DWA

BUILDING SERVICES CONSULTING ENGINEERS

20 Red Lion Street

Demonstration of Compliance with Environmental and Sustainability Planning Requirements

Rev.04 05.12.2019

The following constitutes a concise summary of assumptions and standards laid out in revision T2 of the *Sustainability and Energy Report* compiled by GDM Partnership for 20 Red Lion Street, London, WC1R 4PQ on 14th February 2019.

Such a summary is intended exclusively for the administrative purpose of tracking proof of compliance. For any other use, reference should always be made to the original source.

Any numbering system used is local to this document only and does not correlate to similar systems employed in any related file.

Broad objectives:

	Subject	Item	Proof
1.0.0	General		
1.0.1		Maximise energy demand reduction	The use of efficient VRF heat recovery system along with local return air sensors for fan coil units mean each unit can be self-controlled to achieve thermal comfort. Thus reducing the overall demand of the VRF system as only a few fan coil units will be under maximum energy demand at any point in time
1.0.2		Include passive design measures wherever practical to control heat gains	The use of glazing with good G values ensures minimum solar gains. Heat recovery ventilation system with high efficiency ensures maximum heat recovery from extract air

For the whole scheme:

2.1.0	Architectural		
2.1.1		Air permeability lower than 10	**Air permeability test completed, and the result attached as a part of the evidence**
2.1.2		Window U and G-values in accordance with table 4.2.1	GB265-TS1-DG1 window composition for all windows and doors not part of curtain wall and for curtain walls on 1st to 3rd floor front elevations. U_g of 1 W/m^2K and g of 0.37. GB265-TS1-DG2 window composition for 1st to 3rd floor front elevations for curved parts. U_g of 1 W/m^2K and g of 0.37. GB265-TS1-DG3 window composition for 6th floor and ground floor reception screens. U_g of 1 W/m^2K and g of 0.36. GB265-TS1-DG7 window composition for all windows and doors with duplex spacer bars (Georgian bars) due to thermal stress. U_g of 1 W/m^2k and g of 0.37. Refer to:- */glazing/GB265-TS1-DG1.pdf* */glazing/GB265-TS1-DG2.pdf* */glazing/GB265-TS27-DG3+D4 new.pdf* */glazing/GB265-TS28-DG all.pdf*
2.1.3		Glazing with more than 70% light transmission factor	GB265-TS1-DG1, as per item 2.1.2, with a light transmission factor of 69%. GB265-TS1-DG2, as per item 2.1.2, with a light transmission factor of 69%. GB265-TS1-DG3, as per item 2.1.2, with a light transmission factor of 69%. GB265-TS1-DG7, as per item 2.1.2, with a light transmission factor of 67%. Refer to:- */glazing/GB265-TS1-DG1.pdf* */glazing/GB265-TS1-DG2.pdf* */glazing/GB265-TS27-DG3+D4 new.pdf*

			/glazing/GB265-TS28-DG all.pdf
2.1.4		**The current heating and comfort cooling strategy is not compatible with district energy source scheme, therefore the only provision that could be made is having space available within the basement should a future owner / occupier decide to explore the potential of connecting to such scheme. Please refer to the basement layout which shows multiple service rooms (drying room, showers… etc) that can be used to accommodate future interface units if required**	Refer to:- */drawings/18024-L(53)-01-B.pdf*
2.2.0	Mechanical		
2.2.1		High efficiency heating services	One (1) Worcester-Bosch GB-162 65kW boiler with seasonal efficiency of 95.5%. Refer to:- */boiler/GB162 V2 65kW - Data Sheet.pdf* Two (2) Ormandy 700 litre CA cylinders with standing conductive heat loss of 2.37kWh per day. Refer to:- */calorifiers/Ormandy - Calorifier Tech Sub - 20RLS (Rev.A).pdf* */calorifiers/Re- Standing losses - 700 Litre Vertical HWS Cylinder Type CA.msg* One (1) Mitsubishi Electric PURY-EP-350-YLM-A1 condenser linked to PFFY-P32-VLRMM-E. Season energy efficiency ratio of 6.56 and coefficient of performance of 5.38. Refer to:- */condensers/PURY-EP350YLM-A1 Citi Multi Condenser - Product information sheet (2015-04).pdf* Twelve (12) Mitsubishi Electric PURY-EP-350-YLM-A1 condenser linked to PFFY-P50-VLRMM-E. Season energy efficiency ratio of 6.56 and coefficient of performance of 5.38. Refer to:- */condensers/PURY-EP350YLM-A1 Citi Multi Condenser - Product information sheet (2015-04).pdf* One (1) Mitsubishi Electric PUHZ-ZRP-140-VKA-3R1 condenser linked to PEAD-M140-JA. Season energy efficiency ratio of 5.2 and seasonal coefficient of performance of 4.0. Refer to:-

			/condensers/PUHZ-ZRP-V-YKA3 Series condenser - Product Information Sheet.pdf One hundred and one (101) Mitsubishi Electric PFFY-P50-VLRMM-E fan coil unit. Refer to:- */fan coil units/PFFY-P20-63 VLRMM-E Series FCU - Technical & Service Manual (n.d.).pdf* Six (6) Mitsubishi Electric PEFY-P50-VMA-E2 fan coil unit. Refer to:- */fan coil units/PEFY-P-VMA-E2 FCU - Technical & service manual (2018-09).pdf* Eleven (11) Mitsubishi Electric PFFY-P32-VLRMM-E fan coil unit. Refer to:- */fan coil units/PFFY-P20-63 VLRMM-E Series FCU - Technical & Service Manual (n.d.).pdf* One (1) Mitsubishi Electric PEAD-M140-JA fan coil unit. Refer to:- */fan coil units/PEAD-M35-140JA R32 Power inverter 1Ph - Information Sheet (2017-05).pdf*
2.2.2		High efficiency hot water services	Boiler and calorifiers as per item 2.2.1.
2.2.3		Heat recovery on ventilation systems	Fourteen (14) Mitsubishi Electric LGH-100RVX-E heat recovery ventilation unit with specific fan power of 1.51 assuming static pressure of 170Pa. Actual static pressure expected to be less, refer to:- */heat recovery ventilation units/LGH-100RVX-E Lossnay – Datasheet.pdf*
2.2.4		High efficiency ASHP providing both heating and cooling via VRF	Condensers and fan coil units as per item 2.2.1.
2.2.5		Permit easy future connection to a district energy network	Boiler is located in close proximity to street, easily accessible for future connection should the possibility arise for integration within a district energy network.
2.2.6		Individual MVHR units for office spaces	Heat recovery ventilation units as per item 2.2.3.
2.2.7		Separate central extract fan for WCs with SFP of 0.5W/ls^{-1}	One (1) Nuaire AVT-6R extract fan located on roof with specific fan power of 0.5W/ls^{-1}. Refer to:- */extract fans/ Nuaire AVT6R Extract Fan data sheet.pdf*
2.2.8		Dedicated shower and WC extract fan for basement with SFP of 0.5W/ls^{-1}	One (1) Nuaire AVT-4 extract fan within basement ceiling void, with specific fan power of 0.5W/ls^{-1}. Refer to:- */extract fans/Nuaire AVT4 Extract Fan.pdf*

2.2.9		New gas fired water heaters, with an efficiency of 95% and located in lower ground floor plant room, for the provision of domestic hot water services	Boiler as per item 2.2.1.
2.2.10		Cooling plant seasonal efficiency of 8.42 for offices, basement to 5th floor	Fan coil units and condensers as per item 2.2.1. Refer to:- */fan coil units/18024-M-SCH-01 VRV FCU Equipment Schedule.pdf* */condensers/18024-M-SCH-02 VRV Outdoor Unit Equipment Schedule (Rev.B).pdf* *Details from item 2.2.1.*
2.2.11		Cooling plant seasonal efficiency of 7.87 for office, 6th floor **The condenser used is the most efficient in the market. There are no non-heat recovery condensers in the market which will achieve 7.87 as stated in the energy report. Therefore, the SBEM calculations, the BREEAM credits, and the EPC's were updated to reflect the actual efficiency of the plant quoted above**	Daikin RYYQ10T condenser with ESEER of 7.20. Refer to:- */AET UFH AC/AET UFH AC - Data sheet.pdf* */AET UFH AC/Daikin RYYQ10T condesner - user guide.pdf*
2.2.12		Cooling plant seasonal efficiency of 5.2 for reception **Please refer additional information of the condenser data "Reception Condenser SEER" saved within the Mechanical Evidence folder**	Fan coil units and condensers as per item 2.2.1. Refer to:- */fan coil units/18024-M-SCH-01 VRV FCU Equipment Schedule.pdf* */condensers/18024-M-SCH-02 VRV Outdoor Unit Equipment Schedule (Rev.B).pdf* *Details from item 2.2.1.*
2.2.13		Heating services for offices, basement to 5th floor, provided by ASHP with SCOP of 6.30	Fan coil units and condensers as per item 2.2.1. Refer to:- */fan coil units/18024-M-SCH-01 VRV FCU Equipment Schedule.pdf* */condensers/18024-M-SCH-02 VRV Outdoor Unit Equipment Schedule (Rev.B).pdf* *Details from item 2.2.1.*
2.2.14		Heating services for 6th floor office provided by plant with SCOP of 5.55	AET UFH AC system as per item 2.2.11.
2.2.15		Heating services for reception provided by ASHP with SCOP of 4.00	Fan coil units and condensers as per item 2.2.1. Refer to:- */fan coil units/18024-M-SCH-01 VRV FCU Equipment Schedule.pdf* */condensers/18024-M-SCH-02 VRV Outdoor Unit Equipment Schedule (Rev.B).pdf*

			Details from item 2.2.1.
2.2.16		Local fan coil units connected to heating and cooling system	Fan coil units as per item 2.2.1. Refer to:- */fan coil units/18024-M-SCH-01 VRV FCU Equipment Schedule.pdf* */condensers/18024-M-SCH-02 VRV Outdoor Unit Equipment Schedule (Rev.B).pdf* *Details from item 2.2.1.*
2.2.17		Central, air cooled chillers.	Design adopted heat recovery VRF system as per item 2.2.1. Refer to:- */fan coil units/18024-M-SCH-01 VRV FCU Equipment Schedule.pdf* */condensers/18024-M-SCH-02 VRV Outdoor Unit Equipment Schedule (Rev.B).pdf* *Details from item 2.2.1.*
2.2.18		Central AHU providing minimum fresh air to office areas	Design adopted heat recovery VRF system as per item 2.2.1. Refer to:- */fan coil units/18024-M-SCH-01 VRV FCU Equipment Schedule.pdf* */condensers/18024-M-SCH-02 VRV Outdoor Unit Equipment Schedule (Rev.B).pdf* *Details from item 2.2.1.*
2.3.1	Electrical		
2.3.2		High efficiency LED lighting systems	As per GDM specification - 1845_s4_e_spec - section v21 general lighting. Please also refer to formation lighting data sheets within the attached file.
2.3.3		Occupancy controls on lighting	As per GDM specification - 1845_s4_e_spec – section part 3 Also please see data sheets within the attached file for lighting control.
2.3.4		Daylight dimming controls on lighting	as per GDM specification - 1845_s4_e_spec - section part 3 310.020 sensors for lighting control Also please see attached data sheet within the file for lighting control ps432
2.3.5		Zoning arrangement of the daylight sensors will be no more than 5m from the façade	PTBC-PRO-005-Z-A-DALI-ZONES – DALI0 zoning drawings for dimming as per the attached drawings within the files labelled DALI zoning.
2.3.6		High efficiency LED lighting	High efficiency lighting – as per item 2.3.2
2.3.7		Intelligent lighting control system including control modules, area control units, presence/solar detectors and scene setting switches	As per item 2.3.3
2.3.8		New luminaires electrically supported from the new local	as per GDM specifications - 1845_s4_e_spec - section v20 lv distribution - Each of the tenants distribution boards have a localised board within

		tenant's and landlord's distribution boards	the electrical risers that operate the open floor areas – as per the attached distribution board file. Landlord's lighting is operated from 3no distribution boards within the basement, 1st floor and 4th floor – these operate the lighting to all of the core staircase's, lift area's, WC's, plant areas and reception – Product and drawings are in the attached drawing information.
2.3.9		Dimming system to maintain the design illuminance on the working plane	As per item 2.3.3
2.3.10		85 luminaire lumens per circuit watt lighting efficacy	Awaiting details from the lighting specialist.

Specific to the existing building:

	Subject	Item	Proof
3.1.0	Architectural		
3.1.1		Improved fabric and insulation to L2B 2013 standards. Exact standards described in section 4.2.1	Refer U value details for walls and glazing within Architectural Evidence folder
3.1.2		Window replacement	Glazing as per item 2.1.2. Refer to:- */glazing/GB265-TS1-DG1.pdf* */glazing/GB265-TS1-DG2.pdf* */glazing/GB265-TS27-DG3+D4 new.pdf* */glazing/GB265-TS28-DG all.pdf*
3.1.3		Improved air tightness	Refer thermal data for the various building envelop elements

Specific to the new extension:

4.1.0	Architectural		
4.1.1		High thermal performance of proposed fabric characteristics	Refer thermal data for the various building envelop elements
4.1.2		Low thermal transmittance of new thermal elements	Refer thermal data for the various building envelop elements
4.1.3		Low air infiltration rate for new construction, 8m^3/hr/m^2 at 50Pa	This will be confirmed during final pressure test
4.2.1	Electrical		
4.2.2		30m^2 of photovoltaic panels	Microgeneration certification scheme. Please refer attached PV data within the evidence folder **PV Commissioning report has now been added within the folder evidence.**