

West Road Tottenham

Energy Statement

Issue 2 – Planning

25th June 2025



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REVISIONS

Issue	Description	Date
1	Planning Issue	25/02/25
2	Planning Issue – Section 4 Cooling & Overheating amended in line with planning office comments, to include: • Overheating check on circulation spaces • Clarification on openable windows • Clarification on mechanical ventilation rate • Future weather file cooling demand check • Future overheating mitigation	25/06/25

EXECUTIVE SUMMARY

Overview

This Energy Statement has been prepared to support the planning application in connection with the demolition of all buildings and structures and the construction of a single speculative building providing up to 6,273m² for flexible B2 general industrial, B8 storage and distribution, and E(g)(iii) light industrial uses with ancillary office, associated service yard, access point, car parking, and landscape planting at West Road, Tottenham.

The report complies with and is structured in accordance with the GLA Energy Assessment Guidance (June 2022).

Haringey's Local Plan Strategic Policies 2013 – 2026

Policy SP4 Working Towards a Low Carbon Haringey

1. In line with London Plan policy, the Council will promote and require all new developments to take measures to reduce energy use and carbon emissions during design, construction and occupation, by incorporating the following measures:
 - From 2011 onwards all new non-residential development shall be built to at least BREEAM “very good” standard and should aim to achieve BREEAM “excellent” or the current nationally agreed standard. All new non-residential development shall be zero carbon from 2019.
2. The Council will promote low- and zero-carbon energy generation through the following measures:
 - a. Requiring all developments to assess, identify and implement, where viable, site-wide and area-wide decentralised energy facilities including the potential to link into a wider network;
 - b. Establishing local networks of decentralised heat and energy facilities by requiring developers to prioritise connection to existing or planned networks where feasible;
 - c. Working with neighbouring boroughs and other partners to explore ways of implementing sub-regional decentralised energy networks including the potential in the Upper Lee Valley Opportunity Area; and
 - d. All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from on site renewable energy regeneration, which can include connections to local sources of decentralised renewable energy.

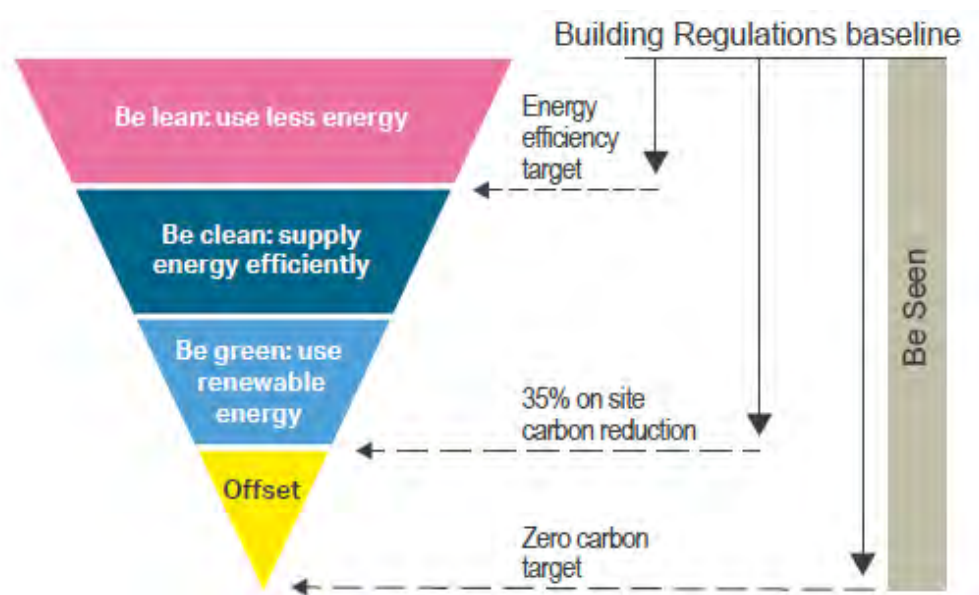
The London Plan

Policy SI 2

The London Plan **Policy SI 2** Minimising greenhouse gas emissions states that major developments are expected to be net zero-carbon by incorporating a series of measures outlined in the following energy hierarchy:

- Be lean: use less energy and manage demand during operation.
- Be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly.
- Be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site.
- Be seen: monitor, verify and report on energy performance.

A minimum on-site reduction of at least 35 per cent beyond the baseline of Part L Building Regulations is required. Non-residential development should achieve 15 per cent reduction through energy efficiency measures alone.



Policy SI 3

The London Plan **Policy SI 3** Energy infrastructure states that major developments should consider the connection to existing and future heat networks.

Policy SI 4

The London Plan **Policy SI 4** Managing heat risk states that major developments are expected to minimise adverse impacts on the urban heat island and follow the cooling hierarchy to minimize the potential for internal overheating and reliance on air conditioning systems.

Development

The proposed development consists of a single building with associated ancillary office space, service yard, carparking, amenity space and soft landscape.

As part of the developers works the warehouse areas will be constructed as shell only.

For the purposes of this report and the energy assessment calculations the warehouse areas will be treated as 'Speculative Industrial Process' area.

For these areas, lighting only is proposed with no provision for future heating, due to the speculative nature of the development.

Results

The development achieves Net-Zero Carbon status through following the London Plan energy hierarchy. Energy efficiency measures and on-site renewable energy generation is included in line with the London Plan Policy SI 2 and Haringey Policy SP4.

The results tabulated below using the GLA carbon emission spreadsheet show that an 15% reduction on the TER through energy efficiency measures can be achieved. The building can also achieve a 111% reduction on the TER through renewable technologies, such as local piped refrigerant air source heat pumps to provide heating and hot water to occupied spaces and a large PV array.

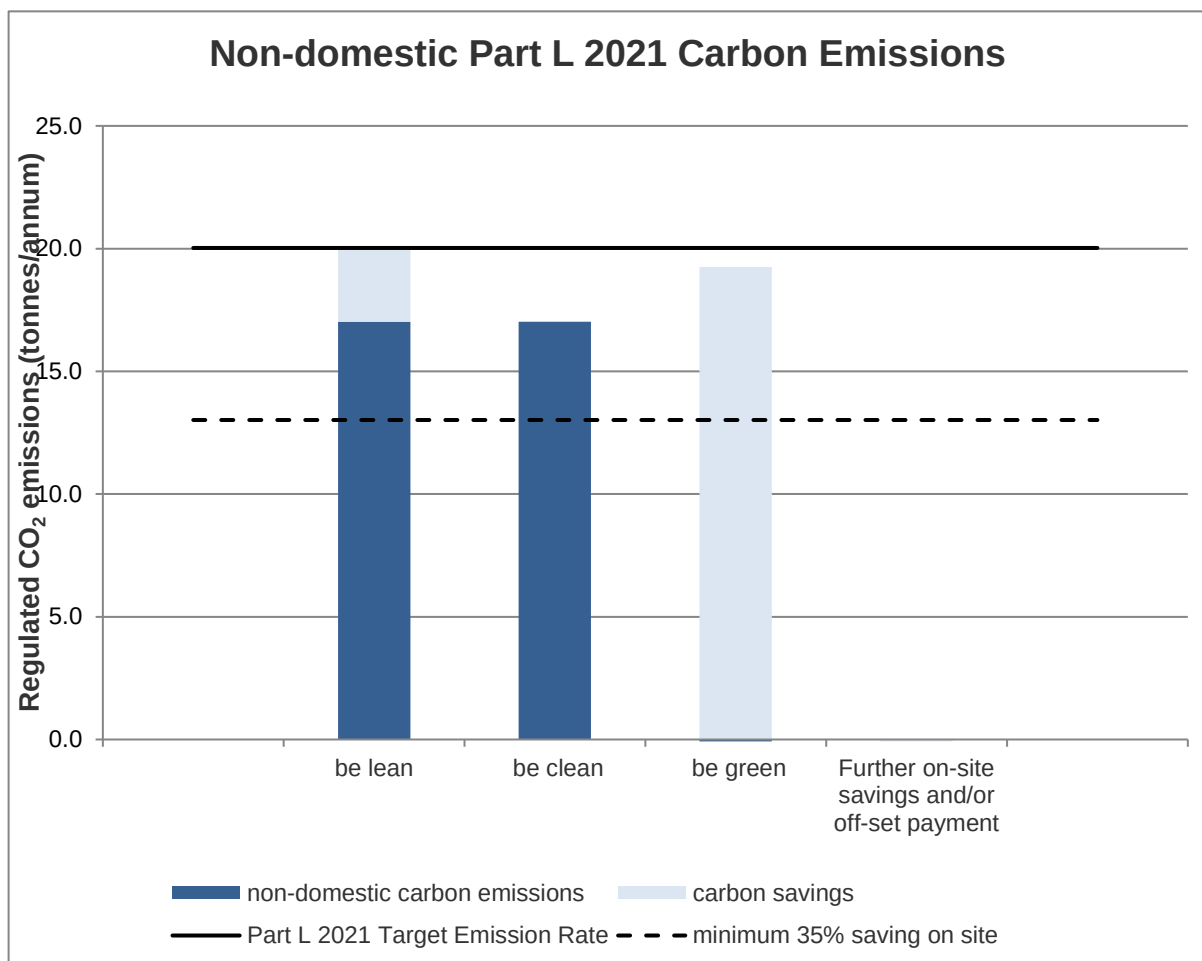
The energy strategy demonstrates a net zero-carbon status and overall compliance with Policy SI 2 of The London Plan and Haringey Policy SP4.

	Carbon Dioxide Emissions for non-residential buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	20.0	
After energy demand reduction (be lean)	17.0	
After heat network connection (be clean)	17.0	
After renewable energy (be green)	-2.2	

GLA Reporting Spreadsheet Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-residential buildings

	Regulated non-residential carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	3.0	15%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	19.2	96%
Total Cumulative Savings	22.3	111%
Annual savings from off-set payment	-2.2	-
	(Tonnes CO ₂)	
Cumulative savings for off-set payment	-67	-
Cash in-lieu contribution (£)	-6,342	

GLA Reporting Spreadsheet Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-residential buildings



GLA Reporting Spreadsheet Chart: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-residential buildings

The BRUKL output documents in **Appendix 6** have been used to calculate the credits awarded under Ene01 to contribute towards achieving a **BREEAM 'Excellent' rating** inline with Local Plan Policy D3, as detailed separately in AES's BREEAM Pre-Assessment Report.

The Green building modelled within this strategy achieves an **EPC A+**.

The 'Be Seen' stage of **Policy SI 2** will be satisfied via the completion of the planning stage webform. The building is being constructed as a speculative 'shell and core' development with the potential for various different occupier requirements. To ensure future compliance with the 'Be Seen' stage, all energy metering devices shall have the capability to report usage to future occupiers.

Although the development has been identified as being in the vicinity of a future district heat network, the calculated base load for a 'speculative Industrial Process' building is not sufficient demand to warrant connection to a heat network as is proposed. To satisfy **Policy SI 3** space provision for future plant and connections to a heat network have been identified.

The cooling hierarchy as defined by London Plan **Policy SI 4** has been applied and occupied areas of the building have been deemed to require mechanical cooling. The space cooling demands are in line with Policy SI 4 guidance.

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1.0 INTRODUCTION

This Energy Statement has been prepared to support the planning application in connection with the demolition of all buildings and structures and the construction of a single speculative building providing up to 6,273m² for flexible B2 general industrial, B8 storage and distribution, and E(g)(iii) light industrial uses with ancillary office, associated service yard, access point, car parking, and landscape planting at West Road, Tottenham.

The Energy Statement seeks to demonstrate compliance with the following planning policy.

All energy calculations undertaken as part of this report have been carried out using the SBEM calculation methodology using IES software as the interface tool.

1.1 Policy SP4 Working Towards a Low Carbon Haringey

1. In line with London Plan policy, the Council will promote and require all new developments to take measures to reduce energy use and carbon emissions during design, construction and occupation, by incorporating the following measures:
 - From 2011 onwards all new non-residential development shall be built to at least BREEAM “very good” standard and should aim to achieve BREEAM “excellent” or the current nationally agreed standard. All new non-residential development shall be zero carbon from 2019.
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 - e. Requiring all developments to assess, identify and implement, where viable, site-wide and area-wide decentralised energy facilities including the potential to link into a wider network;
 - f. Establishing local networks of decentralised heat and energy facilities by requiring developers to prioritise connection to existing or planned networks where feasible;
 - g. Working with neighbouring boroughs and other partners to explore ways of implementing sub-regional decentralised energy networks including the potential in the Upper Lee Valley Opportunity Area; and
 - h. All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from on site renewable energy regeneration, which can include connections to local sources of decentralised renewable energy.

1.2 London Plan Policy SI 2

Policy SI 2 Minimising greenhouse gas emissions states that major developments are expected to be net zero-carbon by incorporating a series of measures outlined in the following energy hierarchy:

- Be lean: use less energy and manage demand during operation.
- Be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly.
- Be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site.
- Be seen: monitor, verify and report on energy performance.

A minimum on-site reduction of at least 35 per cent beyond the baseline of Part L Building Regulations is required. Non-residential development should achieve 15 per cent reduction through energy efficiency measures alone.

1.3 London Plan Policy SI 3

The London Plan Policy SI 3 Energy infrastructure states that major developments should consider the connection to existing and future heat networks.

The policy states where developments are in proximity to a planned network, or within a HNPA, the developments must demonstrate that they are designed to connect to the network, in line with the London Heat Network Manual and the proposed network's design specification.

1.4 London Plan Policy SI 4

The London Plan Policy SI 4 Managing heat risk states that major developments are expected to minimise adverse impacts on the urban heat island and follow the cooling hierarchy to minimize the potential for internal overheating and reliance on air conditioning systems.

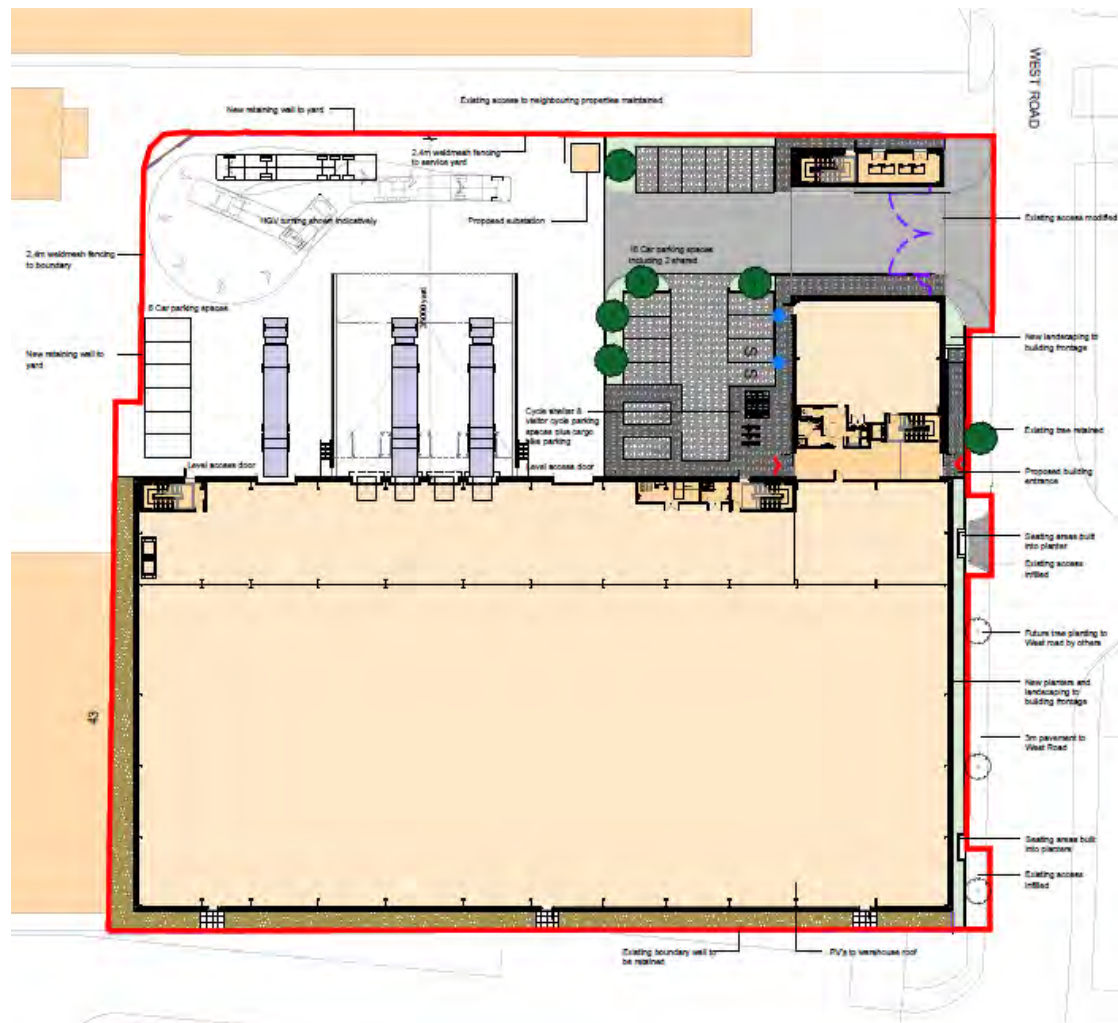
The cooling hierarchy in Policy SI 4 of the London Plan set out the following categories:

1. Reduce the amount of heat entering the building
2. Minimise internal heat generation
3. Manage the heat within the building
4. Provide passive ventilation
5. Provide mechanical ventilation
6. Provide active cooling systems

2.0 BRIEF SCOPE OF DEVELOPMENT PROPOSALS

2.1 Site Layout

The proposed development consists of a single building with associated ancillary office space, service yard, carparking, amenity space and soft landscape.



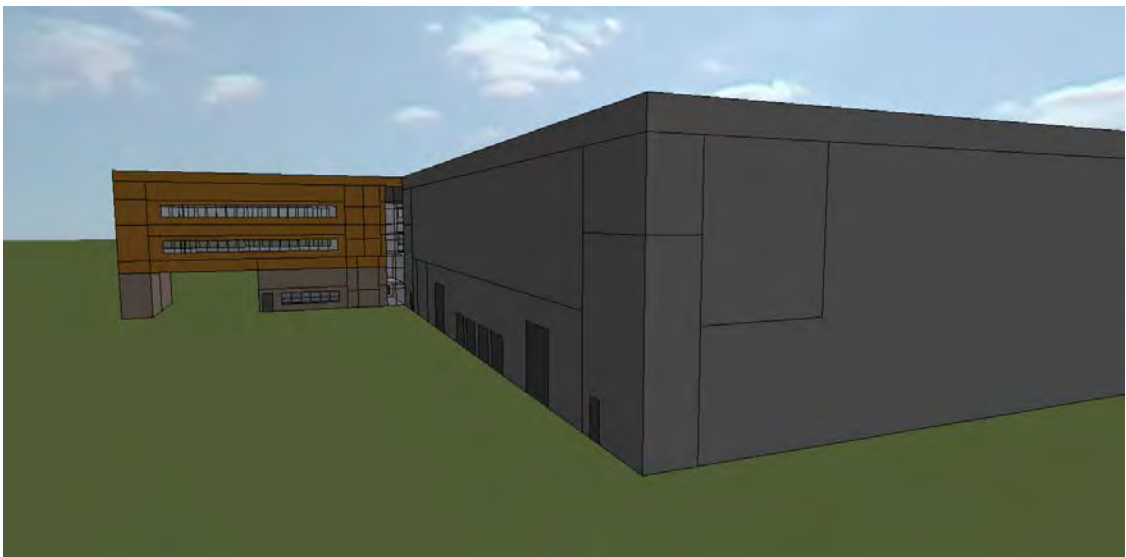
Proposed Site Plan

This energy statement has been developed based on the building form and orientation as detailed on PRC Architect's plan and elevation drawings accompanying the planning submission.

2.2 Energy Model Images



IES Building Model – North Elevations



IES Building Model – West Elevations



IES Building Model – East Elevations



IES Building Model – Warehouse Internal View

2.3 Future Fit-Out Allowances

As part of the developers works the warehouse areas will be constructed as shell only.

For the purposes of this report and the energy assessment calculations the warehouse areas will be treated as ‘Speculative Industrial Process’ area.

For these areas, lighting only is proposed with no provision for future heating, due to the speculative nature of the development.

Details of these allowances are presented in **Appendix 1** Design Criteria for Enhanced Building.

3.0 ENERGY EFFICIENCY MEASURES (LPP SI2 - Be Lean: Use Less Energy)

The following passive & active energy efficiency measures have been considered and incorporated into the development proposals in accordance with the London Plan 'Energy Hierarchy' to maximise the energy efficiency of the building before adopting renewable technologies:

Passive Design Measures	
Roof U-value	The U-value of the Roof has been improved from the minimum requirements of Part L2 2021 of 0.18W/m2K to 0.16W/m2K to reduce the energy demands for heating.
Roof-light U Value	The U-value of the Roof-lights has been improved from the minimum requirements of Part L2 2021 of 2.20W/m2K to 1.30W/m2K to reduce the energy demands for heating.
Roof-Light Areas	Roof-Light Areas are based on the optimum area for energy efficiency when balancing energy saving through the use of daylight lighting controls against the increase energy demands for heating and the requirements to limit solar overheating. This is calculated to be 10% of the warehouse floor area only.
Air Permeability	Air Permeability has been improved from the minimum requirements of Part L2 2021 of 8m3/hr/m2 to 3.0m3/hr/m2 to reduce the energy demands for heating.
Solar Heat Gain Control	Solar Heat Gain Control is achieved through the use of solar control glazing to reduce the need and/or the energy demands for artificial cooling.
Daylight efficiency	Daylight efficiency has been achieved by ensuring a balance has been met between solar energy and useful daylight.
Building Layout	The Building Layout has been designed to maximise the use of office space where active energy enhancement measures can be utilised.
Thermal mass	Thermal mass within the building is achieved through the use of a dense concrete slab between floors.
Ventilation	Heat Recovery Ventilation Units are provided for fresh air supply/extract to the office areas (when natural ventilation is not appropriate) to reduce energy used for heating/cooling.
Adaption to climate change	Adaption to climate change has been addressed through the space provision for future capacity increase in the buildings heating/cooling systems.

Active Design Measures	
High Efficiency LED Lighting	High Efficiency LED Lighting has been specified to reduce lighting energy use.
Warehouse Lighting	Warehouse Lighting has been specified with automatic PIR occupancy sensing and daylight dimming controls to reduce lighting energy use.
Office Lighting	Office Lighting has been specified with automatic PIR occupancy sensing and daylight dimming controls to reduce lighting energy use.
WC Lighting	WC Lighting has been specified with automatic PIR occupancy sensing controls to reduce lighting energy use.
Power Factor Correction	Power Factor Correction has been specified to improve electrical efficiencies by ensuring a power factor no worse than 0.95.
Air Source Heat Pump Heating and Hot Water	Air source heat pump heating and hot water has been specified within the office and core area to reduce electricity demand

3.1 CO₂ Emissions for 'Be Lean' Building with Energy Efficiency Measures

Using the London Plan 'Energy Hierarchy' and by applying all the energy efficiency measures described above the CO₂ emissions and savings calculated are as follows:

Unit	Carbon Dioxide Emissions		
	Baseline: Part L 2021 of the Building Regulations Compliant Development	Lean: After Energy Demand Reduction (& Part L 2021 Renewable Contribution)	Total Savings (%)
	TER (kgCO ₂ /yr)	BER (kgCO ₂ /yr)	
West Rd	20,027	17,020	15

Unit	Carbon Dioxide Emissions		
	Baseline: Part L 2021 of the Building Regulations Compliant Development	Lean: After Energy Demand Reduction (& Part L 2021 Renewable Contribution)	Total Savings (%)
	TER (TonnesCO ₂ .yr)	BER (TonnesCO ₂ .yr)	
West Rd	20.0	17.0	15

See **Appendix 5** for Lean Building BRUKL Report.

3.2 Energy Use Intensity and Space Heating Demand

After applying the energy efficiency measures the Energy Use Intensity (EUI) and Space Heating Demand for the building can be reported below.

Building type	EUI (kWh/m ² /year) (excluding renewable energy)	Space heating demand (kWh/m ² /year) (excluding renewable energy)
All other non-residential	76	13

GLA Reporting Spreadsheet EUI & Space Heating Table: Non-residential

The building energy modelling has been carried out using an approved DSM simulating results via Part L2 Methodology. EUI and space heating demand have been extracted from the Part L2 compliance model results.

The predicted EUI is higher than GLA guidance (55kWh/m²/year), this is due to the building being constructed as 'shell and core' with energy efficiency measures implemented being limited to the landlord core areas. This, paired with worst case unregulated energy loads applied to the speculative 'shell' areas has been modelled to demonstrate the highest likely EUI. It is expected future tenants will demonstrate a lower EUI on operation of the building.

It can be seen through the building energy modelling that the predicted space heating demand is in line with the GLA guidance (15kWh/m²/year).

3.2.1 Occupant Cost

Due to the speculative nature of the development the occupant small power shall be estimated through the Part L energy calculation equipment load (See BRUKL report).

Unregulated Load	Energy Consumption (kWh/year)	Energy Cost (£/year)
Equipment	204,772	61,431.51

Notes:

- Costs based on electricity charged at a rate of 30p/kWh*

4.0 COOLING AND OVERHEATING (LPP SI 4)

4.1 The Cooling Hierarchy

London Plan Policy SI 4 requires the application of a cooling hierarchy as defined below:

The Cooling Hierarchy – Passive Stages	
1. Reduce the amount of heat entering the building through orientation, shading high albedo materials, fenestration, insulation and provision of green infrastructure.	The occupied office areas within the building have been positioned on the north facing façades to limit the effects of solar gain. <i>(note. Solar shading not proposed due to limited benefit on selected occupied orientation.)</i>
	Solar Control Glazing is proposed to the office areas to limit the effects of solar gain.
2. Minimise internal heat generation through energy efficient design.	The domestic hot water pipework runs are limited in occupied spaces, insulated and predominantly run in service voids.
3. Manage the heat within the building through exposed internal thermal mass and high ceilings.	A dense concrete slab between floors will add thermal mass within the building.
4. Provide passive ventilation.	Openable windows with trickle ventilators shall be provided to office areas. Details can be found on the PRC elevation drawings.
The Cooling Hierarchy – Active Stages	
5. Provide mechanical ventilation.	Mechanical ventilation heat recovery units shall provide ventilation to the office areas. The units are capable of functioning in summer bypass mode of the heat exchanger to provide pre-cooling of the space. Mechanical ventilation rates are modelled at 1.4l/s/m ² in accordance with BCO guidance.
6. Provide active cooling systems.	Cooling will be provided to the office and entrance area via a dual mode VRF system capable of effectively moving heat from areas that require cooling to those that require heating.

4.2 Overheating Risk Analysis

Overheating Analysis, as defined by CIBSE TM52 has been used to assess if the building can maintain an optimal temperature and that it doesn't exceed excessively high temperatures throughout the summer months.

There are 3 criteria to assess overheating potential within the CIBSE TM52 Thermal Comfort Analysis. A building that fails two or more of the criteria is deemed to be at an unacceptable risk of overheating.

The 3 CIBSE TM52 Overheating Assessment Criteria are:

1. The first criterion sets a limit for the number of hours that the operative temperature can exceed the threshold comfort temperature (upper limit of the range of comfort temperature) by 1°K or more during the occupied hours of a typical non-heating season (1st May to 30th September). The number of hours during which ΔT is greater than or equal to one degree (°K) during the period May to September inclusive shall not be more than 3% of occupied hours. ΔT is defined as operative temperature less the maximum acceptable temperature.
2. The second criterion deals with the severity of overheating within any one day, which can be as important as its frequency, the level of which is a function of both temperature rise and its duration. This criterion sets a daily limit for acceptability. To allow for the severity of overheating, the weighted exceedance shall be less than or equal to 6 in any one day.
3. The third criterion sets an absolute maximum daily temperature for a room, beyond which the level of overheating is unacceptable. To set an absolute maximum value for the indoor operative temperature the value of ΔT shall not exceed 4 °K.

4.3 Overheating Design Criteria

<u>Weather File</u>	-	London_LWC_DSY1_2020High50.epw
<u>Building Form & Orientation</u>	-	As Detailed in Appendix 1
<u>Infiltration</u>		
Office Areas	-	0.25 Ach/hr Summer
<u>Internal Heat Gains</u>		
Office Lighting	-	8W/m ²
Circulation Lighting	-	5W/m ²
Office Small Power	-	10W/m ²
Office Occupants	-	90W/person Sensible 60W/person Latent
Office Relative Humidity	-	50%RH
Office Occupancy Density	-	1 Person/10m
Circulation Occupancy Density	-	1 Person
<u>Building Operation Hours</u>		
Operation Hours	-	07:00 and 17:00
<u>Clothing Level</u>	-	1.0 – 2.0
<u>Activity Level</u>	-	1.0
<u>Air Speed</u>	-	0.15m/s

4.4 CIBSE TM52 Overheating Assessment Results

The results of the CIBSE TM52 Overheating Assessment can be measured against a base model to demonstrate the application of the Cooling Hierarchy. The **BASE** results of the CIBSE TM52 Overheating Assessment are as follows:

Room Name	Occupied days (%)	Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria 2 (Max. Daily Deg.Hrs)	Criteria 3 (Max. DeltaT)	Criteria failing
00-00-01 - Entrance Lobby	100	51.8	71	9	1 & 2 & 3
00-00-02 - Stair 01	100	52	68	9	1 & 2 & 3
00-00-04 - WC Lobby	100	42.5	55	6	1 & 2 & 3
00-00-10 - Office (West)	85.6	40.8	63	9	1 & 2 & 3
00-00-11 - Office (Internal)	85.6	46.3	68	10	1 & 2 & 3
00-00-12 - Office (East)	85.6	56.6	81	11	1 & 2 & 3
00-00-13 - Stair 02	100	4.1	23	3	1 & 2
00-00-15 - Stair 03	100	1.9	20	2	2 – Overall Pass
00-00-16 - Stair 04	100	1.8	15	2	2 – Overall Pass
00-01-01 - Stair 01	100	56.1	75	9	1 & 2 & 3
00-01-02 - Landing	100	53.9	71	8	1 & 2 & 3
00-01-04 - Corridor	100	37.9	57	6	1 & 2 & 3
00-01-05 - WC Lobby	100	35	53	6	1 & 2 & 3
00-01-11 - Office (West)	85.6	51.2	72	10	1 & 2 & 3
00-01-12 - Office (North)	85.6	68.5	95	12	1 & 2 & 3
00-01-13 - Office (East)	85.6	64.2	86	11	1 & 2 & 3
00-01-14 - Office (Internal)	85.6	56.3	74	10	1 & 2 & 3
00-01-15 - Stair 02	100	14.7	40	5	1 & 2 & 3
00-01-17 - Office (East)	85.6	22.7	52	8	1 & 2 & 3
00-01-18 - Office (Internal)	85.6	20.2	50	8	1 & 2 & 3

Room Name	Occupied days (%)	Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria 2 (Max. Daily Deg.Hrs)	Criteria 3 (Max. DeltaT)	Criteria failing
00-01-19 - Office (West)	85.6	32	59	8	1 & 2 & 3
00-01-20 - Mezz Lobby	100	4.2	30	3	1 & 2
00-02-01 - Stair 01	100	57.3	76	9	1 & 2 & 3
00-02-02 - Landing	100	50.8	68	8	1 & 2 & 3
00-02-04 - Corridor	100	35.2	56	6	1 & 2 & 3
00-02-05 - WC Lobby	100	29.9	49	5	1 & 2 & 3
00-02-11 - Office (West)	85.6	47.3	72	10	1 & 2 & 3
00-02-12 - Office (North)	85.6	62	86	11	1 & 2 & 3
00-02-13 - Office (East)	85.6	58.2	84	11	1 & 2 & 3
00-02-14 - Office (Internal)	85.6	50.7	75	10	1 & 2 & 3
00-02-15 - Stair 02	100	19.2	45	5	1 & 2 & 3
00-02-17 - Office (East)	85.6	27.6	58	8	1 & 2 & 3
00-02-18 - Office (Internal)	85.6	22.9	52	8	1 & 2 & 3
00-02-19 - Office (West)	85.6	27.4	54	8	1 & 2 & 3

Notes:

1. Building Category II – New Builds
2. Weather File: London_LWC_DSY1_2020High50.epw

CIBSE TM52 Overheating Assessment Table BASE: Non-residential

Following review of the base results, the **Passive Stages 1-4** of the cooling hierarchy can be applied, the results of the CIBSE TM52 Overheating Assessment are as follows:

Room Name	Occupied days (%)	Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria 2 (Max. Daily Deg.Hrs)	Criteria 3 (Max. DeltaT)	Criteria failing
00-00-01 - Entrance Lobby	100	2.1	13	3	2 – Overall Pass
00-00-02 - Stair 01	100	1.1	8	2	2 – Overall Pass
00-00-04 - WC Lobby	100	0.3	3	1	- Overall Pass
00-00-10 - Office (West)	85.6	6.3	20	5	1 & 2 & 3
00-00-11 - Office (Internal)	85.6	4.5	19	4	1 & 2
00-00-12 - Office (East)	85.6	5.1	22	4	1 & 2
00-00-13 - Stair 02	100	0.2	2	1	- Overall Pass
00-00-15 - Stair 03	100	0	0	0	- Overall Pass
00-00-16 - Stair 04	100	0	0	0	- Overall Pass
00-01-01 - Stair 01	100	1.4	11	3	2 – Overall Pass
00-01-02 - Landing	100	1.4	8	2	2 – Overall Pass
00-01-04 - Corridor	100	0.3	3	1	- Overall Pass
00-01-05 - WC Lobby	100	0.2	2	1	- Overall Pass
00-01-11 - Office (West)	85.6	6.9	20	5	1 & 2 & 3
00-01-12 - Office (North)	85.6	7.2	25	5	1 & 2 & 3
00-01-13 - Office (East)	85.6	4.6	21	4	1 & 2
00-01-14 - Office (Internal)	85.6	4.1	16	4	1 & 2
00-01-15 - Stair 02	100	0.2	2	1	- Overall Pass
00-01-17 - Office (East)	85.6	3.3	18	4	1 & 2
00-01-18 - Office (Internal)	85.6	5.5	23	5	1 & 2 & 3
00-01-19 - Office (West)	85.6	5.4	21	5	1 & 2 & 3
00-01-20 - Mezz Lobby	100	0.5	5	1	- Overall Pass

Room Name	Occupied days (%)	Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria 2 (Max. Daily Deg.Hrs)	Criteria 3 (Max. DeltaT)	Criteria failing
00-02-01 - Stair 01	100	1.5	11	3	2 – Overall Pass
00-02-02 - Landing	100	0.7	3	1	- Overall Pass
00-02-04 - Corridor	100	0.2	2	1	- Overall Pass
00-02-05 - WC Lobby	100	0.1	1	1	- Overall Pass
00-02-11 - Office (West)	85.6	5.3	16	4	1 & 2
00-02-12 - Office (North)	85.6	3.7	17	3	1 & 2
00-02-13 - Office (East)	85.6	3.3	16	3	1 & 2
00-02-14 - Office (Internal)	85.6	2.6	13	3	2 – Overall Pass
00-02-15 - Stair 02	100	0.2	2	1	- Overall Pass
00-02-17 - Office (East)	85.6	2.7	15	3	2 – Overall Pass
00-02-18 - Office (Internal)	85.6	3.6	18	4	1 & 2
00-02-19 - Office (West)	85.6	5.3	20	6	1 & 2 & 3

Notes:

1. Building Category II – New Builds
2. Weather File: London_LWC_DSY1_2020High50.epw

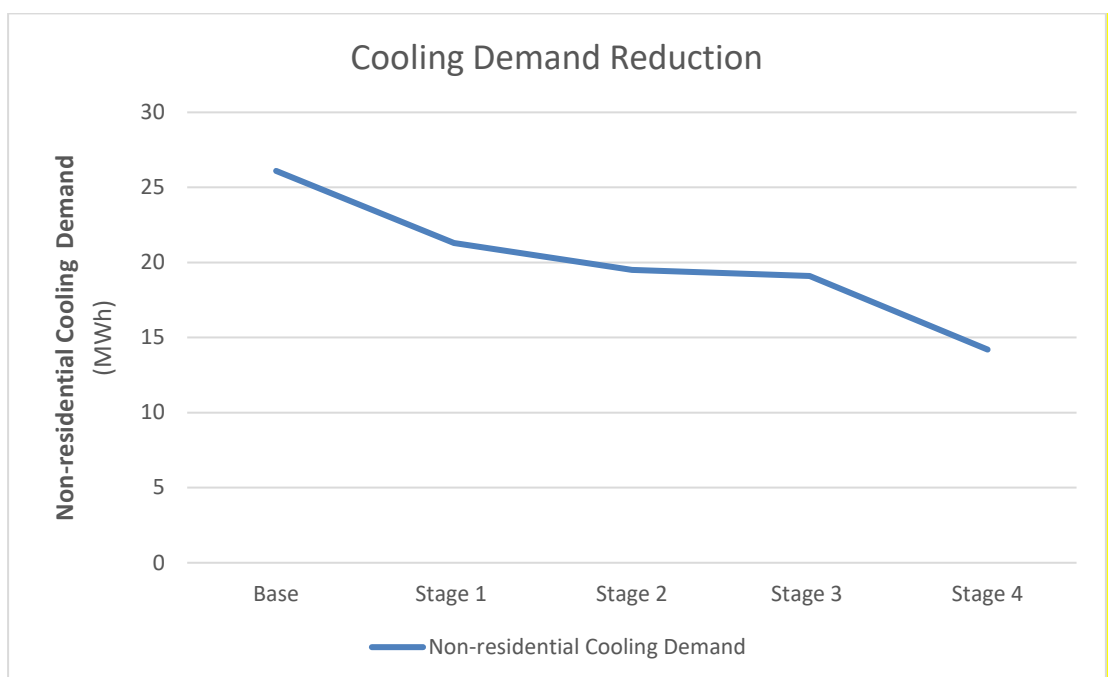
CIBSE TM52 Overheating Assessment Table Stages 1-4: Non-residential

4.5 Cooling Demand

The results of the CIBSE TM52 Overheating Assessment show that the occupied areas designated for office use within the building will require active cooling and mechanical ventilation.

By applying the passive energy efficiency measures in stages, it can be demonstrated how the building active cooling demand can be reduced **before** cooling plant is selected.

Passive Measure	Non-residential Cooling Demand (MWh)
Base	26.1
Stage 1	21.3
Stage 2	19.5
Stage 3	19.1
Stage 4	14.2



The GLA guidance suggests that where active cooling is specified within a zone the aim should be to reduce the actual cooling demand below that of the notional building.

	Area weighted average non-residential cooling demand (MJ/m ²)	Total area weighted non-residential cooling demand (MJ/year)
Actual	1.13	n/a
Notional	1.6	n/a

GLA Cooling Demand Table

The actual building cooling demand is less than the notional target in line with GLA guidance.

4.6 Future Cooling Demand

Where active cooling has been proposed to the office areas it is necessary to consider the system cooling demand in a future climate change scenario, by modelling with the future weather data set:

- London_LWC_DSY2_2050High50.epw

Future Climate Change Check	Non-residential Cooling Demand (MWh)
Stage 4 – Active Cooling	25.5

The risk of future climate change shall fall with the building tenants to mitigate. A potential mitigation measure would be to introduce internal blinds. The simulated results below demonstrate a reduction in the future cooling demand should blinds be installed.

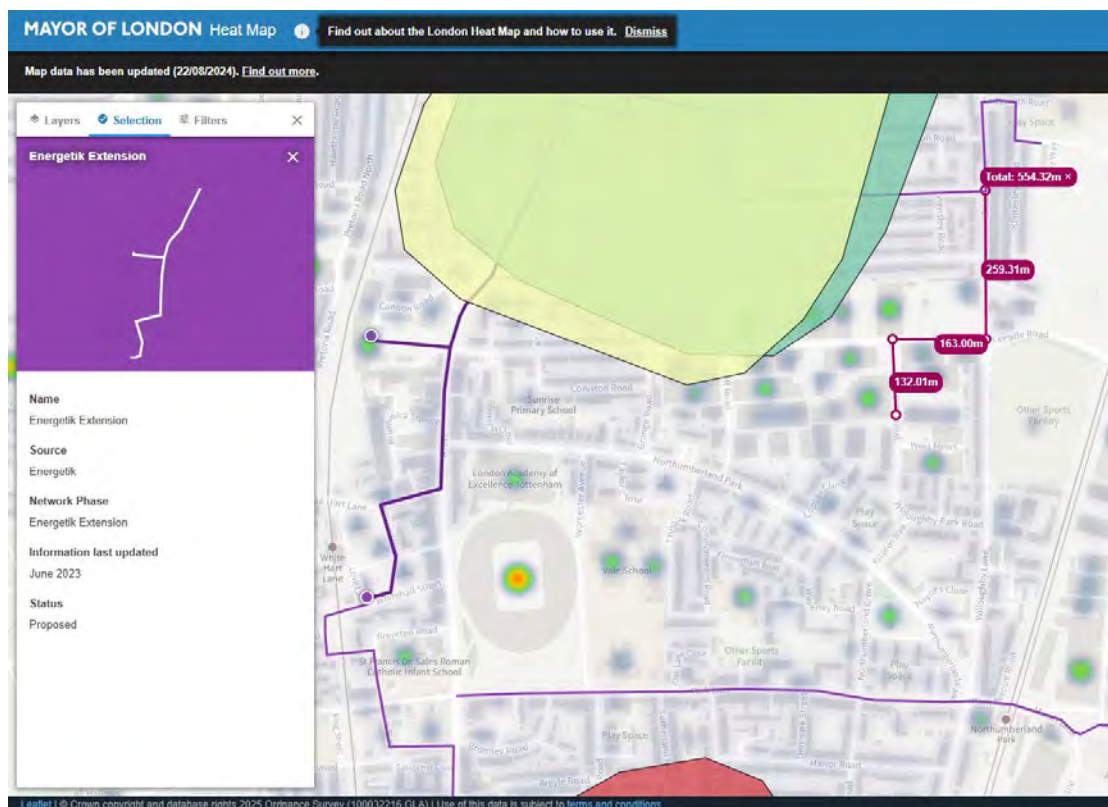
Future Climate Change Mitigation	Non-residential Cooling Demand (MWh)
Internal Blinds – tenant install	19.5

5.0 COMMUNAL HEATING/COOLING & CHP (LPP SI 3 - Be Clean: Supply Energy Efficiently)

5.1 Communal Heating & Cooling

5.1.1 Planned Networks

At present there are no active district heat network available to connect to. The nearest future district heat networks are the 'Energetik Extension' and the 'Proposed Upper Lee Valley 1'.

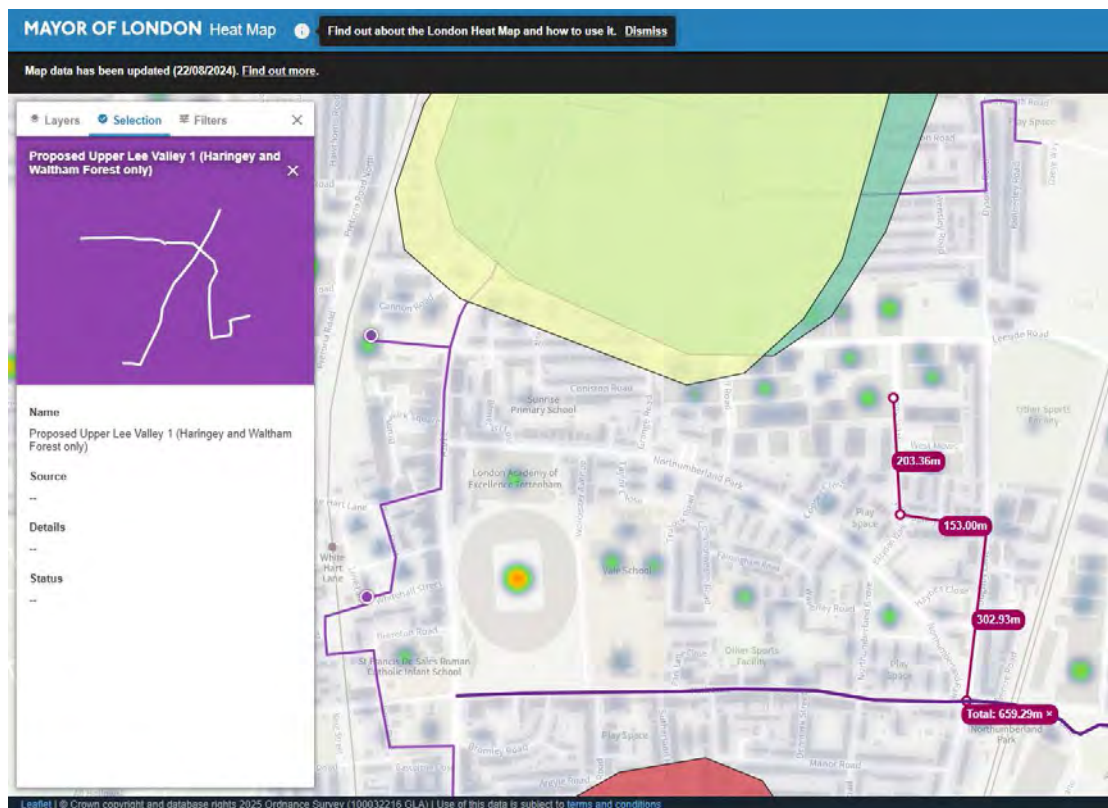


Mayor of London Heat Map – Existing/Proposed Heat Networks

The 'Energetik Extension' Network will be approximately 554m from the West Road development.

Connection to the district heating network is not considered suitable for the proposed development for the following reasons:

1. Availability of an active network to connect to.
2. Low heating demands and lack of all year-round base load creates an undesirable scenario for heat network operators. The Developer's works will be limited to the heating and hot water provisions to the office/core areas. The warehouse areas will be left unheated.



Mayor of London Heat Map – Existing/Proposed Heat Networks

The 'Proposed Upper Lee Valley 1' Network will be approximately 659m from the 17 Western Road development.

Connection to the district heating network is not considered suitable for the proposed development for the following reasons:

1. Availability of an active network to connect to.
2. Low heating demands and lack of all year-round base load creates an undesirable scenario for heat network operators. The Developer's works will be limited to the heating and hot water provisions to the office/core areas. The warehouse areas will be left unheated.

5.1.2 Future Connection Feasibility

The London Plan Policy SI 3 states where heat networks are planned but not yet available, developments should be designed to allow for cost-effective connection at a later date.

To comply with the policy the pipework distribution and plant spaces highlighted in **Appendix 2** are designated for future heating network connection, should an incoming tenant have a suitable heating energy demand.

5.2 CHP (Combined Heat & Power)

Combined Heat and Power (CHP) refers to the local simultaneous generation of electricity and heat.

Electricity is generated by an on-site electrical generator, commonly fuelled by gas, liquid fuel or biomass, and heat is recovered from the exhaust gases and cooling systems which is used to provide hot water.

CHP systems are most appropriate and economically viable where there is high heat demands for a large proportion of the day throughout the year i.e. hospitals, hotels, leisure centres or larger mixed used developments.

In the case of the proposed development the base heating demand is minimal, comprising hot water use for hand washing and showering only, and the demand for space heating will be seasonal.

Due to absence of a substantial and constant heating demand the use of a CHP system is not considered viable in this instance. The infrastructure costs and the ongoing management, service and maintenance obligations to the Landlord are also considered prohibitive on development of this scale.

6.0 RENEWABLE TECHNOLOGIES (LPP SI 2 - Be green: use renewable energy)

The table below identifies which renewable energy technologies are considered feasible for this development.

Technology	Feasible	Reason
Transpired Solar Collectors	No	Due to the speculative nature of the development and the uncertainty of the use of the warehouse it is not suitable for the installation of 'SolarWall' cladding in this instance.
Photovoltaic Panels (PV)	Yes	The building has large relatively flat roof areas which would be suitable for PV installations. Battery storage is not considered feasible in unison with a PV array due to speculative nature of this development.
Air Source Heating	Yes	Air Source Heating is considered a feasible solution for the office and core heating and HWS via a piped refrigerant based multi split or VRF system. There are no conflicts with land use and noise criteria.
Ground Source Heating	No	- Detailed ground investigations would be required to determine the suitability and size of a ground source heating solution in this location. - The cost of a closed loop or open loop borehole system are considered prohibitive for this development. - There is insufficient area on-site for a horizontal 'slinky' type solution.
Solar Water Heating	No	This is considered a feasible technology however the demand for hot water is a very small proportion of the building's total energy demands and therefore the benefits are extremely limited.
Biomass Heating	No	- Not considered suitable for use in connection with the proposed heating systems in the office and warehouse area. - Air quality & pollution issues associated with the use of biomass. - Fuel storage & re-filling requirements are considered difficult to accommodate on site.
Wind Turbines	No	- Local wind speeds are below those generally recommended for wind turbines to be a viable renewable solution. - Given the location of the site the visual and noise impacts from the wind turbines on neighbouring sites are considered prohibitive.

6.1 Photovoltaic Panels (PV)

Photovoltaic systems convert energy from the sun into electricity through semi-conductor cells. Systems consist of semi-conductor cells connected together and mounted into modules. Modules are connected to an inverter to turn their direct current (DC) output into alternating current (AC) electricity for use in buildings.

Photovoltaics supply electricity to the building they are attached to or to any other load connected to the electricity grid. Excess electricity can be exported back to the Grid when the generated power exceeds the local need.

PV systems require only daylight, not sunlight to generate electricity (although more electricity is produced with more sunlight), so energy can still be produced in overcast or cloudy conditions.

Photovoltaic cells typically come in modular panels which can be floor or roof mounted. Ideally the panels should face between south-east and south-west, at an elevation of about 30-40°. However, in the UK even flat roofs receive 90% of the energy of an optimum system.



Typical Roof Mounted PV Array

Roof mounted photovoltaic panels are considered a feasible technology for this development.

6.1.1 Estimated Carbon/Energy Savings & Payback Periods

For PV systems payback is achieved through (1) Reduced grid electrical energy consumption, (2) smart export payments.

The table below illustrates the estimated carbon & energy savings and payback periods for the PV systems proposed to achieve net zero carbon status:

Estimated PV Carbon & Energy Savings & Simple Payback Periods	
PV Area (m ²)	800
PV Array Size (kWp)	158
Annual Carbon Savings (kg.CO ₂)	17,850
Annual Energy Savings (kWh)	141,539
Capital Cost (£)	140,000
Annual Energy Cost Savings (£)	21,231
Smart Export Payments (£)	3,538
Simple Payback Period (years)	6

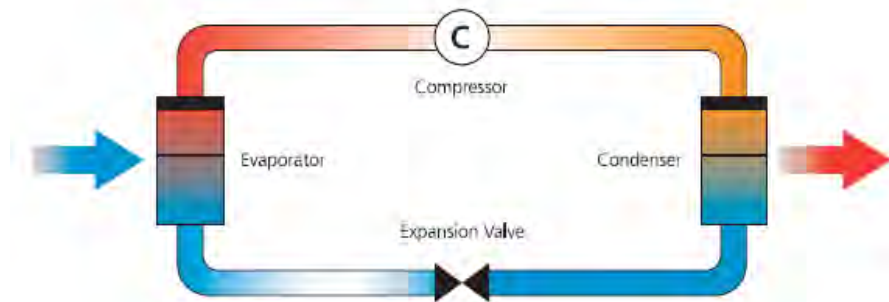
Notes:

1. Annual carbon & energy savings taken from BRUKL output documents in **Appendix 6**.
2. Capital cost based on £175/m² of PV.
3. Annual energy cost savings based on electricity charged at a rate of 30p/kWh and assumes that 50% of the energy generated will be used and 50% will be exported back into the grid at a Smart Export payment rate of 5.00p/kWh.
4. See **Appendix 1** for SBP Indicative Roof PV Layout.

6.2 Air Source Heat Pumps (ASHP)

Split or Multi Split type air conditioning systems are one-to-one systems consisting of one evaporator (fan coil) unit connected to an external condensing unit. Both the indoor and outdoor units are connected through copper tubing and electrical cabling.

The indoor part (evaporator) pulls heat out from the surrounding air while the outdoor condensing unit transfers the heat into the environment, this cycle can be reversed to deliver heat to the space. Refrigerant in the heat exchanger absorbs heat from the outside air and evaporates. Vapour is compressed, thereby increasing pressure and vapour temperature. Hot vapour is condensed in the 2nd heat exchanger where heat is rejected. The liquid refrigerant passes back through an expansion valve, to start the cycle again.



ASHP Cycle

Variable refrigerant flow (VRF) is an air-conditioning system configuration where there is one outdoor condensing unit and multiple indoor units. The term variable refrigerant flow refers to the ability of the system to control the amount of refrigerant flowing to the multiple evaporators (indoor units), enabling the use of many evaporators of differing capacities and configurations connected to a single condensing unit. The arrangement provides an individualized comfort control, and simultaneous heating and cooling in different zones.

Air source heat pumps can only be considered as a renewable technology when used in heating mode. Refer to Annex VI of Directive 2009/28/EC for more detail on accounting for energy from heat pumps.



Typical ASHP Outdoor Units

For details of the air source heat pump selection, location, calculated seasonal efficiency and technical details see **Appendix 3**.

6.2.1 Estimated Carbon & Energy Savings & Payback Periods

The tables below illustrate the estimated carbon & energy savings and simple payback periods for the ASHP systems proposed for the office and entrance areas.

For ASHP systems simple payback is determined by calculating the energy costs for heating compared to the energy costs if the same amount of heating were to be provided by a notional gas boiler.

Estimated Carbon Savings	
System	Gas Boiler
Efficiency	91%
Heating Carbon Emissions (kgCO ₂ /yr)	21,448
System	Air Source Heat Pump
Efficiency	411%
Heating Carbon Emissions (kgCO ₂ /yr)	3,224
Carbon Savings (kgCO ₂ /yr)	18,224
Percentage Savings (%)	85%

Estimated Energy Savings & Simple Payback Periods	
System	Gas Boiler
Efficiency	91%
Heating Energy Consumption (kWh/yr)	102,132
Capital Cost (£)	21,253
Energy Cost (£/yr)	15,319.8
System	Air Source Heat Pump
Efficiency	411%
Heating Energy Consumption (kWh/yr)	21,253
Capital Cost (£)	167,400
Energy Cost (£/yr)	6,375.9
Energy Savings (£/yr)	8,943.9
Incentive Payments (£/yr)	n/a
Simple Payback Period (years)	12

Notes:

- Costs based on gas charged at a rate of 15p/kWh and electricity at a rate of 30p/kWh

6.3 CO₂ Emissions for 'Be Green' Enhanced Building with Renewables

By applying the PV panels and air source heat pumps to the enhanced building the CO₂ emissions and savings calculated are as follows:

Unit	Carbon Dioxide Emissions		
	Baseline: Part L 2021 of the Building Regulations Compliant Development	Green: After ASHP & PV	Total Savings (%)
	TER (kgCO ₂ /yr)	BER (kgCO ₂ /yr)	
West Rd	20,027	-2,225	111

Unit	Carbon Dioxide Emissions		
	Baseline: Part L 2021 of the Building Regulations Compliant Development	Green: After ASHP & PV	Total Savings (%)
	TER (TonnesCO ₂ .yr)	BER (TonnesCO ₂ .yr)	
West Rd	20.0	-2.2	111

See **Appendix 6** for Green Building BRUKL Report.

7.0 FLEXIBILITY AND PEAK ENERGY DEMAND

The table below identifies the building estimated flexible annual and peak energy demand.

	Electrical	Heat	Enabled through...
Estimated peak demand (MW)	0.65	n/a	Realistic estimates of demand profiles and peak demand
Available Capacity (MW)	0.6	n/a	Early engagement with the DNO or Independent Distribution Network Operator (IDNO) to establish available capacity
Flexibility potential (MW)	0.05	n/a	Modelling of flexibility using demand profiles
Revised peak demand (MW)	0.6	n/a	Revision to peak demand considering available capacity, engagement with third parties and flexibility potential
Percentage flexibility predicted (%)	8%	n/a	Calculations from flexibility potential as a proportion of peak demand

GLA Table 9: Summary of site-wide peak demand, capacity and flexibility potential

The potential to reduce the peak demands through modelling and investigation of the flexibility measures are outlined below.

Flexibility achieved through:	Yes/No	Details
Electrical energy storage (kWh) capacity	No	Battery 'ready' systems only
Heat energy storage (kWh) capacity	No	
Renewable energy generation (load matching)	Yes	0.158Mwh peak generation
Gateway to enable automated demand response	Yes	Data collection and remote control energy management
Smart Systems integration (eg smart charge points, gateway etc)	No	

GLA Table 10: Summary of interventions for achieving flexibility

8.0 CONCLUSION

The results tabulated below show that through energy efficiency measures and renewable technologies 111% reduction on the Part L 2021 baseline demonstrates a net zero-carbon status and compliance with **Policy SI 2** of The London Plan and Haringey **Policy SP4**.

The PV array proposed to achieve regulated net zero carbon covers approximately 25% of the available roof space. This allows for future expansion of the array to offset tenant heating & unregulated carbon and future proof the development to 2050.

	Total regulated emissions (Tonnes CO ₂ / year)	CO ₂ savings (Tonnes CO ₂ / year)	Percentage savings (%)
Part L 2021 baseline	20.0		
Be lean	17.0	3.0	15%
Be clean	17.0	0.0	0%
Be green	-2.2	19.2	96%
Total Savings	-	22.3	111%
	-	CO ₂ savings off-set (Tonnes CO ₂)	-
Off-set	-	-67	-

GLA Summary Table: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-residential buildings

The BRUKL output documents in **Appendix 6** have been used to calculate the credits awarded under Ene01 to contribute towards achieving a BREEAM 'Excellent' rating, as detailed separately in AES's BREEAM Pre-Assessment Report.

The Green buildings modelled within this strategy achieve an EPC A+. See **Appendix 7** for draft EPC report.

The 'Be Seen' stage of **Policy SI 2** will be satisfied via the completion of the planning stage webform. The building is being constructed as a speculative 'shell and core' development with the potential for various different occupier requirements. To ensure future compliance with the 'Be Seen' stage, all energy metering devices shall have the capability to report usage to future occupiers.

APPENDIX 1 – Design Criteria for Enhanced Building

BUILDING DATA

<u>Building Address</u>	-	West Road, Tottenham
<u>SBEM Weather File</u>	-	London
<u>Building Form & Orientation</u>	-	As PRC Planning Issue drawings
<u>SBEM Building Type</u>	-	B2-B7 General Industrial

U-Values

External Walls	-	0.26 W/m ² K
Roof	-	0.16 W/m ² K
Exposed Floor	-	0.18 W/m ² K
Exposed Soffit	-	0.18 W/m ² K
Windows/Curtain Walling	-	1.60 W/m ² K (average inc. frame)
Spandrel Panels	-	0.26 W/m ² K (average inc. frame)
Roof-lights	-	1.30 W/m ² K
Personnel Doors	-	1.60 W/m ² K (average inc. frame)
Loading Bay Doors	-	1.30 W/m ² K (average inc. frame)

General Glazing Data

Type	-	Pilkington Suncool 66/33
g-Value	-	36%
Light Transmission Value	-	66%

Rooflight Data

Area	-	8% of Warehouse Floor Area
g-value	-	43%
Light Transmittance	-	45%

Above-grade Wall and Vertical Glazing Area by Orientation			
Orientation	Above-grade wall area (m ²)	Vertical glazing area (m ²)	Vertical glazing area (%)
North	1537.3	12.9	0.8
East	1199.8	209	17.4
South	1461.3	19.3	1.3
West	1199.8	106.6	8.9
Horizontal	4255.9	297.5	7

<u>Air Permeability</u>	-	3.0m ³ /hr/m ²
--------------------------------	---	--------------------------------------

M&E SYSTEM DATA

AC Heating/Cooling System (HVAC System 1)

System Type	-	Variable Refrigerant Flow
Heating/Cooling Generator	-	Air Source Heat Pump
Fuel	-	Electricity
Heating COP	-	4.11
Cooling EER/SEER	-	5.0/7.35
System Sub-Metered	-	Yes
'Out of Range' Meter Monitoring	-	No

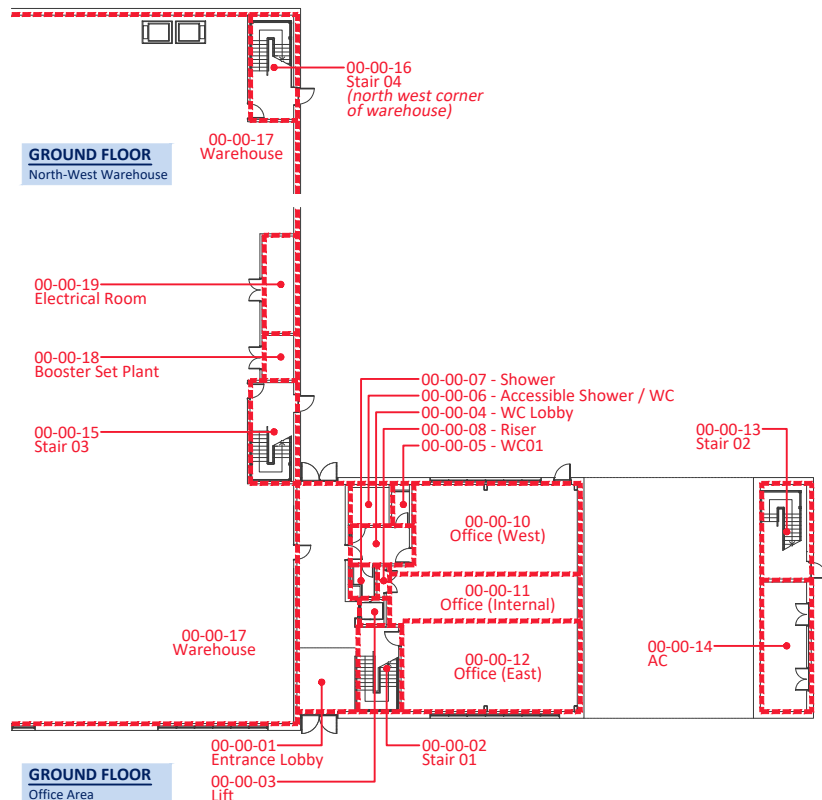
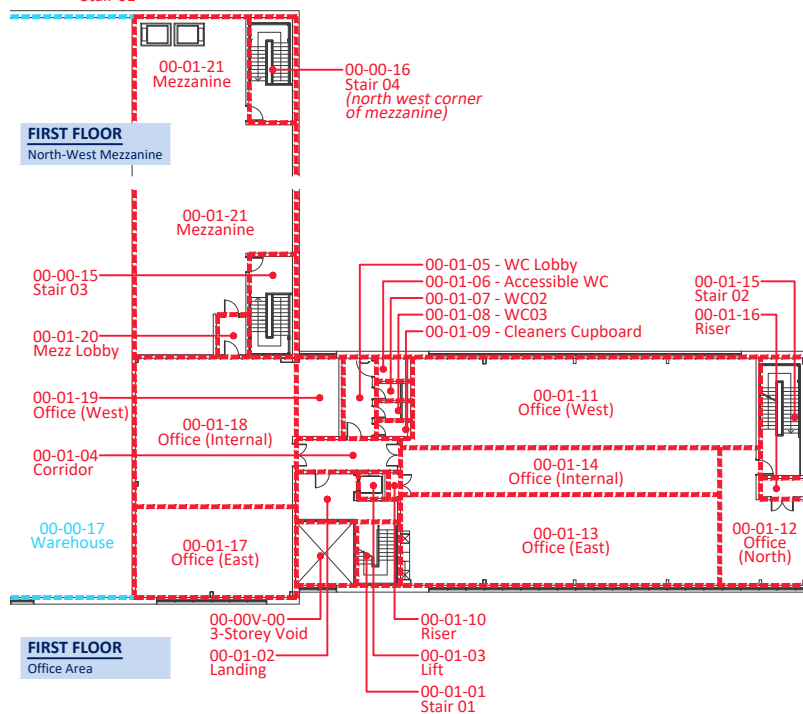
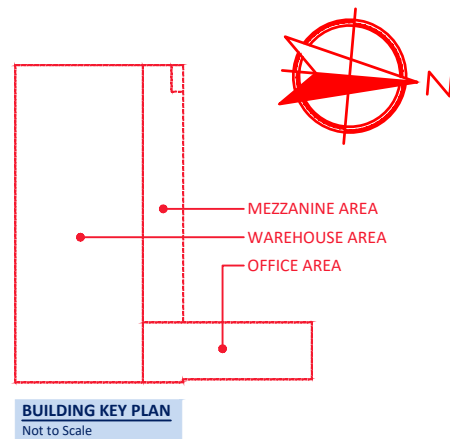
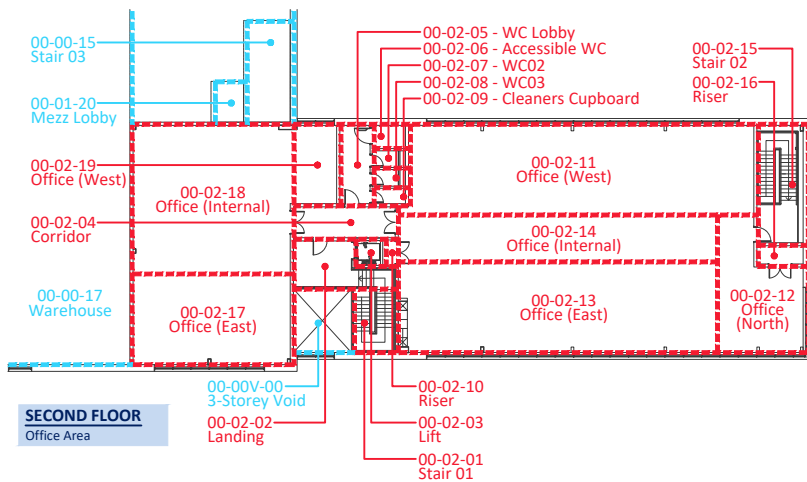
Air Source Heat Pump Radiator Heating System (HVAC System 2)

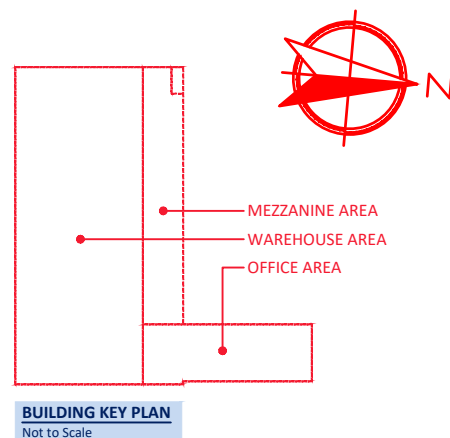
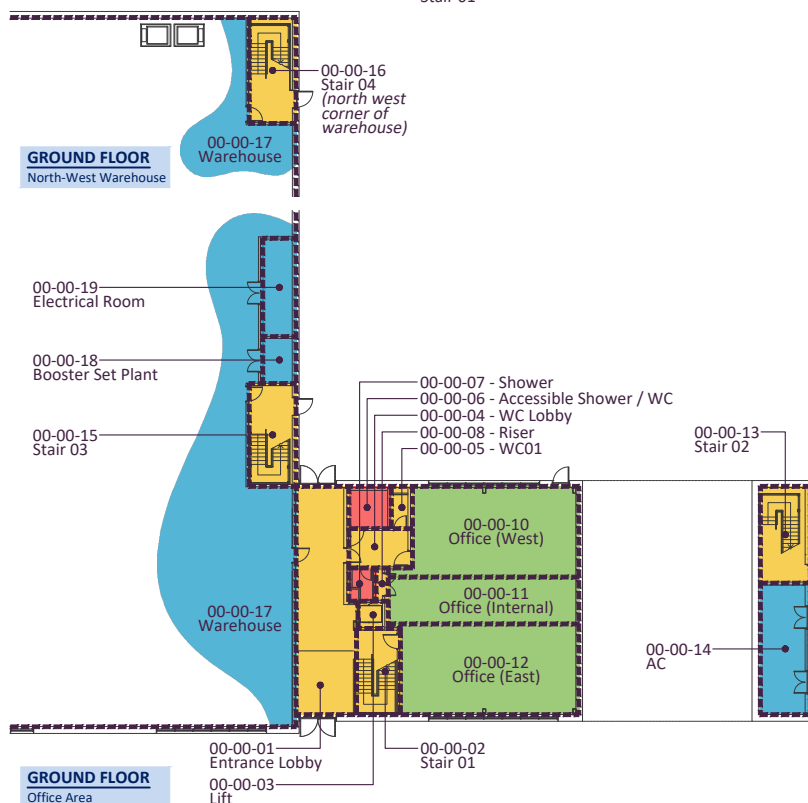
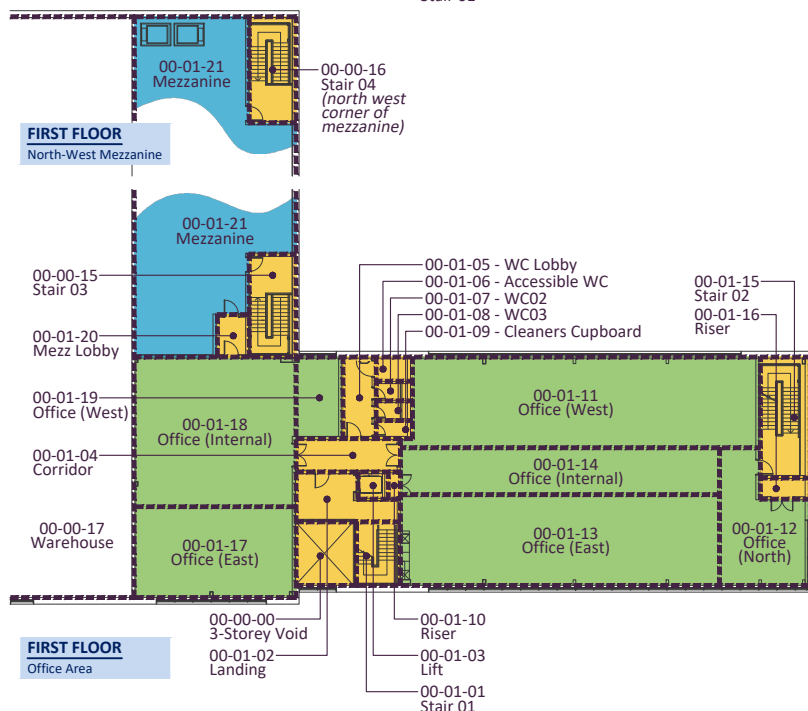
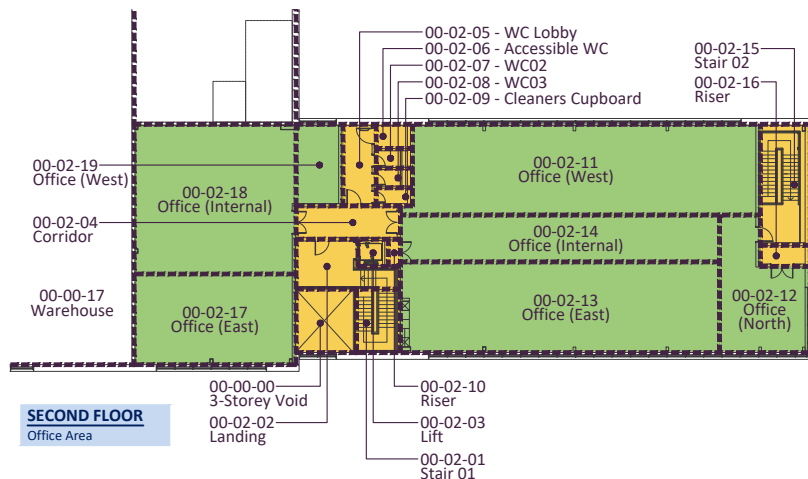
System Type	-	Central heating using water: radiator
Heating Generator	-	Air Source Heat Pump
Fuel	-	Electricity
Heating COP	-	3.5
Pump Type	-	Constant Speed
System Sub-Metered	-	Yes
'Out of Range' Meter Monitoring	-	No

Domestic Hot Water System (DHW System 1)

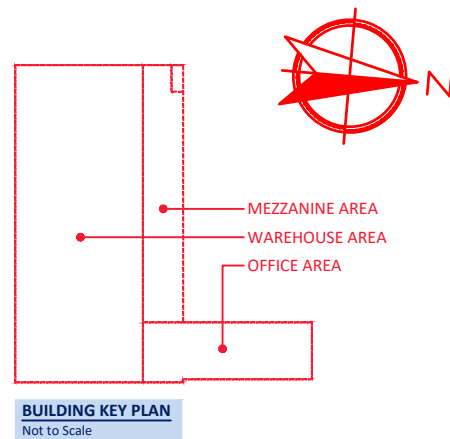
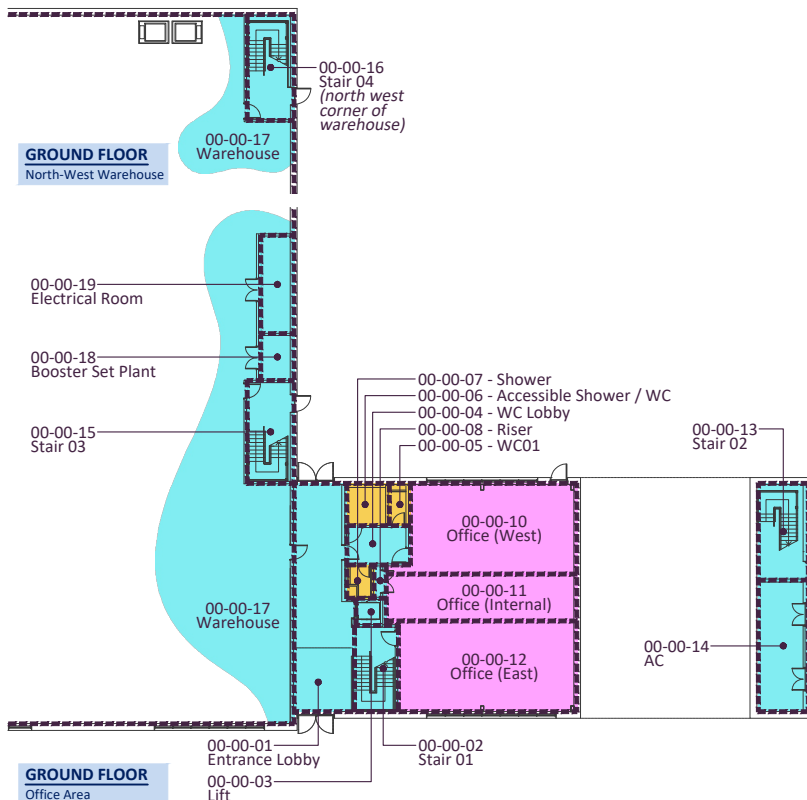
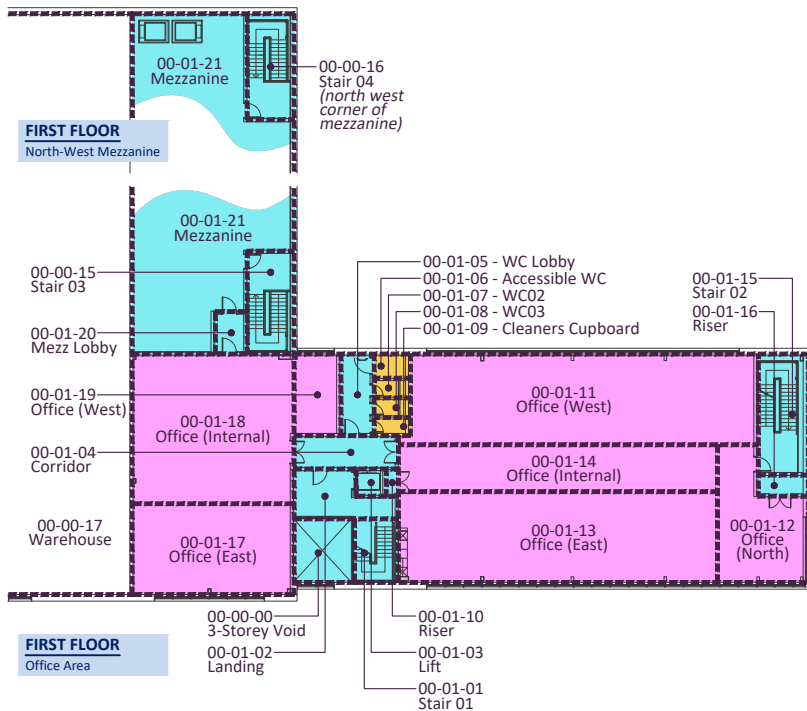
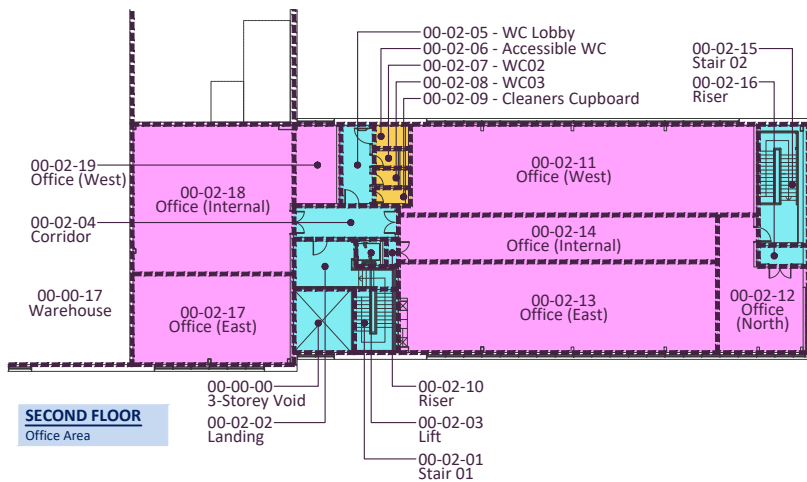
Generator Type	-	Heat Pump
Fuel Type	-	Electricity
Generator Seasonal Efficiency	-	350%
Storage Size	-	180l
Storage Losses	-	0.0077kWh/l/day
Secondary Circulation	-	Yes
Loop Length	-	80m
Circulation Losses	-	10W/m
Pump Power	-	60W

<u>Electric Power Factor</u>	-	>0.95
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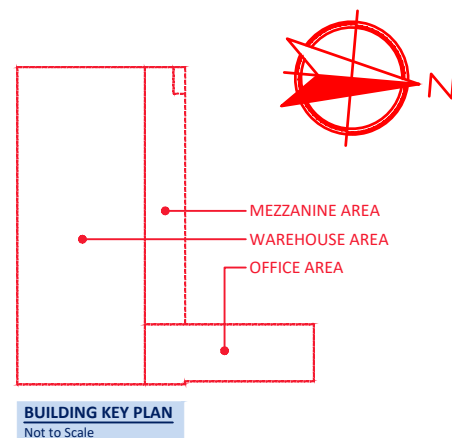
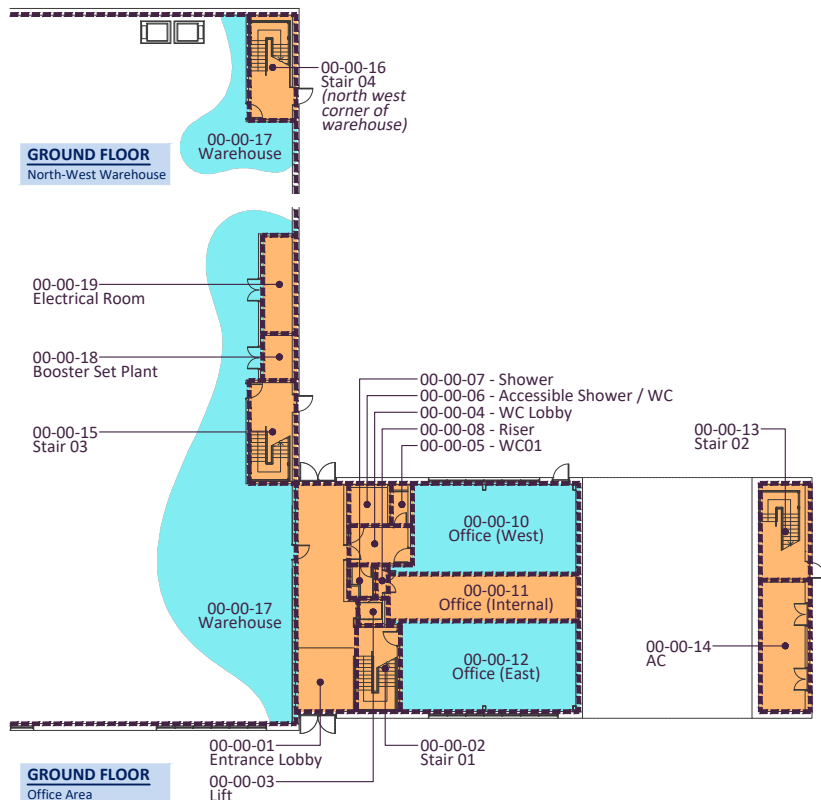
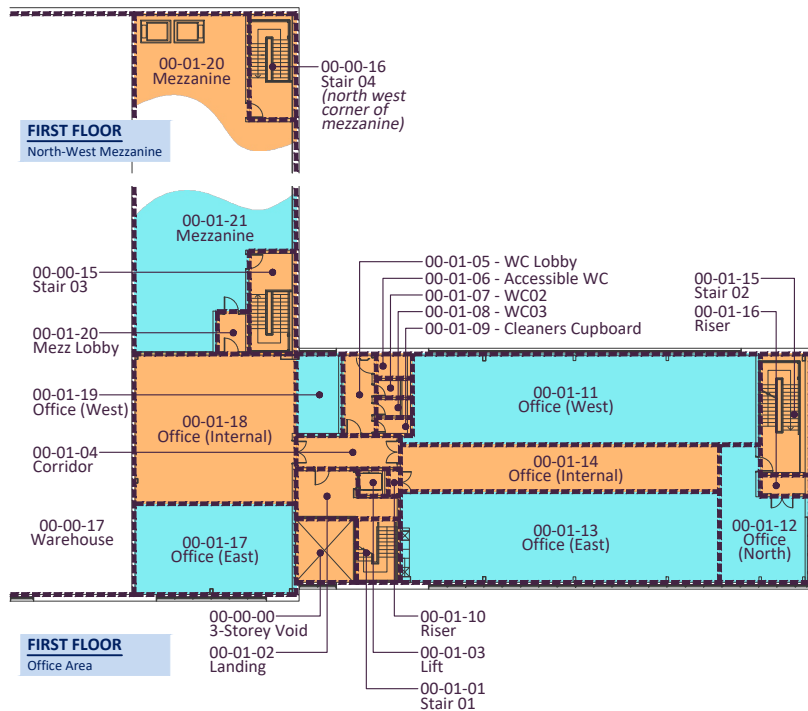
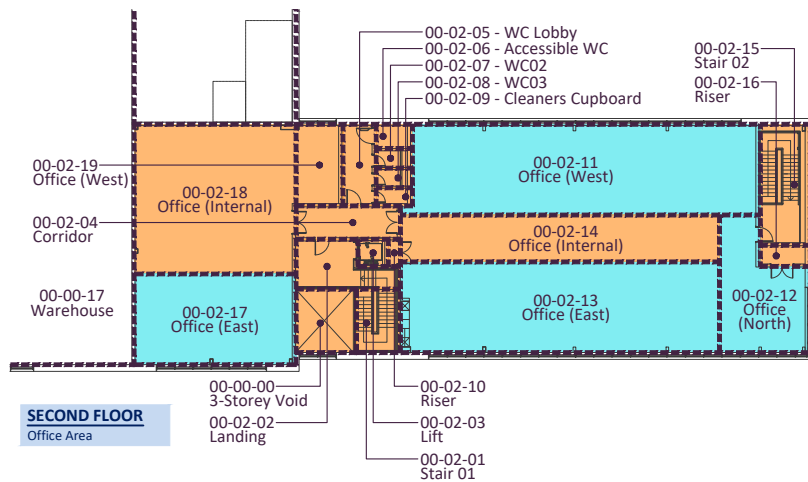




HATCH COLOUR	PLANT	SYSTEM TYPE	EFFICIENCY
		HO HEATING / COOLING	N/A
		LTHW HEATING (WALL MOUNTED) (ASHP GENERATED)	COP = 3.50
		LTHW HEATING (TOWEL RAIL) (ASHP GENERATED)	COP = 3.50
		VRF/MULTI-SPLIT AIR CONDITIONING UNIT	SEER = 7.35 COP = 4.11

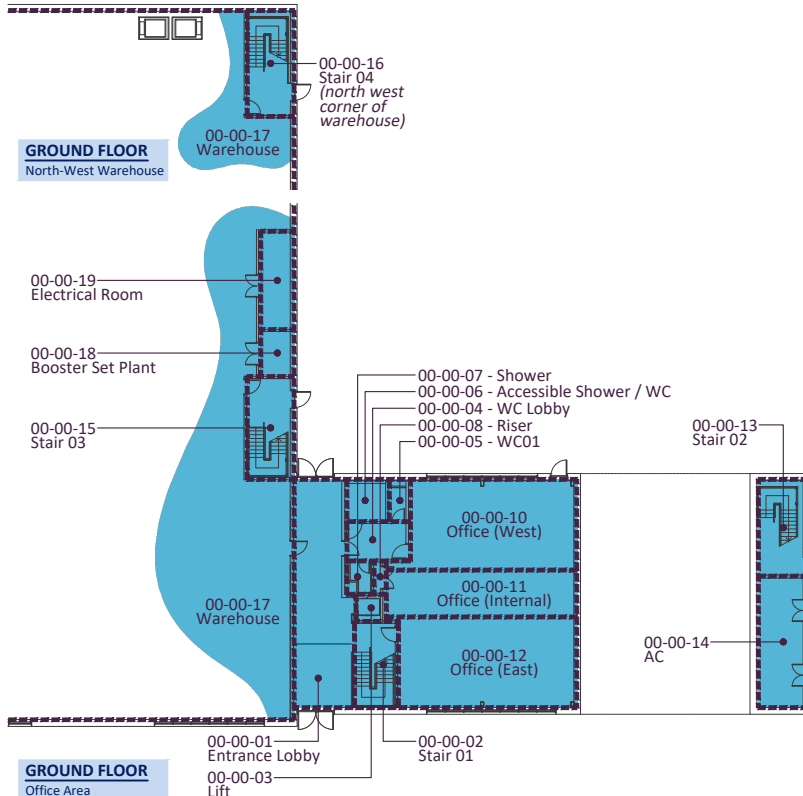
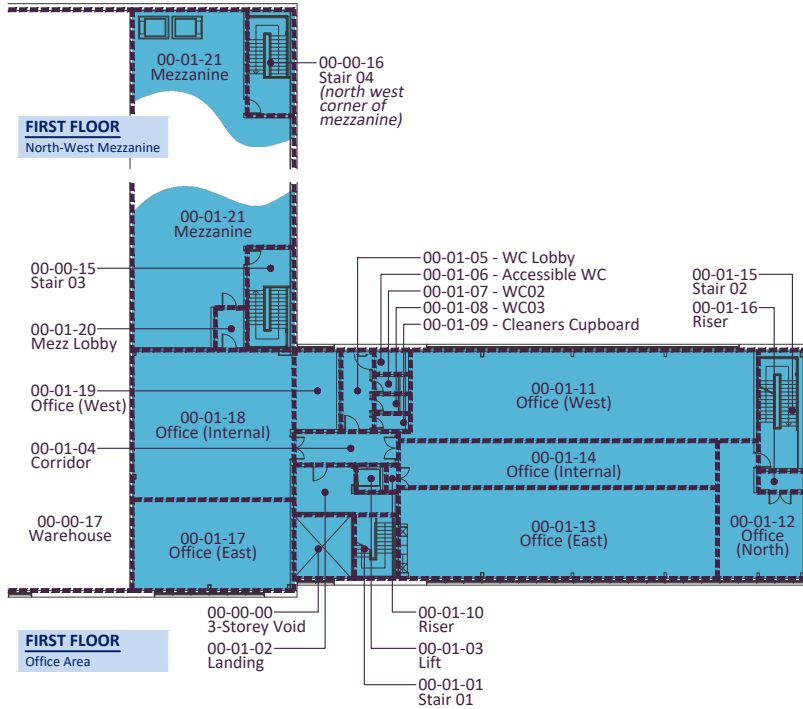
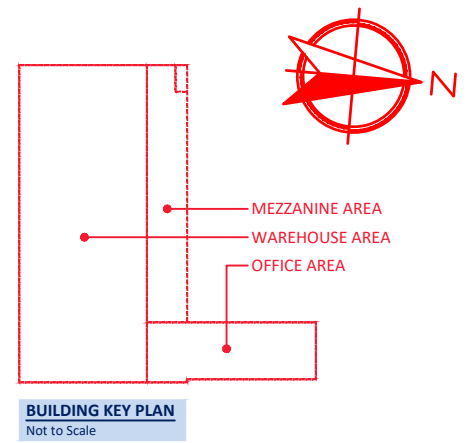
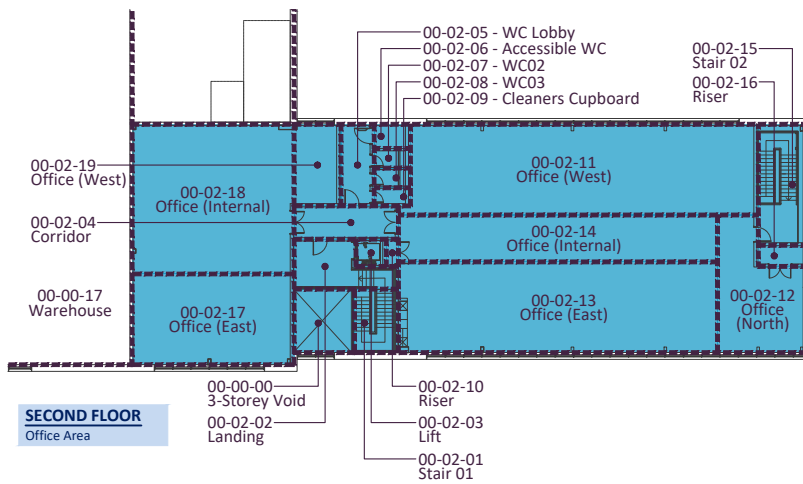


HATCH COLOUR	PLANT	SYSTEM TYPE	SFP
		ZONAL EXTRACT FAN	0.5 W/l/s
		NATURAL VENTILATION / INFILTRATION	N/A
		HEAT RECOVERY UNIT	1.1 W/l/s



HATCH COLOUR	CONTROL ZONE
	AUTO ON/OFF via PIR
	AUTO ON/OFF via PIR with DAYLIGHTING

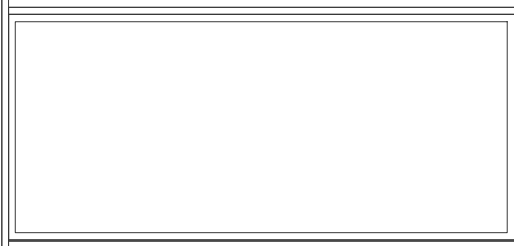
ZONE NAME	POWER CONSUMPTION
Entrance Foyer	95 lm/W
Stairs	95 lm/W
Riser	95 lm/W
Accessible WC	95 lm/W
Office	1.15 W/m² /100 LUX @ 443 LUX
Landing	95 lm/W
Single WC	95 lm/W
WC Lobby	95 lm/W
Warehouse	0.85 W/m² /100 LUX @ 339 LUX



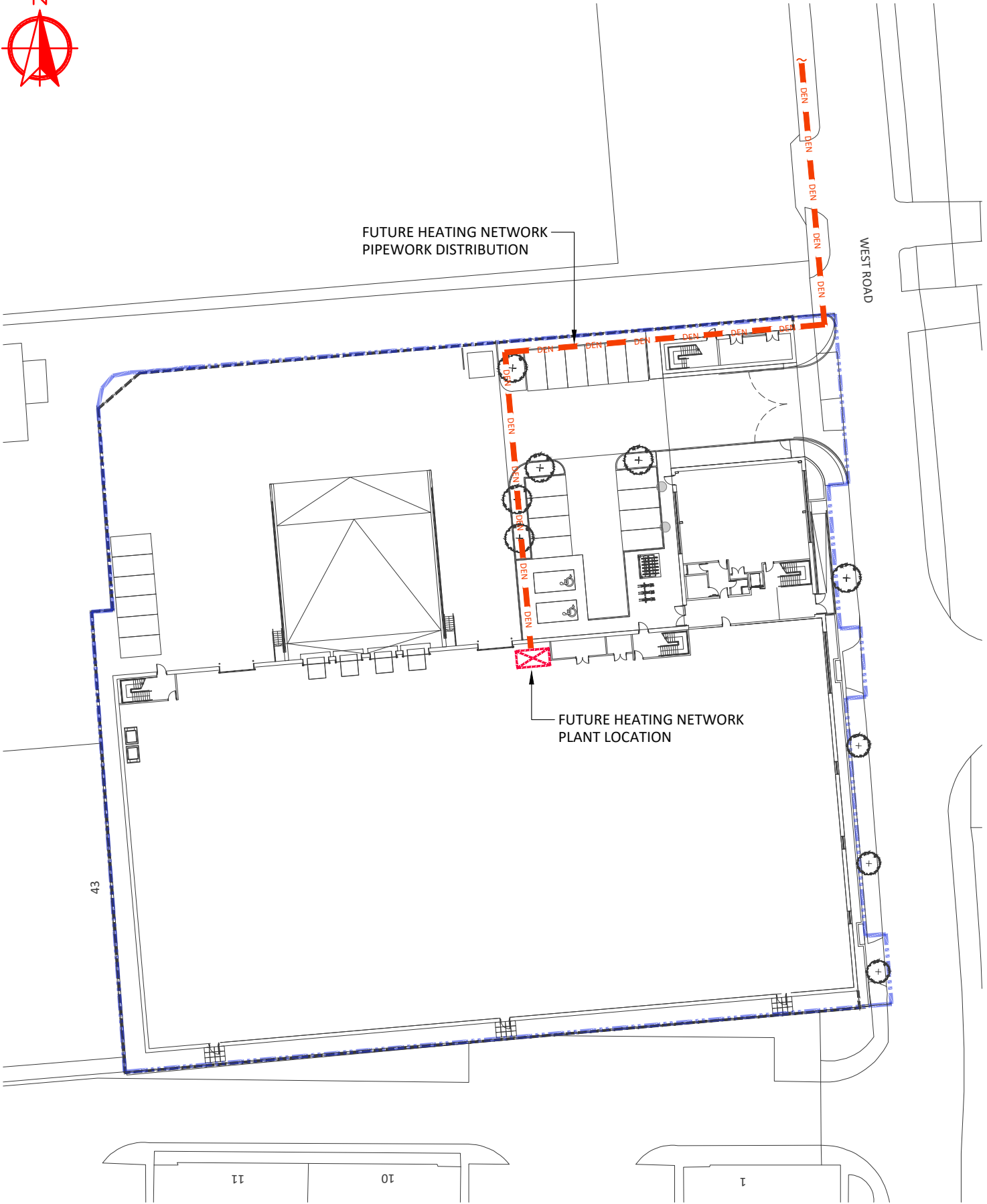
HATCH COLOUR	PLANT	SYSTEM TYPE	RETURN LOOP
		AIR SOURCE HEAT PUMP STORAGE HEATER	80m @ 10W/m



* ORIENTATION MEASURED CLOCKWISE FROM NORTH



APPENDIX 2 – Future District Energy Network Feasibility



APPENDIX 3 – Air Source Heat Pump Technical Information



AIR SOURCE HEAT PUMP
PLANTROOM

MECHANICAL
DISTRIBUTION RISER

WEST ROAD

Office (HVAC System 1) ASHP Outdoor Unit Details (3no.):

NAME	MODEL	CR	COOLING			HEATING			PIPING
			Tmp C	CC	Rq CC	Tmp H	HC	Rq HC	
			%	°C	kW	°C (DBT / RH)	kW	kW	
Out 1	REYA8A	125.0	35.0	20.7	20.0	-5.0 / 86%	18.4	12.0	32.1

Seasonal Efficiency

NAME	MODEL	$\eta_{s,h}$ heating	$\eta_{s,c}$ cooling	SCOP	SEER	CSPF
		%	%			
Out 1	REYA8A	161.5	290.8	4.11	7.35	-

VRV Express Software

The output of the VRV Xpress software is based on Daikin-genuine capacity tables that relate to the Japanese Industry Standard. The VRV Xpress software provides a selection of outdoor and indoor units with optimal efficiency to fit cooling and heating load requirements.
Application version: 2025.1.9.2

Core ASHP (HVAC System 2) - EPRA12EW1

Output - 10.85kW

Seasonal Efficiency - 3.5

APPENDIX 4 – GLA Carbon Emission Reporting Spreadsheet

TABLE 1. APPLICATION COMPLETENESS CHECK	
Development information tab (Tables 1-4) completed and included in appendix of energy strategy?	yes
Part L outputs tab completed	yes
EUI & space heating demand completed	yes
Confirmation that the planning stage workflow will be completed at planning application submission and that the Be Seen process and reporting responsibilities are fully understood, including the requirement for as-built and in-use stage reporting to be undertaken (or where the legal owner changes from one reporting stage to another that the responsible party will be notified).	yes

TABLE 2. DEVELOPMENT DETAILS		Further notes	Response	Supporting comments (or signpost sections in the energy assessment)
Application details	Date of Application	Please provide the date the application was submitted to the Local Planning Authority.		
	Local Planning Authority	Please indicate the Local Planning Authority determining the application.	Haringey	
	Confirmed carbon offset price (£/tonne of carbon dioxide)	Please confirm the agreed carbon offset price for the Local Planning Authority. If no value is entered then the GLA's recommend price of £95 per tonne of carbon dioxide will be used.		0.00
	Evidence of communication on the carbon offset price included in the energy assessment (Y/N).		N	
	Residential units number (Part L1)			
Heat risk	Non-residential floor area in m ² (Part L2)			6014.00
	CIBSE TM59 undertaken for residential development (Y/N).		N	
	CIBSE TM52 undertaken for non-residential development (Y/N).		Y	
	All sample units meet CIBSE criteria with DSY1 weather file (Y/N).		N	
	DSY2 and DSY3 included in overheating assessments (Y/N).			
Energy efficiency measures	Residential g-value			
	% Glazing Ratio over façade			
	External shading proposed (Y/N)		Y	
	Target Fabric Energy Efficiency met (Y/N)		Y	
	Mechanical Ventilation with Heat Recovery included (Y/N).		Y	
District heating connection	Waste Water Heat Recovery (Y/N)		N	
	Low energy lighting (Y/N)		Y	
	Development in a Heat Network Priority Area (HNPA) (Y/N).		N	
	District Heating Network connection (Y/N)		N	
	Name of District Heating Network			
Site heating distribution configuration	Carbon factor (kgCO ₂ /kWh)			
	Borough energy officer and Heat Network Operator contacted and evidence of correspondence included in the energy strategy (Y/N)	Applicable to all applications.	N	
	Development future proofed for DHN connection (Y/N)	Note that individual heating systems would not be appropriate for developments in HNPA's.	N	
	Drawings of communal system provided (Y/N)	Applicants should provide a drawings of the energy centre, on-site communal network with all building uses connected and future proofing arrangements detailed, including single point of connection.	N	
	Distribution type			
Heating system performance	Flow temperature (°C)			
	Return temperature (°C)			
	Distribution losses modelled (%)	See table 4 below for details.	Y	
	Heat Pump (Y/N).		Y	
	Heat Pump source		Air Source	111.00
	Centralised Heat Pump capacity (kWth)			4.11
	Heat Pump Seasonal Heating Efficiency (SCoP)			
	Heat Pump SCoP calculation includes heat source and heat distribution temperature and seasonal performance factor (Y/N).	See table 5 below for details.	Y	
	Fraction of heat supplied by heat pump (only for hybrid systems with boilers) (%)			
	Low-emission on-site CHP enabling an area-wide heat network (Y/N)	Only low-emission CHP is suitable and <u>only</u> where it is facilitating an area-wide heat network. Therefore, new gas engine CHP is not suitable for any other purpose for new developments.		
Solar technologies	CHP (kWth)			
	Estimated end user cost (pence/kWh)			
	Energy assessment includes consideration of occupant running costs (Y/N)	Applicants should consider the estimated costs to occupants of the energy assessment and outline how they are committed to protecting the consumer from high prices.		
	Solar PV included (Y/N)		Y	
	Roof layout demonstrating solar PV technologies have been maximised included in energy strategy (Y/N)		Y	
Flexibility and peak energy demand	kWh generated			141539.00
	kWp			158.00
	Total PV panel area (m ²) installed			800.00
	Solar Thermal included (Y/N)		N	
	Solar Thermal panel area (m ²) installed			
Other technologies	Site-wide peak demand, capacity and flexibility potential included in energy assessment (Y/N).	Table 9 in the energy assessment guidance to be completed.	Y	
	Interventions for achieving flexibility included in energy assessment (Y/N)	Table 10 in the energy assessment guidance to be completed.	Y	
	Estimated peak demand (MW)			0.50
	Electrical energy storage (kWh) capacity			
	Heat energy storage (kWh) capacity			
Cooling	System type (e.g. wind turbine)			
	Capacity (kW)			
	Cooling proposed - Residential (Y/N)	It is not expected that 'active cooling' will be proposed for any residential developments. It will be expected that applicants can fully demonstrate that all passive design measures have been thoroughly investigated before considering 'active cooling'.		
	Cooling proposed - Non-residential (Y/N)		Y	
	Residential Cooling consumption (kWh p.a.)	See note in cell C60.		
	Commercial Cooling consumption (MJ p.a.)			24359.00

TABLE 3. BESPOKE DH CARBON FACTOR CALCULATION METHODOLOGY				
Please provide below details of the calculation methodology followed to establish the bespoke carbon factor, if applicable.				

TABLE 4. DISTRIBUTION LOSSES		COMMENTS		
Primary network (buried pipe)	Total pipe length (m)			
	Average heat loss rate (W/m)			
Secondary network (buried pipe)	Total pipe length (m)			
	Average heat loss rate (W/m)			
Total losses (MWh/year)				
Total heat supplied (MWh/year)				
Distribution Loss Factor (DLF)				
Calculation included in energy statement (yes/no)				

TABLE 5. SEASONAL COEFFICIENT OF PERFORMANCE (SCoP) CALCULATION METHODOLOGY	
Details of the Seasonal Coefficient of Performance (SCoP), the Seasonal Performance Factor (SPF) and Seasonal Energy Efficiency ratio (SEER), which should be used in the energy modelling. This should be based on a dynamic calculation of the system boundaries over the course of a year i.e. incorporating variations in source temperatures and the design sink temperatures (for space heat and hot water). Details of the assumptions should be included in the energy assessment, including manufacturer datasheets showing performance under test conditions for the specific source and sink temperatures of the proposed development and assumptions for hours spent under changing source temperatures.	

The applicant should complete all the light blue cells including information on the modelled units, the area per unit, the number of units, the TER/DER/BER and the TFEE/DFEE.

RESIDENTIAL CO ₂ ANALYSIS (PART L1)																		
Unit Identifier (e.g. plot number, dwelling type etc.)	Model total floor area (m ²) (Row 4)	Number of units represented by model	Total area represented by model (m ²)	Baseline		'Be Lean'	'Be Clean'	'Be Green'	Fabric Energy Efficiency (FEE)		Baseline		'Be Lean'		'Be Clean'		'Be Green'	
				TER	Energy saving/generation technologies (-)	DER	DER	DER	Target Fabric Energy Efficiency	Dwelling Fabric Energy Efficiency	Part L 2021 CO ₂ emissions	Energy saving/generation technologies	Part L 2021 CO ₂ emissions	Part L 2021 CO ₂ emissions with Notional PV savings included	'Be Lean' savings	Part L 2021 CO ₂ emissions	Part L 2021 CO ₂ emissions with Notional PV savings included	'Be Clean' savings
				(kgCO ₂ / m ²) (Row 273)	(kgCO ₂ p.a.) (Row 289)	(kgCO ₂ / m ²) (Row 273 or 384)	(kgCO ₂ / m ²) (Row 273 or 384)	(kgCO ₂ / m ²) (Row 273 or 384)	(kWh/m ²)	(kWh/m ²)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)
Sum		0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0
NON-RESIDENTIAL CO ₂ ANALYSIS (PART L2)																		
Building Use	Model Area (m ²)	Number of units	Total area represented by model (m ²)	Baseline		'Be Lean'	'Be Clean'	'Be Green'			Baseline		'Be Lean'		'Be Clean'		'Be Green'	
				BRUKL TER	BRUKL Displaced electricity (-)	BRUKL BER	BRUKL BER	BRUKL BER			Part L 2021 CO ₂ emissions	Energy saving/generation technologies	Part L 2021 CO ₂ emissions	Part L 2021 CO ₂ emissions with Notional PV savings included	'Be Lean' savings	Part L 2021 CO ₂ emissions	Part L 2021 CO ₂ emissions with Notional PV savings included	'Be Clean' savings
				(kgCO ₂ / m ²)	(kWh / m ²)	(kgCO ₂ / m ²)	(kgCO ₂ / m ²)	(kgCO ₂ / m ²)			(kgCO ₂ p.a.)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)	(kgCO ₂ p.a.)
General Industria	6014	1	6014	3.33	0.00	2.83	2.83	-0.37			20,027	0.00	17,019.62	17,020	3,007	17,020	17,020	0
Sum	1	6,014		3.3	0.0	2.8	2.8	-0.4			20,027	0	17,020	17,020	3,007	17,020	17,020	-2,225
SITE-WIDE ENERGY CONSUMPTION AND CO ₂ ANALYSIS																		
Total Sum		6,014		-	-	-	-	-			20,027	0	17,020	17,020	3,007	17,020	17,020	-2,225

Applicants can use the 'be seen' methodology or an alternative predictive energy modelling methodology to fill in this tab.

Where 'be seen' reporting is used the reported EU1 and space heating demand should align with energy consumption data reported in the planning stage submission for the 'be seen' policy, submitted via the online webform.

Residential predicted energy use

Building type	GIA (m ²)	EUI & space heating demand (kWh/year)										Has the following energy use been included?		Results		Table 4 of the guidance comparison		Methodology used		
		Space heating demand	Annual Electricity Use	Annual Gas Use	Annual Oil Use	Annual Biomass Use	Annual District Htg Use	Annual District Ctg Use	Elec Generation, Gross	Solar Thermal Generation	Regulated	Unregulated	EUI (kWh/m ² /year) (excluding renewable energy)	Space heating demand (kWh/m ² /year) (excluding renewable energy)	EUI value from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Space heating demand from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Software	Operational energy use assessment	notes (if expected performance differs from the Table 4 values in the guidance or other software used)	
Residential use (total)																				
Landlord Circulation (in Residential Blocks)																				
Total	0	0	0	0	0	0	0	0	0	0										

Non-residential predicted energy use

Building type	GIA (m ²)	EUI & space heating demand (kWh/year)									Has the following energy use been included?		Results		Table 4 of the guidance comparison		Methodology used		
		Space heating demand	Annual Electricity Use	Annual Gas Use	Annual Oil Use	Annual Biomass Use	Annual District Htg Use	Annual District Clg Use	Elec Generation, Gross	Solar Thermal Generation	Regulated	Unregulated	EUI (kWh/m ² /year) (excluding renewable energy)	Space heating demand (kWh/m ² /year) (excluding renewable energy)	EUI value from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Space heating demand from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Software	Operational energy use assessment	notes (if expected performance differs from the Table 4 values in the guidance or other software used)
All other non-residential	6014	79076.1	317.185	0	0	0	0	0	141539	0	Yes	Yes	76.27602261	13.14866977	55	15	Part L2 - approved DSM	none	See SBP energy statement
Total	6014	79076.1	317.185	0	0	0	0	0	141539	0									

Part L 2021 Performance

Residential

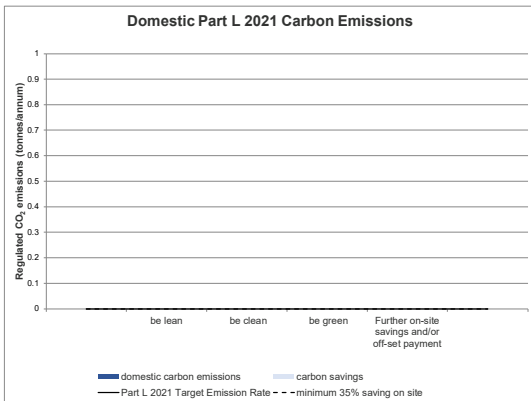
Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for residential building

	Carbon Dioxide Emissions for residential buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	0.0	
After energy demand reduction (be lean)	0.0	
After heat network connection (be clean)	0.0	
After renewable energy (be green)	0.0	

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for residential building

	Regulated residential carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	0.0	0%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	0.0	0%
Cumulative on site savings	0.0	0%
Annual savings from off-set payment	0.0	-
	(Tonnes CO ₂)	
Cumulative savings for off-set payment	0	-
Cash in-lieu contribution (£)	0	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' ta



Non-residential

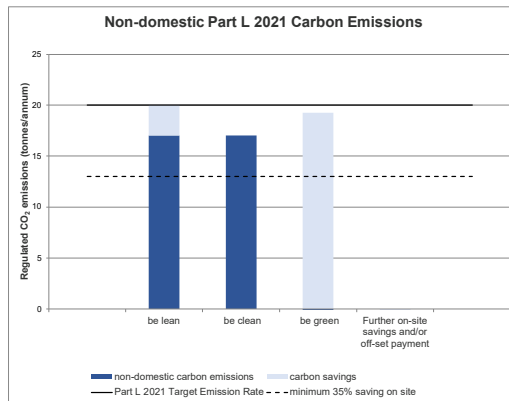
Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-residential building

	Carbon Dioxide Emissions for non-residential buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	20.0	
After energy demand reduction (be lean)	17.0	
After heat network connection (be clean)	17.0	
After renewable energy (be green)	-2.2	

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-residential building

	Regulated non-residential carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	3.0	15%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	19.2	96%
Total Cumulative Savings	22.3	111%
Annual savings from off-set payment	-2.2	-
	(Tonnes CO ₂)	
Cumulative savings for off-set payment	-67	-
Cash in-lieu contribution (£)	-6,342	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' ta



SITE-WIDE

	Total regulated emissions (Tonnes CO ₂ / year)	CO ₂ savings (Tonnes CO ₂ / year)	Percentage savings (%)
Part L 2021 baseline	20.0		
Be lean	17.0	3.0	15%
Be clean	17.0	0.0	0%
Be green	-2.2	19.2	96%
Total Savings	-	22.3	111%
	-	CO ₂ savings off-set (Tonnes CO ₂)	-
Off-set	-	-66.8	-

	Target Fabric Energy Efficiency (kWh/m ²)	Dwelling Fabric Energy Efficiency (kWh/m ²)	Improvement (%)
Development total	0.00	0.00	

	Area weighted non-residential cooling demand (MJ/m ²)	Total non-residential cooling demand (MJ/year)
Actual		
Notional		

EUI & space heating demand (predicted energy use)

Residential

Building type	EUI (kWh/m ² /year) (excluding renewable energy)	Space heating demand (kWh/m ² /year) (excluding renewable energy)	EUI value from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Space heating demand from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Methodology used (e.g. 'be seen' methodology or an alternative predictive energy modelling methodology)	Explanatory notes (if expected performance differs from the Table 4 values in the guidance)

Non-residential

Building type	EUI (kWh/m ² /year) (excluding renewable energy)	Space heating demand (kWh/m ² /year) (excluding renewable energy)	EUI value from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Space heating demand from Table 4 of the guidance (kWh/m ² /year) (excluding renewable energy)	Methodology used (e.g. 'be seen' methodology or an alternative predictive energy modelling methodology)	Explanatory notes (if expected performance differs from the Table 4 values in the guidance)
All other non-residential	76.27602261	13.14866977	55	15	Part L2 - approved DSM & none	See SBP energy statement

APPENDIX 5 – BRUKL Report for Lean Building

Project name

West Road - Lean Model Rev 1**As designed**

Date: Mon Feb 24 11:44:21 2025

Administrative information

Building Details

Address: West Road - Lean Model Rev 1, London,

Certifier details

Name: Aaron Batten

Telephone number: 01962 832 656

Address: Unit 22 Basepoint Business Centre, 1 Winnall Valley Road, Winchester, SO23 0LD

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.27

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.27

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

Foundation area [m²]: 578.48The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	3.33
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	2.83
Target primary energy rate (TPER), kWh _{pe} /m ² annum	35.59
Building primary energy rate (BPER), kWh _{pe} /m ² annum	30.22
Do the building's emission and primary energy rates exceed the targets?	BER ≤ TER BPER ≤ TPER

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

Fabric element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.26	0.26	00000075:Surf[4]
Floors	0.18	0.18	0.18	00000075:Surf[10]
Pitched roofs	0.16	0.16	0.16	00000040:Surf[22]
Flat roofs	0.18	0.16	0.16	00000040:Surf[41]
Windows** and roof windows	1.6	1.6	1.6	00000075:Surf[0]
Rooflights***	2.2	1.3	1.3	00000040:Surf[24]
Personnel doors [^]	1.6	1.6	1.6	0000003A:Surf[2]
Vehicle access & similar large doors	1.3	1.3	1.3	00000040:Surf[14]
High usage entrance doors	3	1.6	1.6	00000075:Surf[0]

U_{a-Limit} = Limiting area-weighted average U-values [W/(m²K)]U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]U_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]

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

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

[^] For fire doors, limiting U-value is 1.8 W/m²K

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

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	3

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	>0.95

1- ASHP Htg & HWS (S2)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.86	-	0.2	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

2- AC Htg & CLG (S1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.64	7.35	0	1.1	0.75
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

1- ASHP Htg & HWS (S2)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	2.86	0.008
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
00-00-05 - WC01	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00-00-06 - Accessible Shower / WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00-00-07 - Shower	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00-01-06 - Accessible WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00-01-07 - WC02	-	-	0.5	-	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
00-01-08 - WC03	-	-	0.5	-	-	-	-	-	-	-	N/A
00-01-09 - Cleaners Cupboard	-	-	0.5	-	-	-	-	-	-	-	N/A
00-02-06 - Accessible WC	-	-	0.5	-	-	-	-	-	-	-	N/A
00-02-07 - WC02	-	-	0.5	-	-	-	-	-	-	-	N/A
00-02-08 - WC03	-	-	0.5	-	-	-	-	-	-	-	N/A
00-02-09 - Cleaners Cupboard	-	-	0.5	-	-	-	-	-	-	-	N/A

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80	0.3
00-00-01 - Entrance Lobby		62	-	-
00-00-02 - Stair 01		107	-	-
00-00-03 - Lift		174	-	-
00-00-04 - WC Lobby		73	-	-
00-00-05 - WC01		105	-	-
00-00-06 - Accessible Shower / WC		78	-	-
00-00-07 - Shower		100	-	-
00-00-08 - Riser		121	-	-
00-00-10 - Office (West)		40	-	-
00-00-11 - Office (Internal)		39	-	-
00-00-12 - Office (East)		40	-	-
00-00-13 - Stair 02		133	-	-
00-00-14 - AC		83	-	-
00-00-15 - Stair 03		174	-	-
00-00-16 - Stair 04		174	-	-
00-00-17 - Warehouse		40	-	-
00-00-18 - Booster Set Plant		121	-	-
00-00-19 - Electrical Room		121	-	-
00-01-01 - Stair 01		174	-	-
00-01-02 - Landing		66	-	-
00-01-03 - Lift		174	-	-
00-01-04 - Corridor		80	-	-
00-01-05 - WC Lobby		74	-	-
00-01-06 - Accessible WC		103	-	-
00-01-07 - WC02		116	-	-
00-01-08 - WC03		116	-	-
00-01-09 - Cleaners Cupboard		123	-	-
00-01-10 - Riser		121	-	-
00-01-11 - Office (West)		40	-	-
00-01-12 - Office (North)		41	-	-
00-01-13 - Office (East)		39	-	-
00-01-14 - Office (Internal)		39	-	-
00-01-15 - Stair 02		174	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80	0.3
00-01-16 - Riser		121	-	-
00-01-17 - Office (East)		40	-	-
00-01-18 - Office (Internal)		39	-	-
00-01-19 - Office (West)		44	-	-
00-01-20 - Mezz Lobby		156	-	-
00-01-21 - Mezzanine		44	-	-
00-02-01 - Stair 01		174	-	-
00-02-02 - Landing		66	-	-
00-02-03 - Lift		174	-	-
00-02-04 - Corridor		80	-	-
00-02-05 - WC Lobby		74	-	-
00-02-06 - Accessible WC		103	-	-
00-02-07 - WC02		116	-	-
00-02-08 - WC03		116	-	-
00-02-09 - Cleaners Cupboard		123	-	-
00-02-10 - Riser		121	-	-
00-02-11 - Office (West)		40	-	-
00-02-12 - Office (North)		41	-	-
00-02-13 - Office (East)		39	-	-
00-02-14 - Office (Internal)		39	-	-
00-02-15 - Stair 02		149	-	-
00-02-16 - Riser		121	-	-
00-02-17 - Office (East)		40	-	-
00-02-18 - Office (Internal)		39	-	-
00-02-19 - Office (West)		44	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00-00-10 - Office (West)	NO (-64%)	NO
00-00-11 - Office (Internal)	NO (-41.4%)	NO
00-00-12 - Office (East)	NO (-56.6%)	NO
00-00-17 - Warehouse	NO (-5.2%)	NO
00-01-11 - Office (West)	NO (-15.1%)	NO
00-01-12 - Office (North)	NO (-30.6%)	NO
00-01-13 - Office (East)	NO (-15.5%)	NO
00-01-14 - Office (Internal)	NO (-45.3%)	NO
00-01-17 - Office (East)	NO (-44.9%)	NO
00-01-18 - Office (Internal)	NO (-84.7%)	NO
00-01-19 - Office (West)	NO (-22.9%)	NO
00-01-21 - Mezzanine	N/A	N/A
00-02-11 - Office (West)	NO (-13.2%)	NO
00-02-12 - Office (North)	NO (-30.4%)	NO
00-02-13 - Office (East)	NO (-15.3%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00-02-14 - Office (Internal)	NO (-44.7%)	NO
00-02-17 - Office (East)	NO (-43.7%)	NO
00-02-18 - Office (Internal)	NO (-85.3%)	NO
00-02-19 - Office (West)	NO (-15.9%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	6014	6014
External area [m ²]	13892.8	13892.8
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	5
Average conductance [W/K]	3762.74	0
Average U-value [W/m ² K]	0.27	0
Alpha value* [%]	25.25	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
100	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	4.75	3.16
Cooling	1.13	1.6
Auxiliary	1.79	2.8
Lighting	10.72	14.94
Hot water	1.86	1.35
Equipment*	34.05	34.05
TOTAL**	20.25	23.86

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	61.82	58.25
Primary energy [kWh _{PE} /m ²]	30.22	35.59
Total emissions [kg/m ²]	2.83	3.33

HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	79.9	89	9.2	5.2	6.1	2.41	4.74	2.64	7.35
Notional	43.4	123.4	4.3	7.4	11.6	2.78	4.63	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	406.4	0	44.2	0	6.4	2.55	0	2.86	0
Notional	356.4	0	35.6	0	4.6	2.78	0	----	----
[ST] No Heating or Cooling									
Actual	0	0	0	0	0	0	0	0	0
Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

APPENDIX 6 – BRUKL Report for Green Building

Project name

West Road - Green Model Rev 1**As designed**

Date: Mon Feb 24 11:40:22 2025

Administrative information

Building Details

Address: West Road - Green Model Rev 1, London,

Certifier details

Name: Aaron Batten

Telephone number: 01962 832 656

Address: Unit 22 Basepoint Business Centre, 1 Winnall Valley Road, Winchester, SO23 0LD

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.27

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.27

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

Foundation area [m²]: 578.48The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	3.33
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	-0.37
Target primary energy rate (TPER), kWh _{pe} /m ² annum	35.59
Building primary energy rate (BPER), kWh _{pe} /m ² annum	-6.58
Do the building's emission and primary energy rates exceed the targets?	BER ≤ TER BPER ≤ TPER

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

Fabric element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.26	0.26	00000075:Surf[4]
Floors	0.18	0.18	0.18	00000075:Surf[10]
Pitched roofs	0.16	0.16	0.16	00000040:Surf[22]
Flat roofs	0.18	0.16	0.16	00000040:Surf[41]
Windows** and roof windows	1.6	1.6	1.6	00000075:Surf[0]
Rooflights***	2.2	1.3	1.3	00000040:Surf[24]
Personnel doors [^]	1.6	1.6	1.6	0000003A:Surf[2]
Vehicle access & similar large doors	1.3	1.3	1.3	00000040:Surf[14]
High usage entrance doors	3	1.6	1.6	00000075:Surf[0]

U_{a-Limit} = Limiting area-weighted average U-values [W/(m²K)]U_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]

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

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

[^] For fire doors, limiting U-value is 1.8 W/m²K

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

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	3

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	>0.95

1- ASHP Htg & HWS (S2)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	-	0.2	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

2- AC Htg & CLG (S1)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.11	7.35	0	1.1	0.75
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

1- ASHP Htg & HWS (S2)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.5	0.008
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
00-00-05 - WC01	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00-00-06 - Accessible Shower / WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00-00-07 - Shower	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00-01-06 - Accessible WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A
00-01-07 - WC02	-	-	0.5	-	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard	
00-01-08 - WC03	-	-	0.5	-	-	-	-	-	-	-	N/A	
00-01-09 - Cleaners Cupboard	-	-	0.5	-	-	-	-	-	-	-	N/A	
00-02-06 - Accessible WC	-	-	0.5	-	-	-	-	-	-	-	N/A	
00-02-07 - WC02	-	-	0.5	-	-	-	-	-	-	-	N/A	
00-02-08 - WC03	-	-	0.5	-	-	-	-	-	-	-	N/A	
00-02-09 - Cleaners Cupboard	-	-	0.5	-	-	-	-	-	-	-	N/A	

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80	0.3
00-00-01 - Entrance Lobby		95	-	-
00-00-02 - Stair 01		95	-	-
00-00-03 - Lift		95	-	-
00-00-04 - WC Lobby		95	-	-
00-00-05 - WC01		95	-	-
00-00-06 - Accessible Shower / WC		95	-	-
00-00-07 - Shower		95	-	-
00-00-08 - Riser		95	-	-
00-00-10 - Office (West)		132	-	-
00-00-11 - Office (Internal)		127	-	-
00-00-12 - Office (East)		131	-	-
00-00-13 - Stair 02		95	-	-
00-00-14 - AC		95	-	-
00-00-15 - Stair 03		95	-	-
00-00-16 - Stair 04		95	-	-
00-00-17 - Warehouse		187	-	-
00-00-18 - Booster Set Plant		95	-	-
00-00-19 - Electrical Room		95	-	-
00-01-01 - Stair 01		95	-	-
00-01-02 - Landing		95	-	-
00-01-03 - Lift		95	-	-
00-01-04 - Corridor		95	-	-
00-01-05 - WC Lobby		95	-	-
00-01-06 - Accessible WC		95	-	-
00-01-07 - WC02		95	-	-
00-01-08 - WC03		95	-	-
00-01-09 - Cleaners Cupboard		95	-	-
00-01-10 - Riser		95	-	-
00-01-11 - Office (West)		129	-	-
00-01-12 - Office (North)		133	-	-
00-01-13 - Office (East)		128	-	-
00-01-14 - Office (Internal)		126	-	-
00-01-15 - Stair 02		95	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80	0.3
00-01-16 - Riser		95	-	-
00-01-17 - Office (East)		131	-	-
00-01-18 - Office (Internal)		128	-	-
00-01-19 - Office (West)		145	-	-
00-01-20 - Mezz Lobby		95	-	-
00-01-21 - Mezzanine		205	-	-
00-02-01 - Stair 01		95	-	-
00-02-02 - Landing		95	-	-
00-02-03 - Lift		95	-	-
00-02-04 - Corridor		95	-	-
00-02-05 - WC Lobby		95	-	-
00-02-06 - Accessible WC		95	-	-
00-02-07 - WC02		95	-	-
00-02-08 - WC03		95	-	-
00-02-09 - Cleaners Cupboard		95	-	-
00-02-10 - Riser		95	-	-
00-02-11 - Office (West)		129	-	-
00-02-12 - Office (North)		133	-	-
00-02-13 - Office (East)		128	-	-
00-02-14 - Office (Internal)		126	-	-
00-02-15 - Stair 02		95	-	-
00-02-16 - Riser		95	-	-
00-02-17 - Office (East)		132	-	-
00-02-18 - Office (Internal)		129	-	-
00-02-19 - Office (West)		145	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00-00-10 - Office (West)	NO (-64%)	NO
00-00-11 - Office (Internal)	NO (-41.4%)	NO
00-00-12 - Office (East)	NO (-56.6%)	NO
00-00-17 - Warehouse	NO (-5.2%)	NO
00-01-11 - Office (West)	NO (-15.1%)	NO
00-01-12 - Office (North)	NO (-30.6%)	NO
00-01-13 - Office (East)	NO (-15.5%)	NO
00-01-14 - Office (Internal)	NO (-45.3%)	NO
00-01-17 - Office (East)	NO (-44.9%)	NO
00-01-18 - Office (Internal)	NO (-84.7%)	NO
00-01-19 - Office (West)	NO (-22.9%)	NO
00-01-21 - Mezzanine	N/A	N/A
00-02-11 - Office (West)	NO (-13.2%)	NO
00-02-12 - Office (North)	NO (-30.4%)	NO
00-02-13 - Office (East)	NO (-15.3%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00-02-14 - Office (Internal)	NO (-44.7%)	NO
00-02-17 - Office (East)	NO (-43.7%)	NO
00-02-18 - Office (Internal)	NO (-85.3%)	NO
00-02-19 - Office (West)	NO (-15.9%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	6014	6014
External area [m ²]	13892.8	13892.8
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	5
Average conductance [W/K]	3762.74	0
Average U-value [W/m ² K]	0.27	0
Alpha value* [%]	25.25	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
100	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	3.53	3.16
Cooling	1.13	1.6
Auxiliary	1.79	2.8
Lighting	10.72	14.94
Hot water	1.52	1.35
Equipment*	34.05	34.05
TOTAL**	18.69	23.86

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	23.53	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	23.53	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	61.82	58.25
Primary energy [kWh _{PE} /m ²]	-6.58	35.59
Total emissions [kg/m ²]	-0.37	3.33

HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Variable refrigerant flow, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	79.9	89	5.9	5.2	6.1	3.75	4.74	4.11	7.35
Notional	43.4	123.4	4.3	7.4	11.6	2.78	4.63	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	406.4	0	36.2	0	6.4	3.12	0	3.5	0
Notional	356.4	0	35.6	0	4.6	2.78	0	----	----
[ST] No Heating or Cooling									
Actual	0	0	0	0	0	0	0	0	0
Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

APPENDIX 7 – Draft EPC for Green Building

Energy Performance Certificate

Non-Domestic Building



West Road - Green Model Rev 1
Tottenham
London

Certificate Reference Number:
5774-2975-0895-7240-5506

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

Energy Performance Asset Rating

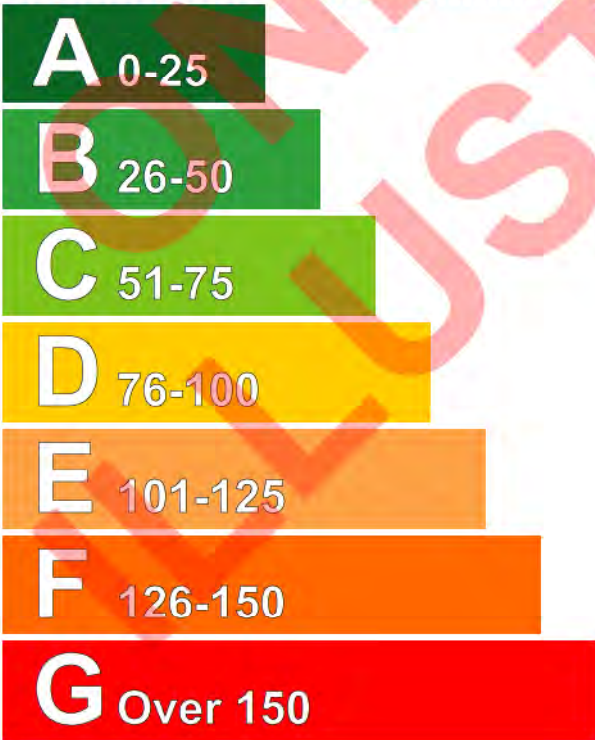
More energy efficient

A+

< -2

This is how energy efficient the building is.

Net zero CO₂ emissions



Less energy efficient

Technical information

Main heating fuel:	Grid Supplied Electricity
Building environment:	Air Conditioning
Total useful floor area (m ²):	6014.020
Building complexity:	Level 5
Building emission rate (kgCO ₂ /m ² per year):	-0.37
Primary energy use (kWh _{PE} /m ² per year):	-6.58

Benchmarks

Buildings similar to this one could have ratings as follows:

14	If newly built
56	If typical of the existing stock

Administrative information

This is an Energy Performance Certificate as defined in the Energy Performance of Buildings Regulations 2012 as amended.

Assessment Software: Virtual Environment v7.0.27 using calculation engine ApacheSim v7.0.27

Property Reference:

Assessor Name: Aaron Batten

Assessor Number: LCEA206039

Accreditation Scheme: CIBSE Certification Limited

Assessor Qualifications: NOS5

Employer/Trading Name: Shepherd Brombley Partnership Ltd

Employer/Trading Address: Unit 22 Basepoint Business Centre, 1 Winnall Valley Road

Issue Date: 19 Feb 2025

Valid Until: 18 Feb 2035 (unless superseded by a later certificate)

Related Party Disclosure: Not related to the owner

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report: 0685-0820-8982-7084-9554

About this document and the data in it

This document has been produced following an energy assessment undertaken by a qualified Energy Assessor, accredited by CIBSE Certification Limited. You can obtain contact details of the Accreditation Scheme at www.cibsecertification.com.

A copy of this certificate has been lodged on a national register as a requirement under the Energy Performance of Buildings Regulations 2012 as amended. It will be made available via the online search function at www.ndepcregister.com. The certificate (including the building address) and other data about the building collected during the energy assessment but not shown on the certificate, for instance heating system data, will be made publicly available at www.opendatacommunities.org.

This certificate and other data about the building may be shared with other bodies (including government departments and enforcement agencies) for research, statistical and enforcement purposes. For further information about how data about the property are used, please visit www.ndepcregister.com. To opt out of having information about your building made publicly available, please visit www.ndepcregister.com/optout.

There is more information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government website at: www.gov.uk/government/collections/energy-performance-certificates. It explains the content and use of this document and advises on how to identify the authenticity of a certificate and how to make a complaint.

Opportunity to benefit from a Green Deal on this property

The Green Deal can help you cut your energy bills by making energy efficiency improvements at no upfront costs. Use the Green Deal to find trusted advisors who will come to your property, recommend measures that are right for you and help you access a range of accredited installers. Responsibility for repayments stays with the property - whoever pays the energy bills benefits so they are responsible for the payments.

To find out how you could use Green Deal finance to improve your property please call 0300 123 1234.