20 Theobald's Road, London, WC1X 8PF

Energy Strategy Report – Planning Submission

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INTRODUCTION-REQUIREMENTS

This Energy Strategy Report has been produced to support the application to Camden Council, by Fernglen Properties Ltd (owners), for the approval of planning permission and listed building consent in respect of the refurbishment works on the lower ground flat and the upper floor flats of a 4-storey house on 20 Theobald's Road.

No 20 is part of the terrace of No's 12-22 Theobald's Road, London, WC1X, granted as a Grade II Listed Building, located within the Bloomsbury Conservation Area and under the London Borough of Camden.

The proposed scheme aims to redesign the flats to create one-bedroom flats at lower-ground, ground and first floor levels and a three-bedroom maisonette at the second and third floor.

SAP Calculations have been undertaken to examine the proposed energy requirements in accordance with Building Regulations Part L1B (2010 edition, including 2013 and 2016 amendments). The proposed scheme consists of minor fabric alterations which don't erode the historical significance of this Statutorily Listed Building Grade II. All the energy efficiency measures considered aim to address the National, Regional, Local Policies including CC1, CC2 and SPG3 of Camden's Local Plan.

As the property is considered a listed building, there is not a mandatory requirement for compliance with Building Regulations Part L, however the aim should be to improve the energy efficiency as far as reasonably practical, ensuring that the proposed works do not alter the character or appearance of the historic building.

DESIGN SPECIFICATIONS - APPROACH

The SAP methodology has been used to calculate the energy consumption and resultant CO_2 emissions for No. 20 of Theobald's Road as estimated for the existing current state of the building (DER-Existing). Afterwards, integrated passive and active design improvements were being implemented on the calculations to estimate the impact that will have on the energy demand and resultant CO_2 emissions (DER – Proposed).

Assumed U-Values were being used based on the age band of the building (in accordance with BRE) to represent the base case existing model's fabric performance, as it can be seen on the first column of Table 1.

As the building is Listed, with significant historic features, character and appearance, the fabric will be retained, revealed and repaired as necessary with some minimal upgrades. As mentioned in table 1, insulation will be incorporated on the internal floors (suspended timber) covering the existing cavity layer to provide noise diminution. The proposed U-Value considered (0.25 W/m^2K) is based on the limiting fabric parameters values stated on Table 3 (b) of Part L1B.

Also, the Front Elevation's windows at ground to second floor already have a secondary glazing and it is proposed to install a secondary glazing on the front elevation of all the floor levels to enhance their thermal and noise performance.

Building Element	Base Case - Existing Fabric Parameters	Proposed Improvements – Improved Fabric Parameters
External Walls	0.6 W/m^{2}K	0.6 W/m^{2}K
Roofs	0.4 W/m^{2}K	0.4 W/m^{2}K
Floors	1.2 W/m^{2}K (All floors)	0.25 W/m^{2}K (Internal Floors) / 1.2 W/m^{2}K (Lower Ground)
Windows: U-value/ G-value	1.8 W/m^{2}K (Front Elevation)/76%– GF to 2nd Floor 4.8 W/m^{2}K (Other Elevations)/85%	1.8 W/m^{2}K (Front Elevation)/76% - All Floor Levels (LG to 3rd Floor) 4.8 W/m^{2}K (Other Elevations)/85%
Doors	4.8 W/m^{2}K	4.8 W/m^{2}K

Table 1: Comparison of Fabric Specifications between the Base Case Existing Fabric Parameters and the Proposed Improved Fabric Values.

The proposed scheme includes electric underfloor heating/electric radiators whereas the hot water for all the flats will be provided via a communal hot water cylinder (Table 2).

The units would be naturally ventilated with updated intermittent extract fans on all the wet rooms (bathrooms and kitchens) and equipped with energy efficient lighting fittings throughout as mentioned on the following table.

Services	Base Case - Existing Services	Proposed Improvements – Services
Space Heating	Electric Radiators	Electric Heating (Underfloor and/or Radiators)
Hot Water	Immersion Cylinder Insulation: None	Communal Single Immersion Cylinder (Electric) – (Serving all floors) Insulation: Spray Foam (30mm)
Mechanical Cooling	None	None
PV Panels	None	None
Ventilation	Natural Ventilation-Intermittent Extract Fans on Wet Rooms	Natural Ventilation-Intermittent Extract Fans on Wet Rooms
Lighting	Fluorescent lighting everywhere	100% have luminous efficacy ≥ 45 lm/W (Low-Energy)

Table 2: Comparison of Systems Specification between the Base Case Systems and the Proposed Improved Systems.

SUMMARY OF THE RESULTS

The result of the SAP calculations for all the flats on 20 Theobalds Road is illustrated in the following figure (Figure 1), which compares the average area-weighted Dwelling Emission Rate (DER) of the current existing building with the average area-weighted Dwelling Emission Rate (DER) of the improved proposed building.

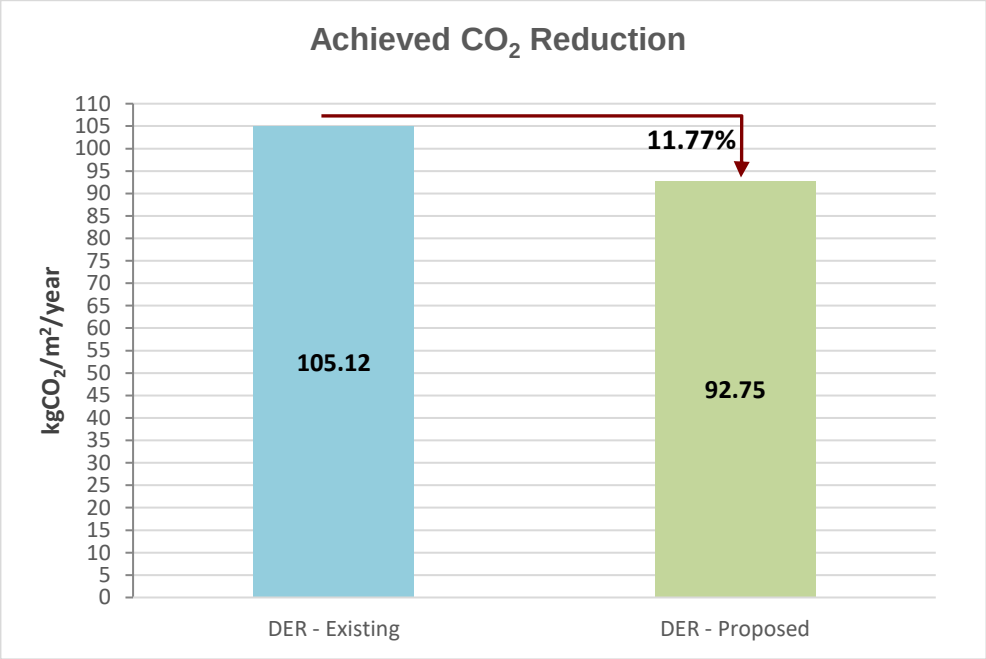

Figure 1: Achieved CO_2 reduction after the implementation of the proposed improvements to the existing building.

Also, the total regulated carbon dioxide (CO_2) emissions of Unit 20 by incorporating all the improvements have been calculated to 25.18 CO_2 tonnes per annum, compared to 28.54 CO_2 tonnes per annum of the current existing building baseline emissions (Table 3).

Unit 20 CO_2 Emissions		
	CO_2 EMISSIONS / ANNUM (TONNES)	% IMPROVEMENTS
Baseline -Existing	28.54	-
Proposed Changes	25.18	11.77%
Overall CO_2 Emissions Reduction		11.77%

Table 3: Achieved CO_2 emissions in tonnes for the existing & proposed buildings.

Figure 1 and table 3 confirms that by incorporating a combination of feasible passive measures along with the replacement of outdated services and provision of LED lighting throughout, a reduction of 11.77% in CO_2 emissions has been achieved compared to the current ones.

As mentioned in the previous paragraphs, Listed Buildings are exempt from the minimum energy efficiency requirements proposed in Part L1B and therefore further improvements are not necessary since a sensible and pragmatic approach was considered to improve the overall fabric and energy efficiency of this historic building.