

## Project name

# Avalon House New Proposed Blinds 2013 Lean

As designed

Date: Fri May 24 11:06:45 2024

## Administrative information

## Building Details

Address: Address 1, City, Postcode

## Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.25

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.25

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

## Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Criterion 1: The calculated CO<sub>2</sub> emission rate for the building must not exceed the target

CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum	22.2
Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum	22.2
Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum	12.9
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 <sub>a</sub> -Limit	U <sub>a</sub> -Calc	U <sub>i</sub> -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.12	0.12	L0000031:Surf[0]
Floor	0.25	0.1	0.1	L0000029:Surf[0]
Roof	0.25	0.1	0.1	L0000040:Surf[14]
Windows***, roof windows, and rooflights	2.2	1.26	1.8	L0000040:Surf[2]
Personnel doors	2.2	1.6	1.6	L000002A:Surf[0]
Vehicle access & similar large doors	1.5	-	-	No vehicle access doors in building
High usage entrance doors	3.5	-	-	No high usage entrance doors in building

U<sub>a</sub>-Limit = Limiting area-weighted average U-values [W/(m<sup>2</sup>K)]U<sub>a</sub>-Calc = Calculated area-weighted average U-values [W/(m<sup>2</sup>K)]U<sub>i</sub>-Calc = Calculated maximum individual element U-values [W/(m<sup>2</sup>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 <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa	10	3

## 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.

<b>Whole building lighting automatic monitoring &amp; targeting with alarms for out-of-range values</b>	YES
<b>Whole building electric power factor achieved by power factor correction</b>	>0.95

### 1- 04\_Rad\_Elec\_MV

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	0.91	-	0.3	-	0.75
<b>Standard value</b>	N/A	N/A	N/A	N/A	0.5
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

### 2- 03\_GF01\_FCU\_ASHP\_GF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	0.91	3.76	0	1.6	0.8
<b>Standard value</b>	0.91*	3.2	N/A	1.6^	0.65
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

### 3- 06\_Rad\_Elec\_NV

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	0.91	-	0.3	-	-
<b>Standard value</b>	N/A	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES

### 4- 02\_TH\_ASHP\_Perimeter Offices\_UF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	0.91	3.76	0	1.6	0.8
<b>Standard value</b>	0.91*	2.55	N/A	1.6^	0.65
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

### 5- 01\_AHU\_ASHP\_DV\_Internal Offices\_UF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	0.91	3.76	0	1.6	0.8
<b>Standard value</b>	0.91*	2.55	N/A	1.6^	0.65
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

"No HWS in project, or hot water is provided by HVAC system"

**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		
L01-WC Lobby 1	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L01-WC Lobby 2	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L02-WC Lobby 1	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L02-WC Lobby 2	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L03-Acc WC	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L03-Lift Lobby	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L03-WC	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L03-WC Lobby 1	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L03-WC Lobby 2	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L03-Office PER3	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L04-Office PER2	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L04-Office PER2	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L04-Plant	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L04-Circulation	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L04-Office PER1	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L04-Lift Lobby	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L04-WC Lobby 1	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L04-WC	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L00-WC Lobby 1	-	-	-	1.6	-	-	-	-	-	-	-	N/A
L00-Office 1-New	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L01-Office PER4-New	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L03-Office PER2	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L03-Office PER2	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L03-Office PER1	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L03-Office PER1	-	-	-	-	-	-	-	0.2	-	-	-	N/A
L03-Office PER1	-	-	-	-	-	-	-	0.2	-	-	-	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	
L01-WC Lobby 1	-	120	-	28

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
	60	60	22		
L01-WC Lobby 2	-	120	-		28
L02-WC Lobby 1	-	120	-		27
L02-WC Lobby 2	-	120	-		27
L03-Acc WC	-	120	-		37
L03-Lift Lobby	-	120	-		38
L03-Stairs 01	-	120	-		35
L03-Stairs 02	-	120	-		30
L03-Stairs 03	-	120	-		30
L03-WC	-	120	-		76
L03-WC Lobby 1	-	120	-		28
L03-WC Lobby 2	-	120	-		28
L04-Stairs 03	-	120	-		30
L03-Office PER3	140	-	-		306
L04-Office PER2	141	-	-		493
L04-Office PER2	358	-	-		21
L04-Plant	120	-	-		55
L04-Circulation	-	120	-		32
L04-Office PER1	132	-	-		590
L04-Office CORE	133	-	-		330
L04-Stairs 01	-	120	-		35
L04-Lift Lobby	-	120	-		38
L04-WC Lobby 1	-	120	-		27
L04-WC	-	120	-		40
L00-WC Lobby 1	-	120	-		40
L00-Office 1-New	138	-	-		241
L01-Office PER4-New	137	-	-		241
L03-Office PER2	142	-	-		188
L03-Office PER2	136	-	-		277
L03-Office PER1	136	-	-		431
L03-Office PER1	134	-	-		93
L03-Office PER1	135	-	-		634
L03-Office CORE 1	135	-	-		596

**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?
L03-Lift Lobby	N/A	N/A
L03-Office PER3	NO (-92%)	YES
L04-Office PER2	NO (-90.5%)	YES
L04-Office PER2	N/A	N/A
L04-Circulation	N/A	N/A
L04-Office PER1	NO (-72.6%)	YES
L04-Office CORE	N/A	N/A
L04-Lift Lobby	NO (-71.7%)	YES

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L00-Office 1-New	NO (-93.2%)	YES
L01-Office PER4-New	NO (-94%)	YES
L03-Office PER2	NO (-88.6%)	YES
L03-Office PER2	NO (-85.6%)	YES
L03-Office PER1	NO (-93.9%)	YES
L03-Office PER1	NO (-83.8%)	YES
L03-Office PER1	NO (-92.8%)	YES
L03-Office CORE 1	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**

<b>Were alternative energy systems considered and analysed as part of the design process?</b>	<b>NO</b>
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

	Actual	Notional
Area [m <sup>2</sup> ]	1292.4	1292.4
External area [m <sup>2</sup> ]	1807.4	1807.4
Weather	LON	LON
Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa]	3	3
Average conductance [W/K]	611.83	872.36
Average U-value [W/m <sup>2</sup> K]	0.34	0.48
Alpha value* [%]	8.81	10

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

## Building Use

### % Area Building Type

	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
<b>100</b>	<b>B1 Offices and Workshop businesses</b>
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	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

## Energy Consumption by End Use [kWh/m<sup>2</sup>]

	Actual	Notional
Heating	13.48	12.89
Cooling	3.38	7.15
Auxiliary	9.31	10.74
Lighting	5.86	19.41
Hot water	2.61	2.48
Equipment*	36.96	36.96
<b>TOTAL**</b>	<b>34.64</b>	<b>52.66</b>

\* 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/m<sup>2</sup>]

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

## Energy & CO<sub>2</sub> Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m <sup>2</sup> ]	75.8	137.56
Primary energy* [kWh/m <sup>2</sup> ]	75.17	130.39
Total emissions [kg/m <sup>2</sup> ]	12.9	22.2

\* 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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
<b>[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b>									
Actual	32.5	45.3	10.7	4.2	8.4	0.84	3.01	0.91	3.76
Notional	62.5	119.1	20.1	8.7	14.3	0.86	3.79	----	----
<b>[ST] Constant volume system (variable fresh air rate), [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b>									
Actual	27.3	46.8	7.1	5.3	19.1	1.06	2.45	0.91	3.76
Notional	16.2	122.8	5.2	9	11.6	0.86	3.79	----	----
<b>[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity</b>									
Actual	44.9	40.7	14.8	3.8	8.5	0.84	3.01	0.91	3.76
Notional	31.6	117.3	10.2	8.6	12.9	0.86	3.79	----	----
<b>[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Natural Gas, [CFT] Electricity</b>									
Actual	100.3	0	36.3	0	0	0.77	0	0.91	0
Notional	164.8	0	53.1	0	0	0.86	0	----	----
<b>[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Natural Gas, [CFT] Electricity</b>									
Actual	7.4	0	2.7	0	5.9	0.77	0	0.91	0
Notional	20.6	0	6.6	0	2.1	0.86	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 <sub>i-Typ</sub>	U <sub>i-Min</sub>	Surface where the minimum value occurs*
Wall	0.23	0.12	L0000031:Surf[0]
Floor	0.2	0.1	L0000029:Surf[0]
Roof	0.15	0.1	L0000040:Surf[14]
Windows, roof windows, and rooflights	1.5	1	L000001E:Surf[0]
Personnel doors	1.5	1.6	L000002A:Surf[0]
Vehicle access & similar large doors	1.5	-	No vehicle access doors in building
High usage entrance doors	1.5	-	No high usage entrance doors in building
U <sub>i-Typ</sub> = Typical individual element U-values [W/(m <sup>2</sup> K)]      U <sub>i-Min</sub> = Minimum individual element U-values [W/(m <sup>2</sup> K)] * There might be more than one surface where the minimum U-value occurs.			

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