London Borough of Camden

Energy Efficiency and Renewable Energy and Sustainability Plan

S106 Pro-forma – Part B Post Completion

(To be completed and submitted for approval prior to occupation)

S106 CLAUSE DETAILS

Please summarise how the applicant is meeting their planning obligations relating to energy / sustainability as outlined within the relevant S106 agreement (please add/remove rows as applicable).

S106 clause no.	S106 clause wording	Summary of performance
4.5.3	"Not to Occupy or permit Occupation of the Property until a satisfactory post-completion review has been submitted to and approved by the Council in writing confirming that the measures incorporated in the Energy Efficiency and Renewable Energy Plan as approved by the Council have been incorporated into the Property."	The following measures incorporated in the Energy & Sustainability Statement have been incorporated into the development: 1. Thermal insulation levels for building fabric elements have been enhanced beyond minimum Building Regulation standards thereby substantially reducing the building's heat losses 2. Good solar control has been provided by the selection of glazing to avoid overheating in summer 3. The office spaces and reception/ waiting area have been supplied with cooling by an efficient Variable Refrigerant Flow system with outdoor units located on the roof of the building within an acoustic enclosure 4. AHU's feature efficient heat recovery in order to reduce their load 5. The development utilises low energy lighting throughout In accordance with Policy 5.7 of the London Plan, investigations into providing a proportion of the site's energy requirements through renewables were undertaken. Variable refrigerant flow (VRF) Air Source Heat Pumps provide heating and cooling using energy from the external ambient air. In combination with a 10m^2 photovoltaic array, the carbon emissions savings through Low and Zero Carbon technologies over the Be Lean case is 20.6%, therefore complying with Camden Policy CS13. Additional sustainable measures that feature in this development include:
4.9.3	"Not to Occupy or permit Occupation of the Property until a satisfactory post-completion review has been submitted to and approved by the Council in writing confirming that the measures incorporated in the Sustainability Plan as approved by the Council have been incorporated into the Property."	

		6. All insulation materials used within the proposed development were selected to be CFC free both in manufacture and through their composition 7. All timber was purchased from responsible forest sources 8. Recycling facilities were provided on site for construction and operational waste 9. A lightweight extensive biodiverse green roof was provided with a mixture of 49 species of wildflowers 10. Water use has been minimised through the specification of water efficient taps, shower heads, dual flush toilets and low water use appliances 11. Water metering and leak detection alarms have been installed to monitor and minimise wastage 12. The construction site was managed in an environmentally sound manner in terms of resource use, storage, waste management and pollution.

BUILDING SPECIFICATION TARGETS

Key targets from approved Energy and Sustainability Statements:

Please outline in the table below the key targets from the Energy and Sustainability Statements submitted at Full Planning stage and summarise how the as-built building compares. Add or delete rows as necessary.

Please clearly outline any reasons for changes to the approved building specification.

<table>
<tr><th></th><th>Approved Planning Documents: energy and sustainability statement targets</th><th>Post completion (Post Construction Stage): performance against targets</th></tr>
<tr><td>Carbon reduction targets</td><td></td><td>The incorporation of the measures set out in the submission document entitled Energy & Sustainability Statement and dated 2nd March 2017 by Cundall (Item 1). Further supplemented by Passive Design Review by Hydrock 26th June 2020 (Item 2) and Low and Zero Carbon Report by Hydrock 26th June 2020 (Item 3).</td></tr>
<tr><td>Building fabric u-values and air permeability</td><td></td><td>
<table>
<tr><th>Element</th><th>$U_{a\text{-}Limit}$</th><th>$U_{a\text{-}Calc}$</th><th>$U_{i\text{-}Calc}$</th></tr>
<tr><td>Wall</td><td>0.35</td><td>0.22</td><td>0.22</td></tr>
<tr><td>Floor</td><td>0.25</td><td>0.12</td><td>0.15</td></tr>
<tr><td>Roof</td><td>0.25</td><td>0.18</td><td>0.18</td></tr>
<tr><td>Windows</td><td>2.2</td><td>1.6</td><td>1.6</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><th>Air Permeability</th><th>Worst Acceptable Standard</th><th>This Building</th><th></th></tr>
<tr><td>$m^3/(h.m^2)$ at 50Pa</td><td>10</td><td>5.59</td><td></td></tr>
</table>
BRUKL doc provided (Item 4)
</td></tr>
</table>

Low carbon technologies		Energy & Sustainability Statement, dated 2nd March 2017 by Cundall (Item 1), was supplemented by a further Low and Zero Carbon Report by Hydrock 26th June 2020 (Item 3). ASHP with PV was suggested as the best strategy for low carbon technologies. Final performance spec included for air handling unit (AHU) with fan coil units and heat recovery to give the best strategy for the office building. This is an electric system which uses the external condenser (pump) to provide heating and cooling to the commercial property in a similar way to an ASHP.
Renewable energy targets		10m2 PV array has been installed as documented in the supporting reports. High efficiency panels (Item 5) have been installed at second floor level (Drawing – Item 6). An air handling unit (AHU) linked to fan coil units and heat recovery has also been installed to deliver fresh air, heating and cooling to the building.
Decentralised energy network connection		As per the Energy & Sustainability Statement and dated 2nd March 2017 by Cundall (Item 1) section 6, the London Heat Map indicates that there are no existing district heat networks in the vicinity of the development. A potential system is proposed for the future but not available at this time, nor is any time scale or information available defining the installation of this network.
Metering, monitoring and management		A BMS and sub metering has been installed in the building. A schematic (Item 7) has been provided to show the metering arrangement with split metered distribution boards for the electrical systems.
Code for Sustainable Homes - **Overall % + Rating** - **% credits Energy** - **% credits Water** **% credits Materials**		N/A
BREEAM rating - **Overall % + Rating** - **% credits Energy** - **% credits Water** **% credits Materials**		Targeted BREEAM Excellent with a design certified score of 73.3%. (Item 8) - **Energy:** 87% - **Water:** 78% - **Materials**: 62%
Materials, sourcing and waste		Materials (External Walls, windows, roof, upper floors & floor finishes) have been assessed against the Green Guide rating (Item 9). Waste has been collated in skips and sorted off site during the construction period.
Green infrastructure		Green roofs within the site at 1st and 2nd floor levels. A photograph has been provided (Item10).
Water efficiency and SuDS		Water efficiency measures include low flow rate water fittings and SuDS. As per the FRA issued on the 10/03/2017 by Parmarbrook the site will incorporate an attenuation led SUDS strategy. This is achieved by specifying extensive green roofs (Item 10) within the site at 1st and 2nd floor levels which will act as a source control measure during storm events.

Other		Extensive planting including a green walling system (both internally and externally) plus a green roof have been installed to improve on CO_2 reduction and biodiversity. Please see page 5 for further information.

Post-Completion (Post Construction Stage) results:

Please enter in the tables below the carbon reductions for each stage of the energy hierarchy (Baseline, Be Lean, Be Clean, Be Green) and for each development type, following the guidance outlined in the GLAs *Guidance on Preparing Energy Assessments* and *Camden Planning Guidance CPG3*.

Please be aware that where carbon dioxide reduction targets are not met, the applicant will be required to provide details of their remedial proposals either:

1. Retrofit on-site carbon reduction measures with a view to meeting targets
2. Implement carbon reduction measures elsewhere in the borough (prior agreement with the Council will be sought)
3. Make a carbon offset payment, where appropriate.

	Commercial New-build (includes major refurbishments assessed under Part L2A)			Residential New-build (includes major refurbishments assessed under Part L1A)			Commercial Refurbishment (assessed under Part L2B)			Residential Refurbishment (assessed under Part L1B)		
	Total tCO2	tCO2 reduction*	% reduction*	Total tCO2	tCO2 reduction*	% reduction*	Total tCO2	tCO2 reduction*	% reduction*	Total tCO2	tCO2 reduction*	% reduction*
Baseline	13.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Be Lean	13.8	0.0	0.0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Be Clean	13.8	0.0	0.0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Be Green	11.9	1.9	13.8%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL		1.9	13.8%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Target	11.04		N/A (minor development)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Shortfall	0.86		N/A (minor development)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

** reduction calculated against previous stage (except TOTAL, which is calculated against Baseline)*

Please note figures are taken from the final 'As Built' BRUKL output. Original figures are stated as KgCO2/m2 so numbers have been multiplied by the floor area of 710.8m2 then divided by 1000 to convert Kg back to tonnes.

Carbon Capture

In relation to the table above, it is noted there is a shortfall in the reduction of CO_2 per annum by 0.86t. To address this, please find below a summary of the carbon capture realised from the planting at the property.

The development includes the following planting areas:

- External green wall: 35.4m^2
- Internal green wall: 13 m^2
- 1st floor planting: 7.3m^2
- Hanging plants (various locations): 9m^2
- Entrance: 8.2m^2

The carbon capture of these plants is estimated to be 2.3Kg/m^2 resulting in 167.7kg of CO_2 captured per year.

In addition, the development has 89m^2 of green roof.

The carbon capture green roof is estimated to be 0.6 Kg/m^2 resulting in 53.4kg of CO_2 capture.

Documentation[1] confirms that a green roof such as that installed at 'Plantworks' reduces energy consumption on the back of increased insulation. The difference is quite substantial and depending on the type of plants and can provide an additional 6 to 7kg/m^2 carbon reduction in addition to carbon capture. Considering a blended estimated average of 6.5Kg/m^2 this would provide a reduction in carbon emissions of 578.5kg of CO_2 per year.

The combined impact of the green roof is therefore a reduction in CO_2 of 632kg/year.

Finally, within the basement area is a 2.5m^2 bamboo planter. Bamboo is an extremely good source of carbon capture. A research paper[2] praises bamboo as an effective carbon absorber and estimates that sequestration can be anywhere between 100-400Kg/m2 carbon reduction. Using the lowest estimate would give 250kg/year of CO_2 reduction.

By combining the above elements of carbon reduction / capture, the total is 1049kg of CO_2 reduction per year, more than the 860kg shortfall.

[1] https://www.sciencedirect.com/science/article/pii/S2667010021000986

[2]https://www.researchgate.net/publication/215475397_Bamboo_plantations_An_approach_to_Carbon_sequestration

Post Completion (Post Construction Stage) Review

	Enclosed? Yes	No	Notes:
Copies of SAP/ SBEM worksheets	☒	☐	Please submit SAP/SBEM calculations evidencing the CO_2 savings for each stage of the energy hierarchy, including baseline (TER), alongside this report. Please provide details of which apartments have been sampled (if applicable). Results will need to reflect the actual constructed building.

Title of Submission	Date produced	Author's Name, Organisation & Client
BRUKL Document has been provided – Item 4 4. 210423 - 159-163 Kings Cross - Final As Built BRUKL AB1	23.04.2021	L Pasifull c/o MWA Engineers

Code for Sustainable Homes Post Construction Assessment and Certificate	☐	☒	This will need to be the final Post Construction Stage Assessment review and certificate. Although the Council is no longer able to condition new housing developments to achieve CfSH certification, any application which has already committed to achieving certification through S106 will be required to fulfil this obligation.

Title of Submission	Date produced	Author's Name, Organisation & Client
CfSH is not applicable to this project	N/A	N/A

BREEAM Post Construction Assessment and Certificate	☐	☒	This will need to be the Post Construction Assessment review and not a copy of the "Pre-Assessment" or "Design Stage" review. Applicants should also submit Post Construction Stage certificates, or evidence from BRE of submission of this review for certification

Title of Submission	Date produced	Author's Name, Organisation & Client
BREEAM Design Stage Certificate 73.3% Excellent (Item 8) 8. BREEAM-0077-8415-1-1	18.02.2021	BRE Global Limited

BREEAM Post Construction Report and Draft Certificate (72.0% - Excellent)	22.04.2022	Carbon Consult Ltd / BRE Global Limited

Technical details/ plans/ drawing of installed CHP and other low/ zero carbon technologies (where relevant) ☒ ☐ Please provide confirmation/ evidence that approved measures have been implemented.

Title of Submission	Date produced	Author's Name, Organisation & Client
PV Data Sheet – Item 5 5. JAM60S10 320-340 Half Cell	Unknown	JAM60S10 Half Cell Module PV Panel
Drawing showing location of PVs – Item 6 6. 200_104 Proposed Second Floor Plan_C6	Unknown	MWA Architects

Decentralised Energy Network connection details. ☐ ☒ Please provide confirmation/ evidence that approved measures have been implemented.

Title of Submission	Date produced	Author's Name, Organisation & Client
Not applicable to this project – decentralized systems were not feasible for or included on this project	N/A	N/A

Remedial CO_2 and renewables proposals ☐ ☒ Document containing full details of proposals to fulfil approved carbon reduction targets &/or renewable energy targets by: retrofitting on site, measures elsewhere in Borough, or additional offset contribution.

Title of Submission	Date produced	Author's Name, Organisation & Client
No remedial renewables were required on this project	N/A	N/A

I confirm that the information supplied in this Proforma (and supporting evidence) is accurate. I will notify the Council should any of the information contained change. The agreed contents of the Energy Efficiency and Renewable Energy and Sustainability Plan, the information contained in this Proforma and the terms of Section 106 agreement pursuant to the planning permission must be complied with, unless otherwise agreed in writing by the Council.

Signed:	F.Baguley
Print full name:	FLEUR BAGULEY
Position:	Sustainability Consultant
Date:	22.04.2022

Please submit to: planningobligations@camden.gov.uk

End of form – B (Post Completion)