Energy Assessment

308 Gray's Inn Road

+44 (0)20 7043 0418
info@eightversa.com

Document information

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Eamon Nolan
Pascall+Watson

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Document prepared by
Klaudia Krasowska

Quality assured by
Yiota Paraskeva

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Contents:

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Executive summary

About the Scheme
The proposal comprises of a refurbishment of National Union of Journalists Headland House. The development is located in the administrative area of Camden Council with a total GIA of approximately 1,325 sqm.

Planning policy
Local planning policies are detailed in the 'Camden Planning Guidance- Energy efficiency and adaptation' (January 2021):

- Section 7 provides that all developments in Camden are expected to reduce carbon dioxide emissions through application of the energy hierarchy.
- Section 7.2 requires all developments to outperform Building Regulations Part L. In the case of this refurbishment, the policy requires application to maximise the possible reduction from part L1B.

Key energy efficient measures
Key measures identified for each stage are shown below:
- Low U-values for windows
- Low g-value

Results
The entire scheme has been modelled for the purposes of the energy assessment.

The scheme complies with the 2021 Building Regulations Part L and the minimum energy efficiency targets in the following documents have been followed:
- Refurbishment - Consequential improvements to refurbished areas have been made to ensure that the building complies with Part L, to the extent that such improvements are technically, functionally, and economically feasible.

In addition, the CO_2 emissions of the scheme have been calculated using the SAP 10.2 carbon emission factors, and the scheme can achieve:
- A total CO_2 reduction of **8.6%** beyond existing building through energy efficiency measures (replacement of windows)

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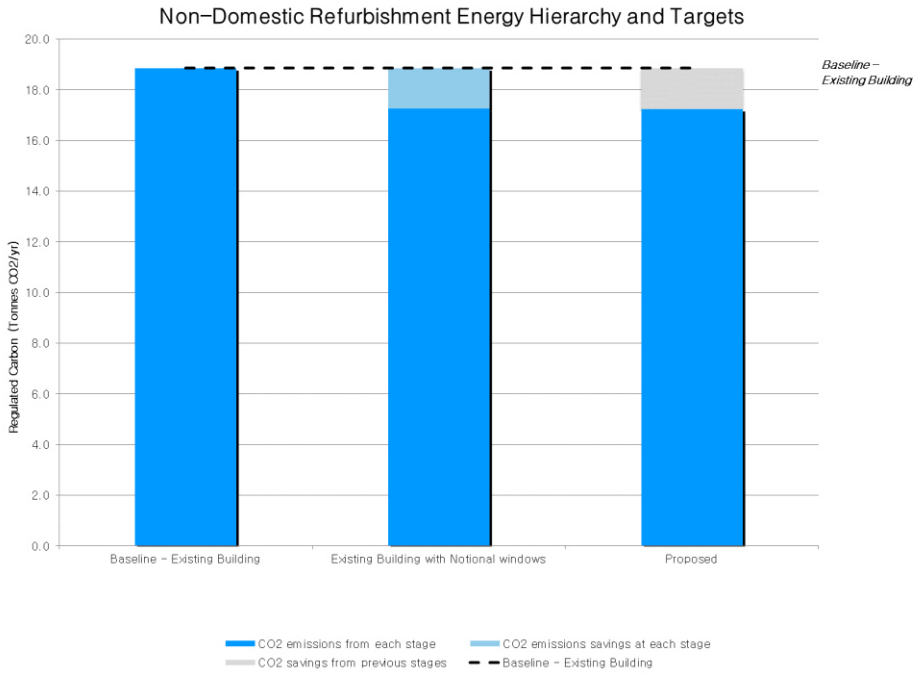
Regulated carbon emissions

A graphical illustration of how the scheme performs in relation to Existing Building and the Existing Building with notional refurbishment is shown below. Carbon dioxide emission factors for SAP 10.2 have been used for the calculation.

As demonstrated in the figure the proposed scheme will reduce total carbon emissions by 8.6% over the existing building (using SAP 10.2 carbon dioxide emission factors) with the inclusion of improved glazing.



Regulated CO_2 emissions

Regulated CO_2 - Calculated using SAP 10.2 CO_2 factors			
	Existing:	Existing with Notional Refurbishment:	Proposed:
CO_2 emissions (tCO_2/yr)	18.85	17.26	17.24
CO_2 emissions saving (tCO_2/yr)	-	1.59	0.03
Saving from each stage (%)	-	8.4	0.1
Total CO_2 emissions saving (tCO_2/yr)	1.62		
8.6% total CO_2 savings over existing building achieved			

Unregulated CO_2 emissions

Both the regulated and unregulated emissions of the development are shown below.

CO_2 Emissions – Regulated and Unregulated (tonnes CO_2/yr) - SAP 10.			
	Regulated Emissions	Unregulated Emissions	Total Emissions
Baseline: Existing	18.85	6.28	25.13
Existing with Notional Refurbishment:	17.26	6.28	23.54
Proposed:	17.24	6.28	23.51

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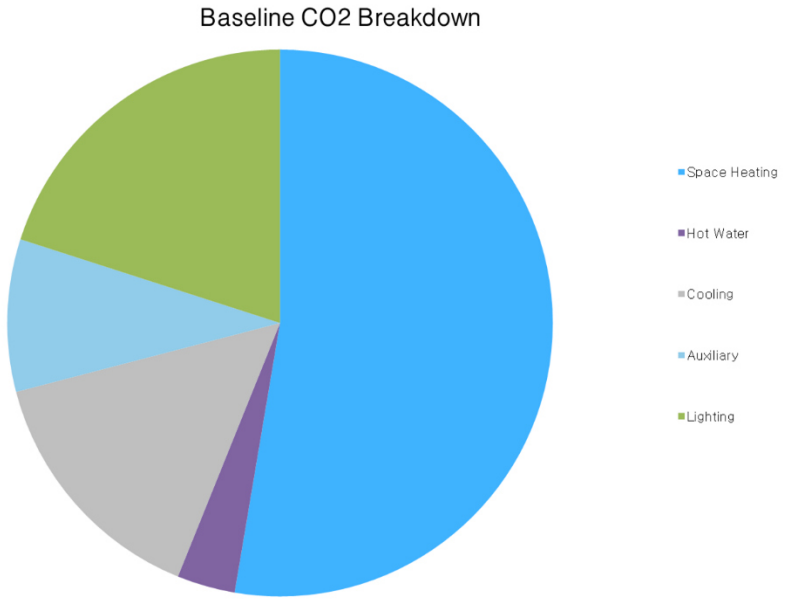
Baseline

Existing Building

The total baseline (existing building) carbon emissions for the whole scheme is 18.85 tonnes CO_2/yr (using SAP 10.2 carbon dioxide emission factors).

The pie chart provides a breakdown of the specific carbon emissions by system over the course of one year. The chart shows that hot water is the primary source of carbon dioxide emissions, and lighting is the second largest, across the scheme.

Carbon Emissions in tonnes CO_2/yr.				
Heating	Hot Water	Cooling	Auxiliary	Lighting
9.33	0.65	2.80	1.70	3.78



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Demand Reduction

Demand reduction measures have been presented in tables below. These provide passive measures implemented in order to decrease energy demand reduction as per energy hierarchy methodology.

U-values

The U-values for existing building were assumed as per inference values for 1995 Regulations (England and Wales) for the Office buildings.

	Non- Domestic	
Element	Existing U-value W/m^{2}K	Proposed U-value W/m^{2}K
External wall	Inference: 0.45	Inference: 0.45
Ground floor	Inference: 0.45	Inference: 0.45
Roof	Inference: 0.45	Inference: 0.45
Window	Inference: 2.817 (g-value of 0.72)	Improved window: 1.30 (g-value of 0.4)
Personnel doors	Inference: 0.81	Inference: 0.81

Air permeability

The following air permeability has been assumed for both existing and proposed building:

Air permeability (m^3/hm^2 @50 Pa)	Existing	Proposed
Non-domestic	25	25

For all scenarios, as no new mechanical systems were proposed, the existing services were modelled.

Heating

For space heating, an air source heat pump was modelled with assumed minimum COP of 2.5 for the offices/ meeting rooms and lobby space. Gas boiler with efficiency of 0.91 has been assigned to corridors, toilets and other areas.

Hot Water

In all scenarios, the existing hot water system compromised a gas boiler with efficiency of 91%.

Ventilation

Existing mechanical ventilation with heat recovery system has been specified for the office spaces, with a minimum heat recovery efficiency of 70% and an SFP of 2.2 W/(l/s). Extract ventilation has been specified for the toilets with a flow rate less than 10l/s/m^2 and an SFP less than 0.5W/l/s.

Cooling

Existing cooling system was specified as an air source heat pump with a minimum EER and SEER of 2.6 to the office spaces and meeting rooms.

Lighting

Lighting was specified a minimum efficacy of 60 lumens/W.

Energy demand following energy efficiency measures (MWh/year)

	Space Heating	Hot water	Lighting	Auxiliary	Cooling	Unregulated gas	Unregulated electricity
Non-Domestic	46.6	3.2	29.0	13.0	12.5	0.0	46.2

Primary Energy

	Target Primary Energy Rate (kWh/m^2 per year)	Building Primary Energy Rate (kWh/m^2 per year)	Improvement (%)
Non-domestic	120.3	108.84	9.5%

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Conclusion

Summary

The proposal studied comprises of a refurbishment of National Union of Journalists Headland House. The development is located in the administrative area of Camden Council with a total GIA of approximately 1,325 sqm.

Planning policy compliance

Local planning policies are detailed in the 'Camden Planning Guidance- Energy efficiency and adaptation' (January 2021):

- The development was designed following Section 7 by reducing carbon dioxide emissions through application of the energy hierarchy.
- The development outperforms Building Regulations Part L1B as per section 7.2.

The entire scheme has been modelled for the purposes of the energy assessment.

The scheme complies with the 2021 Building Regulations Part L and the minimum energy efficiency targets in the following documents have been followed:

- Refurbishment - Consequential improvements to refurbished areas have been made to ensure that the building complies with Part L, to the extent that such improvements are technically, functionally, and economically feasible.

In addition, the CO_2 emissions of the scheme have been calculated using the SAP 10.2 carbon emission factors, and the scheme can achieve:

- A total CO_2 reduction of **8.6%** beyond existing building through energy efficiency measures (replacement of windows)

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Appendix A

BRUKL files

The emission figures and details of the calculations and methodology used to determine the figures provided within the report can be found in the following pages:

- Baseline (Existing building) – BER from the Existing scenario BRUKL
- Existing with Notional Refurbishment – BER from the Existing with Notional Refurbishment scenario BRUKL
- Proposed – BER from the Proposed scenario BRUKL

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Baseline (Existing building) – BER from the Existing scenario BRUKL

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

National Union of Journalists Headland House

As designed

Date: Tue Oct 18 16:54:25 2022

Administrative information

Building Details

Address:

Certifier details

Name:

Telephone number:

Address: , ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.c.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.1.2

BRUKL compliance module version: v6.1.c.0

Foundation area [m²]: 1297.66

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

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), kgCO_2/m².annum	2.73	
Building CO_2 emission rate (BER), kgCO_2/m².annum	14.22	
Target primary energy rate (TPER), kWh/m².annum	16.64	
Building primary energy rate (BPER), kWh/m².annum	120.25	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.63	1.64	Basement - B_Circulation_ 1_P_9
Floors	0.18	0.27	1	L00 - L00_WC_2_F_5
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.45	0.45	L02 - L02_Circulation_2_R_6
Windows** and roof windows	1.6	2.82	2.82	L00 - L00_WC_2_G_8
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	0.81	0.81	L00 - L00_Office_D_10
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

$U_{a\text{-}Calc}$ = 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
m³/(h.m²) at 50 Pa	8	25

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	<0.9

1- heating only- gas boiler

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.91	-	-	-	-
Standard value	0.93*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.

2- heating and cooling- ASHP

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	2.5	2.6	-	-	-
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					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

1- Project DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	Hot water provided by HVAC system	-
Standard value	N/A	N/A

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**		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
Basement - B_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L04 - L04_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Lift	-	-	-	-	2.2	-	-	-	-	0.7	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
Basement - B_Circulation_ 1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_WC_2	-	-	0.5	-	-	-	-	-	-	-	N/A
Basement - B_WC_1	-	-	0.5	-	-	-	-	-	-	-	N/A
Basement - B_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Circulation_4	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Kitchen	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Store	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_WC_2	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - L00_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_WC_1	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - L00_Kitchen	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Server room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Meeting room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_WCs	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - L01_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Cleaners	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Training room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Store	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Office_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Cleaners	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Store	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_WC	-	-	0.5	-	-	-	-	-	-	-	N/A
L03 - L03_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L04 - L04_WC	-	-	0.5	-	-	-	-	-	-	-	N/A
L04 - L04_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_WC	-	-	0.5	-	-	-	-	-	-	-	N/A
L05 - L05_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Teaching	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Office	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Meeting room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Office_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_IT_Workshop_1	-	-	-	-	2.2	-	-	-	-	0.7	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
L01 - L01_Office_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_IT_Workshop 1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Office_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Meeting room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Training room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Meeting Room_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Open_Office	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Office_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L04 - L04_Meeting Room_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L04 - L04_Open_Office	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Meeting Room_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Open_Office	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Office_1	-	-	-	-	2.2	-	-	-	-	0.7	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
Basement - B_Lift	60	-	-
L00 - L00_Lift	60	-	-
L01 - L01_Lift	60	-	-
L02 - L02_Lift	60	-	-
L03 - L03_Lift	60	-	-
L04 - L04_Lift	60	-	-
L05 - L05_Lift	60	-	-
Basement - B_Circulation_ 1	60	-	-
Basement - B_WC_2	60	-	-
Basement - B_WC_1	60	-	-
Basement - B_Circulation_2	60	-	-
Basement - B_Circulation_3	60	-	-
Basement - B_Circulation_4	60	-	-
Basement - B_Kitchen	60	-	-
Basement - B_Store	60	-	-
L00 - L00_WC_2	60	-	-
L00 - L00_Circulation_2	60	-	-
L00 - L00_WC_1	60	-	-
L00 - L00_Kitchen	60	-	-
L00 - L00_Server room	60	-	-
L00 - L00_Circulation_1	60	-	-
L01 - L01_Circulation_1	60	-	-
L01 - L01_Meeting room	60	-	-
L01 - L01_WCs	60	-	-
L01 - L01_Circulation_2	60	-	-
L01 - L01_Cleaners	60	-	-

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
L01 - L01_Training room	60	-	-
L01 - L01_Store	60	-	-
L01 - L01_Circulation_3	60	-	-
L02 - L02_Office_1	60	-	-
L02 - L02_Circulation_1	60	-	-
L02 - L02_Circulation_2	60	-	-
L02 - L02_Cleaners	60	-	-
L02 - L02_Store	60	-	-
L02 - L02_Circulation_3	60	-	-
L03 - L03_Circulation_1	60	-	-
L03 - L03_WC	60	-	-
L03 - L03_Circulation_2	60	-	-
L03 - L03_Circulation_3	60	-	-
L04 - L04_WC	60	-	-
L04 - L04_Circulation_2	60	-	-
L05 - L05_Circulation_1	60	-	-
L05 - L05_WC	60	-	-
L05 - L05_Circulation_2	60	-	-
L05 - L05_Circulation_3	60	-	-
Basement - B_Teaching	60	-	-
L00 - L00_Office	60	-	-
L00 - L00_Meeting room	60	-	-
L01 - L01_Office_1	60	-	-
L01 - L01_IT_Workshop 1	60	-	-
L01 - L01_Office_2	60	-	-
L02 - L02_IT_Workshop 1	60	-	-
L02 - L02_Office_2	60	-	-
L02 - L02_Meeting room	60	-	-
L02 - L02_Training room	60	-	-
L03 - L03_Meeting Room_1	60	-	-
L03 - L03_Open_Office	60	-	-
L03 - L03_Office_1	60	-	-
L04 - L04_Meeting Room_1	60	-	-
L04 - L04_Open_Office	60	-	-
L05 - L05_Meeting Room_1	60	-	-
L05 - L05_Open_Office	60	-	-
L05 - L05_Office_1	60	-	-

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?
L01 - L01_Meeting room	NO (-26.9%)	NO
L01 - L01_Training room	YES (+58.1%)	NO
L02 - L02_Office_1	YES (+26.2%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Basement - B_Teaching	N/A	N/A
L00 - L00_Office	NO (-78.1%)	NO
L00 - L00_Meeting room	YES (+73.7%)	NO
L01 - L01_Office_1	YES (+106.8%)	NO
L01 - L01_IT_Workshop_1	YES (+84.1%)	NO
L01 - L01_Office_2	YES (+47.8%)	NO
L02 - L02_IT_Workshop_1	YES (+88.3%)	NO
L02 - L02_Office_2	YES (+73.7%)	NO
L02 - L02_Meeting room	NO (-26.9%)	NO
L02 - L02_Training room	YES (+58.1%)	NO
L03 - L03_Meeting Room_1	NO (-27%)	NO
L03 - L03_Open_Office	YES (+71.5%)	NO
L03 - L03_Office_1	YES (+26.7%)	NO
L04 - L04_Meeting Room_1	NO (-27%)	NO
L04 - L04_Open_Office	YES (+71.5%)	NO
L05 - L05_Meeting Room_1	NO (-27%)	NO
L05 - L05_Open_Office	YES (+71.5%)	NO
L05 - L05_Office_1	YES (+26.7%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
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
Floor area [m^2]	1325.8	1325.8
External area [m^2]	2020.6	2020.6
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	25	3
Average conductance [W/K]	1848.54	902.94
Average U-value [W/m^2K]	0.91	0.45
Alpha value* [%]	9.7	21.55

* 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
99	**Offices and Workshop Businesses**
	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
1	**Others: Miscellaneous 24hr Activities**
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	37.16	13.07
Cooling	16.16	4.15
Auxiliary	9.82	3.41
Lighting	21.84	8.44
Hot water	2.43	1.87
Equipment*	34.82	34.82
TOTAL**	**87.41**	**30.95**

* 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^2]

	Actual	Notional
Photovoltaic systems	0	17.32
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*17.32*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	323.47	160.43
Primary energy [kWh/m^2]	120.25	16.64
Total emissions [kg/m^2]	14.22	2.73

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] No Heating or Cooling										
	Actual	291.7	3.8	0	0	9.1	0	0	0	0
	Notional	14.6	13.2	0	0	2.2	0	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas										
	Actual	275	117.2	89.4	0	12.2	0.86	0	0.91	0
	Notional	100.6	111.8	32.5	0	6.3	0.86	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	122.5	169.6	13.9	24.3	8.7	2.45	1.94	2.5	2.6
	Notional	41.6	98.7	4.4	6.2	2.1	2.64	4.4	----	----

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

Energy Assessment
308 Gray's Inn Road

eight versa
+44 (0)20 7043 0418
info@eightversa.com

Existing with Notional Refurbishment – BER from the Existing with Notional Refurbishment scenario
BRUKL

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

National Union of Journalists Headland House

As designed

Date: Tue Oct 18 17:08:32 2022

Administrative information

Building Details

Address:

Certifier details

Name:

Telephone number:

Address: , ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.c.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.1.2

BRUKL compliance module version: v6.1.c.0

Foundation area [m^2]: 1297.66

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

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	2.6	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	13.02	
Target primary energy rate (TPER), kWh/m^2.annum	15.17	
Building primary energy rate (BPER), kWh/m^2.annum	107.52	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

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

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.63	1.64	Basement - B_Circulation_ 1_P_9
Floors	0.18	0.27	1	L00 - L00_WC_2_F_5
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.45	0.45	L02 - L02_Circulation_2_R_6
Windows** and roof windows	1.6	1.4	1.4	L00 - L00_WC_2_G_8
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	0.81	0.81	L00 - L00_Office_D_10
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

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

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

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

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

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

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	25

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	<0.9

1- heating only- gas boiler

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.91	-	-	-	-
Standard value	0.93*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.

2- heating and cooling- ASHP

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	2.5	2.6	-	-	-
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					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

1- Project DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	Hot water provided by HVAC system	-
Standard value	N/A	N/A

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**		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
Basement - B_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L04 - L04_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Lift	-	-	-	-	2.2	-	-	-	-	0.7	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
Basement - B_Circulation_ 1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_WC_2	-	-	0.5	-	-	-	-	-	-	-	N/A
Basement - B_WC_1	-	-	0.5	-	-	-	-	-	-	-	N/A
Basement - B_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Circulation_4	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Kitchen	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Store	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_WC_2	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - L00_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_WC_1	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - L00_Kitchen	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Server room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Meeting room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_WCs	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - L01_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Cleaners	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Training room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Store	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Office_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Cleaners	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Store	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_WC	-	-	0.5	-	-	-	-	-	-	-	N/A
L03 - L03_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L04 - L04_WC	-	-	0.5	-	-	-	-	-	-	-	N/A
L04 - L04_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_WC	-	-	0.5	-	-	-	-	-	-	-	N/A
L05 - L05_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Teaching	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Office	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Meeting room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Office_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_IT_Workshop_1	-	-	-	-	2.2	-	-	-	-	0.7	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
L01 - L01_Office_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_IT_Workshop 1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Office_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Meeting room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Training room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Meeting Room_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Open_Office	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Office_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L04 - L04_Meeting Room_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L04 - L04_Open_Office	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Meeting Room_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Open_Office	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Office_1	-	-	-	-	2.2	-	-	-	-	0.7	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
Basement - B_Lift	60	-	-
L00 - L00_Lift	60	-	-
L01 - L01_Lift	60	-	-
L02 - L02_Lift	60	-	-
L03 - L03_Lift	60	-	-
L04 - L04_Lift	60	-	-
L05 - L05_Lift	60	-	-
Basement - B_Circulation_ 1	60	-	-
Basement - B_WC_2	60	-	-
Basement - B_WC_1	60	-	-
Basement - B_Circulation_2	60	-	-
Basement - B_Circulation_3	60	-	-
Basement - B_Circulation_4	60	-	-
Basement - B_Kitchen	60	-	-
Basement - B_Store	60	-	-
L00 - L00_WC_2	60	-	-
L00 - L00_Circulation_2	60	-	-
L00 - L00_WC_1	60	-	-
L00 - L00_Kitchen	60	-	-
L00 - L00_Server room	60	-	-
L00 - L00_Circulation_1	60	-	-
L01 - L01_Circulation_1	60	-	-
L01 - L01_Meeting room	60	-	-
L01 - L01_WCs	60	-	-
L01 - L01_Circulation_2	60	-	-
L01 - L01_Cleaners	60	-	-

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
L01 - L01_Training room	60	-	-
L01 - L01_Store	60	-	-
L01 - L01_Circulation_3	60	-	-
L02 - L02_Office_1	60	-	-
L02 - L02_Circulation_1	60	-	-
L02 - L02_Circulation_2	60	-	-
L02 - L02_Cleaners	60	-	-
L02 - L02_Store	60	-	-
L02 - L02_Circulation_3	60	-	-
L03 - L03_Circulation_1	60	-	-
L03 - L03_WC	60	-	-
L03 - L03_Circulation_2	60	-	-
L03 - L03_Circulation_3	60	-	-
L04 - L04_WC	60	-	-
L04 - L04_Circulation_2	60	-	-
L05 - L05_Circulation_1	60	-	-
L05 - L05_WC	60	-	-
L05 - L05_Circulation_2	60	-	-
L05 - L05_Circulation_3	60	-	-
Basement - B_Teaching	60	-	-
L00 - L00_Office	60	-	-
L00 - L00_Meeting room	60	-	-
L01 - L01_Office_1	60	-	-
L01 - L01_IT_Workshop 1	60	-	-
L01 - L01_Office_2	60	-	-
L02 - L02_IT_Workshop 1	60	-	-
L02 - L02_Office_2	60	-	-
L02 - L02_Meeting room	60	-	-
L02 - L02_Training room	60	-	-
L03 - L03_Meeting Room_1	60	-	-
L03 - L03_Open_Office	60	-	-
L03 - L03_Office_1	60	-	-
L04 - L04_Meeting Room_1	60	-	-
L04 - L04_Open_Office	60	-	-
L05 - L05_Meeting Room_1	60	-	-
L05 - L05_Open_Office	60	-	-
L05 - L05_Office_1	60	-	-

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?
L01 - L01_Meeting room	NO (-70.6%)	NO
L01 - L01_Training room	NO (-36.3%)	NO
L02 - L02_Office_1	NO (-49.2%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Basement - B_Teaching	N/A	N/A
L00 - L00_Office	NO (-91.2%)	NO
L00 - L00_Meeting room	NO (-30.1%)	NO
L01 - L01_Office_1	NO (-16.7%)	NO
L01 - L01_IT_Workshop 1	NO (-25.9%)	NO
L01 - L01_Office_2	NO (-40.5%)	NO
L02 - L02_IT_Workshop 1	NO (-24.2%)	NO
L02 - L02_Office_2	NO (-30%)	NO
L02 - L02_Meeting room	NO (-70.6%)	NO
L02 - L02_Training room	NO (-36.3%)	NO
L03 - L03_Meeting Room_1	NO (-70.6%)	NO
L03 - L03_Open_Office	NO (-30.9%)	NO
L03 - L03_Office_1	NO (-49%)	NO
L04 - L04_Meeting Room_1	NO (-70.6%)	NO
L04 - L04_Open_Office	NO (-30.9%)	NO
L05 - L05_Meeting Room_1	NO (-70.6%)	NO
L05 - L05_Open_Office	NO (-30.9%)	NO
L05 - L05_Office_1	NO (-49%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
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
Floor area [m^2]	1325.8	1325.8
External area [m^2]	2020.6	2020.6
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	25	3
Average conductance [W/K]	1408.71	902.94
Average U-value [W/m^2K]	0.7	0.45
Alpha value* [%]	12.72	21.55

* 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
99	**Offices and Workshop Businesses**
	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
1	**Others: Miscellaneous 24hr Activities**
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	35.13	13.07
Cooling	9.41	4.15
Auxiliary	9.82	3.41
Lighting	21.84	8.44
Hot water	2.43	1.87
Equipment*	34.82	34.82
TOTAL**	**78.64**	**30.95**

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

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	18.32
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*18.32*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	253.96	160.43
Primary energy [kWh/m^2]	107.52	15.17
Total emissions [kg/m^2]	13.02	2.6

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] No Heating or Cooling										
	Actual	291.7	3.8	0	0	9.1	0	0	0	0
	Notional	14.6	13.2	0	0	2.2	0	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas										
	Actual	267.7	89.3	87	0	12.2	0.86	0	0.91	0
	Notional	100.6	111.8	32.5	0	6.3	0.86	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	105.5	98.8	12	14.1	8.7	2.45	1.94	2.5	2.6
	Notional	41.6	98.7	4.4	6.2	2.1	2.64	4.4	----	----

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

Energy Assessment
308 Gray's Inn Road

+44 (0)20 7043 0418
info@eightversa.com

Proposed – BER from the Proposed scenario BRUKL

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

National Union of Journalists Headland House

As designed

Date: Tue Oct 18 17:13:31 2022

Administrative information

Building Details

Address:

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.c.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.1.2

BRUKL compliance module version: v6.1.c.0

Certifier details

Name:

Telephone number:

Address: , ,

Foundation area [m^2]: 1297.66

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

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	2.53	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	13	
Target primary energy rate (TPER), kWh/m^2.annum	14.43	
Building primary energy rate (BPER), kWh/m^2.annum	108.84	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

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

Fabric element	$U_{a\text{-Limit}}$	$U_{a\text{-Calc}}$	$U_{i\text{-Calc}}$	First surface with maximum value
Walls*	0.26	0.63	1.64	Basement - B_Circulation_ 1_P_9
Floors	0.18	0.27	1	L00 - L00_WC_2_F_5
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.45	0.45	L02 - L02_Circulation_2_R_6
Windows** and roof windows	1.6	1.3	1.3	L00 - L00_WC_2_G_8
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	0.81	0.81	L00 - L00_Office_D_10
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

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

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

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

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

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

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

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	25

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	<0.9

1- heating only- gas boiler

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.91	-	-	-	-
Standard value	0.93*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.

2- heating and cooling- ASHP

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	2.5	2.6	-	-	-
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					YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

1- Project DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	Hot water provided by HVAC system	-
Standard value	N/A	N/A

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**		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
Basement - B_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L04 - L04_Lift	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Lift	-	-	-	-	2.2	-	-	-	-	0.7	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
Basement - B_Circulation_ 1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_WC_2	-	-	0.5	-	-	-	-	-	-	-	N/A
Basement - B_WC_1	-	-	0.5	-	-	-	-	-	-	-	N/A
Basement - B_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Circulation_4	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Kitchen	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Store	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_WC_2	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - L00_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_WC_1	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - L00_Kitchen	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Server room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Meeting room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_WCs	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - L01_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Cleaners	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Training room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Store	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Office_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Cleaners	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Store	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_WC	-	-	0.5	-	-	-	-	-	-	-	N/A
L03 - L03_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L04 - L04_WC	-	-	0.5	-	-	-	-	-	-	-	N/A
L04 - L04_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Circulation_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_WC	-	-	0.5	-	-	-	-	-	-	-	N/A
L05 - L05_Circulation_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Circulation_3	-	-	-	-	2.2	-	-	-	-	0.7	N/A
Basement - B_Teaching	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Office	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L00 - L00_Meeting room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_Office_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L01 - L01_IT_Workshop_1	-	-	-	-	2.2	-	-	-	-	0.7	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
L01 - L01_Office_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_IT_Workshop 1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Office_2	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Meeting room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L02 - L02_Training room	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Meeting Room_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Open_Office	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L03 - L03_Office_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L04 - L04_Meeting Room_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L04 - L04_Open_Office	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Meeting Room_1	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Open_Office	-	-	-	-	2.2	-	-	-	-	0.7	N/A
L05 - L05_Office_1	-	-	-	-	2.2	-	-	-	-	0.7	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
Basement - B_Lift	60	-	-
L00 - L00_Lift	60	-	-
L01 - L01_Lift	60	-	-
L02 - L02_Lift	60	-	-
L03 - L03_Lift	60	-	-
L04 - L04_Lift	60	-	-
L05 - L05_Lift	60	-	-
Basement - B_Circulation_ 1	60	-	-
Basement - B_WC_2	60	-	-
Basement - B_WC_1	60	-	-
Basement - B_Circulation_2	60	-	-
Basement - B_Circulation_3	60	-	-
Basement - B_Circulation_4	60	-	-
Basement - B_Kitchen	60	-	-
Basement - B_Store	60	-	-
L00 - L00_WC_2	60	-	-
L00 - L00_Circulation_2	60	-	-
L00 - L00_WC_1	60	-	-
L00 - L00_Kitchen	60	-	-
L00 - L00_Server room	60	-	-
L00 - L00_Circulation_1	60	-	-
L01 - L01_Circulation_1	60	-	-
L01 - L01_Meeting room	60	-	-
L01 - L01_WCs	60	-	-
L01 - L01_Circulation_2	60	-	-
L01 - L01_Cleaners	60	-	-

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
L01 - L01_Training room	60	-	-
L01 - L01_Store	60	-	-
L01 - L01_Circulation_3	60	-	-
L02 - L02_Office_1	60	-	-
L02 - L02_Circulation_1	60	-	-
L02 - L02_Circulation_2	60	-	-
L02 - L02_Cleaners	60	-	-
L02 - L02_Store	60	-	-
L02 - L02_Circulation_3	60	-	-
L03 - L03_Circulation_1	60	-	-
L03 - L03_WC	60	-	-
L03 - L03_Circulation_2	60	-	-
L03 - L03_Circulation_3	60	-	-
L04 - L04_WC	60	-	-
L04 - L04_Circulation_2	60	-	-
L05 - L05_Circulation_1	60	-	-
L05 - L05_WC	60	-	-
L05 - L05_Circulation_2	60	-	-
L05 - L05_Circulation_3	60	-	-
Basement - B_Teaching	60	-	-
L00 - L00_Office	60	-	-
L00 - L00_Meeting room	60	-	-
L01 - L01_Office_1	60	-	-
L01 - L01_IT_Workshop 1	60	-	-
L01 - L01_Office_2	60	-	-
L02 - L02_IT_Workshop 1	60	-	-
L02 - L02_Office_2	60	-	-
L02 - L02_Meeting room	60	-	-
L02 - L02_Training room	60	-	-
L03 - L03_Meeting Room_1	60	-	-
L03 - L03_Open_Office	60	-	-
L03 - L03_Office_1	60	-	-
L04 - L04_Meeting Room_1	60	-	-
L04 - L04_Open_Office	60	-	-
L05 - L05_Meeting Room_1	60	-	-
L05 - L05_Open_Office	60	-	-
L05 - L05_Office_1	60	-	-

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?
L01 - L01_Meeting room	NO (-59.4%)	NO
L01 - L01_Training room	NO (-12.2%)	NO
L02 - L02_Office_1	NO (-29.9%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Basement - B_Teaching	N/A	N/A
L00 - L00_Office	NO (-87.8%)	NO
L00 - L00_Meeting room	NO (-3.5%)	NO
L01 - L01_Office_1	YES (+14.9%)	NO
L01 - L01_IT_Workshop 1	YES (+2.3%)	NO
L01 - L01_Office_2	NO (-17.9%)	NO
L02 - L02_IT_Workshop 1	YES (+4.6%)	NO
L02 - L02_Office_2	NO (-3.5%)	NO
L02 - L02_Meeting room	NO (-59.4%)	NO
L02 - L02_Training room	NO (-12.2%)	NO
L03 - L03_Meeting Room_1	NO (-59.4%)	NO
L03 - L03_Open_Office	NO (-4.7%)	NO
L03 - L03_Office_1	NO (-29.6%)	NO
L04 - L04_Meeting Room_1	NO (-59.4%)	NO
L04 - L04_Open_Office	NO (-4.7%)	NO
L05 - L05_Meeting Room_1	NO (-59.4%)	NO
L05 - L05_Open_Office	NO (-4.7%)	NO
L05 - L05_Office_1	NO (-29.6%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
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
Floor area [m^2]	1325.8	1325.8
External area [m^2]	2020.6	2020.6
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	25	3
Average conductance [W/K]	1377.67	902.94
Average U-value [W/m^2K]	0.68	0.45
Alpha value* [%]	13.01	21.55

* 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
99	**Offices and Workshop Businesses**
	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
1	**Others: Miscellaneous 24hr Activities**
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	33.33	13.07
Cooling	11.92	4.15
Auxiliary	9.82	3.41
Lighting	21.84	8.44
Hot water	2.43	1.87
Equipment*	34.82	34.82
TOTAL**	**79.35**	**30.95**

* 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^2]

	Actual	Notional
Photovoltaic systems	0	18.82
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*18.82*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	264.54	160.43
Primary energy [kWh/m^2]	108.84	14.43
Total emissions [kg/m^2]	13	2.53

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] No Heating or Cooling										
	Actual	291.7	3.8	0	0	9.1	0	0	0	0
	Notional	14.6	13.2	0	0	2.2	0	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas										
	Actual	257.3	98.6	83.6	0	12.2	0.86	0	0.91	0
	Notional	100.6	111.8	32.5	0	6.3	0.86	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	95.6	125.2	10.8	17.9	8.7	2.45	1.94	2.5	2.6
	Notional	41.6	98.7	4.4	6.2	2.1	2.64	4.4	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
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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