PROJECT REF: BS 1038
Issue 03 – February 2019

52 – 53 Russell Square, London, WC1B 4HP

Post Completion Energy Efficiency and Renewable Energy Plan and Sustainability Plan

NORMAN BROMLEY
PARTNERSHIP

Index

1.0 EXECUTIVE SUMMARY 3
1.1 Section 106 Requirement....3
1.2 Approach....3
1.3 Appraisals 3
1.4 Passive Design & Energy Efficiency Measures 3
1.5 Infrastructure and Low-Carbon Supply of Energy 3
1.6 On-Site Renewable Energy Generation....3
1.7 Carbon Reduction Target....3
2.0 INTRODUCTION....4
2.1 Development Description 4
2.2 Aim 4
2.3 Section 106 Operative Provisions 4
3.0 APPROACH AND METHODOLOGY 6
3.1 Definitions and Limitations 6
Definitions 6
Limitations....6
Energy Hierarchy 6
4.0 POST-IMPLEMENTATION REVIEW - BASELINE SCHEME....8
Building fabric details 8
Fixed Building Services....8
4.1 Be Lean....8
Passive Design Measures 8
Building Fabric Details 8
Fixed Building Services....9
4.2 Be Clean 9
4.3 Be Green....9
5.0 CONCLUSION 10

1.0 EXECUTIVE SUMMARY

1.1 Section 106 Requirement

This statement has been prepared on behalf of the Applicant, in response to the requirements of the agreed Section 106 agreement for 52-53 Russell Square, London. This requirement relates to the post-construction review of the Development certifying that the measures incorporated in the Energy Efficiency and Renewable Energy Plan and Sustainability Plan have been achieved in the Development and will be maintainable in the Development's future management and occupation

1.2 Approach

This report demonstrates our intended approach to ensuring the proposed new school building achieves the energy and sustainability requirements and policies of the local authority as well as the current Building Regulations have been satisfied based on the as installed installation.

Our assessment methodology adopts the principles and procedures outlined within the Greater London Authority Energy Planning Document 2016 and consequently the key stages described therein have been fully incorporated within our calculation, review and reporting processes in delivering this report.

The calculations are based on assumed U values, internal gains and infiltration rates and have not been verified. The model has been produced in the absence of architectural sections and elevations and we are working from record drawings provided by the landlord with on-site check measurements, not a full measured survey.

Because the building is an existing listed building with limited proposed works to the structure and fabric, it does not need to satisfy the London Plan Energy criteria which would be required for a major new build development or large extension. We have however set out the estimated 'Baseline' calculation and the Step 2 – Energy Demand Reduction, however due to reasons detailed further in the report it has not been possible to incorporate any measures for Step 3 (Low Carbon Energy Supplies) or Step 4 (Renewable Energy).

1.3 Appraisals

The Development has been assessed to determine regulated energy requirements and associated CO_2 emissions.

1.4 Passive Design & Energy Efficiency Measures

The following passive design and energy efficiency measures were implemented at the Development, including:

- New improved insulation to roof;
- Efficient low-energy LED lighting throughout the School. Lighting is coupled to daylight and presence detection sensors to minimise unnecessary use;
- All pipework and ductwork to any new or modified areas have been insulated to minimise losses and gains.

These measures incorporated into the new school indicate an approximate 44% improvement in carbon emissions when compared with the old office building.

1.5 Infrastructure and Low-Carbon Supply of Energy

Due to the reasons detailed on the Energy Report the school has not been connected to a heat network and a CHP has not been installed.

1.6 On-Site Renewable Energy Generation

Due to the reasons detailed in the photovoltaic feasibility study, photovoltaic panels were not installed which we believe was a condition discharged by Camden.

1.7 Carbon Reduction Target

By implementing the passive design and energy efficiency measures contained in the Energy Efficiency and Renewable Energy Plan the buildings change of use refurbishment achieves a 44% reduction in CO^2 emissions.

2.0 INTRODUCTION

This statement sets out a post-completion review of the Energy Efficiency and Renewable Energy Plan and Sustainability Plan for the change of use development of 52-53 Russell Square, London, referred to hereafter as the Plan. The review has been prepared on behalf of the Applicant, in response to the requirements of the agreed Section 106 Agreement (Part 4.3 & 4.5) for 52-53 Russell Square, London (Planning permission ref. 2017/2285/P).

2.1 Development Description

The scheme comprises of a school split over 6 storeys with associated classrooms, group rooms, offices, laboratories and other ancillary spaces.

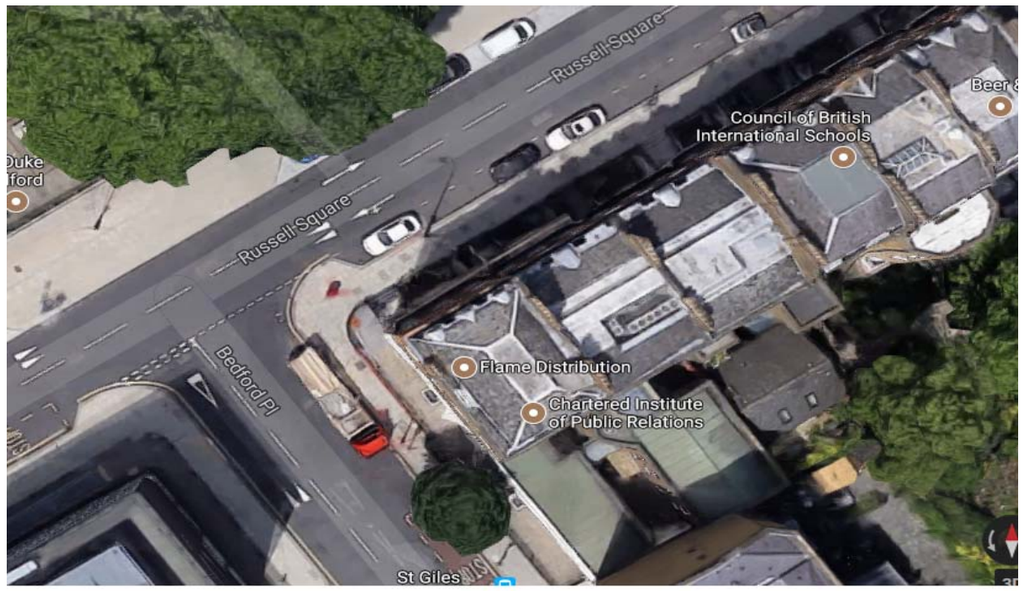
The building was previously an office and is Grade II listed.

2.2 Aim

The overriding aim of the energy strategy for the Development was to provide a low carbon development which has a flexible, future proofed energy supply strategy, as far as practically possible for a Grade II Listed Building.

This post-completion review sets out the various measures that have been adopted and installed to satisfy the objectives of the energy strategy and reduce CO_2 emissions though (but not be limited to) the following:

- the incorporation of the measures set out in the Energy Statements submitted alongside the Application dated April 2017, 11 September 2017 and supplementary statements dated 28 July 2017 and 16 August 2017;
- details of how further reductions in the developments CO_2 emissions from low or zero carbon technologies have been implemented on site. The post-completion review responds to the target reduction of at least 44% CO_2 emissions detailed in the Energy Efficiency and Renewable Energy Plan, approved by Camden on 7th February 2019 and the pro-forma in relation to the Development compared to that of the existing baseline scheme of an office, using a combination of complementary low and zero carbon technologies as set out within Part 2.7 of the Section 106 Agreement;
- separate metering of all low and zero carbon technologies to enable the monitoring of energy and carbon emissions and savings;



2.3 Section 106 Operative Provisions

Part 4.3 of the S106 agreement stipulates the following in relation to Energy Efficiency and Renewable Energy Plan:

4.3.1
On or prior to the Implementation Date to submit to the Council for approval the Energy Efficiency and Renewable Energy Plan.

4.3.2
Not to Implement nor permit Implementation until such time as the Council has approved the Energy Efficiency and Renewable Energy Plan as demonstrated by written notice to that effect.

4.3.3
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.

4.3.4
Following the Occupation Date the Owner shall not Occupy or permit Occupation of any part of the Development at any time when the Development is not being managed in accordance with the Energy Efficiency and Renewable Energy Plan as approved by the Council from time to time and shall not Occupy or permit Occupation of the Development otherwise than in accordance with the requirements of the Energy Efficiency and Renewable Energy Plan.

The Energy Efficiency & Renewable Energy Plan and associated pro-forma were submitted to Camden and approved on 7th February 2019 in association with clauses 4.3.1 and 4.3.2.

This Plan is submitted in association with clause 4.3.3 of the S106 agreement.

Part 4.5 of the S106 agreement stipulates the following in relation to the Sustainability Plan:

4.5.1
On or prior to the implementation Date to submit to the Council for approval the Sustainability Plan.

4.5.2
Not to implement nor permit implementation until such time as the Council has approved the Sustainability Plan as demonstrated by written notice to that effect.

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 Sustainability Plan as approved by the Council have been incorporated into the Property.

4.5.4
Following the Occupation Date the Owner shall not Occupy or permit Occupation of any part of the Development at any time when the Development is not being managed in accordance with the Sustainability Plan as approved by the Council from time to time and shall not Occupy or permit Occupation of the Development otherwise than in accordance with the requirements of the Sustainability Plan.

The Sustainability Plan and associated pre-forma were submitted to Camden and approved on 7th February 2019 in associated with Clauses 4.5.1 and 4.5.2, and that this report is also submitted in association with Clause 4.5.3 of the S106 agreement.

3.0 APPROACH AND METHODOLOGY

The following sets out the approach and methodology agreed under the Energy Efficiency and Renewable Energy Plan, approved by Camden on 7th February 2019.

3.1 Definitions and Limitations

Definitions

The following definitions should be understood throughout this statement:

- Energy Demand – the 'room-side' amount of energy which must be input to a space to achieve comfortable conditions. In the context of space heating, this is the amount of heat which is emitted by a radiator, or other heat delivery mechanism.
- Energy Requirement – the 'system-side' requirement for energy (fuel). In the context of a space heating system using a gas boiler, this is the amount of energy combusted (e.g. gas) to generate useful heat (i.e. the energy demand).
- Regulated CO_2 Emissions – the CO_2 emissions emitted as a result of the combustion of fuel, or 'consumption' of electricity from the grid, associated with regulated sources (those controlled by Part L of the Building Regulations).

Limitations

The appraisals within this Statement are based on a baseline carbon dioxide emissions CO_2 using assumed U values, internal gains and infiltration rates that have not been verified of the previous office building. The calculations and model has been produced in the absence of architectural sections and elevations and the drawings are based on record drawings provided by the Landlord with on-site check measurements, not a full measured survey.

Energy Hierarchy

The London Plan Energy Hierarchy strategy provides an inclusive approach to energy use considering on site energy use, efficiency of energy supply and the use of sources of renewable energy.

The purpose of the energy hierarchy approach is to demonstrate that climate change mitigation measures form a fundamental part of the proposed scheme's design and evolution. Any measures taken forward must be demonstrated as appropriate and feasible in the context of the overall development.

Although this approach is not required for an existing building it has been adopted in this instance where possible.

There are 4 steps to the energy hierarchy process:

1. Design Criteria Building Regulations compliant building	2. 'Be Lean' Reduction by energy efficiency measures	3. 'Be Clean' Selection of low carbon energy supply strategy	4. 'Be Green' Renewable technologies

Step 1 – Design Criteria

As this is an existing building we have taken the baseline scheme as the existing buildings U values and fixed building services arrangement.

Step 2 – 'Be Lean' – Reduction by Energy Efficiency Measures

Apply energy demand reduction measures specific to the scheme such as enhanced building fabric to deliver reduced heat loss, heat gain and improved air permeability.

Other measures include improved efficiency of fixed building services beyond that of the statutory requirements.

Step 3 – 'Be Clean' – Selection of low carbon energy supply strategy

Once demand for energy has been minimised it should be demonstrated that the use of a low carbon energy supply has been explored through the order of preference of the following options:

1 - Connection to an existing heat distribution network
Investigate the potential for connecting onto an existing heat network referencing the London Heat Map and contacting local heat network operators.

2 - Connection to a planned heat distribution network
Investigate the potential for connecting onto a planned heat network referencing the London Heat Map and local energy master plans.

3 - Site wide heating networks - Where multiple buildings are proposed or where the building density is sufficient, a communal heating system should be adopted with all buildings/uses within a development normally connected into a single site wide heating network, thus facilitating future connection to decentralised energy networks.

4 - Combined heat and power (CHP) – Consider the appropriateness of CHP for the development. Typically CHP is deemed feasible where there is a simultaneous demand for heat and power in excess of 5,000 hours per annum.

Step 4 – 'Be Green' – Renewable Energy Technologies

Subject to the 'Be Lean and Be Clean' principles being appropriately satisfied and demonstrated accordingly, consideration should be made to feasible renewable energy technologies.

Figure 2 provides a graphical representation of the London Plan Energy Hierarchy.

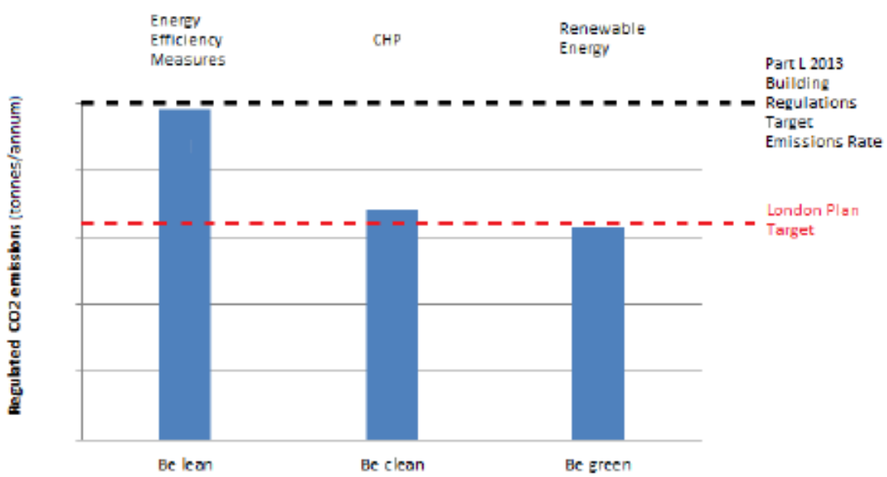


Figure 2 – 'Be Lean, Be Clean and Be Green' Diagram, London Plan

4.0 POST-IMPLEMENTATION REVIEW - BASELINE SCHEME

We took the following assumed construction and fixed services for the previous office building as the baseline scheme.

Building fabric details

U Values	Existing	Units
Wall	1.715	W/m2K
Roof	2.65	W/m2K
Floor	0.5	W/m2K
Windows	2.2	W/m2K
Infiltration	0.25	(Air Permeability of 3m³/h/m² @50Pa)

Fixed Building Services

Service	
Lighting Luminaire	70 lm/circuit watt
Lighting Occupancy control	No
Lighting presence detections	No
Heating / Hot Water	Efficiency 91%
Variable speed control of pumps	Yes
Heat Recovery Ventilation SFP	1.9 W/l/s
Heat Recovery Efficiency	70%
Zonal Extract Ventilation SFP	0.5 W/l/s
Local Supply or Extract Ventilation SFP	0.3 W/l/s
Ventilation demand control	Yes

Based upon the building inputs detailed above, the SBEM calculation identified the following baseline CO_2 emissions:

Notional Building Emissions	59 kgCO_2/m^2

4.1 Be Lean

The following sections outline considerations of the passive design and energy efficiency measures that have been implemented within the Development.

Passive Design Measures

Passive design measures are those which reduce the demand for energy within buildings, without consuming energy in the process.

These are the most effective and robust measures for reducing CO2 emissions as the performance of the solutions, for example wall insulation, is unlikely to deteriorate significantly with time, or be subject to change by future property owners. In this sense, we can be confident that the benefits of the measures will continue at a similar level for the duration of their installation.

To further reduce the CO_2 emissions associated with the scheme, the following measures that have been applied to exceed the standards used as part of the baseline scheme:

1. New insulation to roof
2. Replacement of lighting with high efficiency luminaires
3. Inclusion of lighting controls including daylight / presence sensors in classrooms / offices and PIR's to corridors and WC's.
4. New digital check meters have been installed to all existing distribution boards (section 106 paragraph 2.7d).

Building Fabric Details

U Values	Proposed	Units
Wall	1.715	W/m2K

Roof	0.18	W/m2K
Floor	0.5	W/m2K
Windows	2.2	W/m2K
Infiltration	0.25	(Air Permeability of 3m³/h/m² @50Pa)

Fixed Building Services

Service	
Lighting Luminaire	100 lm/circuit watt
Lighting Occupancy control	Yes
Lighting presence detections	Yes
Heating / Hot Water	Efficiency 91%
Variable speed control of pumps	Yes
Heat Recovery Ventilation SFP	1.9 W/l/s
Heat Recovery Efficiency	70%
Zonal Extract Ventilation SFP	0.5 W/l/s
Local Supply or Extract Ventilation SFP	0.3 W/l/s
Ventilation demand control	Yes

Based upon the building inputs detailed above, the SBEM calculation identified the following "Be Lean" CO_2 emissions:

Notional building emissions	59 $kgCO_2/m^2$
Building emissions rate	25.96 $kgCO_2/m^2$
% emissions improvement	44

4.2 Be Clean

Due to the reasons detailed in the Energy Efficiency and Renewable Energy Plan no infrastructure and low-carbon energy supply measures have been implemented into the scheme.

4.3 Be Green

Due to the reasons detailed in the Energy Efficiency and Renewable Energy Plan and Photovoltaic feasibility study no renewable energy generation measures have been implemented into the scheme.

5.0 CONCLUSION

Following the assessment methodology set out by the London Plan we identified and implemented a number of measures to improve energy efficiency and limit CO_2 emissions for the new School.

The table below provides a summary of the improvements achieved at each step of the energy hierarchy approach:

	Regulated Carbon Dioxide Emissions (Tonnes CO_2/Annum)	CO_2 Emissions Reduction (%)
Savings from Energy Demand Reduction	25.96	44
Savings from Low Carbon Energy Supply	0	0
Savings from Renewable Energy	0	0
Total Cumulative Savings	25.96	44
Total Target Savings	25.96	44

The building's change of use from an office to a school combined with the energy saving proposed is predicted to achieve reduced CO_2 omissions of 44 %.