Isambard Environmental
127 Metal Box Factory, 30 Great Guildford Street, London, SE1 0HS
T: 07725 553 607 E: andrew@isambardenvironmental.co.uk
W: www.isambardenvironmental.co.uk

10 Elsworthy Road
LONDON
NW3 3DJ

SUSTAINABLE DESIGN AND CONSTRUCTION STATEMENT

Job no. 38

November 2017

ISSUE SHEET

Client	Peter and Lorna Klimt
Project	10 Elsworthy Road, LONDON, NW3 3DJ
Title	Sustainable Design and Construction Statement
Job no.	38
Issue no.	3

Issue no.	Date	Details	Author
1	21st Sep 2017	Draft	Andrew Francis
2	25th Sep 2017	Final	Andrew Francis
3	21st Nov 2017	Final – revised	Andrew Francis

EXECUTIVE SUMMARY

This Sustainable Design and Construction Statement has been commissioned from Isambard Environmental by Luca Rubertelli of Zac Monro Architects on behalf of Peter and Lorna Klimt, the owners and developer of the site. It has been prepared to support a planning application for the construction of a new basement and rear and side extensions to the existing 2 bedroom ground floor flat at 10 Elsworthy Road, London, NW3 3DJ.

For alterations and changes of use the London Borough of Camden require a Statement to be completed to demonstrate how the proposed changes comply with its policies, and also those of the London Plan, which relate to climate change mitigation and sustainable design and construction.

A whole house SAP calculation has been completed to estimate CO_2 emissions using government approved FSAP 2012 software to demonstrate compliance with Part L1B (2010) of the Building Regulations. Emissions for the as designed dwelling have been calculated to be 10,298.12kg/yr which represents a reduction of 4,018.84kg/yr or 28.07% over the notional dwelling.

The LBC prefers BREEAM Domestic Refurbishment as the assessment tool for measuring the environmental sustainability of existing dwellings. Formal assessment is not required because the development is below the threshold value of five dwellings or 500m² of floorspace, however, the methodology in the form of a Pre-Assessment, has been followed to demonstrate how environmental sustainability issues have been considered and could be incorporated.

The Pre-Assessment shows that, based on the available information, the development could achieve 59.34% with at least 40% of the available credits being achieved in the energy, water and materials categories. This is the equivalent of a 'Very Good' rating.

For all refurbishment projects Camden require that 10% of the project cost is spent on reducing carbon dioxide emissions in the existing dwelling. Although the development costs have not been formally agreed the clients have committed to providing them as part of the proposed refurbishment works. Measures which will contribute to meeting the 10% target include installing a new gas combination boiler with programmer, room thermostat and thermostatic radiator valves; installing low energy lighting throughout; providing A or A+ energy rated white goods; and insulating all exposed pipework.

CONTENTS

FIGURES

TABLES

APPENDIX

1.0 INTRODUCTION

This Sustainable Design and Construction Statement (SDCC) has been prepared to support a planning application for the construction of a new basement and rear extension of the existing 2 bedroom ground floor flat of a 3 storey semi-detached house at 10 Elsworthy Road, London, NW3 3DJ.

For alterations and changes of use the London Borough of Camden (LBC) require a SDCC to be completed to demonstrate how the proposed changes comply with its policies, and also those of the London Plan, which relate to climate change mitigation and sustainable design and construction.

The LBC prefers BREEAM Domestic Refurbishment as the assessment tool for measuring the environmental sustainability of existing dwellings. While a formal assessment is not required because the development is below the threshold value of five dwellings or 500m^2 of floorspace, however, the methodology is to be followed to demonstrate how environmental sustainability issues have been considered and incorporated in compliance with the relevant local policies.

In addition the LBC require that at least 10% of the project cost is spent on carbon dioxide (CO_2) reduction measures.

This Statement was commissioned by Luca Rubertelli of Zac Monro Architects on behalf of Peter and Lorna Klimt, the owners and developers of the site.

2.0 METHODOLOGY

This SDCS has been completed following the guidelines contained in LBC's Planning Guidance 3 *Sustainability* (LBC, 2015). It first establishes the context of the development and then outlines the main policies and applicable standards and guidelines.

It then goes on to calculate CO_2 emissions using government approved FSAP 2012 software to demonstrate compliance with Part L1B (2010) of the Building Regulations.

Following this, BREEAM Domestic Refurbishment will be used to assess the environmental impact of the proposals and to demonstrate, how, in principle, a 'Very Good' rating can be achieved.

Measures to reduce CO_2 emissions have then been identified.

The SDCS has been completed following a review of the information prepared by Zac Monro Architects, namely the detailed drawings prepared for planning. The specification is yet to be finalised therefore the assumptions made in the statement are based on professional experience.

3.0 THE SITE AND PROPOSED DEVELOPMENT

3.1 The Site

The application site comprises of a 2 bedroom, ground floor flat of a 3 storey semi-detached Victorian house at 10 Elsworthy Road, London, NW3 3DJ (figure 1).

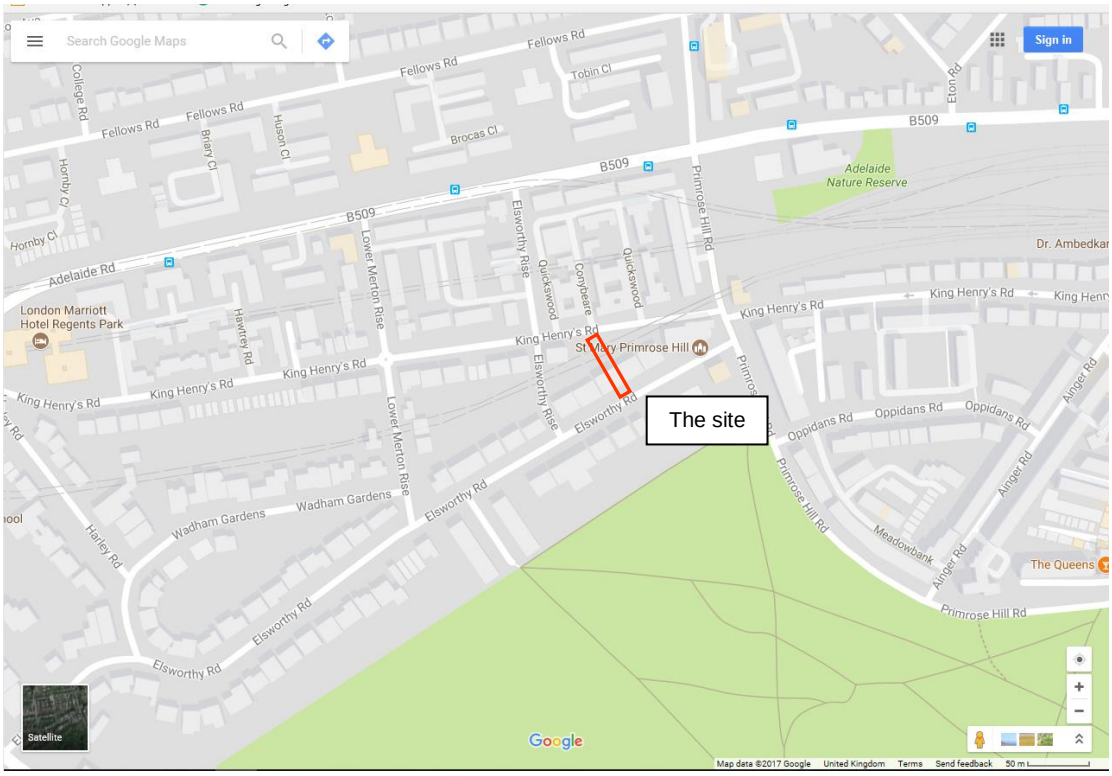

Figure 1. Site location.

3.2 Proposed Development

A planning application is to be submitted for the redevelopment of the 2 bedroom ground floor flat site to include the construction of a full length basement and rear and side extensions on the ground floor (figures 2 and 3).

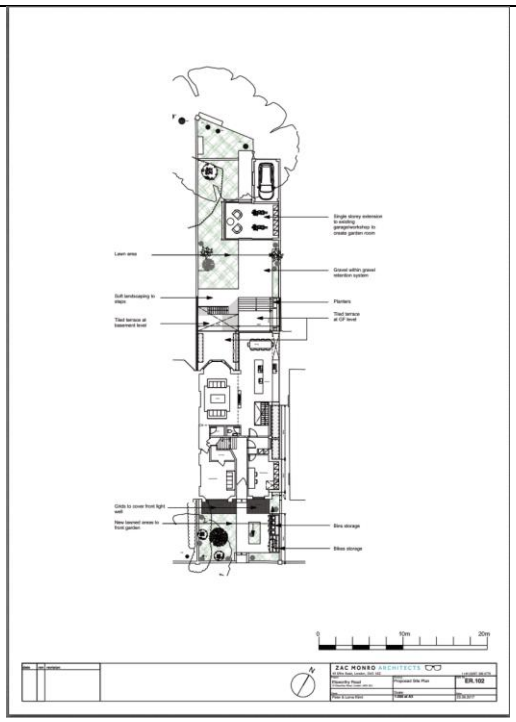

Figure 2. Proposed Site Plan (copyright: Zac Monro Architects).

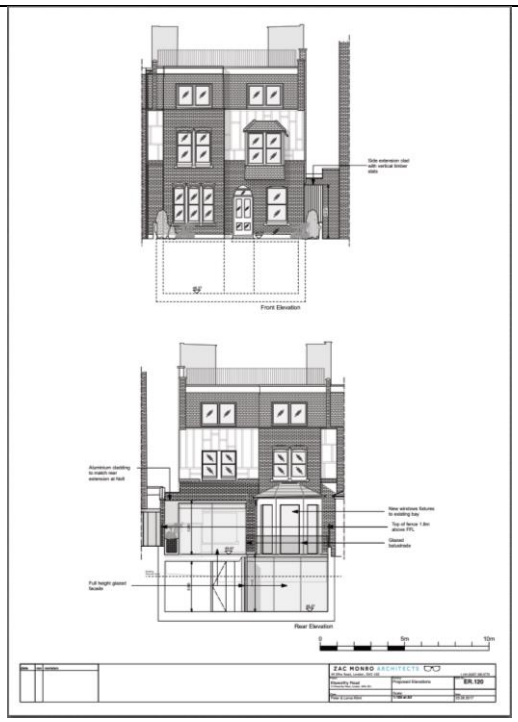

Figure 3. Proposed Elevations (copyright: Zac Monro Architects).

4.0 POLICY AND REGULATORY CONTEXT

4.1 The London Plan

The London Plan is the overall strategic plan for London setting out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. It forms part of the development plan for Greater London. London boroughs' local plans need to be in general conformity with the London Plan. The current plan was published in March 2016 and incorporates minor alterations made in October 2013, March 2015 and March 2016.

Chapter 5 *London's Response to Climate Change* outlines the policies which will mitigate climate change including reducing carbon dioxide emissions; procuring materials from sustainable sources; using renewable technology; and reducing flood risk. The main policies which are applicable to changes of use and refurbishments are:

- Policy 5.1 *Climate Change Mitigation*

Strategic

A The Mayor seeks to achieve an overall reduction in London's carbon dioxide emissions of 60 per cent (below 1990 levels) by 2025. It is expected that the GLA Group, London boroughs and other organisations will contribute to meeting this strategic reduction target, and the GLA will monitor progress towards its achievement annually.

LDF preparation

B Within LDFs boroughs should develop detailed policies and proposals that promote and are consistent with the achievement of the Mayor's strategic carbon dioxide emissions reduction target for London.

- Policy 5.3 *Sustainable Design and Construction*

Strategic

A The highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime.

Planning decisions

B Development proposals should demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process.

C Major development proposals should meet the minimum standards outlined in the Mayor's supplementary planning guidance and this should be clearly demonstrated within a design and access statement. The standards include measures to achieve other policies in this Plan and the following sustainable design principles:

a. minimising carbon dioxide emissions across the site, including the building and services (such as heating and cooling systems);
b. avoiding internal overheating and contributing to the urban heat island effect;
c. efficient use of natural resources (including water), including making the most of natural systems both within and around buildings;

d. minimising pollution (including noise, air and urban runoff);
e. minimising the generation of waste and maximising reuse or recycling;
f. avoiding impacts from natural hazards (including flooding);
g. ensuring developments are comfortable and secure for users, including avoiding the creation of adverse local climatic conditions;
h. securing sustainable procurement of materials, using local supplies where feasible; and
i. promoting and protecting biodiversity and green infrastructure.

LDF preparation

D Within LDFs boroughs should consider the need to develop more detailed policies and proposals based on the sustainable design principles outlined above and those which are outlined in the Mayor's supplementary planning guidance that are specific to their local circumstances.

- Policy 5.4 *Retrofitting*

Strategic

A The environmental impact of existing urban areas should be reduced through policies and programmes that bring existing buildings up to the Mayor's standards on sustainable design and construction. In particular, programmes should reduce carbon dioxide emissions, improve the efficiency of resource use (such as water) and minimise the generation of pollution and waste from existing building stock.

LDF preparation

B Within LDFs boroughs should develop policies and proposals regarding the sustainable retrofitting of existing buildings. In particular they should identify opportunities for reducing carbon dioxide emissions from the existing building stock by identifying potential synergies between new developments and existing buildings through the retrofitting of energy efficiency measures, decentralised energy and renewable energy opportunities (see Policies 5.5 and 5.7).

5.29 Retrofitting buildings can make a significant contribution to the climate change and resource management aims of this Plan – for example, London's existing domestic buildings contribute 36 per cent of the region's carbon dioxide emissions alone. Along with other non-domestic buildings, retrofitting the existing building stock presents a significant opportunity to help meet the strategic carbon dioxide reduction target of 60 per cent by 2025.

5.30 Policy 5.4 applies the principles in Policy 5.3 to existing building stock where retrofit opportunities arise (for example, large estate refurbishments). The Mayor supports an integrated, multi-agency approach, to promote the retrofitting of existing buildings, and where possible policies and programmes supporting zero carbon development and deployment of decentralised energy should also be applied to existing buildings. The Mayor will support measures through the Building Regulations and other regulatory and funding mechanisms to improve the performance of London's existing buildings, increase energy and water efficiency, and to make full use of technologies such as decentralised energy and renewable energy.

- Policy 5.15 *Water User and Supplies*

Strategic

A The Mayor will work in partnership with appropriate agencies within London and adjoining regional and local planning authorities to protect and conserve water supplies and resources in order to secure London's needs in a sustainable manner by:

a. minimising use of mains water;
b. reaching cost-effective minimum leakage levels;
c. in conjunction with demand side measures, promoting the provision of additional sustainable water resources in a timely and efficient manner, reducing the water supply deficit and achieving security of supply in London;
d. minimising the amount of energy consumed in water supply;
e. promoting the use of rainwater harvesting and using dual potable and grey water recycling systems, where they are energy and cost-effective;
f. maintaining and upgrading water supply infrastructure;
g. ensuring the water supplied will not give rise to likely significant adverse effects to the environment particularly designated sites of European importance for nature conservation.

Planning decisions

B Development should minimise the use of mains water by: a incorporating water saving measures and equipment b designing residential development so that mains water consumption would meet a target of 105 litres or less per head per day

C New development for sustainable water supply infrastructure, which has been selected within water companies' Water Resource Management Plans, will be supported

4.2 Mayor of London's Sustainable Design and Construction SPG

The Sustainable Design and Construction SPG relates to the implementation of London Plan Policy 5.3 (see above) and aims to support developers, local planning authorities and neighbourhoods to achieve sustainable development by providing guidance on how to achieve the London Plan objectives effectively.

It is intended that the SPG:

- Provides detail on how to implement the sustainable design and construction and wider environmental sustainability policies in the London Plan;
- Provides guidance on how to develop more detailed local policies on sustainable design and construction;
- Provides best practice guidance on how to meet the sustainability targets set out in the London Plan; and
- Provides examples of how to implement sustainability measures within developments.

4.3 London Borough of Camden

The principles of sustainable design are laid down in Camden's Local Plan, adopted on 3rd July 2017, which provides the framework for development within the borough (LBC, 2017). The Core Strategy provides guidance on how the current planning policies will be applied. The two policies which are relevant to refurbishments are:

- Core Policy CC1 *Climate Change Mitigation*

  The Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation.

We will:

a. promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;
b. require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met;
c. ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks;
d. support and encourage sensitive energy efficiency improvements to existing buildings;
e. require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and
f. expect all developments to optimise resource efficiency.

For decentralised energy networks, we will promote decentralised energy by:

g. working with local organisations and developers to implement decentralised energy networks in the parts of Camden most likely to support them;
h. protecting existing decentralised energy networks (e.g. at Gower Street, Bloomsbury, King's Cross, Gospel Oak and Somers Town) and safeguarding potential network routes; and
i. requiring all major developments to assess the feasibility of connecting to an existing decentralised energy network, or where this is not possible establishing a new network.

To ensure that the Council can monitor the effectiveness of renewable and low carbon technologies, major developments will be required to install appropriate monitoring equipment.

- Core policy CC2 *Adapting to Climate Change*

The Council will require development to be resilient to climate change.

All development should adopt appropriate climate change adaptation measures such as:

a. the protection of existing green spaces and promoting new appropriate green infrastructure;
b. not increasing, and wherever possible reducing, surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems;
c. incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and
d. measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy. Any development involving 5 or more residential units or 500 sqm or more of any additional floorspace is required to demonstrate the above in a Sustainability Statement.

Sustainable design and construction measures

The Council will promote and measure sustainable design and construction by:

e. ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;
f. encourage new build residential development to use the Home Quality Mark and Passivhaus design standards;
g. encouraging conversions and extensions of 500 sqm of residential floorspace or above or five or more dwellings to achieve "excellent" in BREEAM domestic refurbishment; and
h. expecting non-domestic developments of 500 sqm of floorspace or above to achieve "excellent" in BREEAM assessments and encouraging zero carbon in new development from 2019.

Camden's Planning Guidance (CPG) notes provides advice and information on how the council will apply its planning policies. *CPG3 Sustainability* provides information on ways to achieve carbon reduction measures and more sustainable developments (LBC, 2015, 5). CPG3 is being updated following the adoption of the Local Plan. The main expectations of Camden with regard to the energy efficiency of existing buildings are (LBC, 2015, 21):

- *All buildings, whether being updated or refurbished, are expected to reduce their carbon emissions by making improvements to the existing building. Work involving a change of use or an extension to an existing property is included. As a guide, at least 10% of the project cost should be spent on the improvements.*
- *Where retro-fitting measures are not identified at application stage we will most likely secure the implementation of environmental improvements by way of condition. Appendix 1 sets out a checklist of retro fit improvements for applicants.*
- *Development involving a change of use or a conversion of 5 or more dwellings or 500sq m of any floorspace, will be expected to achieve 60% of the un-weighted credits in the Energy category in their BREEAM assessment. (See the section on Sustainability assessment tools for more details).*
- *Special consideration will be given to buildings that are protected e.g. listed buildings to ensure that their historic and architectural features are preserved.*

4.4 Building Regulations Approved Document L1B (2010) Conservation of Fuel and Power in Existing Dwellings

Building Regulations are minimum standards for the design, construction and alterations to virtually all buildings. They are implemented through a suite of documents, known as Approved Documents, which are approved by the Secretary of State to provide practical guidance on ways of complying with the energy efficiency requirements and regulation 7 of the Building Regulations (HMG, 2010. 2).

Approved Document L1B covers the Conservation of Fuel and Power in Existing Dwellings. It sets out guidance on what is considered to be reasonable provision for meeting the energy efficiency requirements which can be achieved by complying with the following:

- *Regulation 4A: Thermal Elements.* If an element is replaced it should meet the minimum requirements, and if new, it should also meet minimum requirements of thermal efficiency.

- *Regulation 17D.* Applies to existing buildings with a total useful floor area of greater than 1,000m² where the proposed works consists of an extension, initial provision or increased capacity of any fixed building service.

- *Regulation 17E.* Where appropriate and Energy Performance Certificate (EPC) should be provided.

If the guidance in an Approved Document is followed there will be a presumption of compliance with the requirement(s) covered by the guidance (HMG, 2010, 2).

It is applicable in the following circumstances:

1. Construction of an extension;
2. A material change of use, or a change to the dwelling's energy status including loft and garage conversions;

3. The provision or extension of controlled services (heating and hot water systems; mechanical ventilation; mechanical cooling/air conditioning; fixed internal lighting; fixed external lighting; and renewable energy systems) and controlled fittings (window; roof window; rooflight; and door); and
4. The replacement of a controlled service or controlled fitting (windows and doors).

4.5 BREEAM Domestic Refurbishment

BREEAM Domestic Refurbishment is a performance-based assessment method and certification scheme for domestic buildings undergoing refurbishment. The primary aim of BREEAM Domestic Refurbishment is to improve the environmental performance of existing dwellings in a robust and cost-effective manner (BRE, 2016, 3).

The assessment is suitable for domestic refurbishment including:

Category 1

- Alterations to existing dwellings where at least one thermal element (walls, roof or floor) undergoes a major alteration (internal or external insulation etc) plus a change to building services (a new boiler, bathroom etc); and

- Extensions can be assessed but would require both the extension and the existing dwelling to be included as part of the assessment.

Category 2

- Domestic conversions and change of use projects where a new building is formed by change of use from a building which was not previously used for domestic purposes.

BREEAM Refurbishment assesses the environmental performance of refurbishment projects in eight categories of sustainable design:

- Management;
- Health and Wellbeing;
- Energy;
- Water;
- Materials;
- Waste;
- Pollution; and
- Innovation.

Within each category credits are available which reflect the options available to the design team. They are awarded where evidence has been provided to confirm that the specific requirements and performance standards have been met. The innovation credits are awarded for exemplary performance in the first seven categories which goes beyond the requirement of the credit criteria. A score for each category is then calculated based on the percentage of credits awarded within that category (table 1). An environmental weighting is applied to each category score to reflect the relative environmental importance of the category. These weighted scores are then combined to give an overall single percentage score. The BREEAM Refurbishment rating awarded is based on the percentage scores as illustrated in table 2.

Categories of environmental impact	Total credits in each category	Section Weighting (% points contribution)
Category 1: Management	11	12%
Category 2: Health and Wellbeing	12	17%
Category 3: Energy	29	43%
Category 4: Water	5	11%
Category 5: Materials	48	8%
Category 6: Waste	5	3%
Category 7: Pollution	8	6%
Total	**118**	**100**
Category 8: Innovation (additional)	10	10

Table 1. Total credits available, category weighting factors and points.

BREEAM Domestic Refurbishment rating	Total percentage score
Outstanding	≥ 85
Excellent	≥ 70
Very Good	≥ 55
Good	≥ 45
Pass	≥ 30
Unclassified	< 30

Table 2. Relationship between percentage score and BREEAM Refurbishment rating.

5.0 PART L1B (2010) SAP CALCULATIONS

A whole house SAP calculation has been used to demonstrate compliance with Part L1B (2010). FSAP 2012 is used to show that the calculated CO_2 emission rate from the dwelling with its proposed extension and basement is no greater than for the dwelling plus a notional extension and basement built to the same size, shape and orientation and which meets the standards for newly constructed thermal elements and controlled fittings as shown in table 3 below:

	Standard W/(m².K)² (U-value)
Thermal Element	
External wall	0.28
Pitched roof (insulation at ceiling level)	0.16
Pitched roof (insulation at rafter level)	0.18
Flat roof or roof with integral insulation	0.18
Floors	0.22
Swimming pool basin	0.25
Controlled fitting	
Windows (including frame)	1.6
Doors (with >60% of internal face glazed)	1.8

Table 3. Standards for new thermal elements and controlled fittings.

Where a fixed building service such as a heating or hot water system or fixed internal lighting is provided or extended as part of constructing an extension or basement, reasonable provision should be made to ensure that the energy performance is no worse than that which is provided in the original dwelling.

To show compliance with Part L1B, CO_2 emissions for the as designed dwelling should be less than the notional dwelling.

Results

The results of the whole house SAP calculation are summarised in table 4. The SAP Data Input worksheet shows the data used to complete the SAP calculation and is shown in Appendix 1.

CO_2 emissions for the as designed dwelling have been calculated to be 10,298.12kg/yr and for the notional dwelling: 14,316.96kg/yr. This represents a saving of 4,018.84kg/yr or 28.07%.

	Specification	As designed W/(m².K)² (U-value)	Notional/Standard W/(m².K)² (U-value)
Thermal element – new			
Basement ground floor	350mm RC wall, cavity drainage membrane, 25x50 metal studs, 80mm insulation, 15mm MR plasterboard	0.15	0.17
Basement retaining wall	400mm RC slab, cavity drainage membrane, 40mm insulation, 90mm screed, 10mm tiles	0.27	0.28
Ground floor extension external wall	External cladding on battens (ventilated), 100mm - 7.3N/mm² aerated concrete block, 60mm insulation, 7.3N/mm² aerated concrete block, 15mm plasterboard	0.25	0.28
Thermal element – retained			
Existing ground floor	Suspended timber	0.78	N/A
Existing external wall	9" solid brick with internal plasterboard	1.98	N/A
Controlled fitting – new			
Windows, patio doors and skylight	PVC-u double glazed, argon filled (low E, En = 0.05, soft coat), 16mm air gap	1.6	1.6
Front door	Timber half glazed, double glazed, argon filled (low E, En = 0.05, soft coat), 16mm air gap	1.5	1.8
Controlled fitting – retained			
Windows	Timber single glazed	4.8	NA
Controlled service			
Space heating	Reasonable provision made to ensure that the energy performance of the new services are no worse than the original services	Vaillant ecoTec pro 28 condensing combination gas boiler (89.3% efficiency) and radiators	Regular gas boiler (74% efficiency) and radiators
Hot water		From main boiler	110 litre HWT
Controls		Programmer, room thermostat and TRV's	Programmer
Fixed lighting		100% low energy	75% low energy
Air permeability			
Air permeability	Assumed	15m³/hm²	15m³/hm²
CO_2 emissions		**10,298.12kg/yr**	**14,316.96kg/yr**
Improvement		**4,018.84kg/yr**	**28.07%**

Table 4. Results of the whole house SAP calculation for the as designed dwelling.

6.0 RESULTS OF THE PRE-ASSESSMENT EXERCISE

To show that the principles of sustainable design have been incorporated into the proposals, and as required by the LBC, BREEAM Domestic Refurbishment has been used. Formal assessment has not been carried out, however, the structure and methodology has been followed. A summary of the results are shown in table 5 and the strategy to achieve these credits, in section 7.0.

Based on the available information from Zac Monro Architects and a number of assumptions using professional experience the following ratings have been achieved for the development.

BREEAM Refurb Category	**Credits Achieved**	**Credits Available**	**% of Credits Achieved**	**Section Weighting**	**Section Score**
Management	8	11	72.73	0.12	8.73
Health and Wellbeing	6	12	50.00	0.17	8.50
Energy	17	29	58.62	0.43	25.21
Water	3	5	60.00	0.11	6.60
Materials	24	48	50.00	0.08	4.00
Waste	3	5	60.00	0.03	1.80
Pollution	6	8	75.00	0.06	4.50
Innovation	-	10	10.00	-	0.00
Final BREEAM score			**59.34%**		
BREEAM Refurbishment Rating			**VERY GOOD**		

Table 5. Summary of results achieved for the Pre-Assessment.

The draft specification for the development achieves 59.34%, if formally assessed, with at least 40% of the credits being achieved in the energy, water and materials categories, which is the equivalent of a 'Very Good' rating. Being 4.34% above the minimum required for a 'Very Good' rating provides some flexibility with the final design.

7.0 STRATEGY TO MEET BREEAM REFURBISHMENT 'VERY GOOD'

The measures outlined below, if incorporated, will achieve a 'Very Good' rating if formally assessed against BREEAM Domestic Refurbishment.

7.1 Management (8 of 11 credits)

7.1.1 *Man 01: Home User Guide (3 of 3 credits)*

A Home User Guide containing all of the information listed in the 'User Guide Contents List' will be produced.

7.1.2 *Man 02: Responsible Construction Practices (1 of 2 credits)*

The appointed contractor will be required to register for the Considerate Constructors' Scheme and demonstrate that they will comply with best practice and achieve a score of 5 in each section.

7.1.3 *Man 03: Construction Site Impacts (1 of 1 credit)*

The appointed contractor will be required to demonstrate that they will implement at least two of the following procedures:

- Set objectives for reducing CO_2 production from energy use arising from site activities;
- Set objectives for reducing water use arising from site activities;
- Main contractor environmental materials statement; and
- 80% of site timber is reclaimed, re-used or responsibly sourced.

7.1.4 *Man 04: Security (2 of 2 credits)*

The advice of a suitably qualified security consultant will be sought and their recommendations will be incorporated into the overall design of the development to ensure that the criteria of Section 2 of Secured by Design are met.

7.1.5 *Man 05: Protection and Enhancement of Ecological Features (0 of 1 credit)*

Credit not sought.

7.1.6 *Man 06: Project Management (1 of 2 credits)*

The client is committed to assigning individual and shared responsibilities amongst the project team including all trades on site.

7.2 Health and Wellbeing (6 of 12 credits)

7.2.1 *Hea 01: Daylighting (1 of 2 credits)*

A daylight/sunlight study has been undertaken by Right of Light Consulting who conclude that all of the requirements set out in the BRE guide *Site Layout Planning for Daylight and Sunlight* have been satisfied RoLC, 2017, 8).

7.2.2 *Hea 02: Sound Insulation (2 of 4 credits)*

There will be a commitment to use pre-completion testing and to achieve a 3dB increase in airborne sound and a 3dB decrease in impact sound based on existing levels.

7.2.3 *Hea 03: Volatile Organic Compounds (0 of 1 credit)*

Credit not sought.

7.2.4 *Hea 04: Inclusive Design (1 of 2 credits)*

The principles of inclusive design will be incorporated into the refurbishment project which will meet the minimum requirements.

7.2.5 *Hea 05: Ventilation (1 of 2 credits)*

It is intended that background, extract and purge ventilation in all appropriate rooms will be provided which meets the minimum requirements of Building Regulations Part F.

7.2.6 *Hea 06: Safety (1 of 1 credits)*

A compliant fire detection system and fire alarm system will be installed in line with the minimum mandatory requirements.

7.3 Energy (17 of 29 credits)

7.3.1 *Ene 01: Improvement In Energy Efficiency Rating (4 of 6 credits)*

Until the advice of a SAP assessor has been taken it is anticipated that the Energy Efficiency Rating will be improved by a minimum of 36. This will be achieved by using high levels of insulation and reducing cold bridging and keeping heat lost to a minimum.

7.3.2 *Ene 02: Energy Efficiency Rating Post Refurbishment (2 of 4 credits)*

Until the advice of a SAP assessor has been taken it has been assumed that the minimum post refurbishment requirements of an Energy Efficiency Rating of 65 will be achieved by using high levels of insulation and reducing cold bridging and keeping heat lost to a minimum.

7.3.3 *Ene 03: Primary Energy Demand (3 of 7 credits)*

It is anticipated that the refurbishment of the building together with the installation of energy efficient lighting, water and space heating will reduce the primary energy demand to a maximum of 280kWh/m^2/yr.

7.3.4 *Ene 04: Renewable Technologies (0 of 2 credits)*

Credits not sought.

7.3.5 *Ene 05: Energy Labelled White Goods (2 of 2 credits)*

White goods conforming to the following minimum requirements of the EU Energy Efficiency Labelling Scheme will be provided:

- Fridge and freezer or fridge freezer – A+ rating;
- Washing machine and dishwasher – A rating; and
- Washer/tumble dryer – B rating.

7.3.6 *Ene 06: Drying Space (1 of 1 credit)*

The development will have secure outdoor drying space with a minimum line length of 6m.

7.3.7 *Ene 07: Lighting (2 of 2 credits)*

All external space lighting will be energy efficient and all internal lighting will be of low energy consuming less than 9w/m².

7.3.8 *Ene 08: Energy Display Devices (0 of 2 credits)*

Credits not sought.

7.3.9 *Ene 09: Cycle Storage (2 of 2 credits)*

Four secure parking spaces will be provided.

7.3.10 *Ene 10: Home Office (1 of 1 credit)*

A home office will be provided on the first floor.

7.4 Water (3 of 5 credits)

7.4.1 *Wat 01: Internal Water Use (2 of 3 credits)*

It is anticipated that internal potable water use will be a maximum of 105 litres per person per day. This will be achieved by specifying water efficient appliances and fittings such as 6/4l dual flush WCs, low volume baths, dishwasher and washing machines and flow restrictors to taps and showers.

7.4.2 *Wat 02: External Water Use (1 of 1 credit)*

A water butt will be provided to collect rainwater.

7.4.3 *Wat 03: Water Meter (0 of 1 credit)*

Credit not sought.

7.5 Materials (24 of 48 credits)

7.5.1 *Mat 01: Environmental Impact of Materials (14 of 25 credits)*

A commitment has been made by the client and main contractor that nay new materials will have a low environmental impact over their life-cycle. This will be achieved by specifying new materials which have a Green Guide rating of A+ as a minimum and high thermal performance in the following elements:

- Roof;
- External walls;
- Internal walls (including separating walls;
- Upper and ground floors; and
- Windows.

7.5.2 *Mat 02: Responsible Sourcing of Materials (6 of 15 credits)*

Materials from the following building elements will be responsibly with the aim of achieving 27 or more percent of available points. The building elements are:

- Structural frame;
- Ground floor;
- Upper floors (including separating floors);
- Roof;
- External walls;
- Internal walls (including separating walls);
- Foundations/substructure (excluding sub-base materials);
- Staircase;
- Windows, external and internal doors;
- Secondary fixes including skirting, panelling, fascias and balustrades;
- Fixed furniture; and
- Any other significant use.

7.5.3 *Mat 03: Insulation (4 of 8 credits)*

Any insulation specified in the external walls, ground floor, roof and building services will have an insulation index of 2 as a minimum.

7.6 Waste (3 of 5 credits)

7.6.1 *Was 01: Household Waste (2 of 2 credits)*

The refurbished dwelling will be provided with internal recycling containers in a dedicated location which will be sized to meet the minimum requirements of 30 litres combined capacity with each individual container being a minimum of 7 litres. External storage space for waste and recycling bins will be the minimum required by the Royal Borough of Kensington and Chelsea.

All waste and recycling will be collected by the Royal Borough of Kensington and Chelsea.

Suitable composting facilities will be provided in the rear garden.

7.6.2 *Was 02: Refurbishment Site Waste Management (1 of 3 credits)*

The appointed contractor will be required to have a Level 1 compliant Site Waste Management Plan which aims to: minimise construction waste by specifying target benchmarks for resource efficiency; to have procedures and commitments to minimise both hazardous and non-hazardous waste which will meet or exceed the refurbishment and demolition waste diversion benchmarks; and to monitor and record the amount of hazardous and non-hazardous waste being produced.

7.7 Pollution (6 of 8 credits)

7.7.1 *Pol 01: Nitrous Oxide Emissions (3 of 3 credits)*

The specified primary and secondary heating system (if specified) will produce less than 40mg/kWh of nitrous oxide in order to reduce the amount of NOx being emitted to the atmosphere.

7.7.2 *Pol 02: Surface Water Runoff (1 of 3 credits)*

It is anticipated that there will be a neutral change in surface water runoff.

7.7.3 *Pol 03: Flooding (2 of 2 credits)*

The site lies in an area of low flood risk, as viewed on the Environment Agency's flood risk checker at www.environment-agency.gov.uk (first accessed 12th September 2017). Maximum credits can therefore be awarded by default as the site is in an area not at risk of flooding.

8.0 CARBON DIOXIDE REDUCTION MEASURES

In line with CPG3 *Sustainability*, 10% of the project cost will be spent on reducing CO_2 emissions in the existing dwelling. Although these have not been formally agreed the clients have committed to providing them as part of the proposed refurbishment works. The LBC have provided a checklist as guidance which needs to be completed and submitted to them before work commences. The measures include:

- Installing a new gas combination boiler to provide both space and water heating. (A Vaillant ecoTec pro 28 has been used for the SAP calculation.);
- Upgrading the space heating controls to a programmer, room thermostat and thermostatic radiator valves (TRV's);
- Insulating all exposed pipework;
- Upgrading the fixed lighting to use low energy LED lighting throughout the dwelling
- Providing A or A+ energy rated white goods (fridge freezer, dishwasher and washing machine);
- Specifying water efficient sanitary appliances and fittings;
- Providing a green roof to the rear extension on the ground floor;
- The basement retaining wall and ground floor will have high levels of insulation which go beyond the minimum requirements for new thermal elements;
- The new glazing and front door will go beyond the minimum requirements for new controlled fittings; and
- When procuring materials these will be sourced from responsible suppliers who have a commitment to reducing their environmental impact.

9.0 CONCLUSION

This Sustainable Design and Construction Statement has been commissioned from Isambard Environmental by Luca Rubertelli of Zac Monro Architects on behalf of Peter and Lorna Klimt, the owners and developer of the site. It has been prepared to support a planning application for the construction of a new basement and rear and side extensions to the existing 2 bedroom ground floor flat at 10 Elsworthy Road, London, NW3 3DJ.

For alterations and changes of use the London Borough of Camden require a Statement to be completed to demonstrate how the proposed changes comply with its policies, and also those of the London Plan, which relate to climate change mitigation and sustainable design and construction.

A whole house SAP calculation has been completed to estimate CO_2 emissions using government approved FSAP 2012 software to demonstrate compliance with Part L1B (2010) of the Building Regulations. Emissions for the as designed dwelling have been calculated to be 10,298.12kg/yr which represents a reduction of 4,018.84kg/yr or 28.07% over that for the notional dwelling.

The LBC prefers BREEAM Domestic Refurbishment as the assessment tool for measuring the environmental sustainability of existing dwellings. While a formal assessment is not required because the development is below the threshold value of five dwellings or 500m² of floorspace, however, the methodology in the form of a Pre-Assessment, has been followed to demonstrate how environmental sustainability issues have been considered and could be incorporated as part of the project.

The Pre-Assessment shows that, based on the available information, the development could achieve 59.34% with at least 40% of the available credits being achieved in the energy, water and materials categories. This is the equivalent of a 'Very Good' rating.

For all refurbishment projects Camden require that 10% of the project cost is spent on reducing carbon dioxide emissions in the existing dwelling. Although these have not been formally agreed the clients have committed to providing them as part of the proposed refurbishment works. Measures include installing a new gas combination boiler with programmer, room thermostat and thermostatic radiator valves; installing low energy lighting throughout; providing A or A+ energy rated white goods; and insulating all exposed pipework.

10.0 REFERENCES

Building Research Establishment (2005) *Standard Assessment Procedure, 2005.* BRE, Watford.

Building Research Establishment (2012) *BREEAM Refurbishment Pre-Assessment Estimator, v0.7.* BRE, Watford.

Building Research Establishment (2016) *BREEAM Refurbishment Technical Manual, SD5077, Issue 2.2.* BRE, Watford.

Greater London Assembly (2014) *Sustainable Design and Construction Supplementary Planning Guidance.* GLA, London.

Greater London Authority (2016) *London Plan. The Spatial Development Strategy for London Consolidated with alterations since 2011.* GLA, London.

Her Majesty's Government (2010) *The Building Regulations 2010: Approved Document L1B Conservation of Fuel and Power in Existing Dwellings.* HMG, London.

London Borough of Camden (2015) *Camden Planning Guidance 3 Sustainability.* LBC, Camden.

London Borough of Camden (2017) *Local Plan, adopted 3rd July 2017.* LBC, Camden.

Right of Light Consulting (2017) *Daylight and Sunlight Study (Within Development): 10 Elsworthy Road, London, NW3 3DJ.* Unpublished client report.

www.environment-agency.gov.uk *Flood Map for Planning.* First accessed 12th September 2017.

Appendix 1: SAP Input Data

SAP Input

Property Details: 10 Elsworthy Road - Proposed

Address:	10 Elsworthy Road, LONDON, NW3 3DJ
Located in:	England
Region:	Thames valley
UPRN:	1234567890
Date of assessment:	30 August 2017
Date of certificate:	19 September 2017
Assessment type:	New extension to existing dwelling
Transaction type:	Not sale or rental
Tenure type:	Owner-occupied
Related party disclosure:	No related party
Thermal Mass Parameter:	Indicative Value Medium
Water use <= 125 litres/person/day:	True
PCDF Version:	417

Property description:

Dwelling type:	Maisonette
Detachment:	
Year Completed:	2017

Floor Location:	**Floor area:**	**Storey height:**
Basement floor	201.73 m²	3.04 m
Floor 1	155.21 m²	2.75 m

Living area: 89.81 m² (fraction 0.252)
Front of dwelling faces: South East

Opening types:

Name:	**Source:**	**Type:**	**Glazing:**	**Argon:**	**Frame:**
D1	SAP 2012	Half glazed	low-E, En = 0.05, soft coat	Yes	Wood
B-W1	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	PVC-U
B-W2	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	PVC-U
B-W3	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	PVC-U
B-W4	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	PVC-U
G-W5	SAP 2012	Windows	Single-glazed	No	Wood
G-W6	SAP 2012	Windows	Single-glazed	No	Wood
G-W7	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	PVC-U
G-W8	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	Wood
G-W9	SAP 2012	Windows	Single-glazed	No	Wood
G-W10	SAP 2012	Windows	Single-glazed	No	Wood
G-W11	SAP 2012	Windows	Single-glazed	No	Wood
G-D2	Manufacturer	Windows	low-E, En = 0.05, soft coat	Yes	PVC-U
G-SL1	Manufacturer	Roof Windows	low-E, En = 0.05, soft coat	Yes	PVC-U

Name:	**Gap:**	**Frame Factor:**	**g-value:**	**U-value:**	**Area:**	**No. of Openings:**
D1	mm	0.7	0.63	1.5	2.82	1
B-W1	16mm or more	0.7	0.44	1.6	11.19	1
B-W2	16mm or more	0.7	0.44	1.6	8.12	1
B-W3	16mm or more	0.7	0.44	1.6	5.94	1
B-W4	16mm or more	0.7	0.44	1.6	14.37	1
G-W5		0.7	0.85	4.8	4.99	1
G-W6		0.7	0.85	4.8	2.59	1
G-W7	16mm or more	0.7	0.44	1.6	6.75	1
G-W8		0.7	0.63	1.6	12	1
G-W9		0.7	0.85	4.8	1.59	1
G-W10		0.7	0.85	4.8	3.15	1
G-W11		0.7	0.85	4.8	1.59	1

Stroma FSAP 2012 Version: 1.0.4.9 (SAP 9.92) - http://www.stroma.com Page 1 of 3

SAP Input

G-D2	16mm or more	0.7	0.44	1.6	2.71	1
G-SL1	16mm or more	0.7	0.44	1.6	2.31	1

Name:	Type-Name:	Location:	Orient:	Width:	Height:
D1		Existing solid wall	South East	0.00117	0.00241
B-W1		New basement retaining wall	South East	0.00361	0.0031
B-W2		New basement retaining wall	South East	0.00262	0.0031
B-W3		New basement retaining wall	South West	0.00198	0.003
B-W4		New basement retaining wall	North West	0.00479	0.003
G-W5		Existing solid wall	South East	0.00241	0.00207
G-W6		Existing solid wall	South East	0.0012	0.00216
G-W7		Existing solid wall	North East	0.00361	0.00187
G-W8		Existing solid wall	North West	0.004	0.003
G-W9		Existing solid wall	North	0.00055	0.00289
G-W10		Existing solid wall	North West	0.00109	0.00289
G-W11		Existing solid wall	East	0.00055	0.00289
G-D2		Existing solid wall	North East	0.00103	0.00263
G-SL1		New green roof	North East	0.00075	0.00308

Overshading: Average or unknown

Opaque Elements:

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Kappa:
External Elements							
Existing solid wall	52.56	38.19	14.37	1.98	0	False	N/A
New basement retaining wall	198.6	39.62	158.98	0.27	0	False	N/A
New extension wall	87.26	0	87.26	0.25	0	False	N/A
New GRP roof	8.87	0	8.87	0.17	0		N/A
New green roof	16.24	2.31	13.93	0.17	0		N/A
Existing ground floor	155.21			0.78			N/A
New basement floor	201.73			0.15			N/A
Internal Elements							
Party Elements							
Party - new	56.39						N/A

Thermal bridges:

Thermal bridges: No information on thermal bridging (y=0.15) (y =0.15)

Ventilation:

Pressure test: No (Assumed)
Ventilation: Natural ventilation (extract fans)
Number of chimneys: 0
Number of open flues: 0
Number of fans: 7
Number of passive stacks: 0
Number of sides sheltered: 3
Pressure test: 15

Main heating system:

Main heating system: Boiler systems with radiators or underfloor heating
Gas boilers and oil boilers
Fuel: mains gas
Info Source: Boiler Database
Database: (rev 417, product index 016839) Efficiency: Winter 87.0 % Summer: 90.2
Brand name: Vaillant
Model: ecoTEC pro 28
Model qualifier: VUW GB 286/5-3
(Combi boiler)
Systems with radiators

SAP Input

	Central heating pump : 2013 or later Design flow temperature: Design flow temperature >45°C Unknown Boiler interlock: Yes Delayed start
Main heating Control:	
Main heating Control:	Programmer, room thermostat and TRVs Control code: 2106
Secondary heating system:	
Secondary heating system:	None
Water heating:	
Water heating:	From main heating system Water code: 901 Fuel :mains gas No hot water cylinder Solar panel: False
Others:	
Electricity tariff:	Standard Tariff
In Smoke Control Area:	Unknown
Conservatory:	No conservatory
Low energy lights:	100%
Terrain type:	Dense urban
EPC language:	English
Wind turbine:	No
Photovoltaics:	None
Assess Zero Carbon Home:	No

Appendix 2: Checklist for retro-fitting measures

Applies to all:

- Changes of use;
- Conversions; and
- Extensions over 300sq.m.

Please note that not all the measures will be appropriate for all buildings and some measures will require planning permission e.g. alterations to the front of a property.

Measure	**Specification**	**Evidence**
Draught proofing		
Reflective radiator panels		
Overhauling/upgrading windows		
New boiler		
LED lighting		
Meters, timers, sensors, controls on heating or lighting		
Mechanical Ventilation and Heat Recovery		
Insulation		
• Hot water tank & pipes		
• Roof		
• Internal walls		
• External walls		
• Floor		
Renewable energy technology		
• Solar PV panels		
• Solar thermal (hot water) panels		
• Ground source heat pumps		
Double glazed windows/secondary glazing		
Combined heat and power (CHP) unit		
Green or brown roof		
Rainwater harvesting		
Other measures		
Join the Camden Climate Change Alliance (commercial only)		
Off-setting contribution		