Client:

HODGES ARCHITECTS LTD.

CARBON EMISSIONS REVISION REPORT

AT

72-80 LEATHER LANE
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REVISION LOG

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P1	**PN**	**21/01/2022**	**All**	**-**	**JB**
P2	**PN**	**21/01/2023**	**Highlighted**	**Increased PV array to improve carbon savings**	**JB**

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1.0 EXECUTIVE SUMMARY

Since the development of the concept design a number of project parameters that directly affect the site carbon calculations have changed owing to site restrictions and construction stage alterations.

These changes have had a negative effect on the performance of the development, namely thermal performance. This has increased the calculated site carbon emissions. However, the performance of the PV system has been significantly increased too further reduce the carbon emissions and the project now meets the requirements of Building Regulations (Part L) and those of the Planning Conditions; specifically:

> *Condition 13: The development hereby approved shall be constructed in accordance with the approved energy statement [Energy Statement Version 2, by Verte Ltd, and dated 03 March 2017] to achieve a 28.5% reduction in carbon dioxide emissions beyond Part L 2013 Building Regulations in line with the energy hierarchy, and a 7.3% reduction in carbon dioxide emissions through renewable technologies.*

It should be also noted that SAP calculations were utilised to obtain CO_2 emission figures (in-line with previous Energy Strategy and Planning Conditions) but in re-calculating the SAP calculations the baseline figure has altered. It is likely this is due to changes to the site dimensions, material differences or alterations to design parameters.

The total PV array at the site now comprises of 9 no. panels each with a peak power output of 385W providing a total installed power of 3.465 kWp.

In summary (CO_2 reductions in relation to Part L 2013 BRUK Baseline):

Verte Energy Strategy Version 2 states a site reduction in CO_2 of:

28.5%

Condition 13 (London Borough of Camden) required reduction in CO_2 :

28.5%

Under current proposals the site reduction in CO_2 is:

43.0%

Verte Energy Strategy Version 2 states a site reduction in CO_2 through renewables:

***0.4* tonnes/year (7.3%)**

Condition 13 (London Borough of Camden) required reduction in CO_2 :

7.3%

Under current proposals the site reduction in CO_2 is:

39.7%

The above figures have been obtained via the use of SAP calculations for the apartments and is summarised below:

Flat No	DER No PV	TER No PV	REDUCTION CO^2 %	PV AMOUNT	REDUCTION Post PV %	DER With PV	TER With PV
3	28.22	20.34	-38.7	NA			
4	24.35	17.52	-38.9	NA			
5	23.61	16.75	-40.9	NA			
10	16.26	17	4.4	0.92Kwp	47.2%	8.97	17
11	20.49	20.66	0.8	1.09kWp	36.3%	13.16	20.66
12	16.7	17.52	4.7	1.45kWp	46.3%	9.4	17.52

Between flats 10 – 12 the overall Reduction in CO^2 is 43% with PV. (Block Compliance)

Between flats 10 – 12 the overall Reduction in CO^2 is 3.27% before PV added.

2.0 INTRODUCTION

Hatton Garden Properties are developing 72-80 Leather Lane in London including the refurbishment and extension of the existing building.

The building was a mixed-use jewellery workshop with dwellings on upper floors. As part of the refurbishment – and the portion of works the report relates to – 3 no. dwellings on the third floor are being created by changing the use of the space and 3 no. new dwellings are being formed via extension of the building at 5th, 6th and 7th floors.

The development is under construction and this document specifically refers to the comparison of the project carbon emissions (specifically 6 no. dwellings) at 'concept design stage' (which is at the time of planning submission) and in the current on-site 'construction stage'.

The initial designs and planning submissions were carried out prior to May 2017, at which point Planning Permission was granted.

Condition 13 of the Planning Approval states:

> *"The development hereby approved shall be constructed in accordance with the approved energy statement [Energy Strategy Version 2, by Verte Ltd, and dated 03 March 2017] to achieve a 28.5% reduction in carbon dioxide emissions beyon Part L 2013 Building Regulations in line with the energy hierarchy, and a 7.3% reduction in carbon dioxide emissions through renewable technologies"*

The Verte Energy Strategy report referenced in the above condition provides a breakdown of energy and carbon calculations based on early design parameters. This document should be reviewed if further details of the original calculations are required.

2.1 Purpose of Report

The calculations included in the Verte Energy Strategy ultimately provide the final carbon emission data on which the planning condition is formed. The concept design has since been developed and a number of project parameters that directly affect the site carbon calculations have changed owing to site restrictions and other various design and construction developments.

These changes have had a small negative effect on the performance of the development, namely thermal performance. This has increased the calculated site carbon emissions. However, the performance of the PV system, in relation to CO_2 emissions, has improved significantly and the site remains compliant with Building Regulations Part L and planning conditions.

The purpose of the report is to state the current site Carbon Emissions (for elements of the site covered by the Energy Strategy and subsequent Planning Conditions) by using the same calculation methodologies.

By determining the current carbon emissions compliance with Building Regulations can be confirmed and the difference in carbon emissions from those calculated at planning stage can be determined and the magnitude of difference reviewed.

2.2 Applicable Component of Project

For clarity, this report, the Verte Energy Statement and the subsequent Planning Approval replate to 6 no. dwellings included within the refurbishment works. The diagram below demonstrates the extent of the dwellings covered:

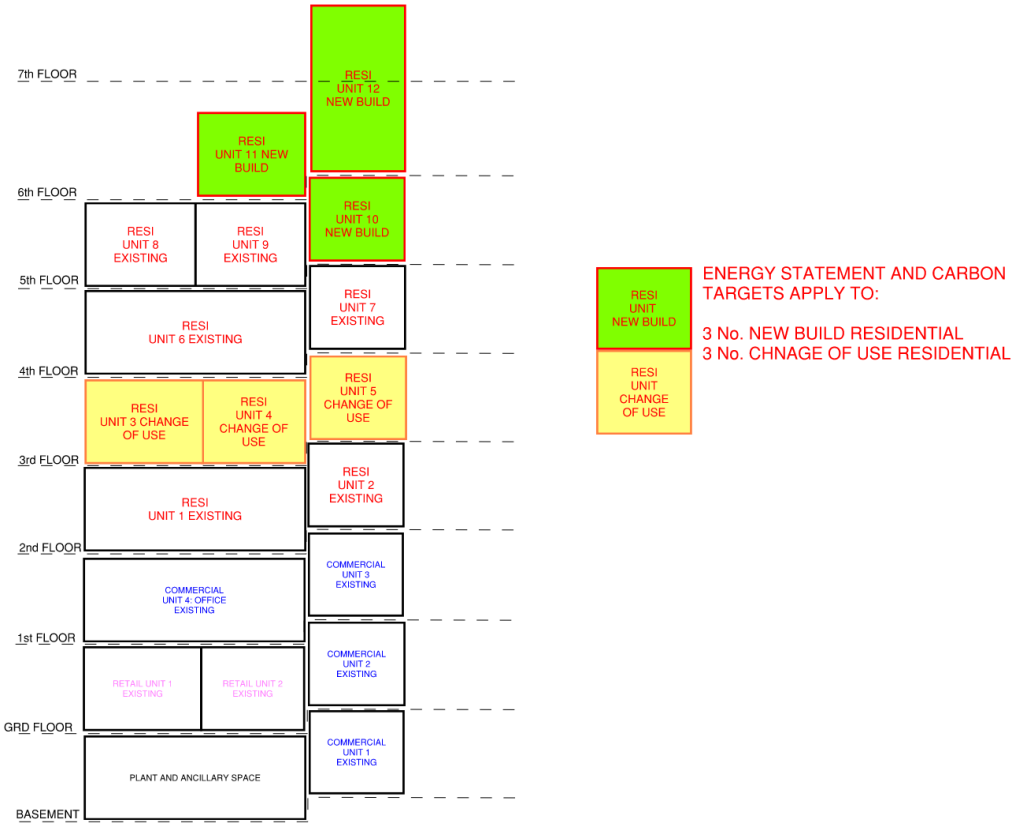

Figure 1 – Extend of Analysis

3.0 CONSTRUCTION STAGE SITE PARAMETERS

Specification to new Flats:

- New External walls – U-Value 0.22 Supplied
- Proposed Partition wall Type 5 K129 – U-Value 0.44 (Outside of BR requirements.)
- Partition wall K127 – Construction or U-Value unknown – U-Value used 0.44 (Outside of U-Values for new builds)
- Partition wall K126 – Construction unknown – U-Value 0.57 – (Outside of required U-Values to new builds.)
- Flat Roof U-Value supplied 0.15
- Windows to new builds to achieve 1.2 overall combined frame and pane
- MVHR as per ME spec supplied – Titon HRV1.6Q Plus Eco
- possibly causing failures also due to poor U-Values)
- Heating as per specification – Worcester Greenstar Life 30kw Combi boilers – radiators – TRVs
- Thermal bridging approved details:
    - Flat 10 – 0.0951
    - Flat 11 – 0.0815
    - Flat 12 – 0.0742
- 100% Low energy lighting throughout

New Build (Units 10,11,12)	Previous Values	Proposed Values
Air tightness	3.5 m³/hr per m²	3.5 m³/hr per m²
Wall U-Values	0.15 W/m²°C	0.22 – 0.57 W/m²°C
Roof U-Value	0.15 W/m²°C	0.15 W/m²°C
Floors	N/A	N/A
Glazing U-Value	0.9 W/m²°C	1.2 W/m²°C
Glazing G-Value	0.4	0.63
Thermal Bridging	Accredited Construction details target 0.06 W/m²K	Aircrete Construction details Achieved 0.07 – 0.09 W/m²K

Figure 2 – Comparison of Parameters for New Build Units

Specification Existing flats:

- Existing External lined walls K166 – U-Value 0.23 supplied
- Partition walls K126 U-Value 0.57 (Actual construction unknown)
- Partition walls K165 U-Value 0.45 (Actual construction unknown)
- Partition walls K127 Construction unknown – U-Value used 0.44
- New walls to Flat 5 – Construction unknown – U-Value used 0.23
- Windows overall combined frame and pane U-Value 1.6 Timber windows
- No air pressure tests required
- MVHR Titon HRV1.6 Q Plus Eco – again results of sap reduce without this.
- Heating Worcester Greenstar Life 30kw boilers
- No renewables
- No thermal bridging calculation – Defaulted to 15

Change of use (Units 3,4,5)	Previous Values	Proposed Values
Air tightness	10 m^3/hr per m^2	None N/A under Part L1B
Wall U-Values	0.25 W/m^2°C	0.23 – 0.57 W/m^2°C
Roof U-Value	N/A	N/A
Floors	N/A	N/A
Glazing U-Value	1.5 W/m^2°C	1.6 W/m^2°C
Glazing G-Value	0.65	0.63
Thermal Bridging	Accredited Construction details 0.11 W/m^2K	Default 0.15 W/m^2K

Figure 3 – Comparison of Parameters for Change of Use Units

4.0 CONSTRUCTION STAGE CARBON CALCULATION RESULTS

SAP calculations were carried out for all 6 no. apartments to provide an accurate update to the relevant portion of the development. This follows the previous methodology – but it should be noted that these SAP calculations were carried out from fresh based in site details and information conveyed to BSDa. In doing so the 'Baseline' carbon figure in our Construction stage calculations differs form that determined at Planning Stage (in the Verte Energy Strategy).

Flat No	DER No PV	TER No PV	REDUCTION CO^2 %	PV AMOUNT	REDUCTION Post PV %	DER With PV	TER With PV
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Between flats 10 – 12 the overall Reduction in CO^2 is 43% with PV. (Block Compliance)

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Figure 4 – Summary of individual SAP Calculations