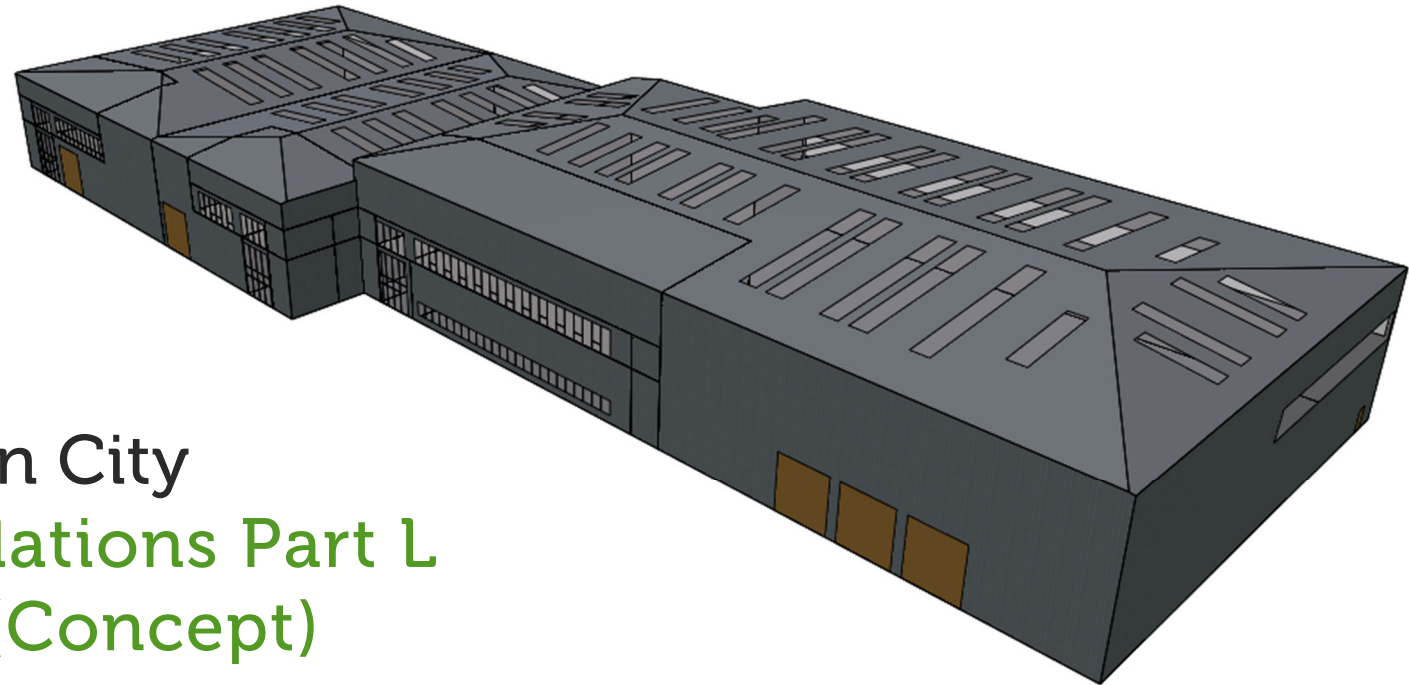




Anderson
Green

building services consultants



Welwyn Garden City Building Regulations Part L & EPC Report (Concept)

NT0826-AG-ZZ-XX-RP-J-0001

Anderson Green Building Services Consultants in association with



Anderson Green Ltd
Unit C4
Park Lane Business Centre
Basford
Nottingham
NG6 0DW

T: 0115 975 4141
Visit: AndersonGreen.co.uk

RIBA STAGE

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Welwyn Garden City

Building Regulations Part L & EPC Report (Concept)

SECTION			CHECKED		
REV	TITLE	BY	BY	DATE	SIGNED
P02	Part L & EPC	NW	TB	25.08.21	

REV	STAGE	DATE
P01	Concept	07.07.21
P02	Concept	25.08.21

1.0 Executive Summary

This report has been prepared on behalf of Henry Boot Developments Ltd. to demonstrate compliance with Part L2A 2013 for the proposed new Warehouse units at Welwyn Garden City, Hertfordshire, AL7 1BD.

In order to demonstrate compliance with Part L2A 2013 of the Building Regulations, the Building Emission Rate (BER) is required to be less than or equivalent to the carbon emissions of the notional building set by the Target Emission Rate (TER).

The local planning authority requires the development to provide 10% reduction in carbon emissions against the target emissions rate.

At this stage an assumed fit-out has been included to demonstrate compliance with Building Regulations.

This building is currently complying with Part L2A 2013 with an actual building emissions rate (**BER**) which achieving a reduction against the notional building target emissions rate (**TER**).

PV INCLUDED IN RESULTS								
Unit	Area	TER	BER	Percentage Target	Percentage Achieved	PV Area	EPC Rating	Ene01 Credits
1	3597	16.7	10.0	10%	40.1%	310m ²	A-13	4
2	1198	17.5	10.2	10%	41.7%	100m ²	A-14	4
3	1603	17.5	10.8	10%	38.3%	120m ²	A-14	4

1.1 BREEAM NC 2018

The units are targeting **4** BREEAM NC 2018 ENE01 credits.

PV was added to the designs to achieve the 4 required credits with the required areas shown in the table above.

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2.0 Introduction

This report is based on the information produced by Anderson Green and aims to show compliance with criteria 1-3 of the Building Regulations L2A 2013.

The proposed development comprises of 3 no. units, incorporating warehouse space, open plan office, WC's, circulation spaces and general welfare.

2.1 Software

This study has been undertaken using IES Virtual Environment v2021.1.1.0 and BRUKL compliance check v5.6.b.0 to create and assess the response of the building engineering services strategy.

2.2 Building Type

The simulation uses an NCM activity database and covers the whole year for activities associated with a **B8 Warehouse/Storage (Warehouse)** building type.

2.3 Location

The weather file selected for the project is **London** in accordance with the SBEM weather locations application. The project building is deemed partially exposed.

The site is located at Welwyn Garden City, AL7 1BD.



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2.4 Key Features

CONSTRUCTIONS	U-VALUES	HEATING		VENTILATION (SFP, HR, DCV)	
ROOF	0.23	VRF (SCOP)	4.50	SEHR (SFP)	0.7
EXTERNAL WALL	0.35	Gas fired air heater	96%	SEHR (HR %)	76%
GROUND FLOOR	0.25	Electric Panel Heaters	100%	Zonal Extract	0.5
PARTITIONS	1.1			CONTROLS	n/a
INTERNAL WALL	0.35	CONTROLS	WEATHER COMP	COOLING	
WINDOWS	U=1.8, G=0.4, LT=0.71	DHW		VRF (SEER)	4.5
ROOFLIGHTS	U=1.3, G=0.55, LT=0.71	Point of Use	100%		
DOORS	2.2	Storage (L)	15L		
VEHICLE ACCESS DOOR	1.5	Storage loss (kW/l/d)	0.04	MANAGEMENT FEATURES	
		Circulation loss (W/m)	n/a	Power factor correction (PFC)	<90%
SHADING	none	Pump power (kW)	n/a	Metering (HVAC & Lighting)	Yes
		DHW pipework (m)	n/a	BMS (out of range warnings)	No
AIR TEST m ³ hm ² @ 50pa	5				

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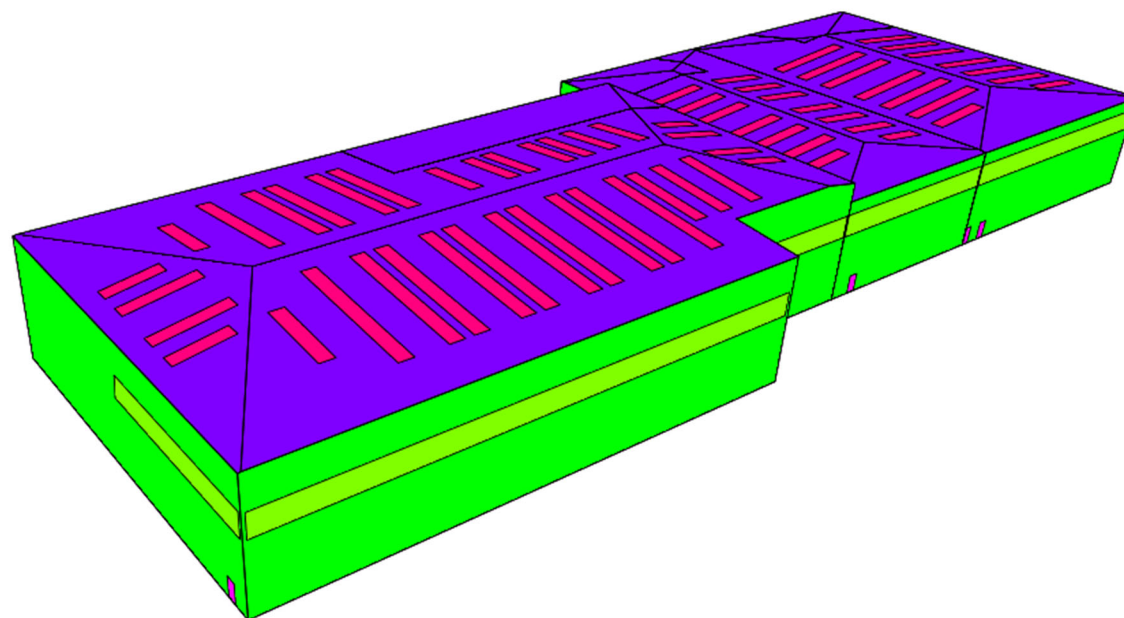
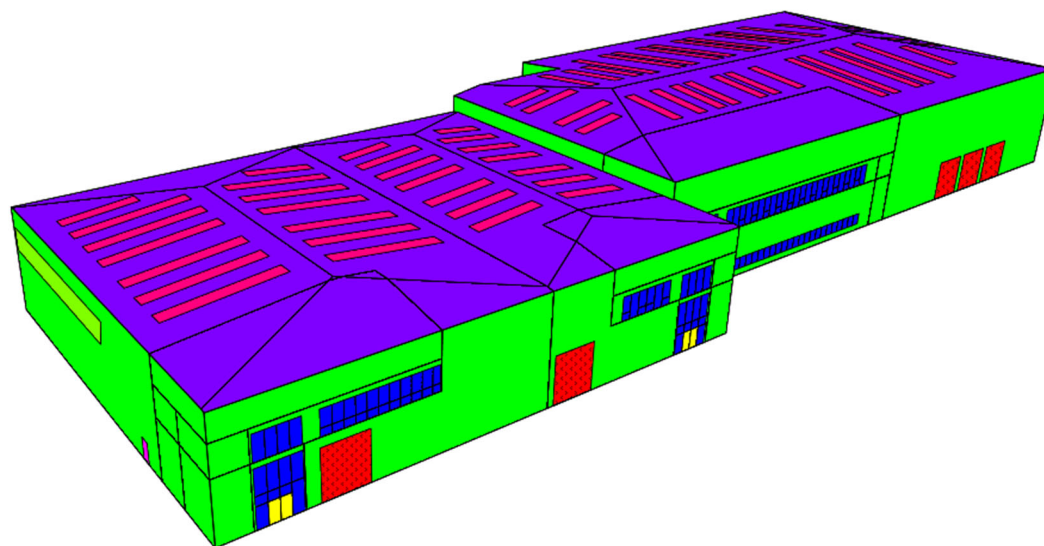
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3.0 Construction

Construction

- AG Ceiling Tile U=1.27 (STD_CEI2)
- AG Door U=2.2 (STD_DOO1)
- AG External Wall U=0.35 (GXTR0001)
- AG External Window U=1.8 G=0.4 Lt=0.71 (STD_EXT1)
- AG Glazed Door U=1.8 G=0.4 Lt=0.71 (STD_EXT2)
- AG Ground/Exposed Floor U=0.25 (STD_FLO2)
- AG Internal Ceiling/Floor U=1.27 (STD_CEI1)
- AG Internal Partition (a) U=1.1 (STD_PAR5)
- AG Internal Partition (b) U=1.1 (STD_PAR3)
- AG Roof U=0.23 (GRF00000)
- AG Rooflight U=1.3 G=0.55 LT=0.6 (GRFL0000)
- AG Translucent Panel U=1.3 G=0.55 Lt=0.5 (STD_EXT3)
- AG Vehicle Access Door U=1.5 (STD_DOO2)



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4.0 Building Services

The following building services strategy is based on the assumed future fit out – shell and core design to demonstrate compliance with Part L2A 2013.

4.1 Management Features

The units are assumed to have **no** power factor therefore the value is **<0.90**.

The units are assumed to have provisions for separate metering to Lighting & HVAC services and **no** warnings for **out of range values**.

4.2 Heating and Cooling

4.2.1 Direct gas fired air heater

The units are assumed to be provided with direct gas fired air heater with an assumed seasonal **efficiency of 96%**.

4.2.2 High Efficiency VRF System

Heating and cooling to the offices is to be provided via a high efficiency VRF system.

- Assumed Seasonal Coefficient of Performance (SCOP): **4.5**.

4.2.3 Electric Panel Heater

Heating is also to be provided via electric panel heaters with a unit efficiency of **100%**.

4.2.4 Heat Distribution

Heating shall be delivered to the spaces as follows:

- **VRF cassettes** to the open plan office and entrance lobby
- **Electric panel heaters** to the circulation spaces, WC's and stores.
- **Gas fired air heater** to warehouse.

4.3 Domestic Hot Water

4.3.1 DHW Heat Source

Hot water is to be provided via point-of-use electric water heaters.

- Unit efficiency of **100%**
- Storage **15L**
- Storage losses of **0.04 (kW/l/d)**.

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4.4 Ventilation

4.4.1 Natural Ventilation

Natural Ventilation is to be provided via openable windows.

4.4.2 Supply and Extract Ventilation with Heat Recovery

General supply and extract ventilation with heat recovery is provided to serve the occupied rooms.

REF	ZONE	SFP (W/l/s)	HR %
HRU1	Offices	0.7	76

4.4.3 Extract Only

Zonal extract systems are to be provided to the WCs with an SFP of 0.5.

REF	ZONE	SFP (W/l/s)
EF01	WC	0.5

4.4.4 General

Mechanical ventilation equipment air leakage is assumed to be a minimum of class L2. All ductwork is Class A and assumed to be untested.

4.5 Lighting

Lighting is assumed to be high efficiency LED luminaires with the following minimum efficacies:

- Warehouse and open plan office – 100lm/W
- Entrance lobby, circulation, WC's and stores – 85lm/W

4.5.1 Lighting Control Presence

- PIR presence detection on/off to all spaces.

4.5.2 Lighting Control Daylight

Daylight dimming will be provided to offices which are adjacent to the external façade and have access to natural daylight and the warehouse spaces.

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4.6 Low or Zero Carbon (LZC)

To help achieve the required BREEAM 2018 Ene01 credits and achieve compliance with the requirements of Part L2A 2013, the following PV system design has been included:

- 15% efficiency; 96% inverter efficiency.

PV INCLUDED IN RESULTS								
Unit	Area	TER	BER	Percentage Target	Percentage Achieved	PV Area	EPC Rating	Ene01 Credits
1	3597	16.7	10.0	10%	40.1%	310m ²	A-13	4
2	1198	17.5	10.2	10%	41.7%	100m ²	A-14	4
3	1603	17.5	10.8	10%	38.3%	120m ²	A-14	4

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5.0 Results

5.1 Criterion 1- TER/BER

This building **PASSES** the Part L2A 2013 compliance assessment confirming that the Building Emission Rate (BER) is less than or equivalent to the carbon emissions of the notional building set by the Target Emissions Rating (TER).

5.2 Criterion 2 – Design Limits Check

To achieve compliance with Criterion 2 of Part L2A, the performance of the building fabric u-values, air permeability and building services should be no worse than design limits.

This building **PASSES** the design limit check as detailed in the BRUKL certificate the building fabric and fixed building services achieve compliance with Part L as they are no worse than the design limits.

5.3 Criterion 3 – Solar Gain Check

It should be noted that this criterion is non-mandatory. The Open Offices in units 1 & 2 and Warehouse spaces **do not pass** the solar gain check as detailed in the attached BRUKL certificate.

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5.4 Part L Certificate (BRUKL)

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Project name

Welwyn Garden City - Unit 1

As designed

Date: Fri Aug 20 10:12:39 2021

Administrative information

Building Details

Address: Tewin Road, , AL7 1BD

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Toby Britton

Telephone number:

Address: Anderson Green, ,

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	16.7
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	16.7
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	10
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.35	0.35	GF000030:Surf[1]
Floor	0.25	0.25	0.25	GF000008:Surf[0]
Roof	0.25	0.23	0.23	GF000050:Surf[2]
Windows***, roof windows, and rooflights	2.2	1.49	1.8	GF000031:Surf[1]
Personnel doors	2.2	2.2	2.2	GF000006:Surf[67]
Vehicle access & similar large doors	1.5	1.5	1.5	GF000006:Surf[75]
High usage entrance doors	3.5	1.8	1.8	GF000031:Surf[9]
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* There might be more than one surface where the maximum U-value occurs.				
** 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.				
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	5

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Panel Heater - NAT

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	0	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

2- VRF System - NAT

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.5	4.5	0	0	-
Standard value	2.5*	2.6	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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Panel Heater - EXT

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	0	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

4- VRF System - SEHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	0	0	0.76
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

5- Gas Fired Unit heater

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.96	-	0	0	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

1- DHW - elec point of use

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.04
Standard value	1	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
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 supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Unit 1 Shower		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 1 WC 01		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 1 Acc. WC		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 1 WC 03		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 1 WC 02		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 1 Open Office		-	-	-	0.7	-	-	-	-	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]	Luminaire	Lamp	Display lamp	General lighting [W]
Unit 1 Stair 01	-	60	85	-	40
Unit 1 Reception	-	60	85	85	150
Unit 1 Lobby 01	-	60	85	-	77
Unit 1 Shower	-	60	85	-	27
Unit 1 WC 01	-	60	85	-	27
Unit 1 Acc. WC	-	60	85	-	44
Unit 1 Stair 02	-	60	85	-	55
Unit 1 Stair 04	-	60	85	-	34
Unit 1 Stair 03	-	60	85	-	34
Unit 1 WC 03	-	60	85	-	65
Unit 1 Lobby 02	-	60	85	-	18
Unit 1 WC 02	-	60	85	-	74
Unit 1 Kitchen/Pantry	-	60	85	-	42
Unit 1 Open Office	100	-	-	-	1743
Unit 1 Main Lobby	-	60	85	-	27
Unit 1 Warehouse	100	-	-	-	14136

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Unit 1 Kitchen/Pantry	N/A	N/A
Unit 1 Open Office	YES (+28.3%)	NO
Unit 1 Warehouse	YES (+46.8%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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?	NO

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Unit 1 Reception	YES (+96.6%)	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	3597.1	3597.1		A1/A2 Retail/Financial and Professional services
External area [m ²]	9504.1	9504.1		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	LON	LON		B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	5	5		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	4108.15	2930.24	100	B8 Storage or Distribution
Average U-value [W/m ² K]	0.43	0.31		C1 Hotels
Alpha value* [%]	18.53	10		C2 Residential Institutions: Hospitals and Care Homes
				C2 Residential Institutions: Residential schools
				C2 Residential Institutions: Universities and colleges
				C2A Secure Residential Institutions
				Residential spaces
				D1 Non-residential Institutions: Community/Day Centre
				D1 Non-residential Institutions: Libraries, Museums, and Galleries
				D1 Non-residential Institutions: Education
				D1 Non-residential Institutions: Primary Health Care Building
				D1 Non-residential Institutions: Crown and County Courts
				D2 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

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	34.88	23.75
Cooling	1.68	0.37
Auxiliary	0.38	0.45
Lighting	7.35	18.2
Hot water	5.55	5.11
Equipment*	30.58	30.58
TOTAL**	49.85	47.88

* 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	10.83	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	142.4	82.1
Primary energy* [kWh/m ²]	90.54	92.35
Total emissions [kg/m ²]	10	16.7

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

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 SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	169.6	204.6	11.2	17.8	0	4.19	3.2	4.5	4.5
Notional	115.7	33.5	12.6	2.5	0	2.56	3.79	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	134.3	0	37.3	0	0	1	0	1	0
Notional	118.6	0	38.2	0	0	0.86	0	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	100.4	0	27.9	0	12.7	1	0	1	0
Notional	83.1	0	26.8	0	14.5	0.86	0	----	----
[ST] Flued forced-convection air heaters, [HS] Air heater, [HFT] Natural Gas, [CFT] Electricity									
Actual	130.9	0	37.9	0	0	0.96	0	0.96	0
Notional	78.2	0	25.2	0	0	0.86	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	76.9	160.8	6.5	18	2.9	3.26	2.49	3.5	3.5
Notional	44.9	56.4	4.9	4.1	3.6	2.56	3.79	----	----
[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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.35	GF000030:Surf[1]
Floor	0.2	0.25	GF000008:Surf[0]
Roof	0.15	0.23	GF000050:Surf[2]
Windows, roof windows, and rooflights	1.5	1.3	GF000006:Surf[65]
Personnel doors	1.5	2.2	GF000006:Surf[67]
Vehicle access & similar large doors	1.5	1.5	GF000006:Surf[75]
High usage entrance doors	1.5	1.8	GF000031:Surf[9]
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	5

Project name

Welwyn Garden City - Unit 2

As designed

Date: Fri Aug 20 10:25:34 2021

Administrative information

Building Details

Address: Tewin Road, , AL7 1BD

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Toby Britton

Telephone number:

Address: Anderson Green, ,

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	17.5
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	17.5
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	10.2
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.35	0.35	GF000026:Surf[1]
Floor	0.25	0.25	0.25	GF000026:Surf[0]
Roof	0.25	0.23	0.23	GF00000F:Surf[2]
Windows***, roof windows, and rooflights	2.2	1.51	1.8	GF00002A:Surf[1]
Personnel doors	2.2	2.2	2.2	GF000003:Surf[19]
Vehicle access & similar large doors	1.5	1.5	1.5	GF000003:Surf[22]
High usage entrance doors	3.5	1.8	1.8	GF00002A:Surf[2]
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* There might be more than one surface where the maximum U-value occurs. ** 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. N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	5

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Panel Heater - NAT

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	0	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

2- VRF System - NAT

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.5	4.5	0	0	-
Standard value	2.5*	2.6	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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Panel Heater - EXT

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	0	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

4- Gas Fired Unit heater

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.96	-	0	0	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

5- VRF System - SEHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	0	0	0.76
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- DHW - elec point of use

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.04
Standard value	1	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
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 supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	ID of system type	SFP [W/(Us)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Unit 2 WC 01		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 2 Shower		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 2 WC 03		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 2 WC 02		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 2 Open Office		-	-	-	0.7	-	-	-	-	-	-	N/A

General lighting and display lighting

Zone name	Standard value	Luminous efficacy [lm/W]			General lighting [W]
		Luminaire	Lamp	Display lamp	
Unit 2 Stair 01		-	85	-	37
Unit 2 Reception		-	85	85	140
Unit 2 WC 01		-	85	-	44
Unit 2 Shower		-	85	-	24
Unit 2 Lobby 01		-	85	-	40
Unit 2 Stair 02		-	85	-	32
Unit 2 Lobby 02		-	85	-	17
Unit 2 WC 03		-	85	-	27
Unit 2 WC 02		-	85	-	26
Unit 2 Main Lobby		-	85	-	22
Unit 2 Warehouse		100	-	-	4700
Unit 2 Open Office		100	-	-	640
Unit 2 Kitchenette		-	85	-	32

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Unit 2 Reception	YES (+156.4%)	NO
Unit 2 Warehouse	YES (+26.3%)	NO
Unit 2 Open Office	YES (+13.3%)	NO
Unit 2 Kitchenette	N/A	N/A

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	1198.4	1198.4		A1/A2 Retail/Financial and Professional services
External area [m ²]	2815.2	2815.2		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	LON	LON		B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	5	7		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	1186.47	912.32	100	B8 Storage or Distribution
Average U-value [W/m ² K]	0.42	0.32		C1 Hotels
Alpha value* [%]	18.68	10		C2 Residential Institutions: Hospitals and Care Homes
				C2 Residential Institutions: Residential schools
				C2 Residential Institutions: Universities and colleges
				C2A Secure Residential Institutions
				Residential spaces
				D1 Non-residential Institutions: Community/Day Centre
				D1 Non-residential Institutions: Libraries, Museums, and Galleries
				D1 Non-residential Institutions: Education
				D1 Non-residential Institutions: Primary Health Care Building
				D1 Non-residential Institutions: Crown and County Courts
				D2 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

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	25.21	20.5
Cooling	2.27	0.47
Auxiliary	0.41	0.49
Lighting	8.68	20.19
Hot water	7.84	5.64
Equipment*	30.27	30.27
TOTAL**	44.41	47.3

* 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	10.53	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	118.69	75.89
Primary energy* [kWh/m ²]	91.11	95.89
Total emissions [kg/m ²]	10.2	17.5

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

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 SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	170.7	240.4	11.3	20.9	0	4.19	3.2	4.5	4.5
Notional	127	43.6	13.8	3.2	0	2.56	3.79	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	164.9	0	45.8	0	0	1	0	1	0
Notional	173.7	0	56	0	0	0.86	0	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	163.1	0	45.3	0	15.5	1	0	1	0
Notional	152.8	0	49.2	0	17.7	0.86	0	----	----
[ST] Flued forced-convection air heaters, [HS] Air heater, [HFT] Natural Gas, [CFT] Electricity									
Actual	91.3	0	26.4	0	0	0.96	0	0.96	0
Notional	62.8	0	20.2	0	0	0.86	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	80.9	163.4	6.9	18.3	2.9	3.26	2.49	3.5	3.5
Notional	53.3	58	5.8	4.3	3.6	2.56	3.79	----	----
[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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.35	GF000026:Surf[1]
Floor	0.2	0.25	GF000026:Surf[0]
Roof	0.15	0.23	GF00000F:Surf[2]
Windows, roof windows, and rooflights	1.5	1.3	GF000003:Surf[20]
Personnel doors	1.5	2.2	GF000003:Surf[19]
Vehicle access & similar large doors	1.5	1.5	GF000003:Surf[22]
High usage entrance doors	1.5	1.8	GF00002A:Surf[2]
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	5

Project name

Welwyn Garden City - Unit 3

As designed

Date: Fri Aug 20 10:33:31 2021

Administrative information

Building Details

Address: Tewin Road, Herfordshire, AL7 1BD

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Toby Britton

Telephone number:

Address: Anderson Green, ,

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	17.5
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	17.5
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	10.8
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.35	0.35	GF000020:Surf[1]
Floor	0.25	0.25	0.25	GF000020:Surf[0]
Roof	0.25	0.23	0.23	GF000052:Surf[2]
Windows***, roof windows, and rooflights	2.2	1.48	1.8	GF000022:Surf[1]
Personnel doors	2.2	2.2	2.2	GF000002:Surf[21]
Vehicle access & similar large doors	1.5	1.5	1.5	GF000002:Surf[24]
High usage entrance doors	3.5	1.8	1.8	GF000022:Surf[2]
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* There might be more than one surface where the maximum U-value occurs.				
** 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.				
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	5

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- VRF System - NAT

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.5	4.5	0	0	-
Standard value	2.5*	2.6	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. For types <=12 kW output, refer to EN 14825 for limiting standards.

2- Panel Heater - NAT

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	0	-
Standard value	N/A	N/A	N/A	N/A	N/A

Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system | NO

3- Panel Heater - EXT

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	0	-
Standard value	N/A	N/A	N/A	N/A	N/A

Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system | NO

4- Gas Fired Unit heater

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.96	-	0	0	-
Standard value	N/A	N/A	N/A	N/A	N/A

Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system | NO

5- VRF System - SEHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	0	0	0.76
Standard value	2.5*	2.6	N/A	N/A	0.5

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. For types <=12 kW output, refer to EN 14825 for limiting standards.

1- DHW - elec point of use

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.04
Standard value	1	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
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 supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(Us)]										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	1.9	1.6	0.5	1.1	0.5	1		
Unit 3 WC 01		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 3 Shower		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 3 WC 02		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 3 WC 03		-	-	0.5	-	-	-	-	-	-	-	N/A
Unit 3 Open Office		-	-	-	0.7	-	-	-	-	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
	Standard value	60	60	22
Unit 3 Reception	-	85	85	140
Unit 3 Stair 01	-	85	-	38
Unit 3 WC 01	-	85	-	44
Unit 3 Lobby 01	-	85	-	40
Unit 3 Shower	-	85	-	24
Unit 3 Stair 02	-	85	-	32
Unit 3 WC 02	-	85	-	27
Unit 3 WC 03	-	85	-	27
Unit 3 Lobby 02	-	85	-	17
Unit 3 Main Lobby	-	85	-	22
Unit 3 Warehouse	100	-	-	6278
Unit 3 Kitchenette	-	85	-	32
Unit 3 Open Office	100	-	-	847

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Unit 3 Reception	YES (+150.7%)	NO
Unit 3 Warehouse	YES (+51.6%)	NO
Unit 3 Kitchenette	N/A	N/A
Unit 3 Open Office	YES (+32.3%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	1603.4	1603.4		A1/A2 Retail/Financial and Professional services
External area [m ²]	4225.4	4225.4		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	LON	LON		B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	5	7		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	1839	1328.43	100	B8 Storage or Distribution
Average U-value [W/m ² K]	0.44	0.31		C1 Hotels
Alpha value* [%]	18.09	10		C2 Residential Institutions: Hospitals and Care Homes
				C2 Residential Institutions: Residential schools
				C2 Residential Institutions: Universities and colleges
				C2A Secure Residential Institutions
				Residential spaces
				D1 Non-residential Institutions: Community/Day Centre
				D1 Non-residential Institutions: Libraries, Museums, and Galleries
				D1 Non-residential Institutions: Education
				D1 Non-residential Institutions: Primary Health Care Building
				D1 Non-residential Institutions: Crown and County Courts
				D2 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

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	29.96	24.04
Cooling	2.2	0.46
Auxiliary	0.37	0.45
Lighting	7.83	19.19
Hot water	6.94	5.4
Equipment*	30.55	30.55
TOTAL**	47.3	49.54

* 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	9.44	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	132.85	85.69
Primary energy* [kWh/m ²]	91.26	96.58
Total emissions [kg/m ²]	10.8	17.5

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

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 SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	166.4	245.7	11	21.4	0	4.19	3.2	4.5	4.5
Notional	118.7	50.1	12.9	3.7	0	2.56	3.79	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	169.9	0	47.2	0	0	1	0	1	0
Notional	156.1	0	50.3	0	0	0.86	0	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	177.5	0	49.3	0	15.5	1	0	1	0
Notional	161.8	0	52.1	0	17.7	0.86	0	----	----
[ST] Flued forced-convection air heaters, [HS] Air heater, [HFT] Natural Gas, [CFT] Electricity									
Actual	110.9	0	32.1	0	0	0.96	0	0.96	0
Notional	77.8	0	25.1	0	0	0.86	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	80	172.9	6.8	19.3	2.9	3.26	2.49	3.5	3.5
Notional	50.1	58.1	5.4	4.3	3.6	2.56	3.79	----	----
[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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.35	GF000020:Surf[1]
Floor	0.2	0.25	GF000020:Surf[0]
Roof	0.15	0.23	GF000052:Surf[2]
Windows, roof windows, and rooflights	1.5	1.3	GF000002:Surf[20]
Personnel doors	1.5	2.2	GF000002:Surf[21]
Vehicle access & similar large doors	1.5	1.5	GF000002:Surf[24]
High usage entrance doors	1.5	1.8	GF000022:Surf[2]
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	5

5.5 Energy Performance Certificate (EPC)

01

02

03

04

05

06

Energy Performance Certificate

Non-Domestic Building



Welwyn Garden City - Unit 1
Tewin Road
Hertfordshire
AL7 1BD

Certificate Reference Number:
5088-2076-2385-6234-4289

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+

Net zero CO₂ emissions

A 0-25

13

This is how energy efficient the building is.

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

Less energy efficient

Technical information

Main heating fuel: Natural Gas
Building environment: Heating and Natural Ventilation
Total useful floor area (m²): 3597.063
Building complexity: Level 5
Building emission rate (kgCO₂/m² per year): 10.01
Primary energy use (kWh/m² per year): 90.54

Benchmarks

Buildings similar to this one could have ratings as follows:

21 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 v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference: UPRN-000000000000

Assessor Name: Toby Britton

Assessor Number: ABCD123456

Accreditation Scheme: Information not available

Assessor Qualifications: NOS5

Employer/Trading Name: Trading Name

Employer/Trading Address: Trading Address

Issue Date: 20 Aug 2021

Valid Until: 19 Aug 2031 (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: 6901-2506-7287-8824-1694

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 Information not available. You can obtain contact details of the Accreditation Scheme at Information not available.

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.ndepregister.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.ndepregister.com. To opt out of having information about your building made publicly available, please visit www.ndepregister.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.

Energy Performance Certificate

Non-Domestic Building



Welwyn Garden City - Unit 2
Tewin Road
Hertfordshire
AL7 1BD

Certificate Reference Number:
2287-9148-1390-3041-6590

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+

Net zero CO₂ emissions

A 0-25

14 This is how energy efficient the building is.

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

Less energy efficient

Technical information

Main heating fuel: Natural Gas
Building environment: Heating and Natural Ventilation
Total useful floor area (m²): 1198.412
Building complexity: Level 5
Building emission rate (kgCO₂/m² per year): 10.18
Primary energy use (kWh/m² per year): 91.11

Benchmarks

Buildings similar to this one could have ratings as follows:

23 If newly built

62 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 v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference: UPRN-000000000000

Assessor Name: Toby Britton

Assessor Number: ABCD123456

Accreditation Scheme: Information not available

Assessor Qualifications: NOS5

Employer/Trading Name: Trading Name

Employer/Trading Address: Trading Address

Issue Date: 20 Aug 2021

Valid Until: 19 Aug 2031 (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: 8041-4751-5415-9920-5909

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 Information not available. You can obtain contact details of the Accreditation Scheme at Information not available.

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Opportunity to benefit from a Green Deal on this property

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

Energy Performance Certificate

Non-Domestic Building



Welwyn Garden City - Unit 3
Tewin Road
Hertfordshire
Hertfordshire
AL7 1BD

Certificate Reference Number:
6870-1644-2388-4655-4502

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+

A 0-25

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

Less energy efficient

Net zero CO₂ emissions

14

This is how energy efficient the building is.

Technical information

Main heating fuel: Natural Gas
Building environment: Heating and Natural Ventilation
Total useful floor area (m²): 1603.438
Building complexity: Level 5
Building emission rate (kgCO₂/m² per year): 10.81
Primary energy use (kWh/m² per year): 91.26

Benchmarks

Buildings similar to this one could have ratings as follows:

22 If newly built

60 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 v7.0.13 using calculation engine ApacheSim v7.0.13

Property Reference: UPRN-000000000000

Assessor Name: Toby Britton

Assessor Number: ABCD123456

Accreditation Scheme: Information not available

Assessor Qualifications: NOS5

Employer/Trading Name: Trading Name

Employer/Trading Address: Trading Address

Issue Date: 20 Aug 2021

Valid Until: 19 Aug 2031 (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: 6549-4900-5797-7242-9244

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 Information not available. You can obtain contact details of the Accreditation Scheme at Information not available.

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6.0 Appendices

A. Drawing Schedule

- 1734-JSA-WY-XX-M2-A-02201-GF Plan
- 1734-JSA-WY-XX-M2-A-02202-FF Plan
- 1734-JSA-WY-XX-M2-A-02203-Roof Plan
- 1734-JSA-XX-XX-DR-A-03201_P4-GA Sections
- 1734-JSA-XX-XX-DR-A-04201_P5-GA Elevations

B. Information Schedule

It is the responsibility of the Contractor to provide the following information to the Approved Inspector/Building Control officer prior to the completion of the building work:

- A schedule of lighting efficiencies showing that the lighting system will achieve a minimum average luminaire-lumens/circuit-Watt of 60 and the maximum installed power loads detailed within this report.
- Confirmation of the U-values for the wall, floor and roof constructions used on site.
- Confirmation that all glazed doors and windows used on site achieve the U-values stated.
- Results of the air permeability test.
- Commissioning reports for the heating, cooling, ventilation and hot water system.
- A building log book should be produced for the building owner. Copies of the log book or confirmation that it has been completed should be provided to the Approved inspector.

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02

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04

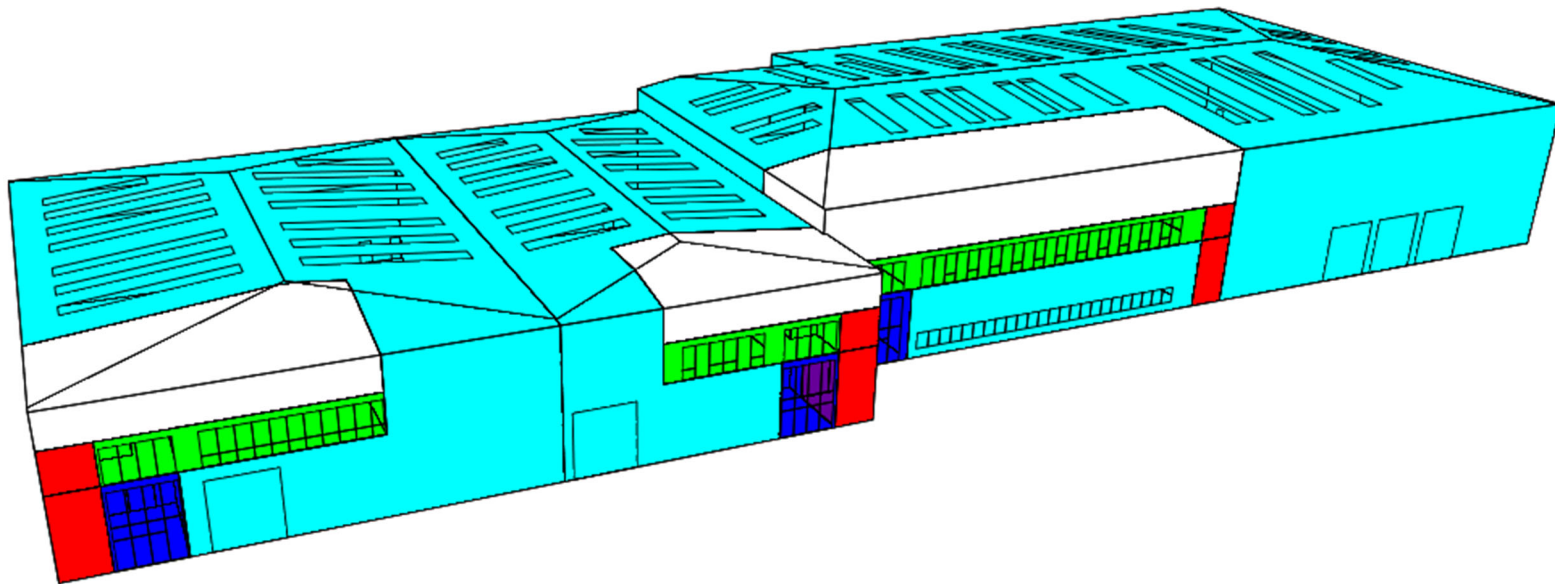
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06

C. NCM Activities

NCM Activity

- NCM Ware: Circulation area
- NCM Ware: Eating/drinking area
- NCM Ware: Office (Warehouse: Open)
- NCM Ware: Reception
- NCM Ware: Toilet
- NCM Ware: Warehouse storage



01

02

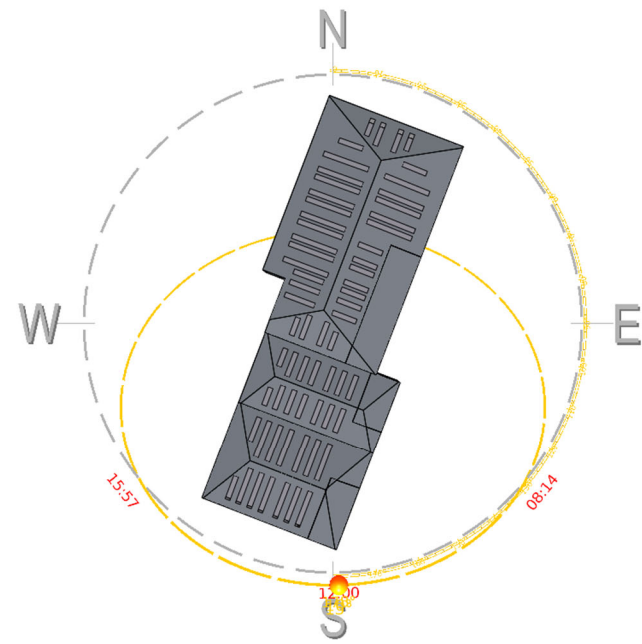
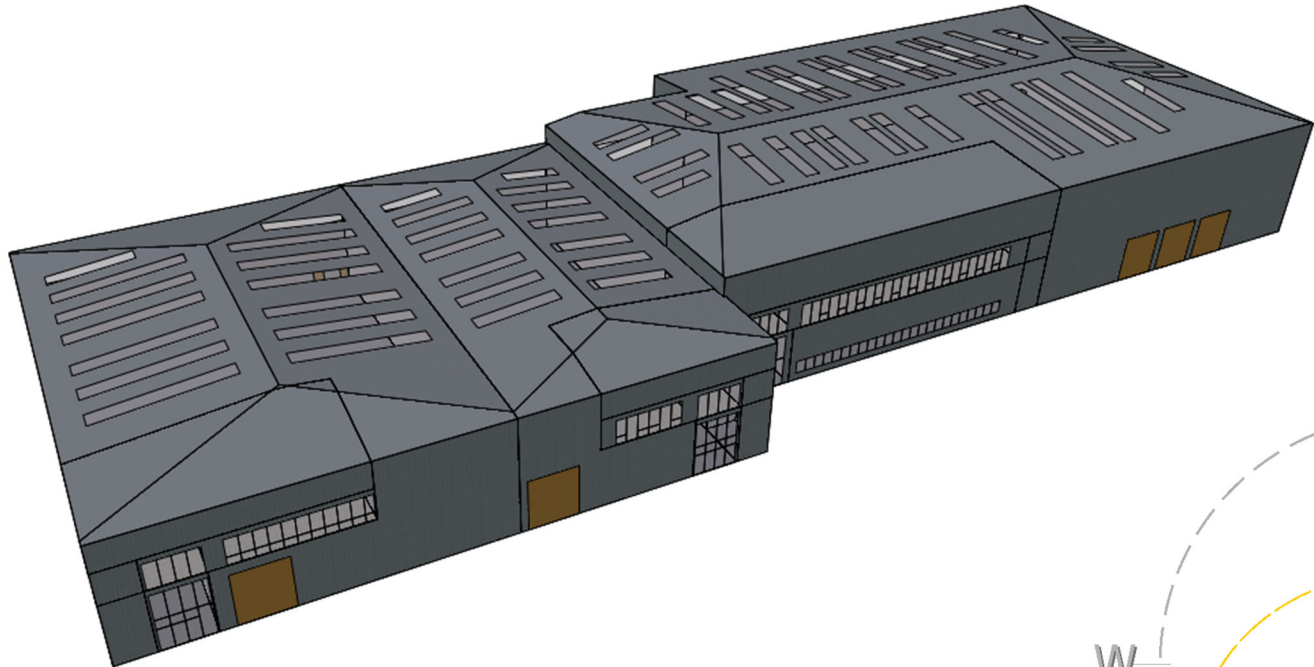
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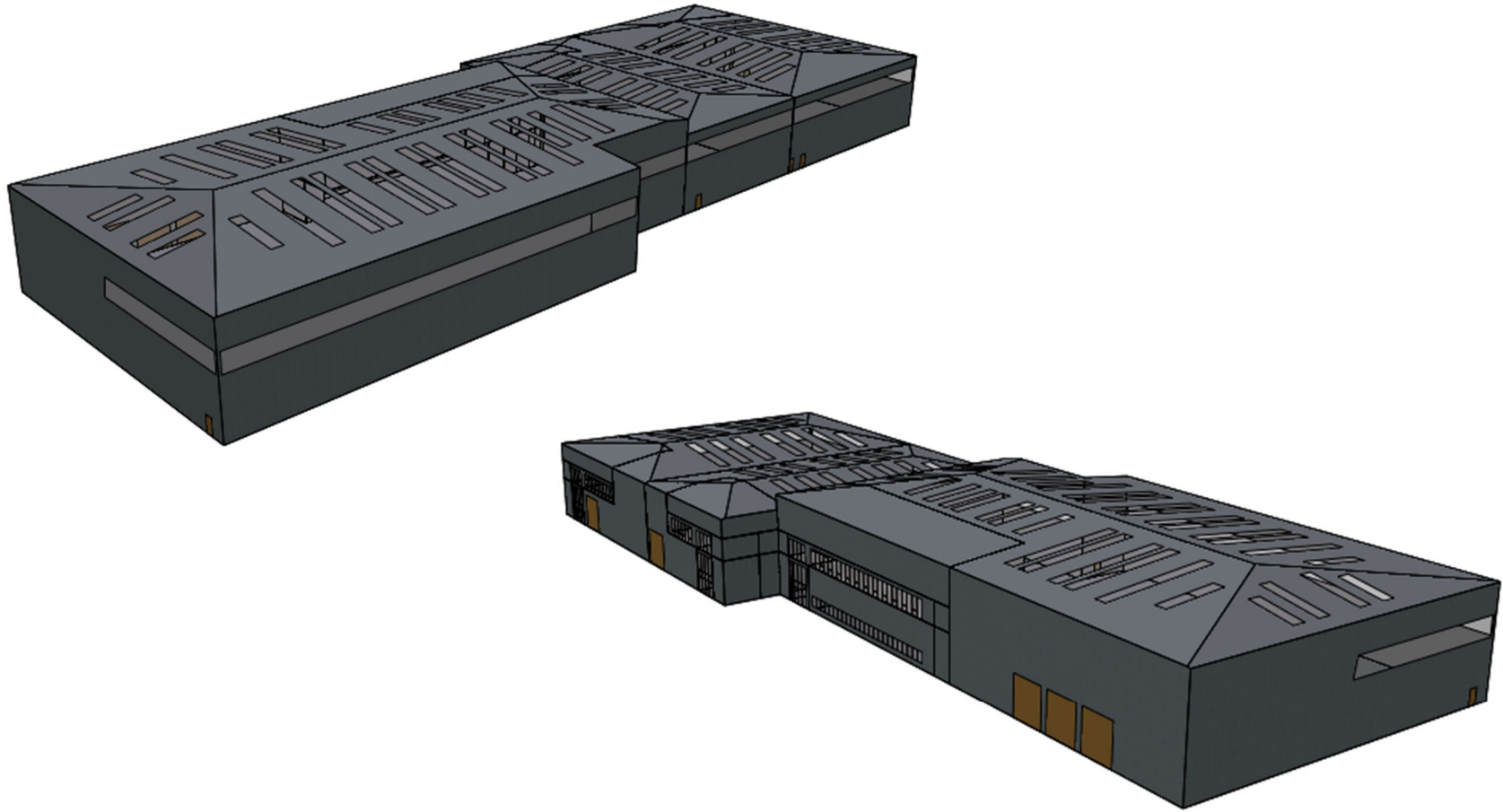
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06

D. 3D Images



- 01
- 02
- 03
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