

WGBC Net Zero Carbon Buildings Report Covering the period Jan 2022 – Dec 2022

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HILSON MORAN

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AUTHOR: **STEVE JOHNSON**
 CHECKER: **GREENLY**
 APPROVER: **VINCE UGAROW**

HM OFFICE: **THE HUB
 FOWLER AVENUE
 FARNBOROUGH BUSINESS PARK
 HAMPSHIRE
 GU14 7JF** **T: +44 (0)1252 550 500
 HILSONMORAN.COM
 INFO@HILSONMORAN.COM**

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1. Introduction

1.1. Background

Hilson Moran (HM) is an environmental engineering consultancy working on numerous high-profile projects in the UK and around the world. HM provide consultancy on building services, sustainability, energy performance and certification as well as providing consultancy on operational buildings.

On the 30th June 2021, HM joined the WGBC Net Zero Carbon Commitment. Signing the Commitment is the latest step in Hilson Moran’s response to the ongoing Climate and Biodiversity Emergency, following the launch of our Climate Manifesto in April 2021.

The Net Zero Carbon Buildings Commitment is developed to recognise and promote advanced climate leadership action from businesses, organisations, cities and subnational governments in decarbonising the built environment, to inspire others to take similar action and remove barriers to implementation.

Since signing up to the commitment our carbon footprint has fallen by around 27% as shown in Figure 1. This is primarily due to moving to a smaller office in Farnborough.

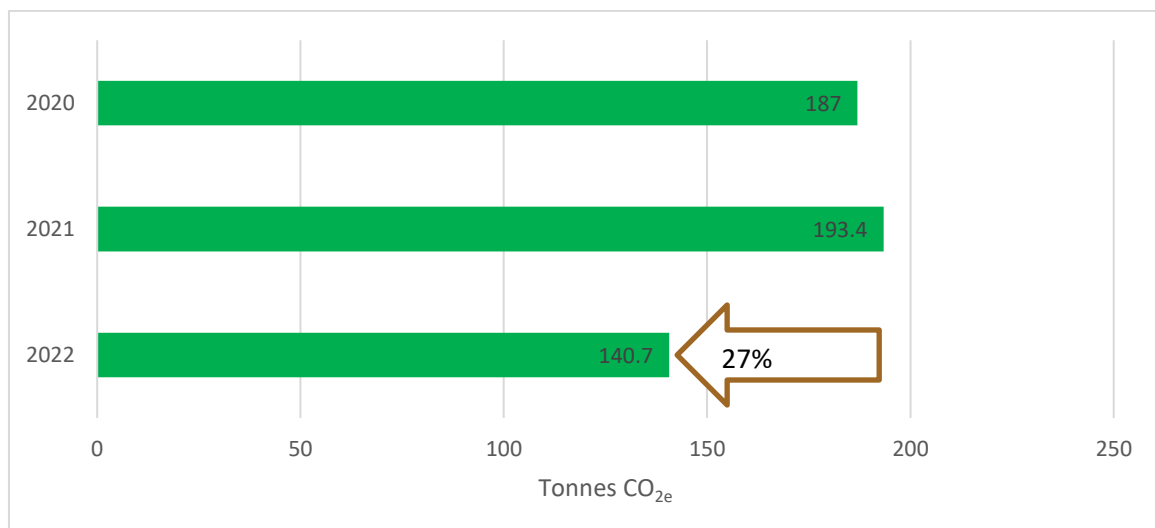


Figure 1 HM Carbon Footprint

1.2. Purpose

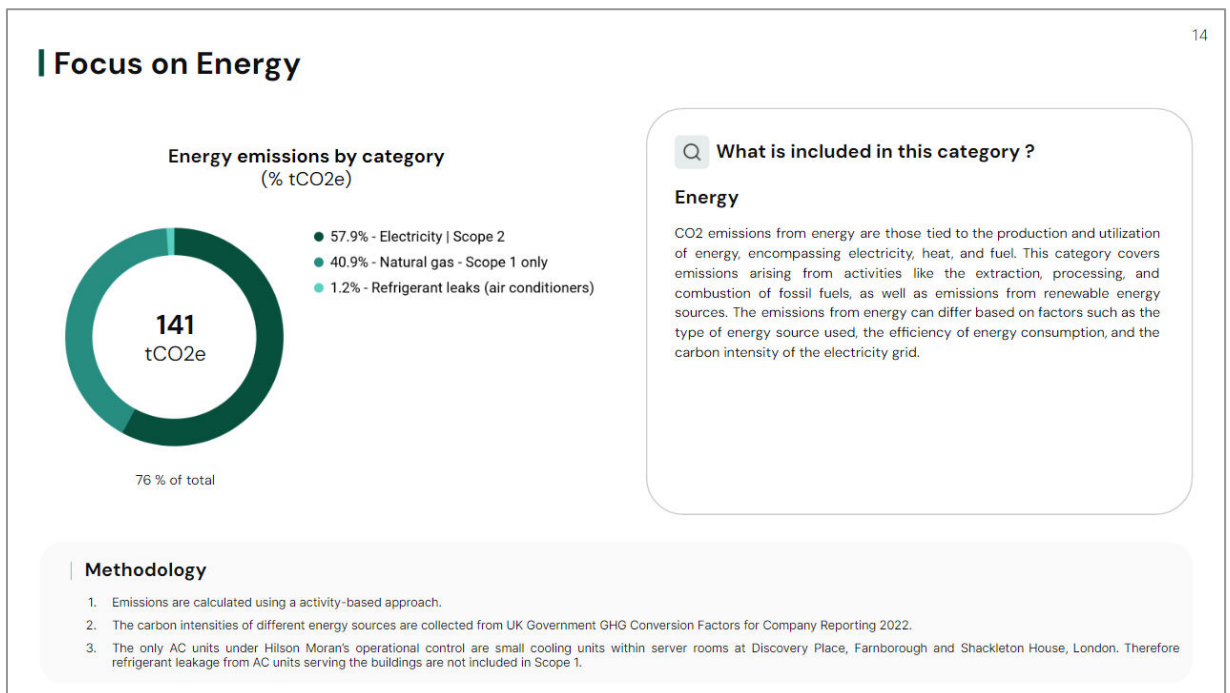
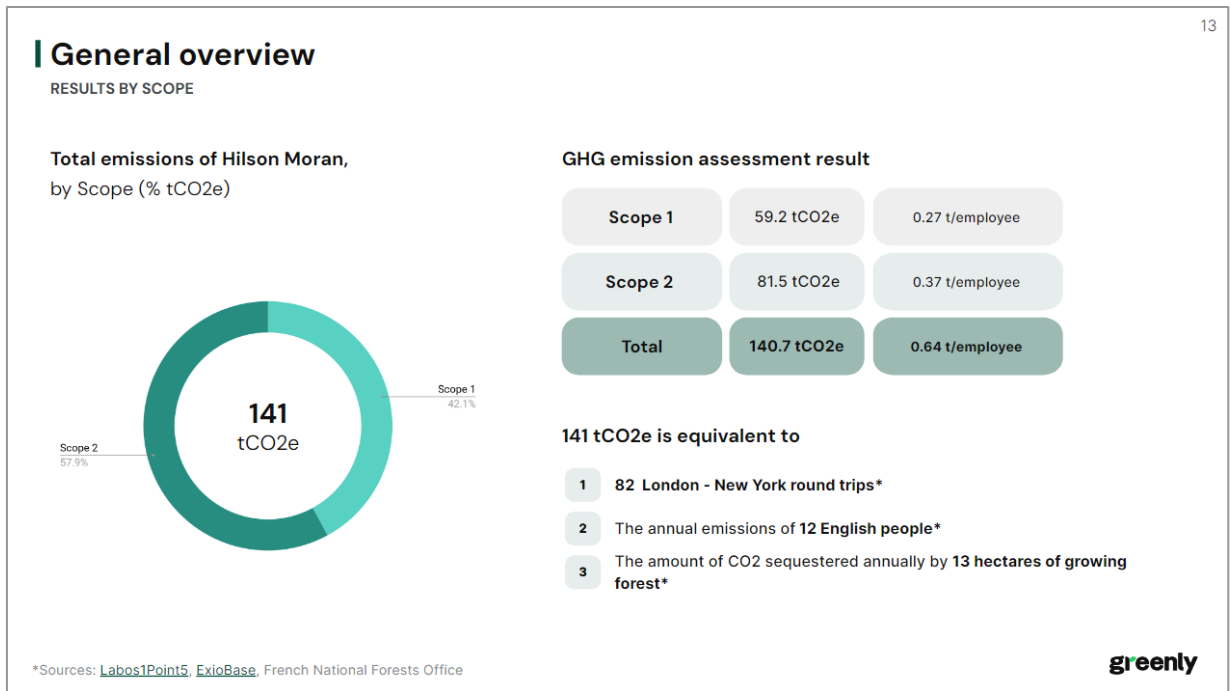
The report assesses the annual operational energy demand and carbon emissions for all our offices, in line with the requirements of the WGBC Net Zero Carbon Commitment.

1.3. Structure

Following this introductory section, Section 2 describes the offices occupied by HM. Section 3 sets out the assessment methodology. Section 4 assesses HM energy and carbon emissions for 2022.

1.4. Independent Verification

This report has been independently verified by Greenly. Greenly is a carbon management platform that helps companies measure, reduce, report, and offset their carbon emissions. Greenly also offers a range of services such as carbon accounting, life cycle assessment. Below are screenshots of pages 13 and 14 from their report dated 28/9/23.



2. HM Offices

During 2022, HM leased office space in the following locations:

- London 3rd floor, Shackleton House, London Bridge, London
- Farnborough Gnd floor, Discovery Place, Farnborough, Hampshire (up to Oct 2022)
- Farnborough The Hub, Farnborough Business Park, Hampshire (from Oct 2022)
- Manchester 7th Floor, Neo, Manchester
- Cambridge Nine Hills Road, Cambridge

Table 1 *Office data*

	Floor area	Staff (FTE)	Notes
London (3 rd flr)	1,208 m ²	114.7	Leased office
Farnborough (DP)	1,951 m ²	49.8	Leased office (382 m ² sublet to Equinity)
Farnborough (Hub)	215 m ²	56.3	Space within a serviced office
Manchester	263 m ²	23	Leased office
Cambridge	Circa 9.5m ²	2 desks	2 out of 18 desks within serviced office (82.5m ²)

In line with the WGBC convention the Cambridge office has been excluded from this assessment as this is a small, serviced office. See the Appendices for more details on each office.

3. Basis of carbon footprint assessment

3.1. Floor areas

Floor areas are based on areas contained within our leasing information.

3.2. Energy Data

In line with WGBC, the measurement methodology for each office is as follows:

Table 2 Measurement Methodology

	London	Farnborough (Discovery Place)	Farnborough (The Hub)	Manchester
Tenants Electricity	AMR ¹	AMR	RBD ⁵	AMR ²
Heating	WBD ³	WBD ⁴	RBD ⁵	AMR ²
Cooling	RBD ⁵	WBD ⁴	RBD ⁵	

AMR = Actual Meter readings, WBD = Whole Building Data, RBD = Regional Building Data

1. Monthly meter readings taken for each office. The meters are read manually and entered into the HM Master Utility Spreadsheet. Due to the difficulties of reading meters during the COVID 19 lockdown, it was not possible to read the London office Tenants electricity meter during 2021. However meter readings were taken on the 18/12/2020 and on the 14/1/2022 allowing the annual energy use during 2021 to be assessed.
2. Monthly meter readings taken by our landlord and forwarded to us before being entered into the HM Master Utility Spreadsheet.
3. The Landlord has assessed the heating energy in kWh for each month for our London office for 2022.
4. Monthly meter readings taken for building gas supply and landlord electricity supply. The meters are read manually and entered in the HM Master Utility Spreadsheet. The spreadsheet adjusts the energy usage by the floor area to the space we occupy.
5. See Section 3.2.1 for details

3.2.1. Regional Building Data

The regional building data for the London office cooling has been derived from Section 20.3 of CIBSE Guide F (2012). This sets out delivered energy use for good practice and typical offices for four office types:

- Type 1: cellular naturally ventilated
- Type 2: open plan naturally ventilated
- Type 3: ‘standard’ air conditioned
- Type 4: ‘prestige’ air conditioned

The London office is likely to be classified as either Type 3 or 4. This assessment is based on the office being classed as ‘Type 4 – typical’ as a worst-case assessment of the energy demand.

Table 3 CIBSE Guide F – Cooling delivered energy

	Good practice	Typical
Type 3: 'standard' air conditioned	14	31
Type 4: 'prestige' air conditioned	21	41

No energy data is available for The Hub in Farnborough. It is proposed to use CIBSE Guide F benchmark for a typical Type 3 office as a worst case in energy performance.

Table 4 CIBSE Guide F – Gas and Electricity Benchmarks

	Good practice	Typical
Type 3: 'standard' air conditioned Gas	97	178
Type 3: 'standard' air conditioned Elec	128	226

3.3. Fugitive Emissions from refrigerant systems

Two small split DX systems are used to cool the server rooms within the Farnborough and London offices. The leakage of refrigerant gas from these systems has been estimated using guidance from the EPA Direct Fugitive Emissions from Refrigeration, Air Conditioning, Fire Suppression, and Industrial Gases (2014) where:

$$\text{Emissions from operation} = C * (x/100) * T$$

Where: C = refrigerant capacity

X = Annual leakage rate

T = Time of year system during reporting period

Table 3 of the EPA guidance suggests that 10% is a suitable leakage rate for residential and commercial AC including heat pumps from 0.5 – 100kg.

Table 5 Server room split DX systems

	Refrigerant type	Refrigerant charge (C)	Leakage (X)	Usage (T)	Leakage
London (3 rd flr)	R410A	5.0 kg	10%	100%	0.5 kg
Farnborough	R410A	3.7 kg	10%	75%	0.28 kg

3.4. Carbon Factors

Conversion factors for natural gas and mains electricity have been taken from the UK Government GHG Conversion Factors for Company Reporting for 2022.

Table 6 *CO₂ Conversion Factors*

Electricity generated	0.19338 kgCO ₂ e/kWh
Natural Gas (kWh gross CV)	0.18324 kgCO ₂ e/kWh
Refrigerants (R410a)	2088 kgCO ₂ /kg

4. Energy Consumption and Carbon Emissions

The energy and carbon emissions for the Farnborough, London and Manchester offices is set out below:

Table 7 Energy Consumption

	Gas	Electricity	Gas	Electricity
	kWh	kWh	kWh/m ²	kWh/m ²
London	105,365	214,411	87	177
Farnborough (DP)	196,069	156,994	125	100
Farnborough (Hub)	12,562	12,148	58	57
Manchester		38,025		145
Total	313,996	421,577		

Table 8 Carbon emissions

	Gas	Electricity	Gas	Electricity
	kgCO ₂ e	kgCO ₂ e	kgCO ₂ e /m ²	kgCO ₂ e /m ²
London	19,307	41,463	16	34
Farnborough (DP)	35,928	30,360	23	19
Farnborough (Hub)	2,302	2,349	11	11
Manchester		7,353		28
Total	57,537	81,525		

Table 9 WGBC reporting

	Gas	Electricity	Scope 1 ¹	Scope 2
	MWh	MWh	tCO ₂ e	tCO ₂ e /m ²
Overall	314	421	59.2	81.5

¹ Scope 1 includes gas and fugitive emissions

Table 10 Fugitive emissions

	Leakage	Emissions
	kg	tCO ₂ e
Refrigerant leaks	0.78	1.6

More detailed information for each office can be found in the appendices.

Appendix 1 - London Office

The Shackleton House office is located within Hays Galleria in London Bridge. It is understood that the buildings were originally warehouses that were converted to offices in the 1980's. The Hays Galleria is a Grade II listed structure.

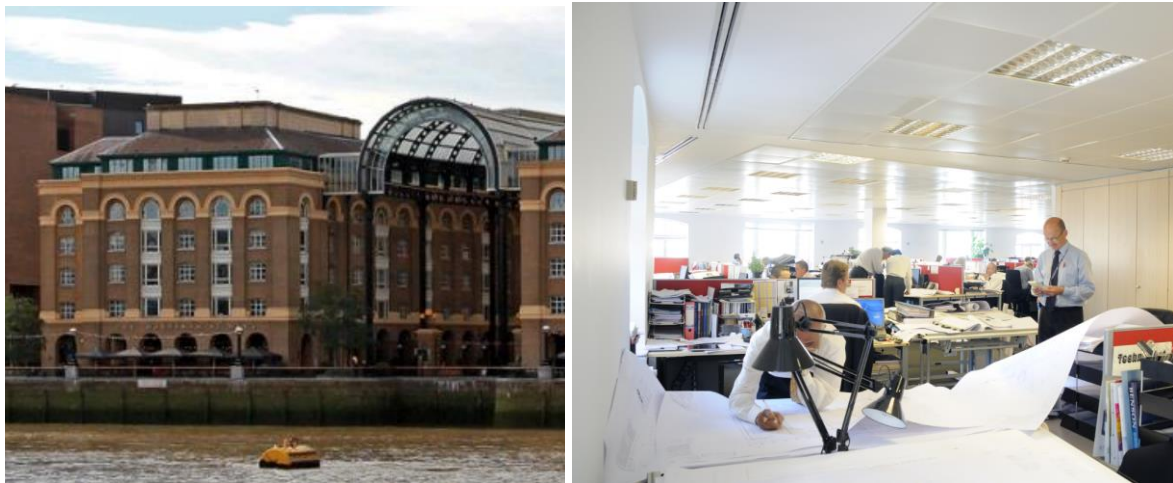


Figure 2 Images of Shackleton House

HM have occupied the 3rd floor since 2005.

Table 11 Key Facts

Owned or leased	Leased	
Leased area	3 rd floor = 1,208 m ²	
Tenants Electricity	Recharged via landlord	Read manually by HM
Heating	Communal gas boilers. Mikrofil Ethos 350 Gas boilers (Seasonal efficiency = 95.6%)	Energy usage for our floor area calculated by landlord
Cooling	Communal Chillers Daikin Chiller DWSC087L (COP @100% = 6.243)	No energy data available
On floor	Variable air volume system	
Lighting	LED to office areas Mix of compact fluorescent and halogen to meeting rooms	Installed in 2016 Lighting power density = 5W/m ²
EPC	D (98)	7177-2226-6796-4688-9741 Valid Until 10/12/30
Green certification	N/a	

Table 12 sets out the energy data for the London office.

Table 12 London Energy Data

	Tenants Electricity Meter kWh	Tenancy Electricity Consumption kWh	Tenancy Gas Consumption kWh	Tenancy Cooling Energy kWh
14/01/2022	1,105,720 A	8,346	15,118	3,688 R
01/02/2022	1,114,066 A	13,306	13,656	3,061 R
01/03/2022	1,127,372 A	15,195	12,796	3,610 R
01/04/2022	1,142,567 A	13,808	10,228	4,145 R
05/05/2022	1,156,375 A	10,567	6,184	4,566 R
27/05/2022	1,166,942 A	16,603	4,135	4,372 R
04/07/2022	1,183,545 A	17,798	5,682	7,166 R
09/08/2022	1,201,343 A	13,281	2,062	3,840 R
06/09/2022	1,214,624 A	13,978	4,438	4,136 R
05/10/2022	1,228,602 A	16,255	5,275	4,059 R
04/11/2022	1,244,857 A	11,001	10,002	3,373 R
05/12/2022	1,255,858 A	14,745	15,789	3,513 R
5/01/2023	1,270,603 A			
Total		164,883 kWh 136 kWh/m ²	105,365 kWh 87 kWh/m ²	49,528 kWh 41 kWh/m ²

A = actual reading, E = estimated reading, R = based on regional building data (See Section 3.2.1)

The office energy performance sits between CIBSE Guide F typical and good practice.



Figure 3 Energy usage compared against CIBSE Guide F benchmarks

Appendix 2 - Farnborough Office (Discovery Place)

The Farnborough office was located within One Discovery Place, Columbus Drive, Farnborough. The building was constructed in the late 1990's.



Figure 4 *Images of Discovery Place*

HM have occupied this building since 2008. In 2013 we sub-let part of the office area to Equinity. Autodesk occupied the 1st floor office between 2012 and September 2021. The 1st floor is now vacant. HM terminated their lease in October 2022.

Table 13 *Key Facts*

Owned or leased	Leased	
Leased area	Gnd Floor = 1,951 m ²	382 m ² of office space sublet to Equinity
Tenants Electricity	Direct contract	Meter read by HM
Heating	Communal gas boilers. Strata 2-120 Gas boilers (Seasonal Efficiency = 88%)	Building gas meter read by HM
Cooling	Communal Chillers. Kappa V 2000 Air Cooled Chiller R407C (COP @ 100% = 2.11)	Landlords elec meter read by HM
On floor	4 pipe fan coil units	
Lighting	Fluorescent lighting to all areas	
EPC	N/a	
Green certification	N/a	

The area sublet to Equinity has been excluded from our energy calculations as this is regarded as a Scope 3 – ‘Downstream Leased Assets’ within the GHG protocol.

Table 14 sets out the energy data for the Farnborough office.

Table 14 Farnborough Energy Data

	Utility Gas Meter m ²	Tenants gas consumption kWh	Landlords electricity meter kWh	Tenants Clg / HWS kWh	Tenants electricity meter kWh	Tenants electricity consumption kWh
05/01/22	964,679 A	40,481	824,990 A	4,127	2,683,730 A	11,307
04/02/22	973,674 A	29,136	835,254 A	3,609	2,697,790 A	9,779
02/03/22	980,148 E	29,136	844,230 E	3,610	2,709,950 A	11,846
01/04/22	986,622 A	21,725	853,207 A	6,885	2,724,680 A	16,969
17/05/22	993,863 A	18,716	870,329 A	2,600	2,745,780 A	5,847
01/06/22	995,608 A	12,522	876,795 A	6,456	2,753,050 A	13,993
08/07/22	999,086 A	12,919	892,850 A	5,819	2,770,450 A	9,795
03/08/22	1,001,261 A	14,703	907,322 A	7,562	2,782,630 A	14,218
07/09/22	1,004,528 A	16,733	926,129 A	4,228	2,800,310 A	9,747
05/10/22	1,008,246 A	40,481 E	936,645 A	4,127	2,812,430 A	8,597
31/10/22	1,048,727 E		940,772 E		2,823,120 A	
1/12/22	-	-	-	-	-	-
Totals		196,069 kWh 197 kWh/m ²		44,896 kWh 35.4 kWh/m ²		112,098 kWh 87.6 kWh/m ²

A = actual reading, E = estimated reading, R = based on regional building data (See Section 3.2.1)

The office energy performance sits between CIBSE Guide F typical and good practice.

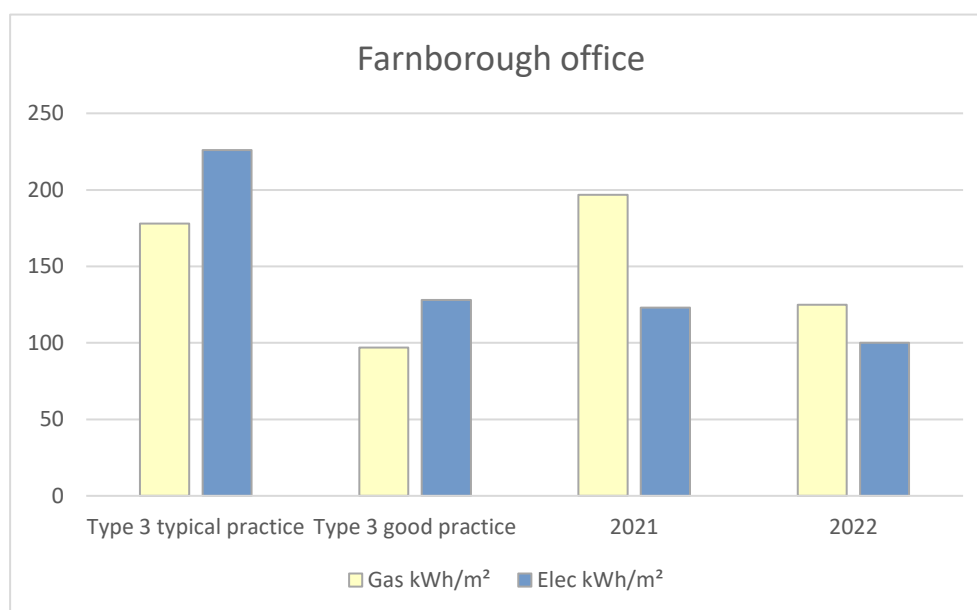


Figure 5 Energy usage compared against CIBSE Guide F benchmarks

Appendix 3 - Farnborough Office (The Hub)

The Farnborough office relocated to the Hub, Fowler Avenue, Farnborough Business Park, Farnborough. The building was constructed in the late 1930's and was originally an airport departures lounge and control tower. The building has been completely renovated, with HM leasing part of the 1st floor from Regus.



Figure 6 *Image of The Hub*

HM have occupied this building since October 2022.

Table 15 *Key Facts*

Owned or leased	Leased	
Leased area	Part of 1 st floor = 215 m ²	
Tenants Electricity	Not known	
Heating	Communal gas boilers.	
Cooling	Communal Chillers.	
On floor	4 pipe fan coil units	
Lighting	LED lighting to all areas	
EPC	D (89)	9494-3077-0517-0800-3921 Valid until 9/6/29
Green certification	BREEAM In Use 55.3% Very Good	BIU00005549-1.0 Valid until 14/8/23

As no energy data is available from our Landlord, energy usage is based on CIBSE Guide F benchmarks for a Typical Practice Type 3 air conditioned office. This is very much considered to be a worst case scenario. See section 3.2.1 for more details. Table 16 sets out the energy data for The Hub.

Table 16 **The Hub Energy Data**

	Tenants gas consumption kWh	Tenants Electricity consumption kWh
01/01/2022	-	-
01/02/2022	-	-
01/03/2022	-	-
01/04/2022	-	-
01/05/2022	-	-
01/06/2022	-	-
01/07/2022	-	-
01/08/2022	-	-
01/09/2022	-	-
01/10/2022	2,691 R	4,049 R
01/11/2022	4,329 R	4,049 R
01/12/2022	5,542 R	4,049 R
Totals	12,562 kWh 58 kWh/m ²	12,148 kWh 57 kWh/m ²

A = actual reading, E = estimated reading, R = based on regional building data (See Section 3.2.1)

Appendix 4 - Manchester Office

The Manchester office is located on the 5th floor of the Neo Building in Piccadilly, Manchester.

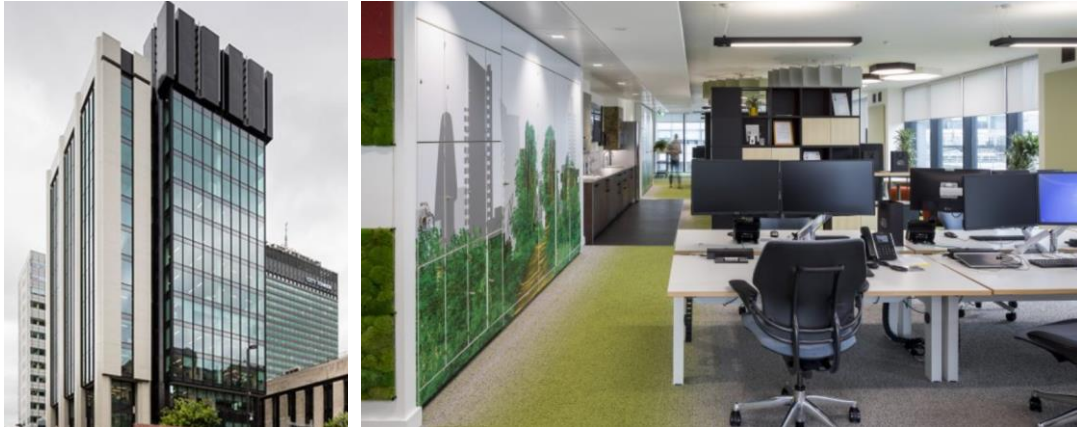


Figure 7 *Images of Neo*

HM have occupied this building since 2017. HM were involved in the base build renovation works and designed the fitout for our floor. This office is certified to the Well Gold standard.

Table 17 *Key Facts*

Owned or leased	Leased	
Leased area	Part of 5 th Floor = 263 m ²	
Tenants Electricity	Direct contract	Tenants elec meter read by landlord
Heating	VRF	Condenser elec meter read by landlord
Cooling	VRF	
On floor	VRF	
Lighting	LED lighting to all areas	
EPC	B (49)	0240-3907-0303-2471-4070 Valid until 1/8/27
Green certification		

Table 18 sets out the energy data for the Manchester office.

Table 18 Manchester Energy Data

	Tenants electricity meter kWh	Tenants electricity kWh	Tenants Condenser Meter kWh	Tenants Condenser kWh
14/01/2022	95,670 A	2,063	88,807 A	1,371
01/02/2022	97,733 A	1,973	90,178 A	986
01/03/2022	99,706 A	2,142	91,164 A	1,034
01/04/2022	101,849 A	2,070	92,198 A	154
05/05/2022	103,919 A	2,262	92,352 A	937
27/05/2022	106,181 A	2,234	93,289 A	409
04/07/2022	108,415 A	2,450	93,698 A	378
09/08/2022	110,865 A	2,605	94,076 A	392
06/09/2022	113,470 A	2,434	94,467 A	211
05/10/2022	115,904 A	2,392	94,678 A	184
04/11/2022	118,296 A	2,321	94,862 A	1,126
05/12/2022	120,617 A	2,162	95,988 A	3,621
05/01/2023	113,470 A		99,609 A	
Totals		27,108 kWh 103.1 kWh/m ²		10,917 kWh 41.5 kWh/m ²

A = actual reading, E = estimated reading, R = based on regional building data (See Section 3.2.1)

The office energy performance is better than CIBSE Guide F good practice.

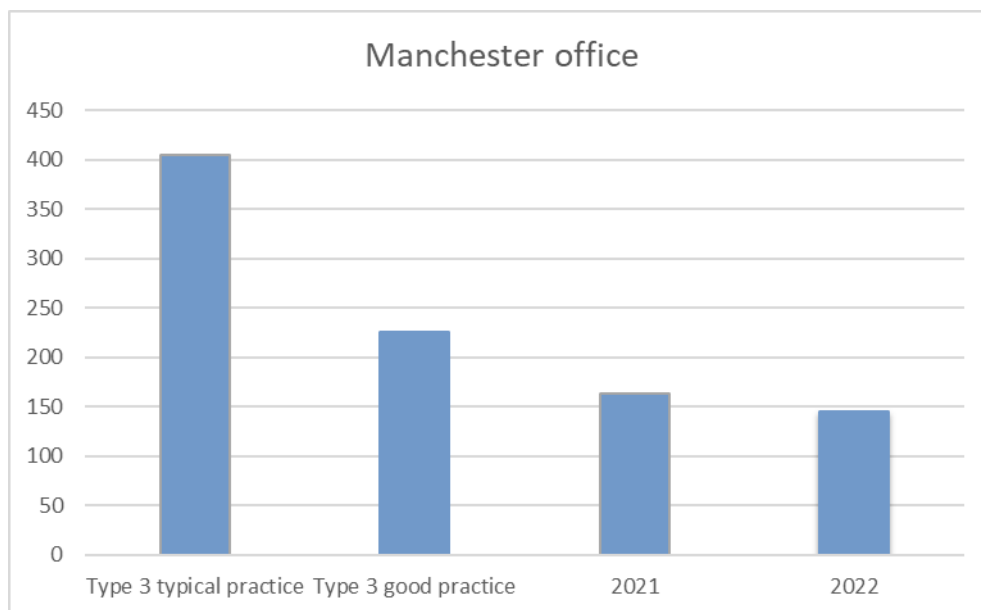


Figure 8 Electricity usage compared against CIBSE Guide F benchmarks