
Ask Real Estate Ltd			
Project			
Manchester Business Park			
Design Stage			
Design Stage 3			
Drawing Title			
Building 3 (Unit 3a, 3b, 3c) Solar PV Strategy			
Hannan Project Number		Scale @ A3	
4080		1:150	
Drawing Number			
13502 - HAN - BS - RF - DR - E - 06901			
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PV Strategy Key:
 PV Array Available Area

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2. The solar PV design is to be verified by the contractor at Stage 4 prior to installation on site.



Rev	Date	Description	Drawn By	Checked By
PG1	11/25	Planning Issue	BS	JW



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Client:		Ask Real Estate Ltd
Project:		Manchester Business Park
Design Stage:		Design Stage 3
Drawing Title:		Building 4 (Unit 4) Solar PV Strategy
WHS Project Number:	Scale @ A3:	1:100
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Drawing Number:		
13502 - HAN - B4 - RF - DR - E - 06901		

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Ask Real Estate MBP Limited

Manchester Business Park, Aviator
Way

Low Carbon Heat Appraisal

2nd December 2025

Ref: 13502-HAN-XX-XX-RP-MEP-00009

Revision P03

1.0 Document Control

Document Authority

Prepared by	Matthew Dalley
Date	25/11/2025
Checked by	Charlotte Becker
Date	25/11/2025
Approved by	Philippa Spivey
Date	25/11/2025

Document History

Issue	Issue Date	Status
P01	25/11/2025	For Information
P02	01/12/2025	For Information
P03	02/12/2025	For Planning

Contents

1.0	Introduction
2.0	Objectives
3.0	Planning Policy
4.0	Options Appraisal
5.0	Conclusion

1.0 Introduction

This Low Carbon Heat Appraisal has been prepared to support the full planning application for the proposed Manchester Business Park, Aviator Way development (proposed development) located at Unit 2000, Aviator Way, near Manchester Airport, Greater Manchester, M22 1GE.

This appraisal demonstrates how the proposed development has been designed to deliver low carbon heat that is cost effective and affordable for the occupants, in accordance with the local energy and carbon policy requirements of the Greater Manchester Combined Authority (GMCA).

1.1 Project Overview

The proposed development comprises 9 no. Commercial B2 (General Industry) and B8 (Storage and distribution) units to form light industrial and ancillary office space, with associated landscaping works, access and car parking.

The site is bounded to the north by residential housing along Thornsgreen Road, to the east by existing Manchester Business Park office units, to the south by Aviator Way and the A555 Ringway Road West, and to the west by Woodhouse Lane and existing Manchester Business Park units beyond this.

A site plan of the units that comprise the proposed development is provided below.



Figure 1 Site plan.

1.2 The Need for Low Carbon Heat

Due to the location and weather conditions of the UK, there is a significant need for both heat and hot water across the country's property portfolio. The energy required to heat buildings and supply them with adequate hot water accounts for approximately 20% of the UK's total carbon emissions.

Heating and hot water generation are a critical factor which must be addressed in order for Greater Manchester to meet its targets and become a carbon-neutral city region by 2038.

It is therefore essential that new buildings do not use fossil fuels for heating and hot water and that they are equipped with low carbon heating systems which are compliant with the pathway towards net zero.

2.0 Objectives

The Low Carbon Heat Appraisal aims to frame the scope of the current assessment:

- Explore Low Carbon technologies
- Analyse upfront costs
- Estimate the running costs of managing the heat demand
- Assess the potential impact on the surroundings in terms of air quality

3.0 Planning Policy

The following statutory requirements, separated by their national, regional and local relevance, have been identified as key policy drivers and considered during the development of this statement. Further details regarding the specific policies relevant to energy and carbon are provided in Appendix 1 of the Energy and Carbon Statement.

Policy Reference	
National	National Planning Policy Framework (December 2024)
Regional	Greater Manchester Combined Authority Places for Everyone Joint Development Plan (adopted March 2024)
Local	Manchester Core Strategy 2012-2027 (adopted July 2012)

Table 1 Statutory requirements.

A key driver of the local energy and carbon policy requirements that apply to the proposed development is the Greater Manchester ambition to become a carbon neutral city-region by 2038, following the declaration of a Climate Emergency by the GMCA in July 2019. A primary element of achieving this target is to set out a pathway for new development to be net zero carbon by 2028 at the latest. Policies within the Places for Everyone Joint Development Plan (PfE) and the Manchester Core Strategy support the delivery of a carbon neutral Greater Manchester by encouraging a range of measures that contribute to reducing greenhouse gas emissions from new development in the area.

The Manchester Core Strategy Policy sections EN 4 to EN 7 and Draft Manchester Local Plan (DMLP) reinforce the GMCA target and states that development shall support Manchester becoming carbon neutral by minimising carbon emissions; maximising carbon storage and sequestration; mitigating and adapting to the impacts of climate change; and responding to the economic and policy changes that are likely to accompany climate change.

Other policies of relevance within the PfE and DMLP include:

- Policy JP-S1 Sustainable Development
- Policy JP-S2 Carbon and Energy
- Policy JP-S3 Heat and Energy Networks
- Policy ZC 2 Towards Net Zero Carbon
- Policy ZC 3 Renewable and Low Carbon Energy Developments

3.1 Policy JP-S3 Heat and Energy Networks

Policy JP-S3 is part of the "Places for Everyone" Joint Development Plan which focuses on promoting renewable and low carbon heat and energy networks, particularly in designated "Heat and Energy Network Opportunity Areas". This policy supports the delivery of renewable and low carbon energy schemes by encouraging the use of decentralized energy networks. It builds upon existing policies (EN 5 and EN 7) to further transition towards a low carbon economy.

The Places for Everyone - Policy JP-S3: Heat and Energy Networks Policy states:

1. Delivery of renewable and low carbon energy schemes will be supported with particular emphasis on the use of decentralised energy networks in areas identified as "Heat and Energy Network Opportunity Areas". These have been identified where:
 - a) Existing heat/energy networks are operational or have been commissioned;
 - b) Proposals for new heat networks/energy networks are being progressed, or future opportunities have been identified in city-region master planning;
 - c) Sufficient density of existing heat demand occurs; and
 - d) Significant future development is proposed at the strategic development locations.
2. Within the identified "Heat and Energy Network Opportunity Areas", unless it can be demonstrated that there are more effective alternatives for minimising carbon emissions or such connection is not practicable or financially viable, it is expected that:
 - a) New residential developments that are '10 dwellings or more' or other developments over 1,000 m2 floorspace shall:
 - i. Connect to an existing or planned heat/energy network or be designed to enable future connection (where within 500m of such a network); and/or
 - ii. Install a site-wide or communal heat/energy network solution.
 - b) An expectation that new industrial development will demonstrate that opportunities for using waste heat locally have been fully examined, and included in proposals;
 - c) An expectation that where publicly owned buildings and assets adjoin new major development sites, opportunities for these buildings and assets to connect to site-wide proposals will be considered; and
 - d) An expectation that any site-wide networks will be designed so as to enable future expansion to adjoining buildings or assets as appropriate.

3.2 Case Identification

Developments that are between those delivering more than 150 residential units and/or more than 5,000 m² GIA of non-residential floor space are considered to be 'large major developments'. Like major developments, large major developments are likely to be located in four different types of locations, which will affect how they should apply Policy JP-S3:

- Case 1: the site is within 500m of an existing low carbon heat network
- Case 2: the site is within 500m of a planned low carbon heat network
- Case 3: the site is within a low carbon heat network opportunity area
- Case 4: any other location in Greater Manchester

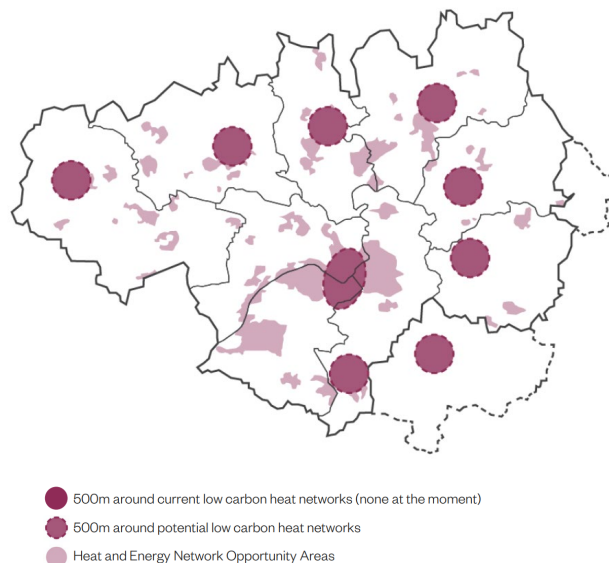


Figure 2 Map of Greater Manchester showing the three different types of heat network areas (as of December 2024).

3.2.1 Site Case Location

Based on an assessment of the location of proposed development and the low carbon heat networks map, the development falls within the Case 4 type location (see red arrow below).

Case 4: any other location in Greater Manchester



Figure 3 Map showing the site location, the planned low carbon heat network areas in the immediate vicinity and map overlay of the local area.

3.3 LPA Engagement

As part of the appraisal, it is a requirement that the applicant liaises with the LPA to enquire about the case classification and to understand the likely development programme of any planned low carbon heat network. In this case, the LPA is Manchester City Council.

Based on the available heat network database, provided in part by Manchester City Council, it has been confirmed that no heat network has been proposed for the area; therefore, no consultation is required.

4.0 Options Appraisal

In accordance with the recently published GMCA Net Zero Carbon Design Guidance, an appraisal of the following three system options has been carried out to enable the selection of the most suitable low carbon heating system. The following appraisal considers the total heating and hot water demand for the development as a whole, and has been informed by early-stage Part L modelling results.

4.1 System Option 1: Notional Low Carbon Heat Network

District heating uses a singular central heat source to distribute hot water through a network of pipes to multiple units, connecting several buildings together and to a low carbon heat source.

Performance Area	Key Performance Indicator	Unit
Environmental performance	Fossil fuel use	No
	Carbon content of heat delivered (As per Net Zero Guidance)	100 gCO₂/kWh Carbon emission factor = 0.0689
	Local pollution	N/A
Impact on residents / building users	Estimated energy costs for heating and hot water	Total £ 12,452.82/ yr Heating = 72.34 (kWh/m ² /yr) DHW = 38.9 (kWh/m ² /yr) (8.53p/kWh source: Swaffham Prior Heat Network) Standing charge not included.
	Estimated maintenance costs	£9,644 /yr Annual O&M costs (excluding fuel) are estimated to be between 4-8% of the initial capital investment (capex). <i>(source: based on figures from: Assessment of the Costs, Performance, and Characteristics of UK Heat Networks)</i>
	Estimated replacement costs	£43,437 /yr

		(source: https://www.gov.uk/government 32 million boost to upgrade existing heat networks and reduce energy costs)
Impact on viability	Estimated capital cost of heating system	£1,085,927 Total (source: based on figures from: Assessment of the Costs, Performance, and Characteristics of UK Heat Networks) Connection to heat network only
Infrastructure development	Connection to low carbon heat network	Yes
	Scale of application	10,098 m ² GIA

Table 2 Notional low carbon heat network.

4.1.1 Scheme Considerations

Electrical Capacity

- The overall development electrical load is anticipated to be approximately 980 kVA, with the full load proposed to be provided via 1nr new DNO substations.
- The electrical load and point of connection to serve the development have been secured from the local DNO (ENWL).

Technical Design

- The system design strategy should the notional low carbon heat network be viable: heat emitters would be wet panel heaters, the vectors for delivering heat is radiant/convection and the primary flow temperatures below 45°C and return temperatures around 25°C to 15°C (based on data from A roadmap to achieve 5th generation heat networks in the UK).
- Any connection to a low carbon heat network would require a dedicated plant space on the ground floor.

Ease of Operation and Maintenance

- 5th generation heat networks utilise smart control systems to manage the network's temperature to optimise efficiency of the system, minimise heat losses, and facilitate the integration of diverse heat sources. These controls are crucial for maximising the efficiency, managing heat losses, and integrating various heat sources and sinks, including renewable energy and waste heat.
- Individual units would have their own heat interface units (HIUs) to further customise heating and hot water delivery.
- Operation and maintenance of the systems are crucial to their success and longevity. The systems themselves are managed through a wider agreement; however, the building-specific maintenance requires periodic maintenance, including checking for leaks, cleaning components, and inspecting electrical connections.

Carbon Emissions

- Heat networks primarily utilise water for heat distribution. This removes the use of refrigerants and minimises the GWP of the system.

Communal Systems (building scale or district)

- Typical heat network losses vary significantly, with many older networks operating at 35-45%. However, modern networks can achieve 65-70% efficiency between generation and transmission.
- There is an increased risk of overheating due to heat emission from communal heat distribution pipework.
- Unit-specific energy/heat metering would be required to enable billing to cover individual occupiers and provide for live energy management.

Embodied Carbon

- The TM65 extract (see figure 6) shows that the communal district heating system is below the 86kgCO₂e/m² average.

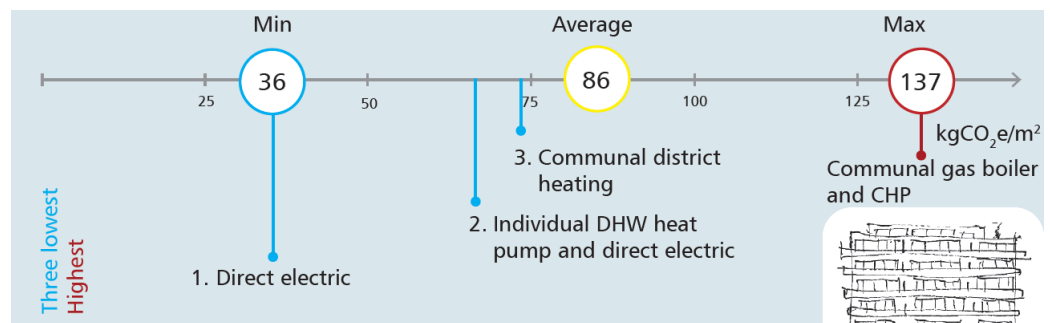


Figure 6 TM65.1: 2022.

4.2 System Option 2: VRF + Direct Electric + Local Electric Hot Water Heaters

Space heating and domestic hot water are provided separately. Space heating is provided through both VRF and electric panel heaters, and domestic hot water is generated via local electric hot water heaters.

Performance Area	Key Performance Indicator	Unit
Environmental performance	Fossil fuel use	No
	Carbon content of heat delivered (HM Treasury Green Book 15yr average)	31.25 gCO₂/kWh (space heating and hot water systems) 8.93 gCO₂/kWh (VRF space heating system)
	Local pollution	N/A
Impact on residents/building users	Estimated energy costs for heating and hot water	Total £37,562.83/ yr Heating = 72.34(kWh/m ² /yr) DHW = 38.09 (kWh/m ² /yr) 25.73 pence per kilowatt hour (kWh) (source: Ofgem) Standing charge not included.
	Estimated maintenance costs	£32,000/yr
	Estimated replacement costs	£150,000 = 20 years lifespan
	Additional operating costs compared with benchmark low carbon heating system	+69.83% (£37,562.83 VRF/electric heating - £12,452.82 Heat network)
Impact on viability	Estimated capital cost of heating system	£171,000 total £19,000 per unit Heat pump & ducting: £15,500 per unit Electric panel heating: £1,000 per unit Electric Water heating: 2,500 per unit (source: Dimplex)
	Additional cost compared with benchmark low carbon heating system	-84.25% (£171,000 ASHP/electric heating / £1,085,927 Heat network)
Infrastructure development	Connection to low carbon heat network	No
	Scale of application	10,098 m ² GIA

Table 3 VRF + Direct Electric + Local Electric Hot Water Heaters.

4.2.1 Scheme Considerations

Electrical Capacity

- The overall development electrical load is anticipated to be approximately 980 kVA, with the full load proposed to be provided via 1nr new DNO substations.
- The electrical load and point of connection to serve the development have been secured from the local DNO (ENWL).

Technical Design

- The system design strategy is based on space heating provided by VRF to the office areas and direct electric panel heaters to the WCs and secondary stairs. Domestic hot water will be generated by direct electric water heaters. The vectors for delivering heat are not applicable due to the all-electric nature of the system.
- The development has space constraints; however, the proposed design would utilise localised direct electric water heaters, which do not require additional central plant space. The VRF space heating will require an external ASHP.
- A PV array will be provided, which will generate electricity on-site and contribute to energy reduction.

Ease of Operation and Maintenance

- Operation and maintenance of a VRF + Direct Electric + Local Electric Hot Water Heater system would require operation and maintenance in-house, which would be the responsibility of the building owner/operator.
- Equipment is readily available; therefore, there should be no supply chain issues.

Carbon Emissions

- As well as the operational carbon outlined in the table, the likely embodied carbon impacts of the system as per CIBSE TM65 for VRF, direct electric heating and local electric hot water heater is 78 kgCO₂e/m² (60 years).

Communal Systems (building scale or district)

- Heat losses over the system are determined by a number of factors, including the nature of the system. ASHP systems can be of a hybrid type, which utilises both refrigerant and water as a transmission medium. This enables a reduction of GWP refrigerants but has an impact on pipe sizes and the need for greater insulation etc. These factors will have to be further reviewed in line with the specifics of the developed design.
- There is a reduced risk of overheating with this system as there is no communal heating distribution pipework.
- Each unit will be individually metered to enable energy use to be recorded and billed.

Embodied Carbon

- The extract below shows that both the individual DHW heat pump + direct electric heating system and the communal district heating system are below the 86kgCO₂e/m² average. The individual DHW heat pump, in conjunction with direct electric heating, is significantly lower than the communal district heating system.

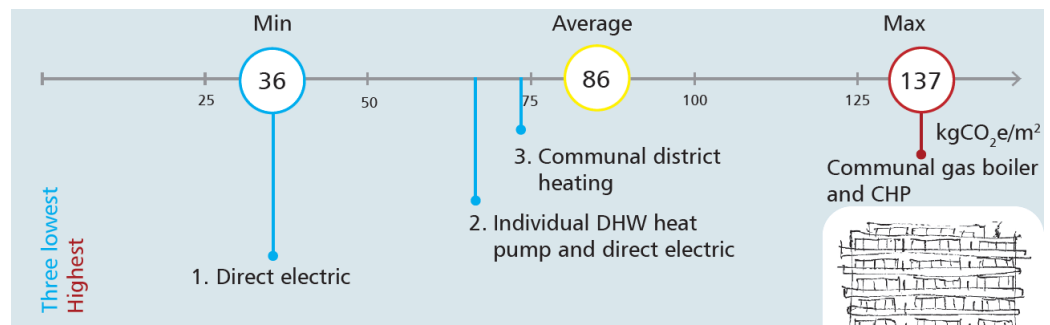


Figure 7 TM65.1: 2022.

4.2.2 Methodology for Carbon Content of Heat Delivered Calculation

As both the heating and hot water systems are fully electric, the estimated carbon content of the proposed system can be calculated based on the average fuel carbon factor for UK electricity provided in the HM Treasury Green Book, in accordance with GMCA guidance.

The average carbon conversion factor for electricity has been calculated using the consumption-based domestic emissions factors over the first 15 years from the development's predicted completion date. This value therefore represents the carbon intensity over the heating system's lifetime and reflects the gradual decarbonisation of the UK electricity grid, also accounting for transmission and distribution losses, as shown in the table below.

Year	Electricity Emissions Factors kgCO ₂ e/kWh
2027	0.073
2028	0.063
2029	0.054
2030	0.049
2031	0.042
2032	0.033
2033	0.026
2034	0.021
2035	0.020
2036	0.020
2037	0.018
2038	0.018
2039	0.017
2040	0.016
2041	0.015
2042	0.015
Average	0.03125 kgCO ₂ e

Table 4 Carbon emissions factors for electricity.

As the electric panel heaters have a COP of 1.0, every kWh of energy consumed to produce heat is equivalent to 31.25 grams of CO₂.

As the VRF systems are highly efficient and have a COP of 3.5, every kWh of energy consumed produces 3.5 kWh of heat, which is equivalent to 8.93 grams of CO₂ per 1kWh of heating. The estimated carbon content of heating is therefore 8.93gCO₂/kWh.

4.3 System Option 3: Biomass Boiler

Space heating and domestic hot water are provided via a singular central heat source that distributes hot water through a network of pipes to enable heat interface units to transfer the heat to a standalone system within each unit.

Performance Area	Key Performance Indicator	Unit
Environmental performance	Fossil fuel use	Yes
	Carbon content of heat delivered (Greenhouse gas reporting: conversion factors 2024)	113.2 gCO₂/kWh Carbon emission factor = 0.01132
	Local pollution	Combustion likely to generate localised VOCs and other GHGs.
Impact on residents / building users	Estimated energy costs for heating and hot water	Total £7,299.42/ yr Heating = 72.34(kWh/m ² /yr) DHW = 38.09 (kWh/m ² /yr) Pellets: £250/tonne (with 5,000 kWh/tonne) = 5 pence per kWh (source: Green central) Standing charge not included.
	Estimated maintenance costs	£18,000/yr
	Estimated replacement costs	£25,600/yr over a 20 years lifespan
	Additional operating costs compared with benchmark low carbon heating system	-41% (£7,299.42 Biomass Boiler / £12,452.82 Heat network)
Impact on viability	Estimated capital cost of heating system	£512,973 Total £56,997 per building £50,000 per building - Biomass boiler £2,465 per unit - (£169/m) - Network capital costs per length (internal pipe) £1,075 per unit - HIUs cost £2,878 /building - Heat meter cost per building (ND and bulk) £579 (£/unit) - Heat meter cost per unit (source: based on figures from:

		Assessment of the Costs, Performance, and Characteristics of UK Heat Networks)
	Additional cost compared with benchmark low carbon heating system	+ 94.75% (£56,997 Biomass Boiler / £1,085,927 Heat network)
Infrastructure development	Connection to low carbon heat network	No
	Scale of application	10,098 m ² GIA

Table 5 Biomass Boiler.

4.3.1 Scheme Considerations

Electrical Capacity

- The overall development electrical load is anticipated to be approximately 980 kVA, with the full load proposed to be provided via 1nr new DNO substations.
- The electrical load and point of connection to serve the development have been secured from the local DNO (ENWL).

Technical Design

- The system design strategy for biomass boiler: heat emitters are wet panel heaters, the vectors for delivering heat are radiant/convection, and the typical flow temperatures range from 70°C to 95°C, with return temperatures ideally around 65°C to prevent boiler corrosion.
- The development would need additional available space for the storage of biomass, which may impact viability and the need for a delivery and drop-off area.
- The system cannot be integrated with an alternative system, such as PV and battery storage.

Ease of Operation and Maintenance

- Operation and maintenance of a biomass system would require operation and maintenance in-house, with all responsibility with the building owner/operator.
- Equipment is readily available; therefore, there should be no supply chain issues.

Carbon Emissions

- As well as the operational carbon outlined in the table, there are other emissions associated with burning biomass, such as particulate matter and nitrogen dioxide, which contribute significantly to air pollution and are detrimental to human health. The negative impacts of these pollutants are greatest in areas where atmospheric pollutant concentrations are already high due to emissions from other sources, for example, in large cities or in areas close to major roads.
- GWP of the refrigerant type – N/A.

Communal Systems (Building scale or district)

- Heat losses over the system are determined by a number of factors, including direct heating, heating interfaces, hot water only etc. These factors would have to be further reviewed in line with the specifics of the developed design.
- There is an increased risk of overheating due to heat emission from communal heat distribution pipework.
- Unit-specific energy/heat metering will be required to enable billing to cover individual occupiers and provide for live energy management.

5.0 Conclusion

The current development is classed as a large major development with more than 5,000 m² GIA. As such, this appraisal has considered the predicted performance of the proposed system (option 2) against a range of key performance indicators.

The location of the Manchester Business Park, Aviator Way development is classified as case 4: any other location.

There are currently no existing low carbon heat networks in the area to enable immediate connection. Without this essential network, the conclusion of this report is based on the potential to connect to a heat network in the future and provides a comparison between a notional low carbon heat network and alternative schemes.

A summary of the three system options considered is provided in the table below. All figures and estimates are based on early-stage design information and indicative cost information available from various online sources.

Systems Considered	Carbon Emissions gCO ₂ /kWh (heat delivered)	Cost of Heat / Hot Water £/unit/year	Capital Cost £	Overall Suitability
Notional Low Carbon Heat Network	100	12,452.82	1,085,927	• Future proofed technology • Reliable heating compared to individual systems • Purchase energy in bulk, potentially securing better prices • Constrained by the lack of existing networks in the area to enable an immediate connection
VRF + Direct Electric + Local Electric Hot Water Heaters	31.25 (space heating and hot water systems) 8.93 (VRF space heating system)	37,562.83	171,000	• No external units required • Low distribution losses • Low impact on overheating • Zero carbon ready
Biomass Boiler	113.2	7,299.42	512,973	• Purchase fuel in bulk, potentially securing better prices • Negative impact on local air quality • High capital cost

Table 6 Low carbon heat appraisal summary.

In conclusion, given the lack of low carbon heat networks and the high-carbon nature of the existing heat networks within the Greater Manchester area, it is not feasible to connect to, or install, a low carbon heat network at this time. This, combined with the higher costs and higher carbon emissions associated with the heat delivered, limits the suitability of a low carbon heat network heating system when compared to the proposed VRF + Direct Electric + Local Electric Hot Water Heaters system.

Biomass boilers are not considered to be a feasible option given the high carbon content of heat delivered. Additionally, the capital costs are significantly higher than the proposed system option, and there would be a need for larger storage and manoeuvring space for deliveries, which would adversely affect the development. The negative impact of a biomass boiler of this size on the local air quality in comparison to the other technologies is considerable and is also a detracting factor that would limit the carbon emissions reductions possible.

Consequently, the use of an VRF + Direct Electric + Local Electric Hot Water Heaters system also has the benefit of not generating any air pollutants in the immediate vicinity of the development, and therefore supports the Greater Manchester Combined Authority's Five-Year Environment Plan, which aims to improve air quality.

The proposed VRF + Direct Electric + Local Electric Hot Water Heaters system provides an all electric low carbon non-fossil fuel approach, which will become decarbonised over time due to the greening of the national grid.

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**L.C.D.
CONSULTING**

Manchester Business Park

RIBA Stage 2 Embodied Carbon Assessment Report



Specialists in Life Cycle Design of the Built Environment
Net Zero | LCA | LCC | Embodied Carbon | Circular Economy



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REVISION	DESCRIPTION	DATE	BY
P01	Stage 2 - Embodied Carbon Assessment Report	24/11/25	EL
Author	Erin Lynas		
Date	24/11/2025		
Approved	Jethro Coups		
Date	24/11/2025		

Our LCA work is aligned with:



1.0 Summary

1.1 EXECUTIVE SUMMARY

The following report is an assessment of the Embodied Carbon impacts of Manchester Business Park.

Results Overview

The total embodied carbon impacts of Manchester Business Park is

873 kgCO₂e/m²

These results are inclusive of an early design phase contingency factor of 15%.

BREAKDOWN BY MODULE

UPFRONT TOTAL	635	kgCO ₂ e/m ²
IN-USE TOTAL	206	kgCO ₂ e/m ²
OPERATIONAL	TBC	
EOL TOTAL	32	kgCO ₂ e/m ²
UPFRONT TOTAL (excl. biogenic)	637	kgCO ₂ e/m ²
EOL TOTAL (excl. biogenic)	30	kgCO ₂ e/m ²

TOTAL EMBODIED CARBON

8,407,695	kgCO ₂ e	
873	kgCO ₂ e/m ² GIA	With Biogenic
873	kgCO ₂ e/m ² GIA	Without Biogenic

Potential Options Overview

The total carbon savings from lower carbon options = 16%.

This is the equivalent of:



Planting 240 new trees.

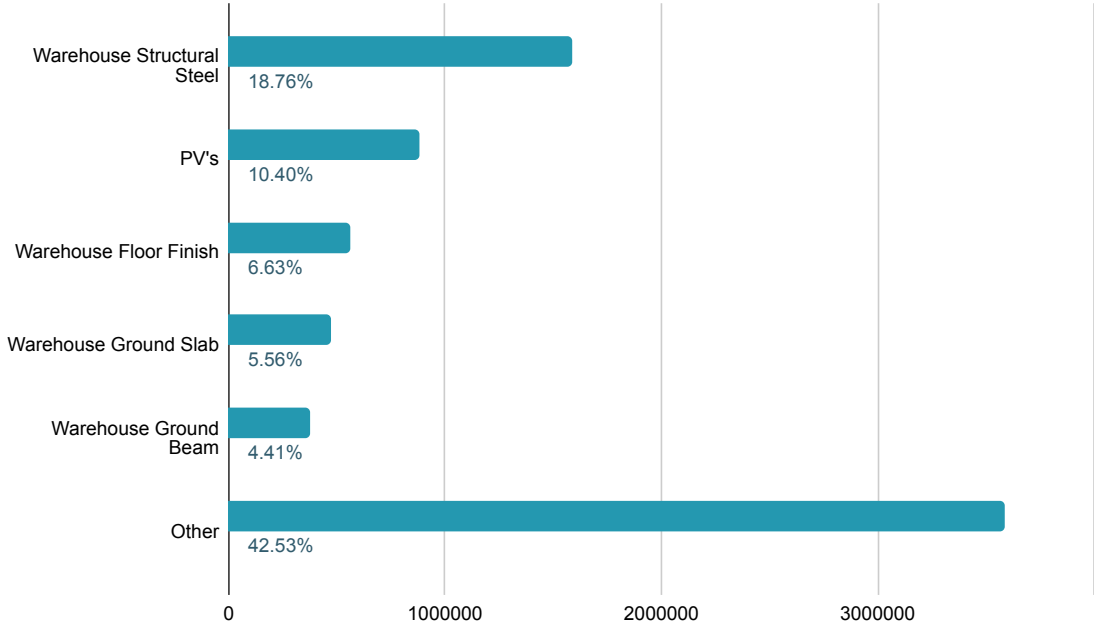


Removing 857 from the road in the UK for a year.

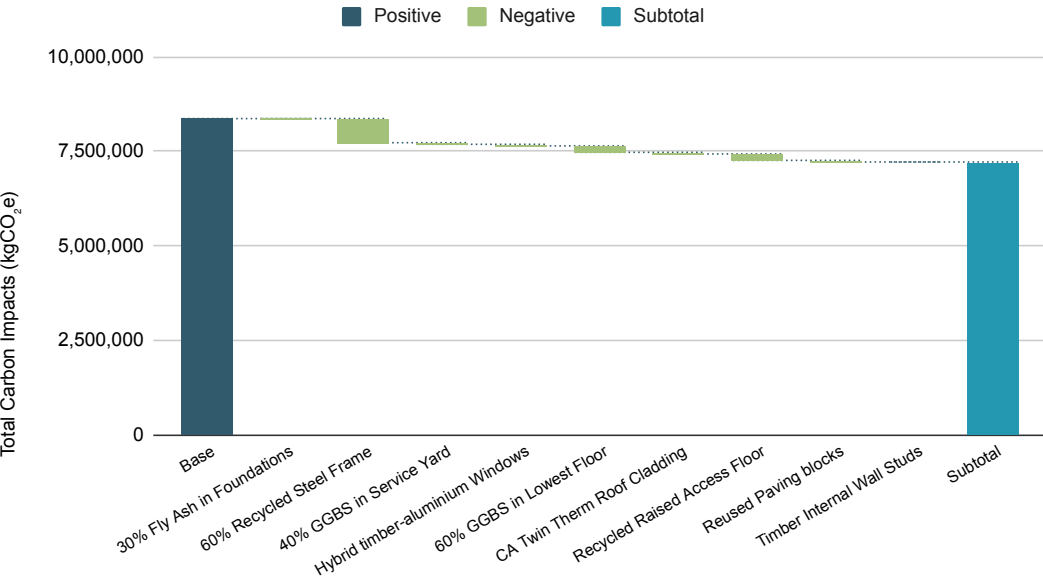
The largest reduction is from using 60% Recycled Steel Frame, lowering impacts by 7.84%.

In this report, results show the baseline results and the potential low-carbon options separately, highlighting the most impactful areas of each design, results by LCA module and the results by RICS category.

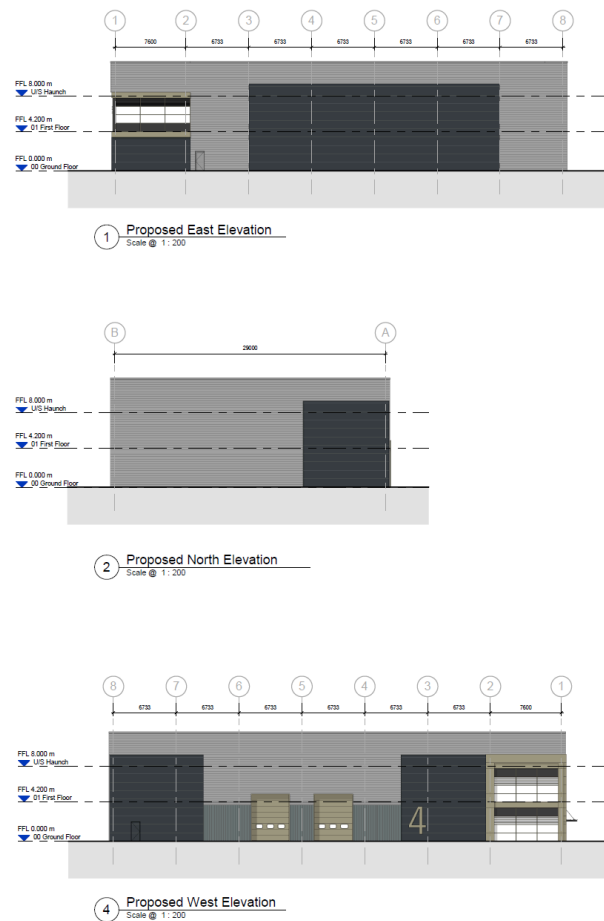
1.2 TOP CONTRIBUTING MATERIALS - % OF TOTAL IMPACT



1.3 CARBON SAVINGS - THROUGH POTENTIAL OPTIONS



2.0 Introduction



2.1 DISCLAIMER

The assessment was undertaken using OneClick by LCD Consulting.

The LCA predictions of embodied and operational impacts conducted in LCA software, by their very nature, cannot be exact. It is not feasible to track all the impacts associated with a product or service back through history to 100% accuracy. The software has been built and tested to enable informed decisions when comparing design options. Generic and product specific environmental impact coefficients and EPDs do not necessarily correspond to those of final individual brands due to differences within industries in the way these products and services are delivered.

A stage 2/3/4 assessment may differ significantly to an as-built assessment as more accurate design information is forthcoming

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2.2

PROJECT INFORMATION

Manchester Business Park

DEVELOPER:	Ask Real Estate Ltd		
PROJECT:	Manchester Business Park		
PROJECT DESCRIPTION:	Development of 9 warehouses, separated into 4 units, with upper floor offices and adjacent external works.		
PROPERTY TYPE:	New Build	Industrial	
ASSESSMENT INFO:	RIBA Stage 2	WLCA	
DATE OF ASSESSMENT:	24/11/2025		
PROJECT DESIGN LIFE:	60	Years	
SIZE GIA :	9,635 m²		
ASSESSMENT OBJECTIVE:	To assess the whole life carbon performance of the new build development from cradle to grave, understand hotspots and consider how the performance may be improved. Assessment to follow ISO 14044 standard and EN15978, RICS Whole Life Carbon V2		
DATA SOURCES:	Environmental data derived from One Click Generic Datasets, ICE and EN15804 EPDs. Quantity data derived from the GA Plans, Elevations and Site plan (Architectural Drawing package received on 10/11/2025).		
VERIFIED BY:	LCD Consulting		

Materials	Quantity	UM	Assumptions/Information
1.1 - Substructure			
Pad Foundations	945	m3	Assumed 5m3 each - 10% GGBS Assumed
Reinforcement	19,373	kg	LCD Assumption - 20.5kg/m3
Precast Ground Beam	432	m3	Assumed 160lm at 500x300mm
Ground Slab	1,726	m3	Assumed 200mm thick - 10% GGBS Assumed
Reinforcement	153,951	kg	LCD Assumption - 2 layers of 6.16kg/m2 mesh
Office Foundations	550	m3	Assumed 5m3 each - 10% GGBS Assumed
Reinforcement	11,275	kg	LCD Assumption - 20.5kg/m3
Office Ground Beam	64	m3	Assumed 160lm at 500x300mm
Office Ground Slab	66	m3	Assumed 200mm thick - 10% GGBS Assumed
Reinforcement	4,731	kg	LCD Assumption - 2 layers of 6.16kg/m2 mesh
Lift Pit	9	nr	From GA Floor Plans
Type 1 MOT Aggregate	469	m3	Assumed 100mm thick below ground slab
2.1 - Frame			
Warehouse Steel	48,175	kg	Assumed 50kg per m2 floor area
Intumescent Paint	2,500	kg	
Office Steel	69,250	kg	Assumed 50kg per m2 floor area
Intumescent Paint	300	kg	
2.2 - Upper Floor			
Upper Floor Area	940	m2	From GA Floor Plans
Concrete	94	m3	Assumed 100mm thick - 10% GGBS Assumed
Reinforcement	11,581	kg	LCD Assumption - 2 layers of 6.16kg/m2 mesh
Metal Deck	940	m2	
2.3 - Roof			
Composite Roof Cladding	9,320	m2	Assumed Kingspan QuadCore Variation
Polycarb Roof Lights	1,455	m2	From GA Roof Plans
Gutters	1,090	lm	From GA Roof Plans
Eaves	85	m2	From GA Elevations
PVs	1,525	m2	From GA Roof Plans
2.4 - Stairs and Ramps			
Steel Stairs	12	nr	From GA Floor Plans
Lifts	9	nr	From GA Floor Plans
Lift Shaft	9	nr	From GA Floor Plans
2.5 - External walls			
Ribbed Cladding	4,175	m2	Assumed Kingspan QuadCore Variation
Flat Cladding	7,800	m2	Assumed Kingspan QuadCore Variation
Louvres	385	m2	From GA Elevations
2.6 - External windows and doors			
Double Glazed Windows	625	m2	From GA Elevations
Curtain Walling	445	m2	From GA Elevations
Lobby Doors	26	m2	Based off 9 sets of glazed double doors
Level Access Doors	240	m2	Based off 12 doors - Measured on elevations
Fire Doors	16	nr	From GA Elevations

Materials	Quantity	UM	Assumptions/Information
2.7 - Internal walls			
Fireboard	1,800	m2	Assumed between warehouse and offices
Block Wall - Stairs	905	m2	Assumed Around stairwells
Stud Walls	460	m2	Assumed all other internal walls
2.8 - Internal doors			
Internal Doors	122	m2	Based off 68 doors - Measured on elevations
3 - Finishes			
Entrance Matwells	250	m2	LCD Assumption
Raised Access Floor	940	m2	LCD Assumption
Carpet Tiles	940	m2	LCD Assumption
Epoxy Flooring	7,000	m2	LCD Assumption
Emulsion Paint - Walls	2,720	m2	LCD Assumption
Suspended Ceiling	940	m2	LCD Assumption
Emulsion Paint Ceiling	260	m2	LCD Assumption
4 - FF&E			
Toilets	36	nr	From GA Floor Plans
Sinks	45	nr	From GA Floor Plans
Showers	9	nr	From GA Floor Plans
Kitchen	9	nr	From GA Floor Plans
5 - Services			
Electric to level access door	450	m2	LCD Assumption
Fire System	35	nr	LCD Assumption
Sewage Network	35	nr	LCD Assumption
Drinking Water Supply	4	nr	LCD Assumption
Water Heater	2	nr	LCD Assumption
Electric Heater	2	nr	LCD Assumption
MVHR	2	nr	LCD Assumption
Toilet Extractors	2	nr	LCD Assumption
Ventilation Ducting	1	nr	LCD Assumption
VRF System	2,075	lm	LCD Assumption
Lighting and Power	1	nr	LCD Assumption
8 - External works			
Concrete Service Yard	5,730	m2	From Proposed External Works Plan
150mm Concrete	860	m3	LCD Assumption
150mm Type 1 MOT	860	m3	LCD Assumption
Tarmac Footpath	3,370	m2	From Proposed External Works Plan
30mm wear course	135	m3	LCD Assumption
60mm base course	202	m3	LCD Assumption
150mm Type 1 MOT	506	m3	LCD Assumption
Tarmac HGV Road	3,425	m2	From Proposed External Works Plan
40mm wear course	103	m3	LCD Assumption
80mm base course	171	m3	LCD Assumption
150mm Type 1 MOT	514	m3	LCD Assumption

Materials	Quantity	UM	Assumptions/Information
8 - External works			
Permeable Paving	1640	m2	From Proposed External Works Plan
50mm Paving Slabs	82	m3	LCD Assumption
50mm Sand Bed	82	m3	LCD Assumption
150mm Type 1 MOT	246	m3	LCD Assumption
Soft Landscaping	7951	m2	From Proposed External Works Plan
Cycle Shelter	7	nr	From Proposed External Works Plan
Timber Refuse Store	9	nr	From Proposed External Works Plan
2.4m high paladin fence	650	lm	From Proposed Boundary Treatment Plan
4.5/3m high acoustic fenc	70	lm	From Proposed Boundary Treatment Plan
Kerbs	670	lm	From Proposed Boundary Treatment Plan
Other			
Average construction (A5)	9,635	m2	LCD Assumption - RICS v2/OneClick default
Average Maintenance (B2)	9,635	m2	LCD Assumption - RICS v2/OneClick default
VRF refrigerant	10	kg	LCD Assumption - R32

4.0 WHY LCAS ARE IMPORTANT

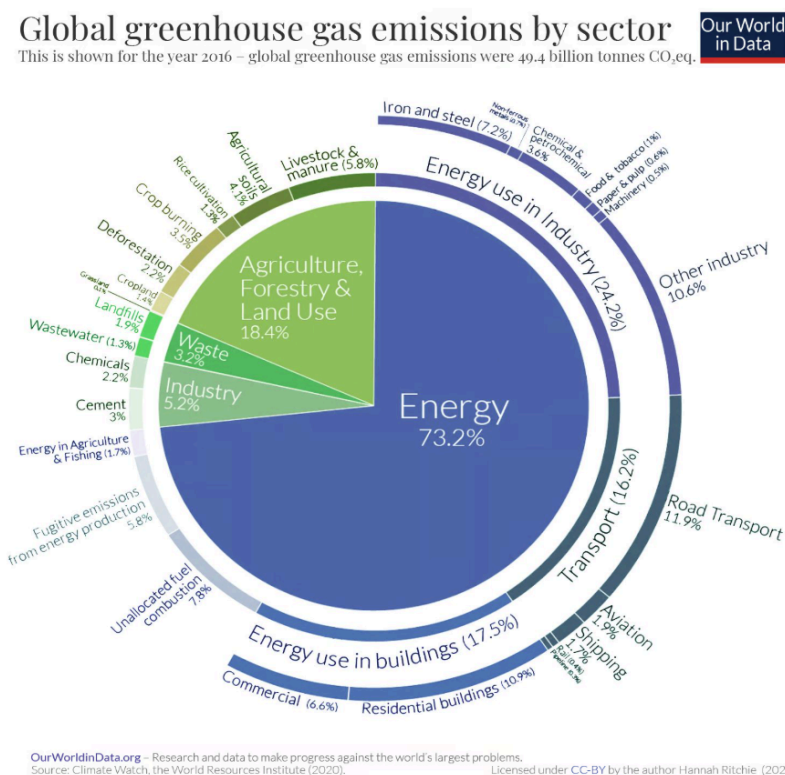
4.1 THE GHG PROBLEM

Understanding where carbon emissions come from in construction is the first step in reducing them. Life Cycle Assessment (LCA) helps identify these impacts so we can make better design choices that save carbon, and in many cases, cost too.

Greenhouse gas (GHG) emissions are a major driver of climate change, and the construction sector is responsible for a significant share of them.

Energy use in buildings makes up about 17.5% of global emissions, while the production of key building materials also adds substantially — iron and steel contribute around 7.2%, and cement about 3%.

Taken together, this means the construction industry as a whole is responsible for a very large proportion of global impacts.



Having seen the scale of the construction sector's contribution to global emissions, it's important to understand the two main sources of carbon in buildings — operational and embodied.

4.2 WHY LCAS ARE IMPORTANT

LCAs allow us to:

- Compare design options and quantify their carbon impacts
- Identify opportunities for efficiency and cost savings
- Choose lower-carbon materials and technologies
- Demonstrate sustainability performance to regulators and stakeholders

4.3 OPERATIONAL VS EMBODIED CARBON

When we look at the carbon impacts of buildings, there are two main types to consider.

> Operational carbon

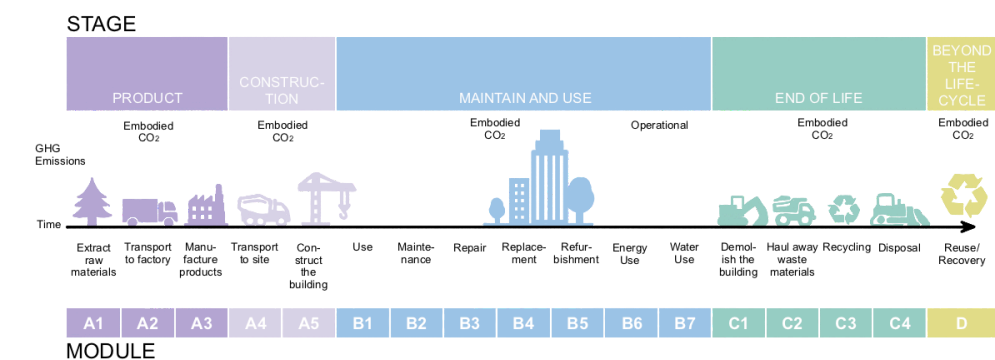
This refers to the emissions caused by the day-to-day running of a building, things like heating, cooling, and lighting.

> Embodied carbon

This covers the total emissions linked to the building's materials, construction, maintenance, and eventual end-of-life disposal.

In recent years, operational carbon has decreased thanks to the decarbonisation of the national grid, driven by renewable energy sources such as solar and wind. However, embodied carbon has remained high, and is now a much larger share of a building's overall impact.

For this reason, the main focus of today's LCA is on embodied carbon impacts associated with our current design, as this is where the biggest opportunities lie to reduce emissions going forward.



4.4 APPROACH

The LCA has been carried out using a structured and transparent methodology to ensure robustness and compliance:

> Data Collection

Material quantities and specifications have been taken from information provided. Where gaps exist, assumptions have been made (refer to Quantities and Assumptions for full details)

> Calculation Method

The assessment was undertaken using eTool, referencing a combination of verified Environmental Product Declarations (EPDs) and established databases compliant with EN 15804.

> Scenario Assumptions

Key factors such as transport distances, service life of materials, and end-of-life treatment have been assumed based off RICS guidance.

> Results presentation

Results are reported in kgCO₂e/m² Gross Internal Area (GIA), in line with EN 15978 functional unit definitions.

> Optioneering and Interpretation

Results have been used to test different design scenarios and material specifications, enabling a process of identifying lower-carbon solutions.

5.0 BACKGROUND

5.1 LIFE CYCLE ASSESSMENT

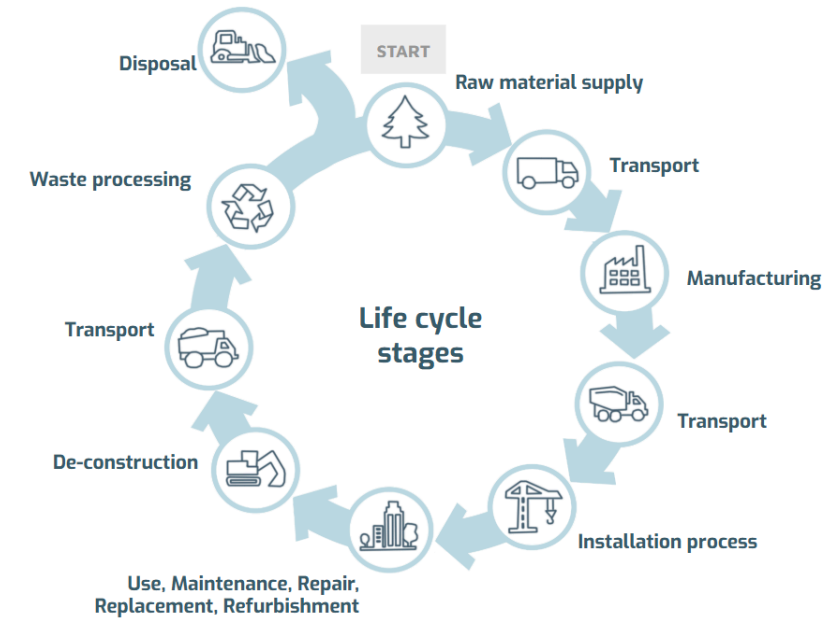
A LCA is a method of evaluating the environmental impacts of a building throughout its whole life - from material extraction through to eventual demolition.

This LCA has been developed in line with:

- RICS Professional Statement: Whole Life Carbon Assessment for the Built Environment
- EN 15978: Sustainability of construction works - Assessment of environmental performance of buildings

This table shows the different stages of a building's life that are considered in the assessment – from materials and construction through to use, maintenance, and eventual disposal:

WHOLE LIFE CARBON - SYSTEM BOUNDARY					
EMBODIED CARBON/LIFE CYCLE EMBODIED CARBON					
UPFRONT CARBON	A0	PRE-CONSTRUCTION	Non Physical process before construction, preliminary studies, tests and design		UPFRONT BIOGENIC CARBON
	A1	PRODUCT	Raw material supply		
	A2		Transport		
	A3		Manufacturing		
	A4	CONSTRUCTION	Transport		
	A5		Construction and installation		
OPERATIONAL CARBON			USER CARBON		
B6	Operational energy		B8	User activities not covered in B1-B7	
B7	Operational Water				



5.2 BUILDING COVERAGE ELEMENTS

#	BUILDING PARTS/ELEMENT GROUPS	BUILDING ELEMENTS	Scope
0	FACILITATING WORKS	0.1 Temporary/Enabling works/Preliminaries	NA
		0.2 Specialist groundworks	NA
1	SUBSTRUCTURE	1.1 Substructure	✓
2	SUPERSTRUCTURE	2.1 Frame	✓
		2.2 Upper floors inc. balconies	✓
		2.3 Roof	✓
		2.4 Stairs and ramps	✓
	SUPERSTRUCTURE	2.5 External walls	✓
		2.6 Windows and external doors	✓
	SUPERSTRUCTURE	2.7 Internal walls and partitions	✓
		2.8 Internal doors	✓
3	FINISHES	3.1 Wall finishes	✓
		3.2 Floor finishes	✓
		3.3 Ceiling finishes	✓
4	FITTINGS FURNISHES EQUIPMENT	Building/Non-building related	✓
5	BUILDING SERVICES / MEP	5.1-5.14 Building-related services	✓
		Non-building related	✓
6	PREFABRICATED BUILDINGS	6.1 Prefabricated Buildings and Building Units	NA
7	WORK TO EXISTING BUILDING	7.1 Minor Demolition and Alteration Works	NA
8	EXTERNAL WORKS	8.1 Site preparation works	NA
		8.2 Roads, Paths, Pavings and Surfacing	✓
		8.3 Soft landscaping, Planting and Irrigation Systems	NA
		8.4 Fencing, Railings and Walls	NA
		8.5 External fixtures	NA
		8.6 External drainage	✓
		8.7 External surfaces	NA
		8.8 Minor Building Works and Ancillary Buildings	NA

6.0 RESULTS

6.1 RESULTS - TOTAL kgCO₂e BY MODULE

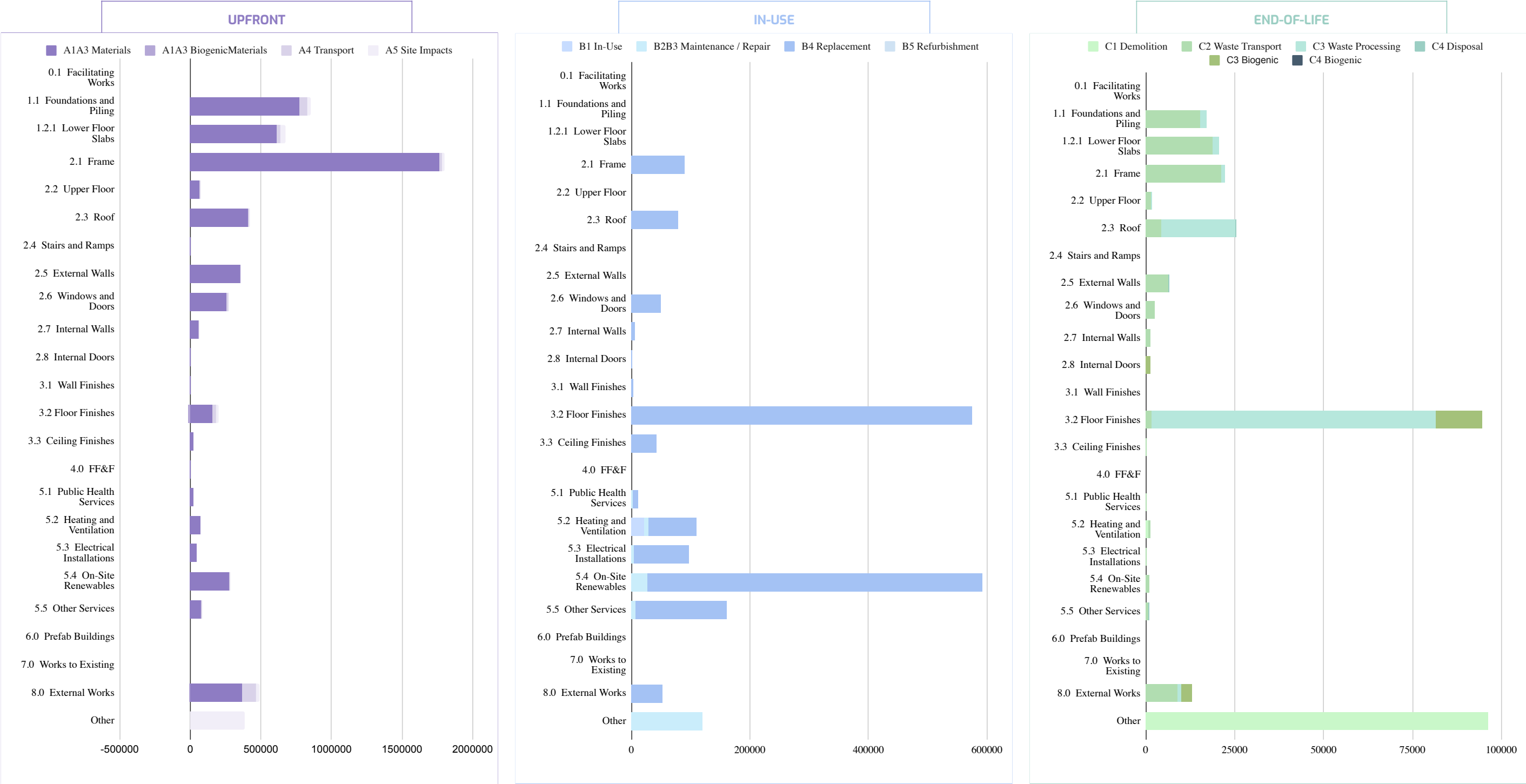
LC Module	UPFRONT				IN-USE				Operational		END-OF-LIFE						Totals	Module D
	A1A3 Materials	A1A3 Biogenic Materials	A4 Transport	A5 Site Impacts	B1 In-Use	B2B3 Maintenance / Repair	B4 Replacement	B5 Refurbishmen t	B6 Energy	B7 Water	C1 Demolition	C2 Waste Transport	C3 Waste Processing	C3 Biogenic	C4 Disposal	C4 Biogenic		
0.1 Facilitating Works	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.1 Foundations and Piling	775490	-583	53811	26058	0	0	0	0	0	0	0	15313	1742	0	9	0	871,839	-113,951
1.2.1 Lower Floor Slabs	614675	0	25158	33017	0	0	0	0	0	0	0	18662	1838	0	0	0	693,350	-77,856
2.1 Frame	1765147	0	15914	18874	0	0	89103	0	0	0	0	21108	1202	0	7	0	1,911,355	-1,227,776
2.2 Upper Floor	67201	0	1727	2254	0	0	0	0	0	0	0	1522	127	0	0	0	72,831	-28,581
2.3 Roof	410087	-213	3475	11076	0	0	79118	0	0	0	0	4284	20828	0	231	0	528,886	-77,442
2.4 Stairs and Ramps	3294	0	34	34	0	0	0	0	0	0	0	46	3	0	0	0	3,411	-2,674
2.5 External Walls	352238	-1558	4670	5194	0	0	0	0	0	0	0	6224	76	0	328	0	367,172	-67,395
2.6 Windows and Doors	256380	-194	14587	974	0	0	50245	0	0	0	0	2450	39	0	18	0	324,499	-27,592
2.7 Internal Walls	56788	0	4880	2571	0	0	5425	0	0	0	0	1159	80	0	3	0	70,907	-4,385
2.8 Internal Doors	793	-1540	341	265	0	0	1148	0	0	0	0	4	10	1275	0	0	2,297	0
3.1 Wall Finishes	446	0	6	27	0	0	2401	0	0	0	0	1	0	0	1	0	2,881	0
3.2 Floor Finishes	157154	-13581	26263	16624	0	0	573807	0	0	0	0	1566	79998	12856	0	0	854,688	-402,554
3.3 Ceiling Finishes	20708	0	163	213	0	0	42762	0	0	0	0	216	12	0	0	0	64,074	-35,373
4.0 FF&F	4347	0	647	0	0	0	0	0	0	0	0	7	0	0	6	0	5,007	0
5.1 Public Health Services	20574	0	2349	800	0	2057	10167	0	0	0	0	171	14	0	12	0	36,145	-8,651
5.2 Heating and Ventilation	69614	-82	3605	513	22400	6961	80204	0	0	0	700	491	33	64	1	0	184,504	-42,915
5.3 Electrical Installations	43801	0	2364	312	0	4380	91795	0	0	0	0	137	11	0	14	0	142,813	-18,141
5.4 On-Site Renewables	275087	0	6212	0	0	27509	564456	0	0	0	0	847	76	0	6	0	874,193	-131,719
5.5 Other Services	75958	0	6540	233	0	7596	153215	0	0	0	0	752	67	0	15	0	244,375	-87,803
6.0 Prefab Buildings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.0 Works to Existing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8.0 External Works	368086	-6728	93986	29783	0	0	52305	0	0	0	0	9020	1054	2775	0	0	550,282	-81,047
Other	0	0	0	385400	0	120438	0	0	0	0	96350	0	0	0	0	0	602,188	0

Total by Module	5,337,867	-24,480	266,731	534,221	22400	168941	1796151	0	0	0	97050	83978	107211	16970	652	0	8407695	kgCO ₂ e
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Total by GIFA with Biogenic	UPFRONT	IN-USE	Operational	END-OF-LIFE	TOTAL	kgCO ₂ e/m ²
	635 kgCO ₂ e/m ²	206 kgCO ₂ e/m ²	TBC kgCO ₂ e/m ²	32 kgCO ₂ e/m ²	873	

Total by GIFA without Biogenic	UPFRONT	IN-USE	Operational	END-OF-LIFE	TOTAL	kgCO ₂ e/m ²
	637 kgCO ₂ e/m ²	206 kgCO ₂ e/m ²	TBC kgCO ₂ e/m ²	30 kgCO ₂ e/m ²	873	

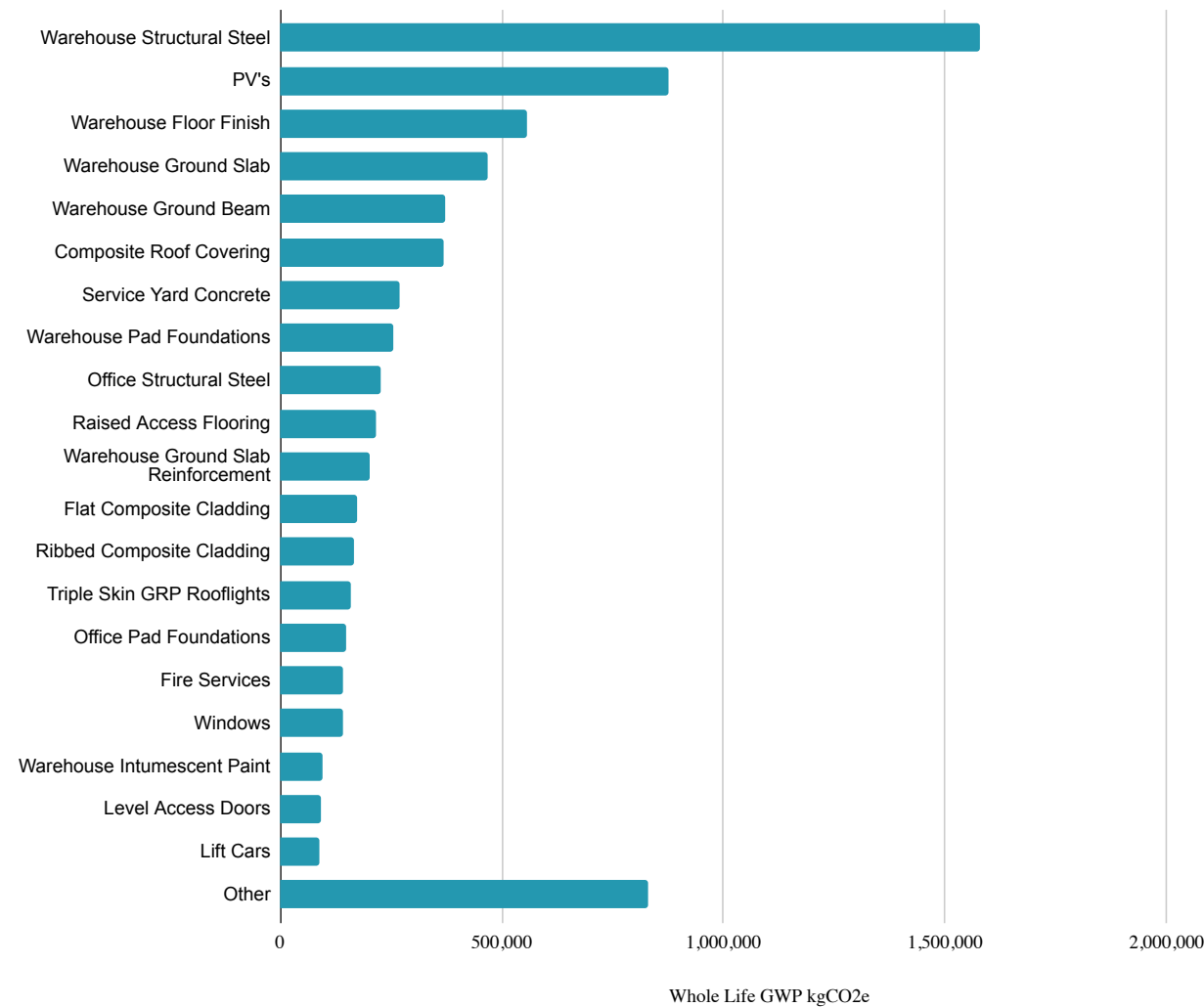
6.2 RESULTS - TOTAL kgCO2e BY MODULE GRAPHS



7.0

TOP MATERIAL IMPACTS

7.1

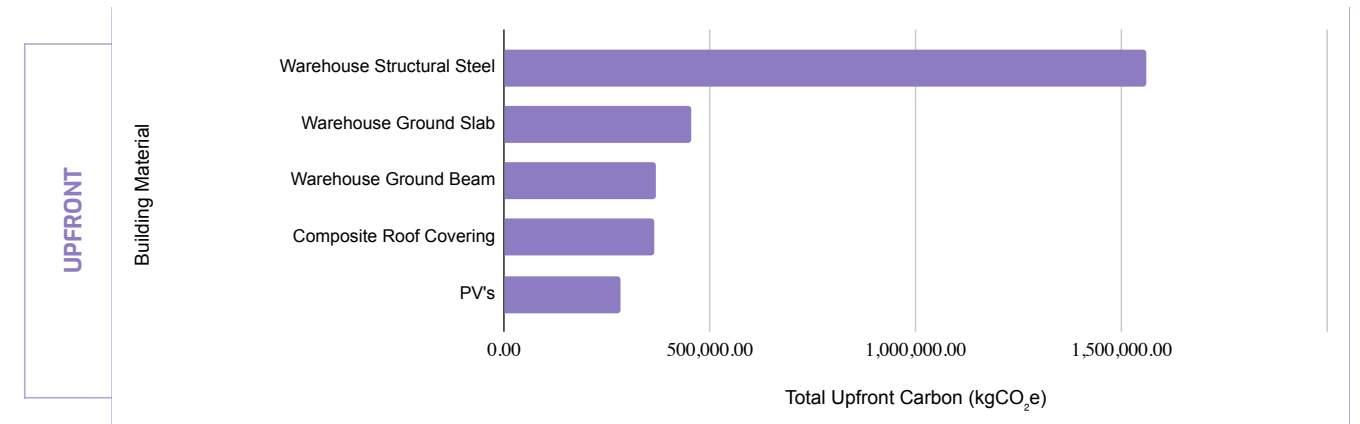
TOP 20 MATERIAL IMPACTS - TOTAL kgCO₂e BY MATERIAL

This graph shows the Global Warming Potential (GWP) in kilograms of CO₂ emissions for each of the highest impact identified materials used in the proposed design. As is typical, we can see the largest contributors of emissions are from the steel and concrete elements (e.g. frame, external works, foundations, etc.).

Structural steel is a typical top GWP item, with high impacts arising from UK BOF steel production. PV's also have high impacts, further increased by their expected replacement during the buildings' service life. However, this is offset by operational carbon efficiencies. High volume areas of concrete also present some of the highest impacts.

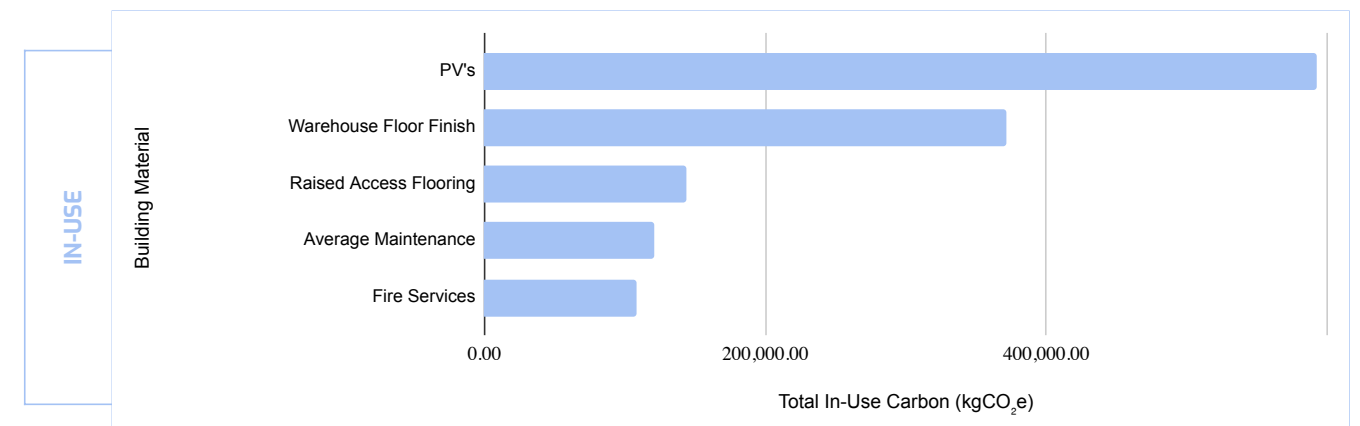
7.2

TOP MATERIALS - UPFRONT CARBON



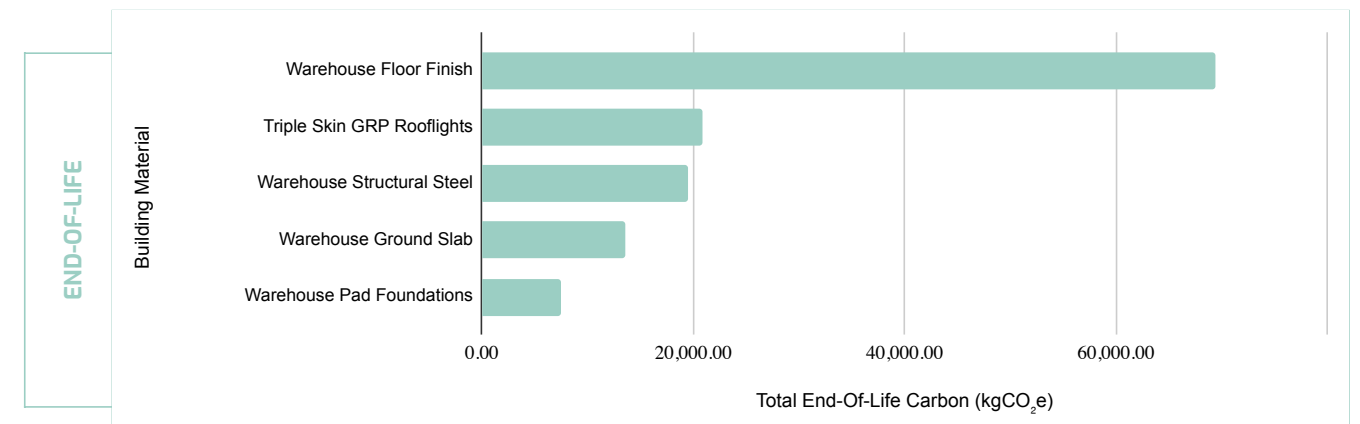
7.3

TOP MATERIALS - IN-USE CARBON



7.4

TOP MATERIALS - END-OF-LIFE CARBON



8.0 LOW-CARBON OPTIONS

8.1 BASELINE MATERIALS

The substructure consists of reinforced concrete foundations and ground beam. The building frame is structural steel. External walls are insulated metal cladding, assumed to be Kingspan QuadCore. Internal walls use blockwork or steel studs with acoustic insulation and plasterboard. Finishes include epoxy, raised access floors, carpet, and emulsion paint, with suspended ceiling tiles throughout. Services include PV, VRF, generic ductwork, and electrical and lighting fittings.

8.2 OPTIONS

OPTION		Life Cycle CO ₂ e reduced	Carbon savings (kgCO ₂ e)
1	30% Fly Ash in Foundations	1.01%	78101
LCA Notes:		Fly ash is a byproduct produced when coal power plants generate electricity by burning pulverized coal. Using fly ash cement instead of Portland cement is a cost-effective option that reduces CO ₂ emissions by utilizing a byproduct, decreasing the amount of cement used.	
2	60% Recycled Steel Frame	7.84%	606130
LCA Notes:		Using recycled steel frames for construction significantly reduces impacts compared to newly produced steel. Recycled steel, particularly when produced using electric arc furnaces (EAF), can reduce CO ₂ emissions by up to 86% compared to the traditional blast furnace method (using generic datasets).	
3	40% GGBS in Service Yard	0.63%	48653
LCA Notes:		A common practice in the reduction cement impacts is the fractional substitution of normal cement with other by-materials such as ground granulated blast furnace slag (GGBS). GGBS is a by-product from the blast-furnaces used to make iron, making it a low-carbon alternative to cement.	
4	Hybrid timber-aluminium Windows	0.47%	36696
LCA Notes:		Including timber substitutes such as hybrid curtain walls reduces the need for aluminium. The use of less aluminium and low-carbon alternatives like timber leads to a greater reduction in overall carbon emissions.	

OPTION		Life Cycle CO ₂ e reduced	Carbon savings (kgCO ₂ e)
5	60% GGBS in Lowest Floor	2.52%	194847
LCA Notes:		A common practice in the reduction cement impacts is the fractional substitution of normal cement with other by-materials such as ground granulated blast furnace slag (GGBS). GGBS is a by-product from the blast-furnaces used to make iron, making it a low-carbon alternative to cement.	
6	CA Twin Therm Roof Cladding	0.11%	8482
LCA Notes:		Kingspan wall cladding systems consist of Quad Core insulation, which is generally higher in impacts. CA Twin-therm wall cladding have a lower carbon impact due to its mineral wool insulation. Substituting Kingspan cladding with Twin-therm leads to reduction in overall carbon emissions.	
7	Recycled Raised Access Floor	2.56%	198082
LCA Notes:		Recycled finishes are available from various sources in the UK, and from local demolition projects. Recycled products benefit from having much lower carbon impacts, besides some transport and processing.	
8	Reused Paving blocks	0.23%	17921
LCA Notes:		Concrete paving blocks are high in carbon, although better than in-situ concrete. To reduce impacts further but retain the strength and durability of concrete, reclaiming pavers can be a great way to reduce impacts. Reclaimed products can have extremely low carbon impacts, sometimes close to zero, besides the transport and minor processing involved.	
9	Timber Internal Wall Studs	0.13%	10362
LCA Notes:		Timber is generally a low carbon resource, whereas steel requires significant energy for extraction and manufacturing. The lower embodied carbon of timber and its ability to sequester carbon during growth make it a good alternative to steel. The sourcing and processing of timber is generally lower than steel.	

8.3 TOTAL FROM OPTIONS

TOTAL POTENTIAL SAVINGS	15.51%	1199272 kgCO ₂ e
-------------------------	--------	-----------------------------

The Whole Life Carbon assessment for Manchester Business Park shows total impacts of 873 kgCO₂e/m² GIA. A range of low-carbon options was assessed, offering further potential savings of up to 15.51% (1199272 kgCO₂e). Measures include low-carbon concrete mixes, timber substitutes to steel and metal, higher recycled content in steel frames, reclaimed finishes, reused pavings, and low-carbon refrigerant.

Service elements contribute the most to the project's overall carbon emissions. It should be noted that detailed service information (e.g., product weights, manufacturers, or specifications) was not provided, which may affect the results. Internal finishes were assumed, and these typically have higher carbon impacts due to shorter service lives and more frequent maintenance, as outlined by RICS guidance. Providing product-specific EPDs would improve data accuracy and support the identification of low-carbon alternatives. Structural steel and concrete was also estimated using floor area and assumptions, providing more exact weights of steel and concrete will help improve the accuracy of the data.



Greenhouse Gases (GHG)
(Often referred to as
'carbon emissions' in
general usage):

'Greenhouse Gases' are constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. For these 'Carbon Definitions', we are only addressing the GHGs with Global Warming Potentials assigned by the IPCC, e.g. carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFC's), perfluorocarbons (PFC's), and sulphur hexafluoride (SF6).

Whole Life Carbon:

'Whole Life Carbon' emissions are the sum total of all asset related GHG emissions and removals, both operational and embodied over the life cycle of an asset including its disposal (Modules: A1-A5; B1-B7 (plus B8 and B9 for Infrastructure only); C1-C4). Overall Whole Life Carbon asset performance includes separately reporting the potential benefit from future energy recovery, reuse, and recycling (Module D).

Embodied Carbon:

The 'Embodied Carbon' emissions of an asset are the total GHG emissions and removals associated with materials and construction processes throughout the whole life cycle of an asset (Modules A1-A5, B1-B5, C1-C4).

Upfront Carbon

'Upfront Carbon' emissions are the GHG emissions associated with materials and construction processes up to practical completion (Modules A1-A5). Upfront carbon excludes the biogenic carbon sequestered in the installed products at practical completion.

Operational Carbon -
Energy

'Operational Carbon – Energy' (Module B6) are the GHG emissions arising from all energy consumed by an asset in-use, over its life cycle.

Operational Carbon - Water

'Operational Carbon – Water' (Module B7) are those GHG emissions arising from water supply and wastewater treatment for an asset in-use, over its life cycle.

Carbon Sequestration

'Carbon Sequestration' is the process by which carbon dioxide is removed from the atmosphere and incorporated as 'Biogenic Carbon' in 'Biomass', through photosynthesis and other processes associated with the carbon cycle.

Net Zero (Whole Life) Carbon

A 'Net Zero (Whole Life) Carbon' Asset is one where the sum total of all asset related GHG emissions, both operational and embodied, over an asset's life cycle (Modules A1-A5, B1-B7 (plus B8 and B9 for Infrastructure only), C1-C4) are minimized, meet local carbon, energy and water targets, and with residual 'offsets', equals zero.

Net Zero Embodied Carbon

A 'Net Zero Embodied Carbon' asset is one where the sum total of GHG emissions and removals over an asset's life cycle (Modules A1-A5, B1-B5 and C1-C4) are minimized, meets local carbon targets (e.g.kgCO2e/m2), and with additional 'offsets', equals zero.

Net Zero Upfront Carbon

A 'Net Zero Upfront Carbon' asset is one where the sum total of GHG emissions, excluding 'carbon sequestration', from Modules A1-A5 is minimized, meets local carbon targets (e.g.kgCO2e/m²), and with additional 'offsets', equals zero.

(Whole Life Carbon Network Definitions LETI)

https://b80d7a04-1c28-45e2-b904-e0715cfac93.filesusr.com/ugd/252d09_879cb72cebea4587aa860b05e187a32a.pdf

ANNEX 2 MEETING NOTES

A meeting with between the LCA practitioner and the design team is suggested to discuss the current design, check quantities and assumptions, and to identify hotspots in the design and suggest low-carbon alternatives.



Our Clients



"We have used LCD on a number of projects for their expertise and their advice has been invaluable in helping us to advise clients accordingly. They have a proactive approach and are always ready to engage."

Richard Davies - **Goodrich Consulting LLP**

"LCD's experience and flexibility when supporting time sensitive Whole Life Carbon Assessments have been invaluable to our team on a number of occasions."

Matthew Ingham - **CBRE**

Our Work

Since 2019, we have modelled over three million tonnes of CO2e in our projects to help tackle global climate change.

We take pride in delivering the best quality data and analysis, concisely formatted to provide reliable and usable outcomes for our clients.

- 300+ LCA's, LCC's and EPD's delivered/verified
- Official partners of EPD Hub providing third-party verification of EPD's
- Committee board members of industry leading standards such as Ecoplatform, CEN350, Net Zero and UKGBC
- Fast and accurate modelling from decades of collective experience
- Trained 60+ LCA practitioners in all leading LCA softwares

Our Services

Built-environment LCA + EPD
Product-level LCA + EPD
Circular Economy
Corporate-level carbon strategy and LCA Methodology
Bespoke LCA/EPD Tool
BREEAM V7/V6 Mat01 LCA + Man02 LCC
Whole Life Carbon, Embodied Carbon and Upfront Carbon reporting
Net Zero UKGBC & NZC reports
Third-Party Verification services



LCD is supporting Bamboologic. 10% of our profits go towards supporting the local communities of arid regions of Portugal. By transforming low grade deserted land into bamboo plantations we are helping to rejuvenate the land, increase biodiversity and support modern farming for the struggling economies of the local area. The bamboo grown provides a rapidly renewable source of construction materials vital for the transition to a zero carbon future

JETHRO COUPS

Jethro is a 3rd party to the design team working for LCD Consulting who have been contracted to solely provide LCA analysis. He is therefore independent to the project and has no conflicts of interest.

Jethro Coups is a life-cycle assessment consultant with over 6 years of industry experience, specialising in LCA, Net Zero and Circular Economy reporting. Jethro spent the first three years of his career working in an architecture studio in Cambridge after completing his Bachelor's degree in Architecture and Design, transitioning to sustainability focused design and reporting within the built environment for various large-scale building typologies such as warehouses, schools, residential master plans and storage facilities.

Jethro has also worked in sustainable school design, working with the governments' 'Condition Improvement Fund' project. This scheme provided financial support for UK schools to repair and rebuild their dilapidated buildings, creating more open, modern and sustainable environments for future students to learn in.

Jethro is competent in both eTool and One CLick LCA and is a certified eTool assessor having completed their full training course. He has completed over 50 LCAs, notable projects include:

- LCA of Dagenham Studios: 60,000m2 mixed use industrial, and commercial spaces. (Lambert Smith Hampton, 2020)
- LCA of Burgess Hill (Plot 4): industrial warehouse project with associated office spaces. (Michael Sparks Associates, 2021)
- LCA of Castlewood Development: 180,000m2 industrial warehouse project. (Clowes Developments, 2021)
- LCA of Coventry Logistics (Units 1-3), industrial warehouse project. (Bericote 2021)
- LCA of Ferry Lane Unit 1 and LCA of Ferry Lane Unit 2, industrial warehouses. (SEGRO, 2021)
- LCA of Highclere North Harbour Medical Group, dental practice with 10 surgery rooms. (S&C, 2021)
- LCA of West Cornwall, new outpatient block connecting to existing site (Stride Treglown, 2021)
- LCA of Okehampton School, new teaching block. (NPS group, 2021)

SRILAKSHMI RAMAKRISHNAN

Srilakshmi is a 3rd party to the design team working for LCD Consulting who have been contracted to solely provide LCA analysis. She is therefore independent to the project and has no conflicts of interest.

Srilakshmi is a life-cycle assessment consultant with a background in sustainable architecture and life-cycle analysis. She completed her Bachelor's degree in Architecture from India, where she worked on sustainability-focused projects that ignited her passion for creating environmentally conscious designs.

Pursuing her interest further, Srilakshmi moved to the UK to complete her Master's degree in Sustainable Architecture at the University of Sheffield. During her studies, she worked on several impactful projects, including the retrofit of the Worksop Priory Gatehouse, which integrated sustainable design strategies to preserve heritage structures. Srilakshmi's research underscores her dedication to sustainability. Her publication, "Assessment of Indoor Illuminance in a Traditional House in Hot-Semi Arid (BSh) Climate in Shekhawati, Rajasthan," highlights her ability to bridge traditional architectural practices with modern sustainability insights.

Professionally, Srilakshmi has transitioned to LCA consulting, where she applies her expertise to quantify and reduce environmental impacts. At LCD Consulting, she has conducted life-cycle assessments, analyzing carbon emissions, materials efficiency, and environmental impacts to align with net-zero targets.

Srilakshmi is competent in both eTool and One CLick LCA and is a certified eTool assessor having completed their full training course. She has completed over 30 LCAs, notable projects include:

- LCA of Queen Elizabeth The Queen Mother Hospital: maternity department at QEOM Hospital (IHP, 2024)
- LCA of QMUL Queens' Building Phase 2A Refurbishment (Queen Mary University London , 2024)
- LCA of Falkirk Arts Centre: arts centre, including auditoriums and library (Falkirk Council, 2024)

At the Concept Design Stage, early decisions can significantly influence the environmental performance of a building. The following key frameworks have been considered to ensure the Life Cycle Assessment aligns with current best practice in whole life carbon assessments and supports the project's sustainability ambitions:



The Royal Institution of Chartered Surveyors (RICS) provides a structured methodology for assessing carbon impacts across the life cycle of a building. It covers both embodied and operational carbon and is widely used as a baseline methodology in the UK for consistent and transparent carbon reporting. It supports alignment with international standards such as EN15978.

At Stage 2, this framework guides the initial quantification of life cycle carbon impacts and supports the identification of key carbon hotspots for design intervention.



The UKGBC is an industry-led network driving the transformation of the built environment towards sustainability. The Net Zero Carbon Buildings Framework defines principles for achieving net zero in both embodied carbon and operational carbon, promoting a whole-life carbon approach. These principles help to shape early design targets and inform material and system selections in line with the project's low-carbon goals.



LETI is a voluntary network of built environment professionals that work together to accelerate the transition to net zero. It provides detailed technical guidance and targets for both embodied and operational carbon, offering benchmarks for different building types. LETI's Climate Emergency Design Guide is used as a reference to inform material choices, structural systems, and construction methodologies that support low-carbon design from the outset.



The UK NZCBS is a collaborative initiative to define a robust, science-based standard for what constitutes a net zero carbon building in the UK. It provides metrics, targets and verification criteria across both embodied and operational carbon emissions, ensuring alignment with national climate goals and consistency in industry reporting.



- Reduce need for materials

- Thinner floor slab

- Reduce glazing area

- Open exposed ceilings (office)

- Polished concrete floor in place of carpets
- Improve functionality fewer common areas/lobbies etc

- Re-use materials directly

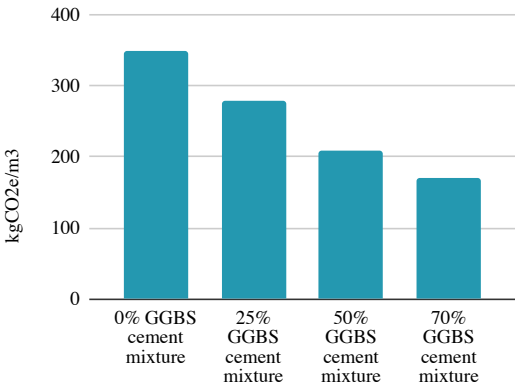
- Onsite aggregates from demolition
- Replace with low/zero carbon alternatives

- Timber alternatives - structure, roof, cladding, timber frame plus brick slip

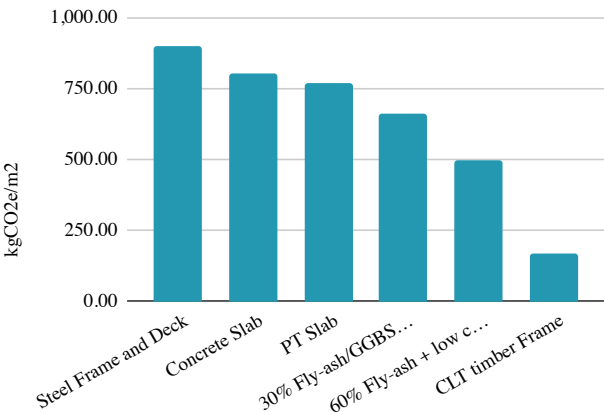
- Plastic, fibre cement or GRP over metals

- Fly-ash or GGBS in cement mix
- Look for materials with Environmental Product Declarations (EPDs).

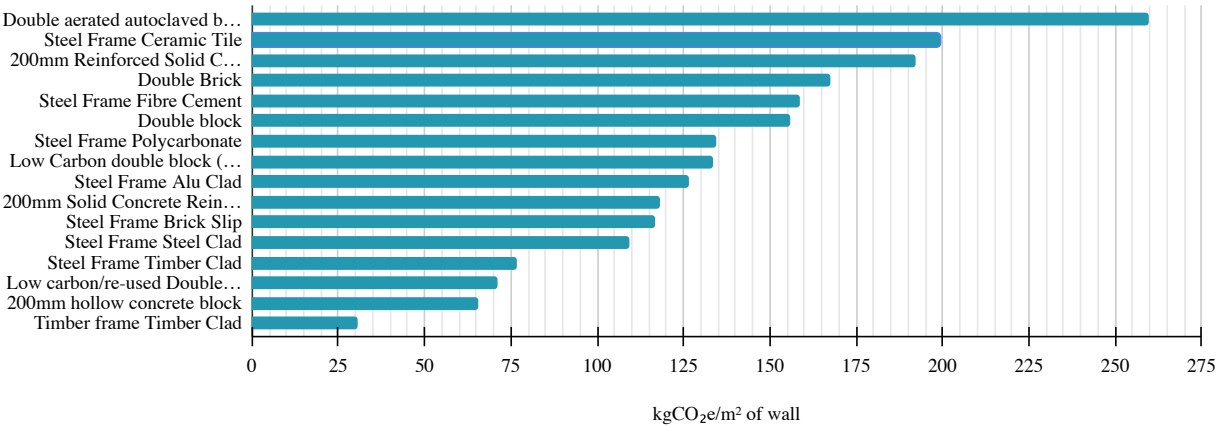
GGBS Cement Mixture Concrete



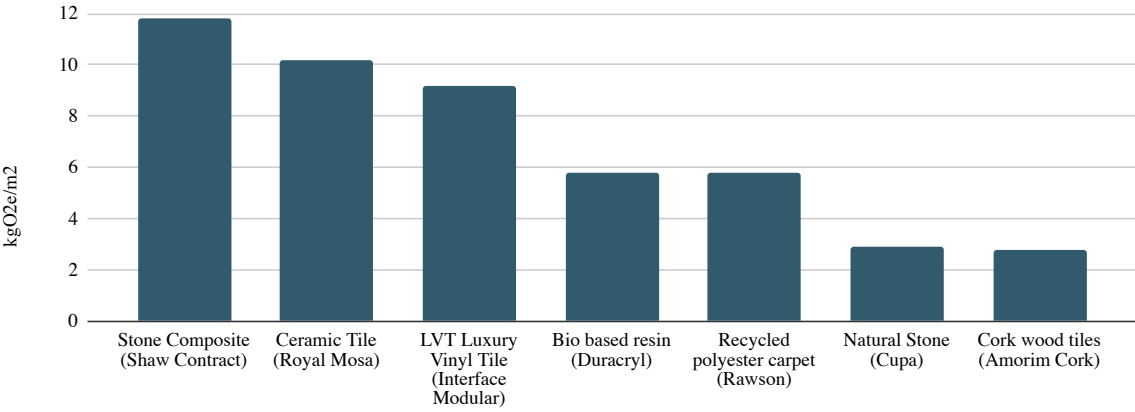
Structural Options



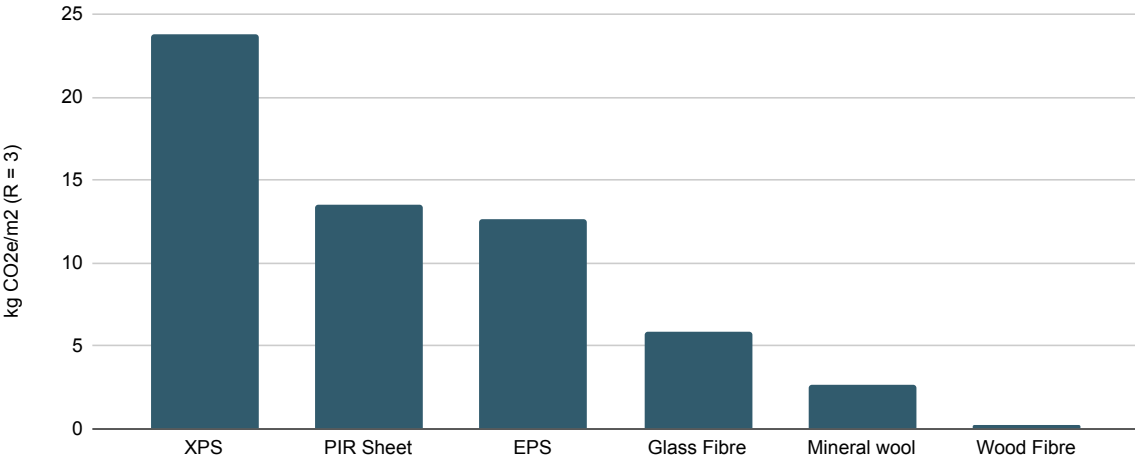
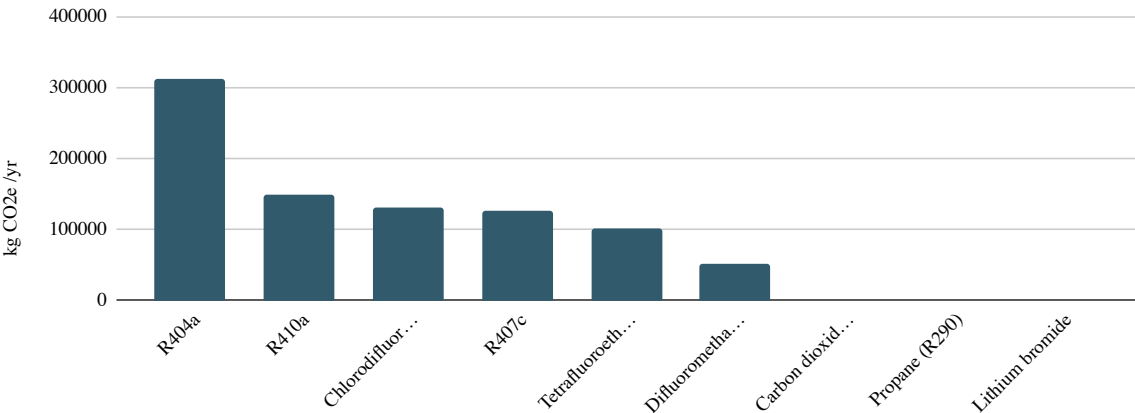
Impacts /m2 for wall types



Floor Finishes Manufacturing Upfront Carbon (per m2)



Refrigerant Gas Impacts (6% leakage)



OTHER ENVIRONMENTAL INDICATORS

A whole life cycle assessment includes the calculation of impacts of a number of different environmental indicators. Although climate change measured in GWP is by far the most significant environmental problem we currently face, it is important to ensure that measures that reduce one indicator do not adversely impact on other indicators in a more detrimental way. For example diesel was a favoured fuel due to its lower CO2 emissions however large particulate emissions were later discovered which have considerably worse impact on human health.

➤ Global Warming Potential, GWP (kgCO2e)

Anthropogenic global warming is caused by an increase of greenhouse gases (GHG) in the earth's atmosphere. These gases reflect some of the heat radiated from the earth's surface that would normally escape into space back to the surface of the earth. Over time this warms the earth. Common GHGs include CO2, N2O, CH4 and volatile organic compounds (VOCs). Global Warming Potential (GWP) is expressed in equivalent GHGs released, usually in kgCO2e.

➤ Ozone Depletion Potential, ODP (kg CFC-11 eq)

Ozone is formed and depleted naturally in the earth's stratosphere (between 15-40 km above the earth's surface). Halocarbon compounds are persistent synthetic halogen containing organic molecules that can reach the stratosphere leading to more rapid depletion of the ozone. As the ozone in the stratosphere is reduced more of the ultraviolet rays in sunlight can reach the earth's surface where they can cause skin cancer and reduced crop yields. Ozone Depletion Potential (ODP) is expressed in equivalent ozone depleting gases (normally kgCFC11e).

➤ Acidification Potential for Soil and Water, AP (kg SO2 eq.)

Acidification is a consequence of acids (and other compounds which can be transformed into acids) being emitted to the atmosphere and subsequently deposited in surface soils and water. Increased acidity can result in negative consequences for flora and fauna in addition to increased corrosion of manmade structures (buildings, vehicles etc.). Acidification Potential (AP) is an indicator of such damage and is usually measured in kg CO2e

➤ Eutrophication potential, EP (kg PO4 eq)

Over enrichment of aquatic ecosystems with nutrients leading to increased production of plankton, algae and higher aquatic plants leading to a deterioration of the water quality and a reduction in the value and/or the utilisation of the aquatic ecosystem. Eutrophication is primarily caused by surplus nitrogen and phosphorus. Sources of nutrients include agriculture (fertilisers and manure), aquaculture, municipal wastewater, and nitrogen oxide emissions from fossil fuel combustion.

➤ Photochemical Ozone Creation Potential, POCP (kg ethylene)

Photochemical Ozone Creation Potential (POCP), commonly known as smog, is toxic to humans in high concentration. Although ozone is protective in the stratosphere at low levels it is problematic from both a health and nuisance perspective. Plant growth is also affected through damaged leaf surfaces and reduced photosynthesis. POCP is formed when sunlight and heat react with Volatile Organic Compounds (VOCs).

➤ Abiotic Depletion Potential - Elements, ADPE (kg antimony)

Abiotic Resource Depletion of energy (ADPM) is a measure of the extraction and consumption of primary resources from the earth. Such exploitation reduces resources available to future generations and as such must be managed.

➤ Abiotic Depletion Potential - Fossil Fuels, ADPF (MJ)

Abiotic Resource Depletion of energy (ARDE) is a measure of the extraction and consumption of non-renewable energy sources (primarily fossil fuels, but also inclusive of other energy sources such as uranium). Primary energy content of non-renewable energy sources including the embodied energy to extract, process and deliver the non renewable fuels, or manufacture, transport and install the renewable generator. Hence there is usually non-renewable energy content associated with renewable fuels also.

SAP 10.2 SCENARIO (As seen in rest of report)

LC Module	UPFRONT				IN-USE				Operational		END-OF-LIFE								
	A1A3 Materials	A1A3 Biogenic Materials	A4 Transport	A5 Site Impacts	B1 In-Use	B2B3 Maintenance / Repair	B4 Replacement	B5 Refurbishmen t	B6 Energy	B7 Water	C1 Demolition	C2 Waste Transport	C3 Waste Processing	C3 Biogenic	C4 Disposal	C4 Biogenic	Totals		
Total by Module	5,337,867	-24,480	266,731	534,221	22400	168941	1796151	0	0	0	97050	83978	107211	16970	652	0	8407695	kgCO ₂ e	
Total by GIFA with Biogenic	UPFRONT				IN-USE				Operational		END-OF-LIFE						TOTAL		kgCO ₂ e/m ²
	635 kgCO ₂ e/m ²				206 kgCO ₂ e/m ²				0 kgCO ₂ e/m ²		32 kgCO ₂ e/m ²						873		
Total by GIFA without Biogenic	UPFRONT				IN-USE				Operational		END-OF-LIFE						TOTAL		kgCO ₂ e/m ²
	637 kgCO ₂ e/m ²				206 kgCO ₂ e/m ²				0 kgCO ₂ e/m ²		30 kgCO ₂ e/m ²						873		

DECARBONISED SCENARIO

LC Module	UPFRONT				IN-USE				Operational		END-OF-LIFE								
	A1A3 Materials	A1A3 Biogenic Materials	A4 Transport	A5 Site Impacts	B1 In-Use	B2B3 Maintenance / Repair	B4 Replacement	B5 Refurbishmen t	B6 Energy	B7 Water	C1 Demolition	C2 Waste Transport	C3 Waste Processing	C3 Biogenic	C4 Disposal	C4 Biogenic	Totals		
Total by Module	5,337,867	-24,480	266,731	534,221	11200	84494	898680	0	0	0	48525	41991	107211	16970	652	0	7324065	kgCO ₂ e	
Total by GIFA with Biogenic	UPFRONT				IN-USE				Operational		END-OF-LIFE						TOTAL		kgCO ₂ e/m ²
	635 kgCO ₂ e/m ²				103 kgCO ₂ e/m ²				0 kgCO ₂ e/m ²		22 kgCO ₂ e/m ²						760		
Total by GIFA without Biogenic	UPFRONT				IN-USE				Operational		END-OF-LIFE						TOTAL		kgCO ₂ e/m ²
	637 kgCO ₂ e/m ²				103 kgCO ₂ e/m ²				0 kgCO ₂ e/m ²		21 kgCO ₂ e/m ²						761		

* Decarbonised scenario uses the average factor for 'FES Falling Short Scenario' (0.0413 kgCO₂e/kWh). Calculation method: Decarbonised WTT = non decarbonised WTT x energy decarbonisation factor x RSP

Highest Impact EPD's	Geographical	Technological		Temporal		Data aspects		Total (out of 40)
	Geography	Technology	Product specificity	EPD	Generic	Granularity	Verification	
Structural steel profiles, generic, 0% recycled content (only virgin materials), I, H, U, L, and T sections, S235, S275 and S355 (One Click LCA)	10	6	4		6	3	0	29
Ready-mix concrete, normal strength, generic, C25/30 (3600/4400 PSI) with CEM II/A-S, 10% GGBS content (280 kg/m3; 17.5 lbs/ft3 total c	10	6	4		8	3	0	31
Photovoltaic systems, calculated average for United Kingdom, 14.5 kg/m2, P=500 Wp (One Click LCA)	10	6	4		6	3	0	29
Precast beams and columns, 2500.32 kg/m3 (LAING O'ROURKE LTD)	7	6	4	6		3	0	26
Epoxy self-leveling flooring, 4.79 kg/m2, EPONAL 376 / EPONAL 326 / NOVAFLEX 344 Descosol AL+ Epovic MC-AL-Liss 300 Epovic MC-AL-L	7	6	5	8		3	0	29
Carbon steel reinforcing bar (rebar) (secondary production route – scrap), 7850 kg/m3 (Speciality Steel UK Limited (T/A Liberty Speciality S	7	4	4		8	3	0	26
Ready-mix concrete, PAV1, with Portland Limestone Cement (14% Limestone)	7	4	4		6	3	0	24
Steel-faced sandwich panel with PIR foam insulation core, 13.39 kg/m2, KS RW QuadCore® LEC; KS TF QuadCore® LEC; KS TL QuadCore® L	7	6	5	6		3	0	27
Window system, double glazed with aluminium frame, 1.23 m x 1.48 m, 48.862 kg/m2, ST60 (APA Façade Systems Ltd)	7	4	4	6		3	0	24
Sandwiched insulated roof lights with GRP sheet facings and polycarbonate layers, 6.915 kg/m (Filon Products Ltd.)	7	4	4	8		3	0	26
Averages								27.1
Carbon data uncertainty factor								+/-3%

	Geographical representativeness (maximum 10 points)		Technological representativeness (maximum 12 points)				Temporal representiveness - assess either as an EPD or generic dataset (maximum 8 points)				Data aspects (maximum 10 points)			
	Geography		Technology		Product Specificity		For EPD		For generic datasets		Granularity		Verification	
Very Good	Refers to the specific geographic context for large countries, same region (e.g. UK for UK)	10	Reflects identical technology (e.g. BF/BOF steel with similar recycled content)	6	Data for actual product used	6	Year of data collection less than 4 years from year of construction	8	Reference year less than 3 years or published less than 2 years from year of construction	8	Site-specific data (actual factory and manufacturer used)	8	Third-party independently verified to EN 15804	8
Good	Refers to similar geographic context (e.g. UK data for Ireland)	7	Partially reflects the technology and technical characteristics (e.g. BF/BOF steel with different recycled content)	4	Representative or average product adapted by relevant characteristic (e.g. data per m2 adapted by mass/m2 or scaling factor provided)	5	Year of data collection less than 7 years from year of construction	6	Reference year less than 6 years or published less than 5 years from year of construction	6	Manufacturer specific data (actual manufacturer used and average site or different site)	6	Independently verified to ISO 14025	6
Fair	Refers to a very different geographic context or much larger region (e.g. Italy for UK, EU for UK)	4	Does not satisfactorily reflect the technology and technical characteristics (e.g. steel generally)	3	Average data/ representative product for product group of actual product used	4	Year data collection less than 10 years from year of construction	4	Reference year less than 10 years or published less than 10 years from year of construction	4	Regional sector data (e.g. UK or EU)	4	Peer reviewed to ISO 14044	4
Poor	Refers to a totally different context (different continent e.g. Canada for UK, EU for China)	2	Does not reflect the technology and technical characteristics at all (e.g. EAF steel for BOF steel)	1	Any proxy dataset or data extrapolated from group of datasets	2	Year of data collection less than 15 years or published more than 10 years from year of construction	2	Reference year less than 15 years or published more than 10 years from year of construction	2	Global sector data	2	Not verified or peer reviewed	2

The Life Cycle Assessment results presented in this report account for the inherent uncertainty associated with each project stage.

At Stage 2, uncertainty is estimated at approximately 15%, reflecting the preliminary nature of the design and assumptions used.

By Stage 4, uncertainty reduces to around 6% as more detailed data and refined information become available.

At the As-Built stage, uncertainty is effectively eliminated (0%), as results are based on verified, actual data.

This trend demonstrates the increasing confidence and reliability of the LCA findings as the project progresses from early design through to completion.

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