Energy & Sustainability Statement for

73a Maygrove Road,

Camden, London

30th July 2019

Contents

1.0 EXECUTIVE SUMMARY

1.1 This Statement outlines the estimated energy/emissions performance of the proposed residential development at 73a Maygrove Road, Camden, including features that have been incorporated to the building design and building systems to minimise energy demand, energy use and resultant carbon dioxide emissions.

1.2 In addition to demand management and energy efficient equipment, the proposed development has assessed the opportunity to generate energy through on-site low or zero carbon (LZC) technologies.

1.3 The Statement presents the commitments to meet the CO_2 emissions reductions targeted for compliance with Condition 5 of Planning Approval reference 2016/5498/P. The target set by this condition is a 19% reduction in carbon dioxide emissions beyond Part L 2013 Building Regulations in line with the energy hierarchy, and a 20% reduction in carbon dioxide emissions through renewable technologies.

1.4 The proposed development at Maygrove Road, has applied the Energy Hierarchy to prioritise emissions reductions from the building fabric and energy efficiency before assessing the proposed incorporation of low and zero carbon technologies.

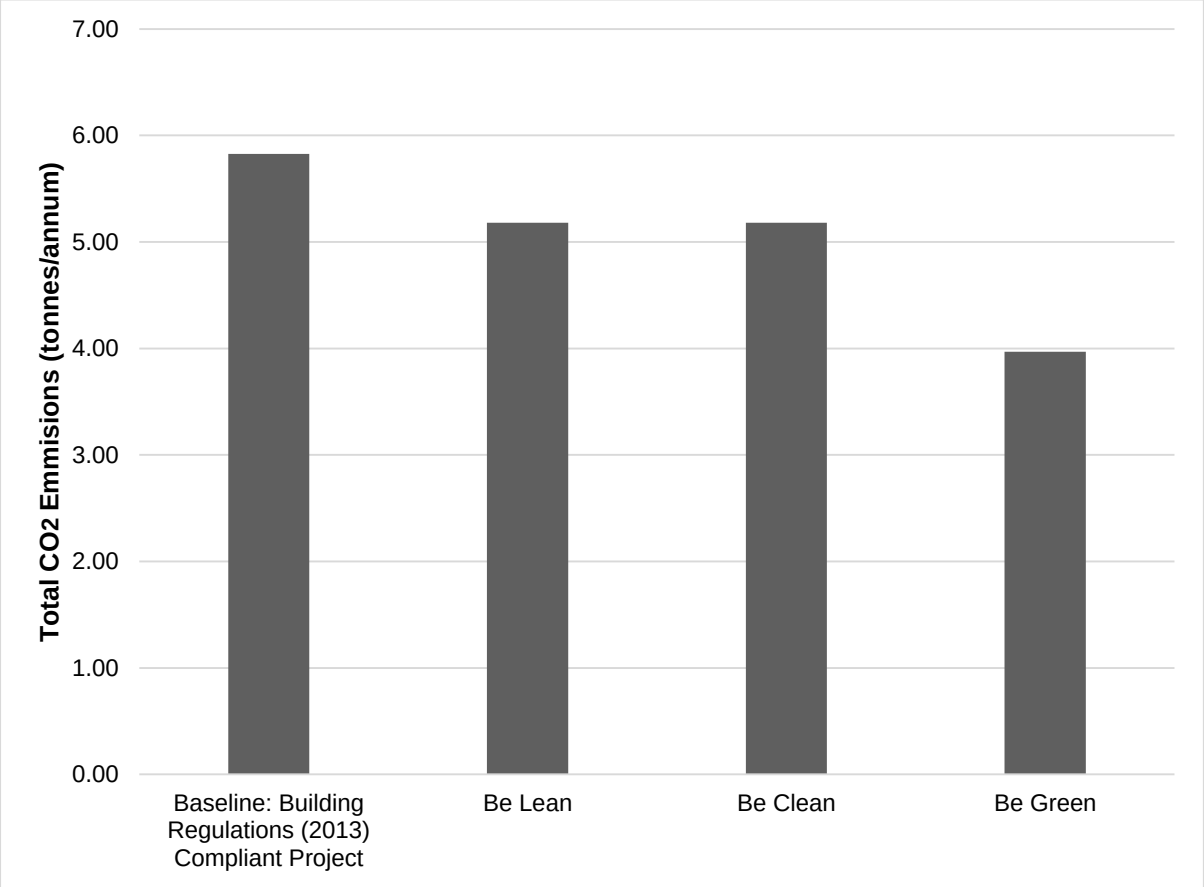
1.5 The proposed development has targeted meeting the energy demand as efficiently as possible through passive design and fabric improvements, as the main component of the energy strategy. This will be done in conjunction with key measures including improved fabric U- values, improved levels of air-tightness and high efficiency heating and lighting systems.

1.6 The proposed development achieves a 31.89% annual CO_2 saving against the baseline Part L (2013) compliance threshold, through a combination of improved fabric standards beyond Regulatory Minimum (Part L), high energy efficient systems and low zero carbon systems.

1.7 Of the above improvement, a 20.76% reduction in carbon dioxide emissions through renewable technologies (ASHP and Solar PV systems) has been achieved. The 20% reduction has been calculated from the regulated CO2 emissions of the development after all proposed energy efficiency measures and any CO2 reduction from non-renewable decentralized energy (e.g. CHP) have been incorporated.

1.7 In addition to the CO_2 savings achieved, the proposed development will also ensure water consumption rates of less than 110litres/person/day will be achieved for each dwelling, along with the careful selection of construction materials which have a higher Green Guide Rating when compared to similar constructions, where feasible.

The Energy Hierarchy Applied to Maygrove Road



Emission Savings for Maygrove Road

	Regulated CO_2 Savings	
	Tonnes CO_2/annum	**Percentage Savings (%)**
'Be Lean'	0.65	11.12
'Be Clean'	0.00	0.00
'Be Green'	1.21	20.76
Overall Savings	**1.86**	**31.89**

Annual Regulated/Unregulated Emissions for Maygrove Road

	CO_2 Emissions (tonnes/annum)	
	Regulated	**Unregulated**
Building Regulations 2013 Part L Compliant Project	5.83	2.62
'Be Lean'	5.18	2.62
'Be Clean'	5.18	2.62
'Be Green'	3.97	2.62

2.0 BACKGROUND

INTRODUCTION

2.1 MG Partnership were commissioned to prepare an Energy & Sustainability Statement for the proposed development at 73a Maygrove Road, in the London Borough of Camden.

2.2 This report presents the outcome of the energy appraisal of the proposed development and details the approach that the applicant and the design team have collectively taken towards achieving a high standard of operational energy performance. This Statement outlines the features that have been incorporated into the design proposals which aim to reduce the energy demand, energy use, resultant carbon dioxide emissions and therefore environmental impact of the scheme. In addition to demand reduction and energy efficient design the Statement assesses the application of low or zero carbon technologies (LZCs) to the proposed development.

2.3 The purpose of the Energy Statement is to provide an independent verification that the design of the proposed development is in accordance with objectives of relevant planning policy at all levels and is an example of good practice in low energy design. This Statement reports the performance of the proposed development using local, regional and national level guidance on energy performance.

2.4 The Statement includes:

- A brief description of the proposed development;
- A definition of the energy hierarchy applied to the development;
- A summary of the relevant national, regional and local energy planning policy drivers;
- A review of the proposed development's performance against set planning objectives and good practice identifying the opportunities and constraints of both the application site and the proposals.
- Details of feasible Sustainable Design & Construction measures to be incorporated into the development.

2.5 The energy appraisal has been undertaken at an early stage to directly inform building design and ensure that the building can achieve optimal energy performance. The Energy Statement, therefore, also provides a framework for the team to monitor the scheme's performance throughout its development and operation.

THE PROPOSED DEVELOPMENT

2.6 The application site is found at 73a MAygrove Road, within the London Borough of Camden and the proposed development comprises the construction of four apartments in one block, including terraces, bicycle storage facility.

3.0 POLICY & LEGISLATIVE CONTEXT

3.1 There are a number of national policy drivers for energy efficiency and reduced carbon dioxide (CO_2) emissions, which have been introduced to address the issue of global warming and the implications of climate change including the Energy White Paper[4], National Planning Policy Framework[5] (NPPF), Building Regulations Approved Document Part L (2013 edition), and the BREEAM Assessment methodology. On a regional level, the London Plan[1] provides the policy drivers for major developments within Greater London and at the local level the relevant development policies are detailed within the Camden Local Plan (2017)[2].

Regional Policy Drivers

The London Plan: Spatial Development Strategy for Greater London

3.5 On 10 March 2015, the Mayor published (i.e. adopted) the Further Alterations to the London Plan[1] (FALP). From this date, the FALP are operative as formal alterations to the London Plan (the Mayor's spatial development strategy) and form part of the development plan for Greater London.

Section 5 of the Plan covers the mitigation of, and adaptation to climate change and the management of natural resources. The London Plan supports the Mayor's Energy Strategy. The key policies regarding energy efficiency are summarised below.

Policy 5.2 Minimising Carbon Dioxide Emissions

'A - Development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:

1 Be lean: use less energy
2 Be clean: supply energy efficiently
3 Be green: use renewable energy

B – The Mayor will work with boroughs and developers to ensure that major developments meet the following targets for carbon dioxide emissions reduction in buildings. These targets are expressed as minimum improvements over the Target Emissions Rate (TER) outlined in the national Building Regulations leading to zero carbon residential buildings from 2016 and zero carbon non-domestic buildings from 2019.

Residential Buildings	Non-Domestic Buildings
• 2010 – 2013: 25% improvement on 2010 Building Regulations (CSH Level 4) • 2013 – 2016: 40% improvement on 2010 Building Regulations	• 2010 – 2013: 25% improvement on 2010 Building Regulations (CSH Level 4) • 2013 – 2016: 40% improvement on 2010 Building Regulations.

• 2016 – 2031 Zero Carbon	• 2016 – 2019: As Building Regulations requirements • 2019 – 2031: Zero Carbon

C - Major developments proposals should include a detailed energy assessment to demonstrate how the targets for carbon dioxide emissions reduction outlined above are to be met within the framework of the energy hierarchy.

D – As a minimum, energy assessments should include the following details:
a Calculation of the energy demand and carbon dioxide emissions covered by the Building Regulations and, separately, the energy demand and carbon dioxide emissions from any other part of the development, including plant or equipment, that are not covered by the Building Regulations… at each stage of the energy hierarchy.
b Proposals to reduce carbon dioxide emissions through the energy efficient design of the site, buildings and services
c Proposals to further reduce carbon dioxide emissions through the use of decentralised energy where feasible, such as district heating and cooling and combined heat and power (CHP)
d Proposals to further reduce carbon dioxide emissions through the use of on-site renewable energy technologies.

E – The carbon dioxide reduction targets should be met on-site. Where it is clearly demonstrated that the specific targets cannot be fully achieved on-site, any shortfall may be provided off-site or through a cash in lieu contribution to the relevant borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere.'

Whilst the project shall aspire to deliver the fullest achievable contribution to carbon reductions it should be noted that the London Plan carbon reduction targets are not applicable to 73a Maygrove Road as a minor development.

GLA Energy Team Guidance on Planning Energy Assessments

3.6 The GLA Energy team published a guidance note which provides further detail on addressing the London Plan's energy hierarchy through the provision of an Energy Assessment. The most recent version published in March 2016[7] describes the means by which development proposals can demonstrate that climate change mitigation and adaptation measures are integral to the context of the development.

3.8 The document has provided a guide to the structure and content of the energy assessment which has been adopted by this Statement for all applicable considerations.

Local Policy Drivers

London Borough of Camden Local Plan

3.9 The Camden Local Plan[2] (2017) sets out the Council's planning policies and replaces the Core Strategy and Development Policies planning documents (adopted in 2010). It ensures that Camden continues to have robust, effective and up to date planning policies that respond to changing circumstances and the borough's unique characteristics and contribute to delivering the Camden Plan and other local priorities. The Local Plan will cover the period from 2016-2031.

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.'

In response to the above, this statement will outline how the proposed development will address the following measures:

- Minimising of CO_2 emissions following the lean, clean, green energy hierarchy.
- Efficient water consumption
- Energy Efficient Materials
- Reduction of Construction Waste

BUILDING REGULATIONS

3.11 Building Regulations exist to ensure the health, safety, welfare and convenience of people in and around buildings, and the energy efficiency of buildings. The regulations apply to most new buildings and many alterations of existing buildings in England, whether new residential, or non-residential.

3.12 The development at MAygrove Road will be constructed to be compliant with Building Regulations Part L1a (2013), which represent the current Regulations at the time of construction and are appropriate of the proposed works.

4.0 ENERGY ASSESSMENT

4.1 In order to assess the likely energy demands of the proposed development, the emissions have been calculated using drawings produced by Create Design + Architecture of the proposed development.

4.2 An energy modelling exercise has been undertaken to determine the anticipated Building Regulations baseline, which indicates the minimum regulatory performance for the regulated emissions of the proposed development.

4.3 The methodology used to estimate the energy demand from the building has been informed by the guidance in the following publications:

- The London Plan[1];
- Standard Assessment Procedure (SAP) modelling guide [8];
- The GLA Energy Planning – Guidance on preparing energy statements[7];

4.4 The software used to generate the Regulation baseline is approved by the DCLG as being compliant with the Standard Assessment Procedure 2012 (SAP).

REGULATED EMISSIONS BASELINE

4.5 The average regulated emissions baseline for the proposed development is taken as the baseline compliance figures generated by the calculation software to achieve regulatory (Part L1a) compliance.

Baseline CO_2 Emissions (tonnesCO_2/yr)
5.83

REGULATED & UNREGULATED EMISSIONS

4.6 In addition to the resultant carbon dioxide emissions from the regulated emissions, there are additional uses of energy which are unregulated, examples of which include energy for lifts, small power and building type specific processes, such as IT or plug in equipment. Process energy used in buildings is described as unregulated energy use (emissions) as it is not directly covered by the standard compliance calculation.

4.7 Unregulated energy use has been calculated using the Standard Assessment Procedure 2012 (SAP), utilising approved software.

Baseline Unregulated CO_2 Emissions (tonnesCO_2/yr)
2.62

BASELINE SUMMARY

4.9 This section describes the baseline of the anticipated energy use of the development at the application site. Regulated and unregulated emissions have been established using government approved energy modelling software, and where required, government approved fuel conversion factors.

CO_2 Emissions Baseline for Maygrove Road:

	CO_2 Emissions (tonnes/annum)	
	Regulated	**Unregulated**
Building Regulations 2013 Part L Compliant Project	5.83	2.62

5.0 'BE LEAN' - ENERGY EFFICIENCY MEASURES

THE ENERGY HIERARCHY

5.1 The Energy Strategy adopts a set of principles to guide design development and decisions regarding energy, balanced with the need to optimise environmental and economic benefits. The London Plan[1] states that 'The following hierarchy should be used to assess applications:

- Using less energy, in particular by adopting sustainable design and construction measures;
- Supplying energy efficiency, in particular by prioritising decentralised energy generation; and
- Using renewable energy.

5.2 Consequently, the first stage in the energy strategy for the proposed development is the consideration of energy efficiency measures to ensure that the base energy demand is minimised.

ENERGY EFFICIENCY MEASURES

5.3 In order to ensure the proposed development complies with 2013 Building Regulations and improves upon the baseline compliance threshold, specific measures to make the building energy efficient must be incorporated within the scheme design and construction.

5.4 The following key energy efficiency design measures to reduce emissions have been incorporated in the design of the project:

New Fabric Elements	
External walls	0.27 W/m2k
Ground Floor	0.16 W/m2k
Roof	0.16 W/m2k
Entrance Doors	1.4 W/m2k
New Glazing Parameters	
u-values	1.3 W/m2k
g-value	0.75

Other, active design measures included are also summarised below:

- Design Air Permeability of 5m3/h/m2 @ 50Pa
- 100% low energy LED light fittings.
- High efficiency, low NOx gas fired combi boiler for space heating & hot water, minimum seasonal efficiency of 90%.
- Space heating controls comprising of independent time and temperature zone controls.

UNREGULATED EMISSIONS SAVINGS

5.10 The incorporation of energy efficiency measures proposed for the whole development is expected to meet 2013 Building Regulations and be comparable in performance with the baseline building. Whilst there will be measures included to reduce unregulated emissions (e.g. provision of Building User Guides and energy metering, which will encourage occupants to utilise the building in a sustainable and energy efficient manner), a quantitative assessment on the reduction of unregulated emissions is less technically rigorous than the assessment of regulated emissions.

EMBODIED CARBON DIOXIDE

5.11 For the new major building elements the design team have the opportunity to select materials with low embodied energy. Using the Green Guide to Specification[9], the team will prioritise the selection of materials given high ratings, though the guide does not assess embodied carbon dioxide performance alone.

'BE LEAN' EMISSIONS PERFORMANCE

5.12 The energy modelling of the proposed development indicates that by incorporating the features described in Section 5.4, the following performance can be achieved:

'Be Lean' Building Emission Ratings for Maygrove road :

Annual CO_2 Emissions ($tonnesCO_2$/yr)
5.18

Annual Regulated/Unregulated Emissions for Maygrove Road:

	CO_2 Emissions (tonnes/annum)	
	Regulated	**Unregulated**
Building Regulations 2013 Part L Compliant Project	5.83	2.62
'Be Lean'	5.18	2.62

'Be Lean' Emission Savings for Maygrove Road:

	Regulated CO_2 Savings	
	Tonnes CO_2/annum	**Percentage Savings (%)**
'Be Lean'	0.65	11.12

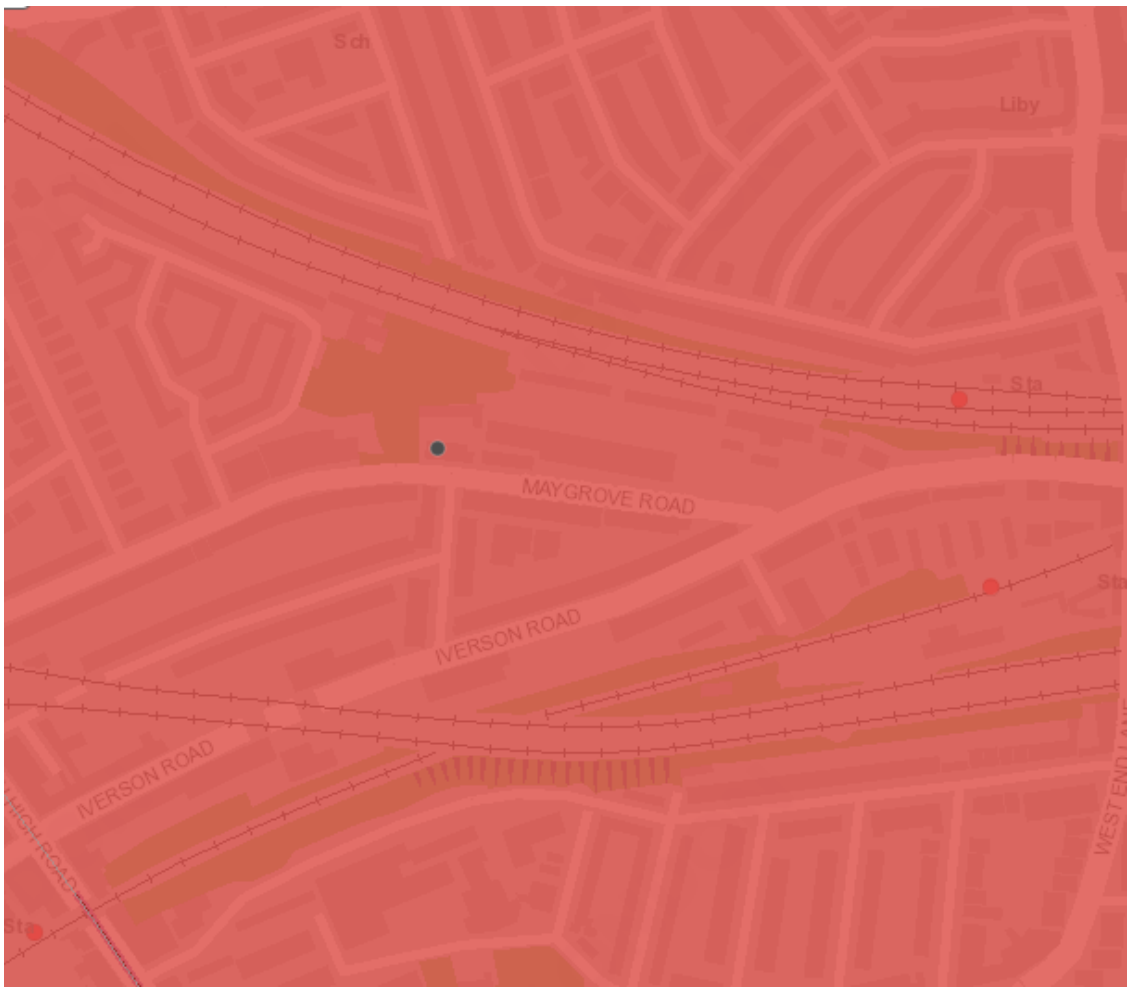
6.0 'BE CLEAN' - SUPPLYING ENERGY EFFICIENTLY

DECENTRALISED ENERGY NETWORK

6.1 In response to the second tier of the Energy Hierarchy a preliminary investigation into the adjacent heat loads and infrastructure has been undertaken.

6.2 Using the mapping system developed by the London Development Agency[10] (LDA), an investigation into the potential for connection to an existing or proposed scheme was undertaken, as shown in below.

London Heat Map for the Application Site and surrounding areas:



6.3 From the heat map above the proposed development is shown located in an area of moderately high heat demand, with no proposed or existing heat networks in the area. It is therefore currently not feasible to consider connection to an existing district heating network. However a scheme of four new dwellings is also considered to be too small to justify a communal heat network. For these reasons, a communal heat network has been deemed unfeasible for Maygrove Road.

COMBINED HEAT & POWER OPTION

6.4 The Energy Hierarchy identifies combined heat and power (CHP) as a method of producing heat and electricity with much lower emissions than separate heat and power. However, CHP, although highly desirable, does have practical limitations. The principle requirement is that to be effective, all of the energy produced must be utilised, with annual operating hours of at least 5000hrs/yr. This means that all the electricity must be used in a financially sound manner and all the waste heat must be put to good use –preferably to meet a heat demand –and not dumped.

It expected the simultaneous demand for heat and power for the development will be less than 5,000 hours per annum, therefore CHP has not been considered a viable option.

'Be Clean' Building Emission Ratings for Maygrove Road:

Annual CO_2 Emissions (tonnesCO_2/yr)
5.18

Annual Regulated/Unregulated Emissions for Maygrove Road:

	CO_2 Emissions (tonnes/annum)	
	Regulated	**Unregulated**
Building Regulations 2013 Part L Compliant Project	5.83	2.62
'Be Lean'	5.18	2.62
'Be Clean'	5.18	2.62

'Be Clean' Emission Savings for Maygrove Road:

	Regulated CO_2 Savings	
	Tonnes CO_2/annum	**Percentage Savings (%)**
'Be Lean'	1.42	12.64
'Be Clean'	0.00	0.00

7.0 'BE GREEN' - LZC TECHNOLOGIES ASSESSMENT

7.1 An initial assessment of feasible renewable energy sources has been carried out and the results are detailed below. The renewable energy feasibility study for the proposed development has assessed the use of solar thermal collectors, biomass heating, ground/air source heat pumps, wind turbines and photovoltaic modules.

WIND TURBINE GENERATORS

7.2 The wind speeds and frequencies in urban areas such are not expected to yield any significant carbon reductions. For these reasons the application of a wind turbine for the project has not been considered.

SOLAR WATER

7.3 Solar thermal panels are used to produce hot water and consist of roof mounted collector panels that make use of heat energy from the sun to heat water circulating in a closed loop. Usually this heat is then transferred via a heat exchanger into a hot water storage tank that is also heated by a gas or other boiler.

7.4 Two main types of solar water heating system are used in the UK; flat plate collectors and evacuated glass heat tubes. Flat plate collectors circulate water around a black coloured receiver plate that is heated by direct sunlight and to some extent by indirect light; heat being retained by a thermally glazed panel above. Evacuated glass heat tubes are more efficient, particularly in the UK, as they can work more effectively at low solar radiation levels. They are however, more expensive than flat plate collectors. They consist of rows of parallel transparent glass tubes, each containing an absorber tube which converts the sunlight into heat energy.

7.5 At the proposed development solar hot water systems are technically unfeasible for the proposed project given the likely area od system required will exceed the available roof area in order the meet the CO2 reduction target, therefore it is not recommended to install a solar hot water system at the proposed development.

GROUND SOURCE HEATING

7.6 Ground source heat pumps (GSHP) extract heat from the ground. GSHPs work on the principle that the below ground temperature is more constant compared to above ground. In the winter months, the below-ground temperature is warmer than above ground and the heat carrier fluid circulating within the absorber pipes absorbs the heat. This heat energy is then raised by a compressor (using the compression cycle) and through a heat exchanger, distributed via a low temperature distribution system such as under floor heating, to satisfy a proportion of space heating requirements. GSHP systems are not suitable for satisfying high temperature hot water demands.

7.7 In the summer months, the below-ground temperature is colder than above ground and heat carrier fluid circulating within the buried pipes rejects building heat. This heat rejecting capacity is then raised by a compressor (using the compression cycle),

and through a heat exchanger, is then distributed via a chilled water distribution system to satisfy a proportion of space cooling requirements.

7.8 There are a number of configurations for GSHP systems, however the installation of a vertical collector system or horizontal collector system is not considered technically feasible for the project, given the restricted areas available for their installation.

7.9 Given the expense of installation, the number of boreholes required to meet the load requirements of the proposed development, along with a severely limited installation area for collectors (horizontal and vertical) it is not recommended to install a ground coupling at the proposed development.

AIR SOURCE HEATING

7.10 Air source heat pumps (ASHPs) utilise the outside air as a heat source or heat sink. Heat can be used to warm water for radiators or underfloor heating systems, or to warm the air within a dwelling. ASHPs work on a similar principle to a fridge, which extracts heat from its inside. An evaporator coil, mounted outside absorbs or expels the heat; a compressor unit then drives refrigerant through the heat pump and compresses it to the right level to suit the heat distribution system. Finally, a heat exchanger transfers the heat from the refrigerant for use, depending on which of the two main types of systems (identified below) is installed:

7.11 ASHPs could be technically integrated with the heating system at the proposed development, and have been considered within the CO” reduction analysis of this stage of the Energy Hierarchy.

BIOMASS

7.12 Biomass boilers replace conventionally powered boilers with an almost carbon neutral fuel such as wood pellets or wood chips. The fuel is classed as almost carbon neutral because the CO_2 released during the burning of biomass is balanced by that absorbed by the plants during their growth.

7.13 Due to existing site constraints, adequate space for biomass fuel storage and safe delivery cannot be allocated.

7.154 Although many biomass burners will meet Clean Air Act requirements, combustion of wood biomass releases higher quantities of NO_X, SO_X and particulates (PM10 and PM2.5) compared to a comparable system fuelled by natural gas, which can adversely affect local air quality.

7.16 Biomass could technically be burned at the application site but is not preferred given site spatial limitations, the management burden of fuel deliveries and removal of ash and the potential impact on local air quality given the proximity of existing residential dwellings. For these reasons Biomass has been deemed unfeasible for the project.

PHOTOVOLTAIC CELLS

7.17 Solar Photovoltaics (PVs) are solar panels which generate electricity through photon-to-electron energy transfer, which takes place in the dielectric materials that make up the cells. The cells are made up from layers of semi-conducting silicon material which, when illuminated by the sun, produces an electrical field which generates an electrical current. PVs can generate electricity even on overcast days, requiring daylight, rather than direct sunlight. This makes them viable even in the UK, although peak output is obtained at midday on a sunny summer's day. PVs offer a simple, proven solution to generating renewable electricity.

7.18 The main types of commercially available PV panels on offer in the UK are constructed from cells as described below:

- Monocrystalline silicon cells are the most efficient of the PV technologies with a conversion efficiency of between 15-18% (available solar energy to electricity produced). They are cut from single ingots of silicon, have an unbroken crystal lattice and are the most expensive of PVs;
- Polycrystalline silicon cells have a conversion efficiency of between 13-16%. They are less expensive than monocrystalline cells, are constructed of a number of smaller crystals and are recognisable from a visible 'grain' on the panel; and

7.20 At the proposed development solar PV systems are technically feasible. In conjunction with the provision of air source pumps for space heating, in order to achieve the CO_2 reduction targets, a minimum 2kWp solar PV system is required for the development. Typically, a 2kWp PV system would require approximately 15m^2 of roof space (depending on the efficiency of the PV panel selected). Based upon the current design, it is expected the proposed roof area provides a suitable location for the siting of the PV system.

'BE GREEN' EMISSIONS SAVINGS

7.21 The overall savings from applying the principles of the Energy Hierarchy are summarised in the tables below:

'Be Green' Building Emission Ratings for Maygrove Road:

Annual CO_2 Emissions (tonnesCO_2/yr)
3.97

Annual Regulated/Unregulated Emissions for Maygrove Road:

	CO_2 Emissions (tonnes/annum)	
	Regulated	**Unregulated**
Building Regulations 2013 Part L Compliant Project	5.83	2.62
'Be Lean'	5.18	2.62

'Be Clean'	5.18	2.62
'Be Green'	3.97	2.62

'Be Green' Emission Savings for Maygrove Road:

	Regulated CO_2 Savings	
	Tonnes CO_2/annum	**Percentage Savings (%)**
'Be Lean'	0.65	11.12
'Be Clean'	0.00	0.00
'Be Green'	1.21	20.76

8.0 SUSTAINABLE DESIGN & CONSTRUCTION MEASURES

In addition to making the fullest contribution to minimizing carbon dioxide emissions (in accordance with the energy hierarchy), the proposed development will also include a number of measures intended to ensure sustainability is embedded into its design and construction as follows:

WATER EFFICIENCY

8.1 The proposed development will ensure water consumption rates of ≤110lites/person/day will be achieved in each dwelling. A typical water efficiency calculation is included in Appendix B, and in order to achieve the required target, water consuming fittings may likely comprise of the following:

- WCs with effective flushing volume of 4.5lires
- Wash hand basin taps flow rate of 4litres/min
- Kitchen Taps flow rate of 4itres/min
- Shower Flow rate of 7litres/min
- Bath Capacity to Overflow of 210litres

LOW CARBON & SUSTAINABLE MATERIALS

8.2 Where feasible, the selection and installation of new building materials with low embodied energy will be prioritised. This will be undertaken using the BRE Green Guide to Specification[9], where the team will prioritise the selection of materials with higher ratings, though the guide does not assess embodied carbon dioxide performance alone.

All timber used (temporary or permanent) will be sourced in accordance with the UK Government's Timber Procurement Policy and all timber suppliers and products will be FSC (Forest Stewardship Council) or PEFC (Programme for the Endorsement of Forest Certification) certified.

In addition, and where feasible, all major construction materials will be sourced from suppliers who themselves have a third party certificated environmental standard in place. This ensures sustainability is transferred throughout the project supply chain.

REDUCTION IN CONSTRUCTION WASTE

8.3 In order to minimize the quantity of waste generated during the construction process, the appointed main Contractor will be encouraged to implement a Resource Management Plan (RMP) for the project to ensure the following measures are reported on:

- Construction waste generated by the project in m^3 or tonnes per $100m^2$ gross internal floor area (excluding demolition and excavation waste).
- The proportion of this construction waste diverted from landfill, i.e. reused/recycled/recovered, with at least 70% by volume (or 80% by tonnage) of waste will be diverted from landfill to be reused or recycled.

8.0 CONCLUSION

8.1 This Energy & Sustainability Statement has shown how the proposed development at Maygrove Road, will be designed using the Energy Hierarchy and will make the fullest contribution to minimizing carbon dioxide emissions as compared to a Part L 2013 compliant, 'business as usual' building.

8.2 Following the energy hierarchy has enabled carbon reductions to be calculated for the proposed development at Maygrove Road. A total overall site-wide carbon reduction of 1.86 tCO_2/year equivalent to 31.89% can be achieved through the energy strategy demonstrated in this report.

8.3 In accordance with the Energy Hierarchy and GLA guidance the baseline energy figures derived from energy calculations have been used. Separately, an un-regulated energy demand has also been reported. The proposed development is calculated to have a site-wide regulated carbon emissions Notional Baseline of 5.83 tCO_2/year.

8.4 In the first stage of the energy hierarchy (Be Lean), a 0.65 tCO_2/year site-wide carbon reduction associated with the proposed energy efficiency measures has been predicted, equivalent to a 11.12% reduction from the notional Building Regulation compliance baseline.

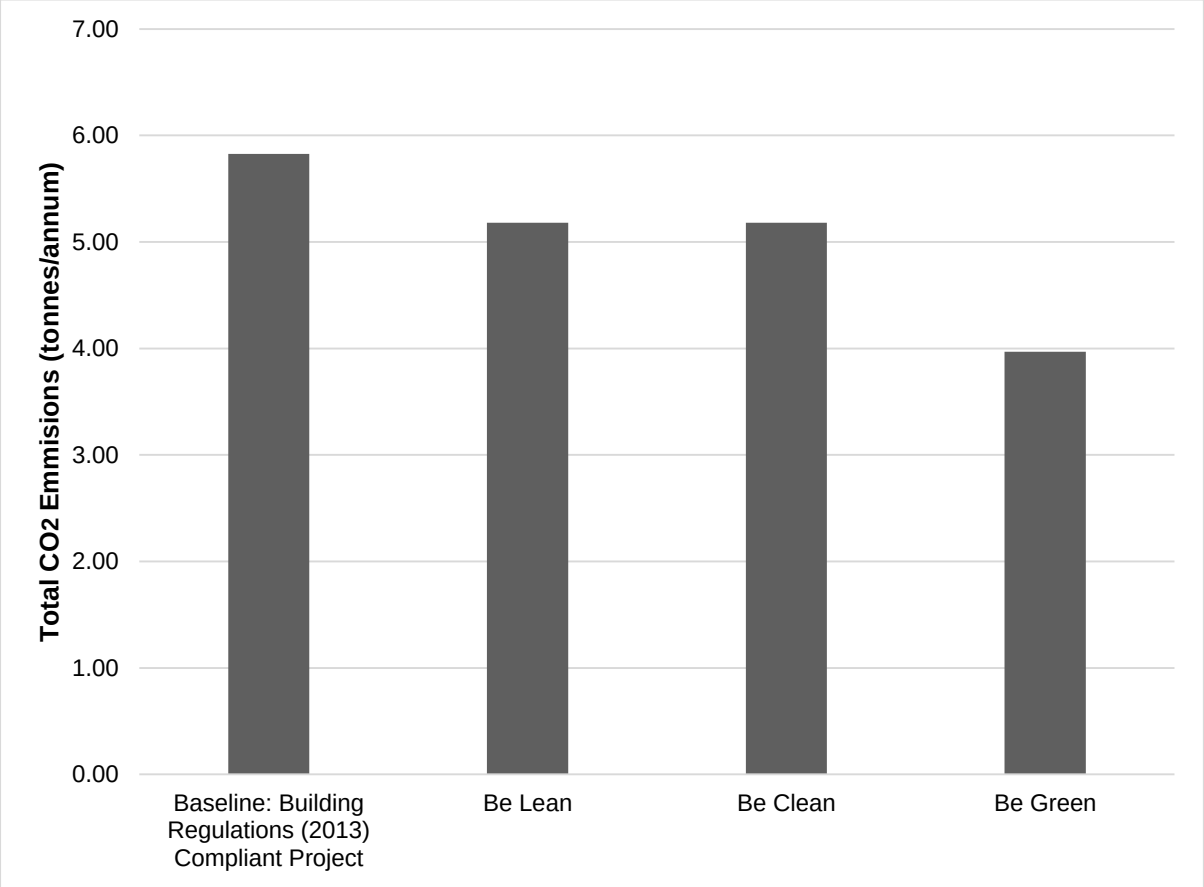
8.5 For the second stage of the energy hierarchy (Be Clean) investigations shows that there are no existing district heating networks nearby that the site can feasibly connect to. In addition, given the scale and function of the development, it was deemed that a CHP system was not feasible for the project.

8.6 In the third stage of the energy hierarchy (Be Green), site analysis and calculations have determined the site would benefit from the combination of Air Source Heat Pump for space heating, along with a 2kWp Solar PV system. The combination of these systems would deliver an additional 1.21 tCO_2/year carbon reduction, equivalent to a further 20.76% reduction from the notional baseline.

8.7 The result tables below provide a summary of the site-wide CO_2 emissions, and overall carbon reductions for the modelled baselines of the proposed development at Maygrove Road. The building services and plants specified have been taken to their practical limits far exceeding the minimum requirements of Building Regulations and ensuring optimal reductions in carbon emissions.

8.8 In addition to making the fullest contribution to minimizing carbon dioxide emissions, the proposed development will also include a number of measures intended to ensure sustainability is embedded into its design and construction. As a result, the current proposals meet the requirements of Condition 5 of Planning Approval reference 2016/5498/P.

The Energy Hierarchy Applied to Maygrove Road



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REFERENCES

1 The Greater London Authority (GLA), (March 2015); The London Plan. GLA.

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APPENDIX A

Average Energy & CO_2 Calculations

APPENDIX B

Typical Water Efficiency Calculation