

Energy and Sustainability Statement

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London Borough of Haringey



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The figures within this report may be based on indicative modelling and an assumed specification outlined within the relevant sections. Therefore, this modelling may not represent the as built emission or energy use of the Proposed Development and further modelling may need to be undertaken at detailed design stage to confirm precise performance figures. Please contact SRE should you have any questions, or should you wish further modelling to be undertaken post planning.

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Contents

Executive Summary	1
1.0 Introduction.....	3
1.1 The Proposed Development.....	3
1.2 Planning Policy Requirements	4
1.3 Application to Proposed Development.....	6
2.0 Energy	8
2.1 Method.....	8
2.2 LEAN – Demand Reduction.....	9
2.2.1 Passive Design Measures.....	9
2.2.2 Active Design Measures	10
2.2.3 Cooling.....	11
2.3 CLEAN – Heating Infrastructure	11
2.3.1 District Heat Networks	12
2.4 GREEN – Low Carbon and Renewable Energy.....	13
2.4.1 Air Source Heat Pump (ASHP)	13
2.4.2 Photovoltaics (PV).....	14
2.4.3 Energy Storage.....	14
2.5 Carbon Offsetting.....	14
2.6 SEEN – In-use monitoring	14
2.7 Conclusions.....	15
3.0 Sustainability	17
3.1 Climate Change	17
3.2 Pollution.....	17
3.2.1 Air	17
3.2.2 Noise.....	19
3.2.3 Light	19
3.3 Flood Risk.....	19
3.4 Transport	21
3.4.1 Public Transport.....	21
3.4.2 Parking.....	21
3.4.3 Electric Vehicle Charging	21
3.4.4 Cycle Storage.....	21
3.4.5 Cycle Rental.....	22
3.5 Biodiversity	22

3.6	Resource efficiency	22
3.6.1	Construction Phase Waste Management.....	22
3.6.2	Resource Management	23
3.6.3	Materials	23
3.6.4	Water.....	24
3.7	Sustainability Summary.....	24
Appendix A	– Site Plan.....	A
Appendix B	– SAP Summary Sheet.....	B
Appendix C	– Urban Greening factor calculation sheet	C
Appendix D	– GLA Carbon Emissions Reporting Spreadsheet.....	D
Appendix E	– Unfeasible Low and Zero Carbon Technologies	E

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Executive Summary

Executive Summary

This Energy and Sustainability Statement has been written to demonstrate the measures incorporated into the design of the Proposed Development at Oak Lawn, Compton Avenue, London, which will deliver lower energy and water use, lower carbon emissions and lower operational costs than a Building Regulations 2021 compliant design.

The energy strategy has been developed by following the Greater London Authority (GLA) Energy Hierarchy of 'Be Lean', 'Be Clean', 'Be Green' and 'Be Seen'. The chosen energy strategy includes Lean passive and active design measures and Green Low and Zero Carbon (LZC) technologies to achieve a minimum 35% improvement over Baseline Carbon Dioxide Equivalent (CO₂e) emissions in line with Building Regulations Part L Volume 1, with a minimum 10% improvement in Lean measures, thus aligning with the 2021 London Plan and Haringey Borough Council planning policies.

Proposed Energy Strategy

- Passive and active design measures
- 100% of space heating and hot water to be provided by high efficiency Air Source Heat Pumps (ASHP)
- 12 kWp Photovoltaics (PV) array
- Mechanical Ventilation with Heat Recovery (MVHR)

Table 1 and Figure 1 below show the regulated CO₂e savings based on Standard Assessment Procedure (SAP10) carbon factors.

Scenario	CO ₂ e emissions (t/yr)	Improvement (%)	Improvement over baseline (%)
Baseline	13.70		
Lean	9.60	29.93	29.93
Clean	9.60	0.00	29.93
Green	2.5	73.96	81.75

Table 1 - Summary of CO₂e savings

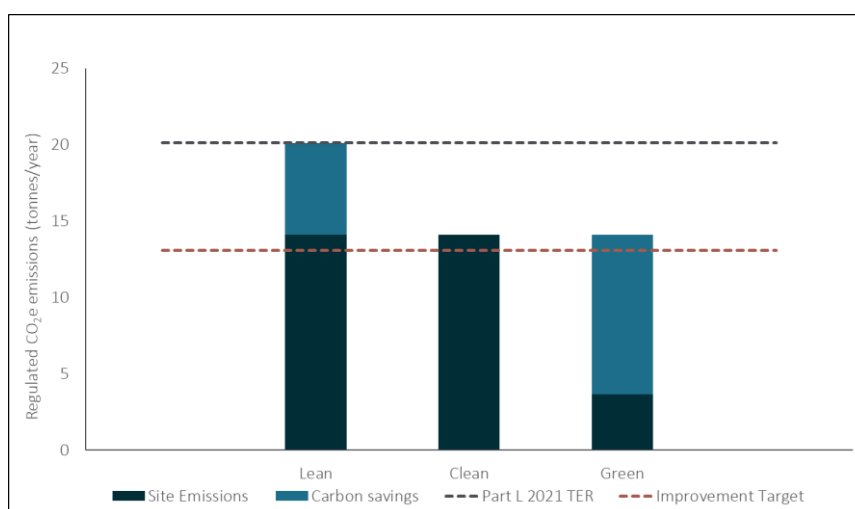
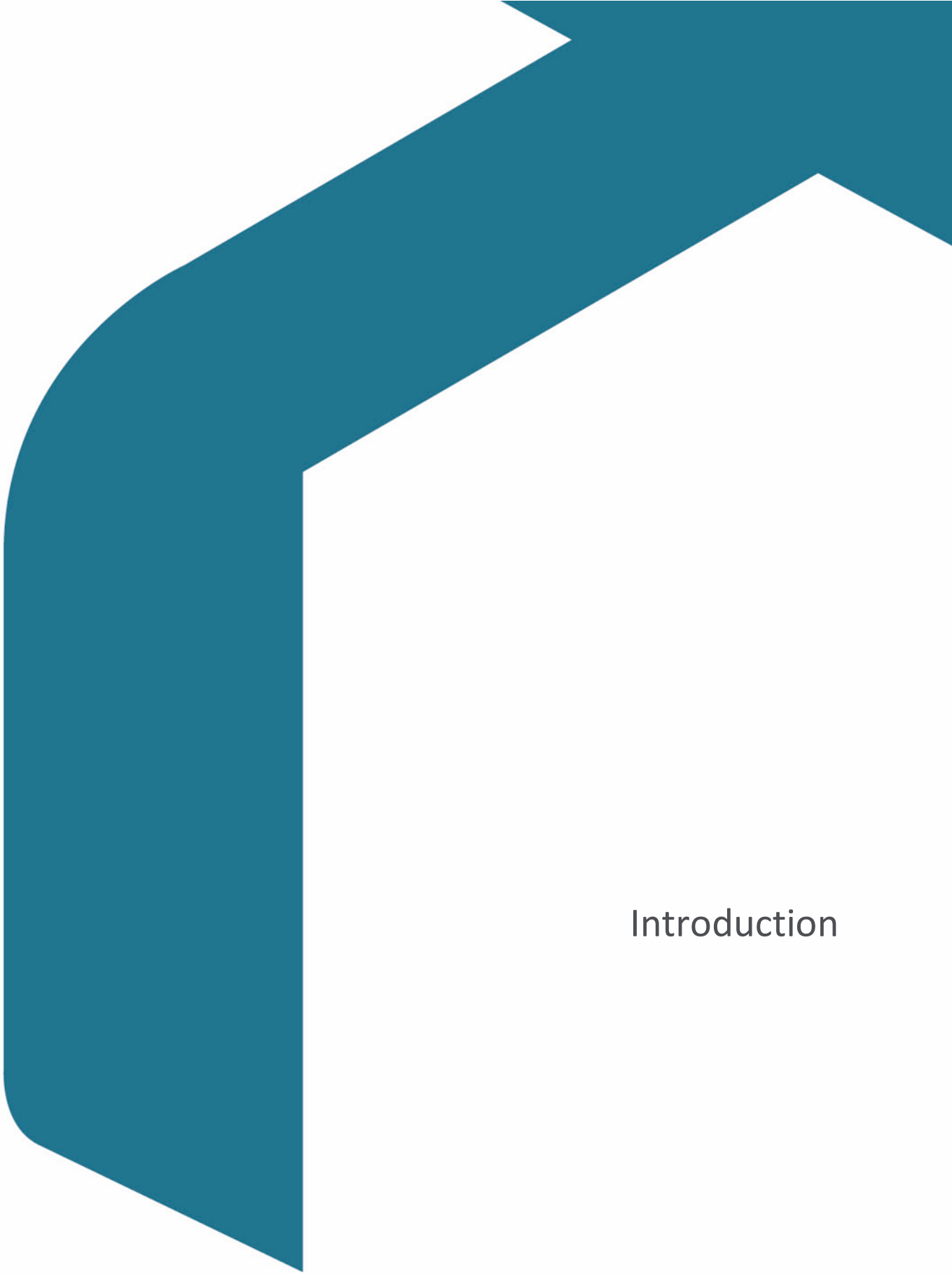


Figure 1 - Summary of CO₂e savings



Introduction

1.0 Introduction

This Energy and Sustainability Statement has been written by SRE for By Design (108 Heath Street) Ltd (the Real Estate Manager) on behalf of Mr Vladimir Skiguine and Ms Irina Galikhanova to demonstrate the measures incorporated into the design of Oak Lawn, London (the Proposed Development) which will deliver lower energy and water use, lower carbon emissions and lower operational costs than a Building Regulations 2021 compliant design.

The statement compares the predicted actual building energy requirement with a Building Regulations 2021 Part L Volume 1 compliant design, outlines passive and active design measures, and assesses the suitability of Low and Zero Carbon (LZC) technologies specific to this site to address the relevant planning policy requirements.

The statement analyses how the Proposed Development will integrate with its surrounding environment within the context of sustainability to ensure it benefits the surrounding area socially, environmentally and economically.

1.1 The Proposed Development

The Proposed Development consists of the demolition of an existing 5-bed residential development to a 7-bed detached dwelling with an additional 2 no. bedrooms for staff. This is situated over 3 no. stories with basement including a cinema, gymnasium, swimming pool, sauna, and treatment room amenities.

The site is located to the East of Compton Avenue and is located on a private road surrounded by residential developments. The front elevation of the Proposed Development is presented in Figure 2.



Figure 2 – Front Elevation of the Proposed Development (Charlton Brown Architects)

Please refer to Appendix A for the proposed site plan.

1.2 Planning Policy Requirements

The Proposed Development is located within Haringey, London, therefore the relevant planning policy summarised in Table 2 are applicable to the site.

Planning Policy	Requirement
The London Plan (2021)	<u>Policy SI 2 Minimising Greenhouse Gas Emissions</u> A. Major development should be net zero-carbon. This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy: 1) be lean: use less energy and manage demand during operation 2) be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly 3) be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site 4) be seen: monitor, verify and report on energy performance. B. Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy. C. A minimum on-site reduction of at least 35 per cent beyond Building Regulations is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either: 1) through a cash in lieu contribution to the borough's carbon offset fund, or 2) off-site provided that an alternative proposal is identified and delivery is certain
	<u>Policy SI 4 Managing Heating Risk</u> A. Development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure. B. Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy: 1) reduce the amount of heat entering a building through orientation, shading, high albedo materials,

	fenestration, insulation and the provision of green infrastructure 2) minimise internal heat generation through energy efficient design 3) manage the heat within the building through exposed internal thermal mass and high ceilings 4) provide passive ventilation 5) provide mechanical ventilation 6) provide active cooling systems.
London Borough of Haringey Local Plan (2013 to 2026) 2017 revision	<u>Policy SI 5 Water infrastructure</u> A. In order to minimise the use of mains water, water supplies and resources should be protected and conserved in a sustainable manner. B. Development Plans should promote improvements to water supply infrastructure to contribute to security of supply. This should be done in a timely, efficient and sustainable manner taking energy consumption into account. C. Development proposals should: 1) through the use of Planning Conditions minimise the use of mains water in line with the Optional Requirement of the Building Regulations (residential development), achieving mains water consumption of 105 litres or less per head per day (excluding allowance of up to five litres for external water consumption) <u>SP4: Working towards a Low Carbon Haringey</u> Over the life time of the Local Plan, reducing energy use in buildings and working towards a low carbon borough will be one of the key challenges facing Haringey. The Council will promote the measures outlined below to reduce carbon emissions from new and existing buildings. 1) In line with London Plan policy, the Council will promote and require all new developments to take measures to reduce energy use and carbon emissions during design, construction and occupation, by incorporating the following measures: a) From 2011 onwards, all new residential development will achieve a minimum 25% reduction in total (regulated) CO₂e emissions in line with Code for Sustainable Homes Level 4 energy standards, and should aim to achieve Level 6. All new residential development shall be zero carbon from 2016 onwards. 2) The Council will promote low- and zero-carbon energy generation through the following measures: a) Requiring all developments to assess, identify and implement, where viable, site-wide and area-wide decentralised energy facilities including the potential to link into a wider network; b) Establishing local networks of decentralised heat and energy facilities by requiring developers to prioritise

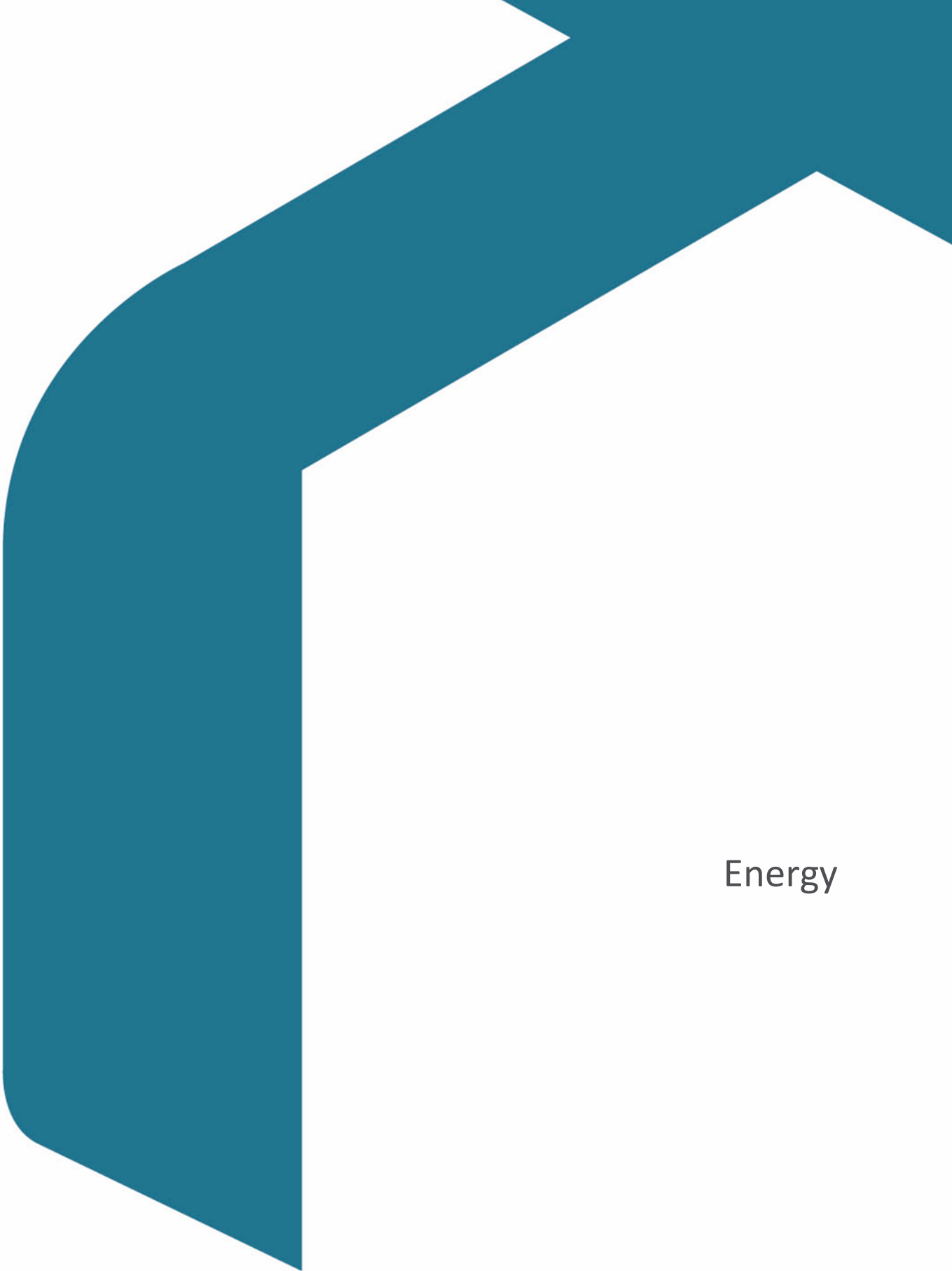
	connection to existing or planned networks where feasible; c) Working with neighbouring boroughs and other partners to explore ways of implementing sub-regional decentralised energy networks including the potential in the Upper Lee Valley Opportunity Area; and d) All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from on site renewable energy regeneration, which can include connections to local sources of decentralised renewable energy.
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Table 2 – Summary of local planning policy requirements

1.3 Application to Proposed Development

The London Borough of Haringey Local Plan 2017 is outdated, and a new Local Plan is currently being produced. As such, the Proposed Development will aspire to align itself with the London Plan and follow the LZC requirements set by Haringey Council.

- Follow the Energy Hierarchy
- Reduce risk of overheating risks by following the Cooling Hierarchy
- Achieve at least 35% improvement over Building Regulations 2021 Part L V1
- 10% reduction in CO₂e emissions from energy efficiency measures
- 20% improvement from Low and Zero Carbon (LZC) Technologies
- Achieve 105 Litres or less per person per day of water use.



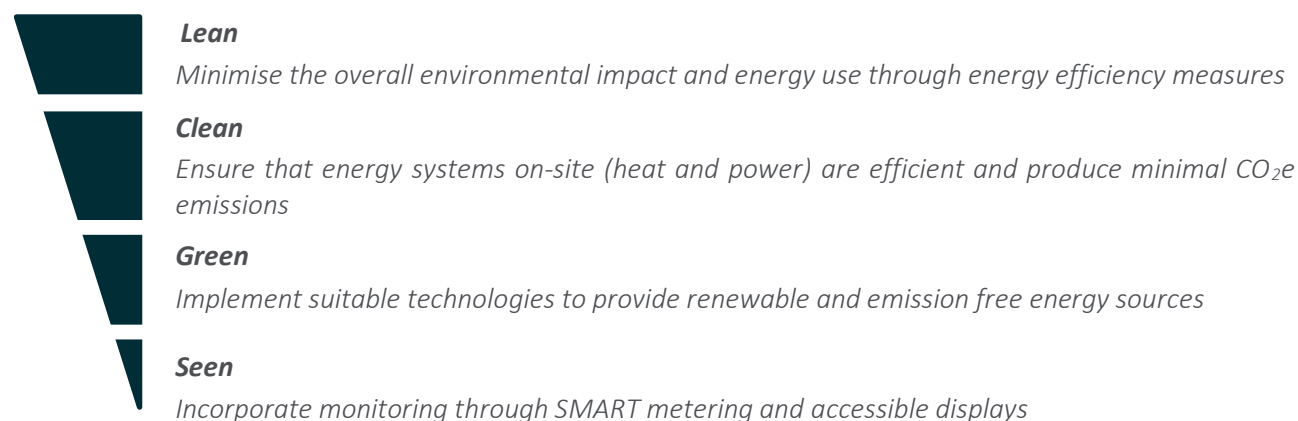
Energy

2.0 Energy

The following section reviews and assesses the energy strategy and requirements of the Proposed Development in relation to Building Regulations 2021, the London Borough of Haringey planning policies and best practice guidance.

2.1 Method

The energy strategy has been developed by following the Energy Hierarchy of Lean, Clean, Green and Seen as outlined in the London Plan 2021¹ and seeks to be:



The Carbon Dioxide (CO₂e) Conversion Factors have been taken from Building Regulations 2021. Within Standard Assessment Procedure (SAP10.2) modelling, the CO₂e conversion factor for electricity varies over the course of the year due to the changing mix of generation inputs to the electricity grid, i.e. increased (photovoltaic) PV generation in the summer months and gas/coal in the winter.

Therefore, CO₂e Conversion Factors are based on standard yearly figures taken from the Government SAP Guidance² and are outlined in Table 3 below. This results in some discrepancy between the actual SAP10 modelling and any generic reporting results tool (such as checklists) when cross referenced.

Energy Source	CO ₂ e Conversion Factor (kgCO ₂ e/kWh)
Electricity (mains)	0.136
Electricity (offset)	-0.136
Gas (mains)	0.210

Table 3 – CO₂e conversion factors by energy source (SAP10.2)

The energy modelling for the Proposed Development has been calculated using SAP10 software in accordance with Building Regulations 2021 Part L V1.

¹The London Plan https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf

²The Government Standard Assessment Procedure for Energy Rating of Dwellings Version 10.2 (Table 12, Pg 182): <https://files.bregroup.com/SAP/SAP%2010.2%20-%2017-12-2021.pdf>

The Target Emission Rate (TER), Target Fabric Energy Efficiency (TFEE), Target Primary Energy Rate (TPER) from the Proposed Development (Green Scenario) is taken as the energy baseline to enable a clear comparison of actual building performance throughout the Energy Hierarchy. The notional model is the exact size and shape of the Proposed Development but is based on notional U-values and heating specifications outlined in Approved Document L³. Table 4 shows the Baseline values for the TER, TFEE and TPER.

Scenario	CO ₂ e emissions (t/yr)	Fabric Energy Efficiency (kWh/m ² /yr)	Target Primary Energy Rate (kWh/m ² /yr)
Baseline	13.70	48.80	50.27

Table 4 – Baseline Values

2.2 LEAN – Demand Reduction

The Lean scenario can achieve a 29.93% reduction in CO₂e emissions using passive and active design measures, exceeding the London Plan requirement of a 10% improvement through energy efficiency measures. A summary of the Lean improvements is presented in Table 5. The improvement of DFEE (Dwelling Fabric Energy Efficiency) over TFEE relates to a higher performance building fabric, this will not change as a result of Clean or Green measures.

The Part L V1 notional dwelling contains PV relative to the floor area. It is because of this that a direct comparison of improvements made from passive and active measures is difficult. In order to address this, the Greater London Authority (GLA) emissions reporting spreadsheet is used to normalise the notional PV to show a direct comparison between the Baseline and Lean scenario measures.

Scenario	CO ₂ e emissions (t/yr)	Improvement (%)	Fabric Energy Efficiency (kWh/m ² /yr)	Improvement (%)
Baseline	13.70		48.80	
Lean	9.60	29.93	47.56	2.54

Table 5 – Lean improvement over Baseline for ER and FEE

2.2.1 Passive Design Measures

The building has been positioned within the site to maximise the usable space, both for the building and the external spaces. The building orientation and design will maximise natural light and positive solar gains with glazing on the east and west elevations. Glazing on the north elevation is limited to minimise overall heat loss. Solar gains will be further controlled through low-emissivity (Low E) glazing.

The exact construction method is yet to be determined, however, the building will be well insulated through all external elements with a low infiltration rate. Proposed U-values are provided within Table 6. The overall

³<https://www.gov.uk/government/publications/conservation-of-fuel-and-power-approved-document-l>

building should have a medium/high thermal mass as construction will be load-bearing masonry. A medium thermal mass will balance providing high energy efficiency and limiting overheating during the summer months.

Element	Proposed (U-value)
External Walls	0.17-0.20
Basement Wall	0.18
Ground Floor	0.13
Basement Floor	0.10
Roof	0.10-0.13
Glazed Doors	1.20
Air Tightness @ 50 N/m ²	3 (m ³ /hr/m ²)
Thermal Bridge	Notional Psi Values used – to be calculated at detailed design stage

Table 6 – Fabric energy efficiencies

2.2.2 Active Design Measures

The Proposed Development will utilise 100% low energy/light emitting diode (LED) lighting in excess of Building Regulation 2021 requirements. All external lighting will be positioned to avoid excessive light pollution and be supported by Passive Infra-Red (PIR)/daylight sensor and time controls with a maximum lamp capacity of 150W (equivalent) for essential security lighting.

High efficiency gas boilers are proposed to provide heating and hot water at this stage as part of the Lean measures. Time, temperature and optimum start/stop controls will be installed as a minimum to allow the control of individual zones/rooms throughout the building. However, this is not part of the final heating strategy and has simply been applied in order to demonstrate the improvements made by active and passive measures.

In modern air-tight buildings, careful consideration needs to be given to the specification of ventilation systems to ensure moisture is removed and ventilation standards are met to ensure a healthy standard of internal air. Mechanical Ventilation with Heat Recovery (MVHR) is to be installed in the Proposed Development, along with openable windows to promote airflow and provide fresh air to the building occupants.

MVHR systems are continuously running with boost facilities controlled through humidistats and/or manual controls. Air is continually extracted from the wet rooms and kitchen spaces, and the heat within this air is recovered through a heat exchanger, and then returned to the habitable spaces as pre-warmed fresh air.

Cross ventilation will also be possible with the dwelling having openable windows on opposite elevations, providing fresh air.

Through the above passive and active measures, the new build elements show a 29.93% improvement over the Baseline emissions.

2.2.3 Cooling

The cooling hierarchy has been used to ensure that passive building design has been optimised to reduce the cooling load for the Proposed Development.

MVHR is proposed and this will be specified with an automatic summer bypass facility to reduce the likelihood of summer overheating.

Cooling Hierarchy	Potential Design Measures
Minimising internal heat generation through energy efficient design	All primary pipework to be insulated, therefore low system losses. A high specification 570L hot water cylinder installed with low heat loss of 2.44kWh/day. Low energy lighting throughout.
Reducing the amount of heat entering the building in summer	Low E glass windows to be provided to minimize solar gain. All walls are to be well insulated.
Use of thermal mass and high ceilings to manage the heat within the building	Thermal mass is anticipated to be medium with some element of exposed mass.
Passive Ventilation	Openable windows will be provided to all rooms and cross ventilation is possible.
Mechanical Ventilation	MVHR to be provided to all units, with automatic summer bypass to reduce overheating potential.

Table 7 – Design measures following the cooling hierarchy

2.3 CLEAN – Heating Infrastructure

Connection of the Proposed Development to a district heating system is not currently feasible hence has not been proposed. Therefore, there is no further improvement of Clean measures above the Lean scenario.

Scenario	CO ₂ e emissions (t/yr)	Improvement (%)
Lean	9.60	
Clean	9.60	0.00

Table 8 – Clean CO₂e emissions and improvement over Lean

2.3.1 District Heat Networks

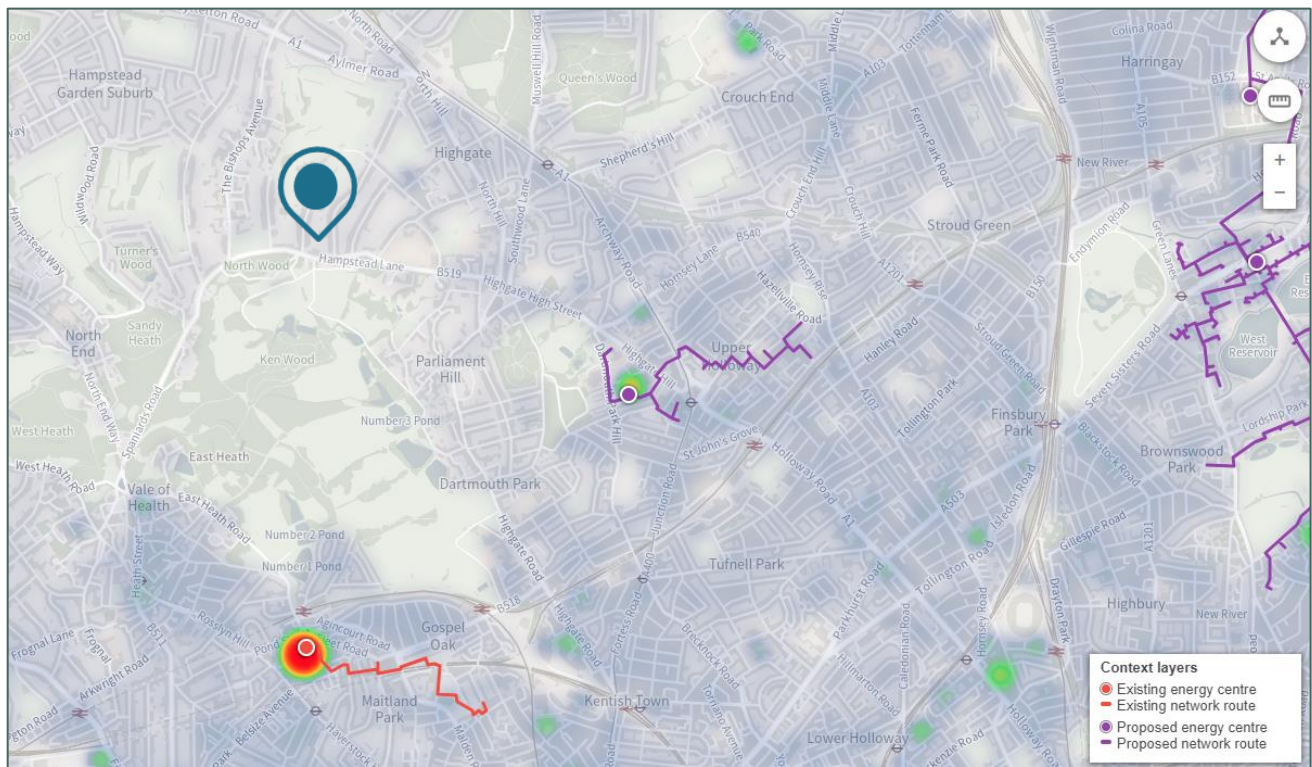


Figure 3 – London Heat Map (maps.london.gov.uk/heatmap/)

The London Heat Map shows that the Proposed Development is within an area of relatively low heat density and is not located near any existing heat network areas. There are also currently no proposals for a network nearby. Furthermore, the Proposed Development is a detached house and therefore district heating is not suitable for a development of this scale. Therefore, at present, connection to a district heating system is not feasible.

2.4 GREEN – Low Carbon and Renewable Energy

The addition of Green technologies can provide a significant reduction in CO₂e emissions and enable the Proposed Development to meet the threshold of 35% improvement over Baseline emissions, with a 20% improvement through LZC technologies alone, aligning with the London Plan and London Borough of Haringey planning policy requirements.

Scenario	CO ₂ e emissions (t/yr)	Improvement (%)	Improvement over baseline (%)
Baseline	13.70		
Lean	9.60	29.93	29.93
Clean	9.60	0.00	29.93
Green	2.5	73.96	81.75

Table 9 – Green CO₂e emissions and improvement over Baseline, Lean and Clean

Scenario	Primary Energy Rate (kWh/m ² /yr)	Improvement over baseline (%)
Baseline	50.27	
Green	17.75	64.69

Table 10 – Green CO₂e emissions and improvement over Clean

2.4.1 Air Source Heat Pump (ASHP)

All Heat Pump (HP) systems consume electricity to operate – the Coefficient of Performance (CoP) of the system is the ratio of electrical energy consumed, to heat energy emitted. Generally, a CoP of 3 or 4 can be achieved, meaning 3 or 4 units of thermal energy are produced for each unit of electricity consumed.

Heat pumps will only deliver low grade heat (up to ~50°C) efficiently, and therefore HP systems alone are generally relatively inefficient in providing hot water, as this requires additional electrical input (immersion or increased compressor use).

The use of Air Source Heat Pumps (ASHP) has the potential to supply 100% of the Proposed Development with the heating (and cooling) requirements, subject to the provision of oversized/low temperature radiators or an underfloor heating system (air-to-water systems).

ASHPs tend to generate some noise and will therefore be located in an acoustic enclosure concealed at the back of the garden in order to prevent visual impact and noise disturbances to the building's occupants and neighbours. More information about the modelled ASHP has been specified in the SAP Summary Building Performance Specification sheet in Appendix B.

ASHPs have been considered and proposed as a Green LZC technology for the Proposed Development. The heat emitters used within the proposed development will be underfloor heating.

2.4.2 Photovoltaics (PV)

PV panels convert energy from daylight into direct (DC) electrical current. These are generally roof mounted and provide electrical generation which can either be utilised directly on-site (or nearby), stored in batteries, or exported back to the National Grid.

The installation of PV could be used to offset electrical demand within the Proposed Development. The PV array would be connected into the electrical system via an inverter or series of inverters, depending on system size and setup.

Noise will not be an issue – a PV system does not feature moving parts and is silent during operation.

An indicative investigation into the roof area of the Proposed Development shows that there is approximately 132m² of flat roof area available on the main roof. Of this, approximately 124.8m² of nett roof area is available for PV installation, taking into account all rooflights.

Based on a 400W monocrystalline module (~1.7m² in area) there is the potential for an overall 24kWp PV array to be installed horizontally. However, installation of PV horizontally will not provide optimal performance and would void the manufacturer warranty. As such, panels would be installed south facing at a 30-degree pitch, which would increase the required spacing to prevent the panels shading each other and decrease the available active area by about half to 12kWp. Through the proposed installation of PVs, and with the use of an ASHP, a 81.75% improvement over the Baseline can be achieved.

Proposed Array (kWp)	Approximate no. Panels @400W	Active Area (m ²)	Pitch (degrees)	Orientation
12	30	51	30	South

Table 11 – Proposed PV Array Summary

2.4.3 Energy Storage

Although practically feasible the Proposed Development has not been modelled with export cable meters or battery storage due to increased expense and fire safety risks of PV batteries respectively. As such, no energy storage measures have been considered at this stage. Further investigation on storage and energy exportation will be explored post planning.

2.5 Carbon Offsetting

The London Plan requires all ‘major residential developments’ to be net-zero carbon.

The Proposed Development is not considered a major development and is therefore not required to meet the zero-carbon target.

2.6 SEEN – In-use monitoring

The ‘Be Seen’ stage requires the monitoring and reporting of actual operational energy performance of major developments for at least five years.

This works to ensure the alignment of actual and estimated energy and carbon performance, as well as help identify methods for improving energy performance from the project inception stage and throughout the building’s lifetime. As previously mentioned, the Proposed Development is not classed as a major development, however, smart metering is recommended to allow the building occupants to monitor energy consumption.

2.7 Conclusions

The Proposed Development will deliver passive and active energy demand reduction measures along with LZC technologies in order to reduce energy demand and associated CO₂e emissions resulting from the Proposed Development's operation.

The calculations undertaken demonstrate that the Proposed Development will successfully exceed Baseline emissions by 81.75%, surpassing the requirements set by the London Plan and London Borough of Haringey Local Plan.

Scenario	CO ₂ e emissions (t/yr)	Improvement (%)	Improvement over baseline (%)
Baseline	13.70		
Lean	9.60	29.93	29.93
Clean	9.60	0.00	29.93
Green	2.5	73.96	81.75

Table 12 – Summary of CO₂e emissions, incremental improvement and improvement over Baseline

In delivering the Green energy strategy, the Proposed Development provides:

- Passive and active design measures
- 100% of space heating and hot water to be provided by high efficiency Air Source Heat Pumps (ASHP)
- 12 kWp Photovoltaics (PV) array
- Mechanical Ventilation with Heat Recovery (MVHR)

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Sustainability

3.0 Sustainability

The World Commission on Environment and Development (WCED) report: Our Common Future, describes Sustainable Development as development that:

“...meets the needs of the present without compromising the ability of future generations to meet their own needs.”

The planning system focuses on three objectives to achieve a sustainable development: economic, social and environmental. These objectives mutually support each other and have been adapted specifically to the London Borough of Haringey which seek to address the challenges of climate change at a local level by expecting development to maximise energy efficiency, supply energy efficiently through low carbon heating and cooling systems and using on-site renewable energy generation. Therefore, careful considerations relating to sustainable design and construction have been taken to ensure the Proposed Development meets these objectives and supports the commitments.

3.1 Climate Change

Since June 2019, the UK Official Development Assistance (ODA) has aligned with the Paris Agreement and is committed to limiting global warming to 1.5°C in comparison to pre-industrial levels. However, the UK Met Office estimates this level will be exceeded within the next 5 years.

The UK built environment is one of the largest contributors to greenhouse gas emissions (GHG), contributing approximately 42% to the total share of UK emissions according to the UK Green Building Council⁴. This includes emissions produced during the manufacturing of building materials, the construction of infrastructure as well as emissions associated with the transportation of workers and materials.

The London Plan and London Borough of Haringey Local Plan emphasises a commitment to addressing the causes of climate change and encourages new development to minimise energy use – moving toward zero carbon development, prevent overheating, minimise waste and meet minimum requirements for water efficiency.

Considerations have been made in the design and layout of the Proposed Development to ensure that it addresses these priorities. These include ensuring the layout of the Proposed Development maximises natural lighting, passive solar heating, ensuring the units are thoroughly insulated and have effective ventilation. As well as building fabric and structural considerations, technological factors such as, considering renewable energy technologies for inclusion in the development, selecting built-in appliances with energy efficiency in mind have been included. The installation of MVHR in the dwelling along with the inclusion of a ASHP will reduce the energy demand for heating and cooling in the Proposed Development.

3.2 Pollution

3.2.1 Air

The Proposed Development will aim to limit its contribution to local air pollution by not installing any gas boilers, rather ASHPs to provide heating and hot water. The ASHPs will emit no onsite NO_x emissions but consumes grid electricity (when not consuming electricity generated by the PV). As the NO_x emissions resulting from the production of electricity decreases at the national scale, the resulting theoretical emissions from the Proposed Development will do also. Furthermore, the use of PV panels will decrease the import of electricity from the national grid and replace it with PV electricity which produces no emissions during operation.

The Proposed Development is located within a high NO_x emissions area as defined by the UK NO_x emissions map (see Figure 4), therefore, the proposed energy strategy aims to mitigate this as far as practicable.

⁴ <https://www.ukgbc.org/climate-change-2/>

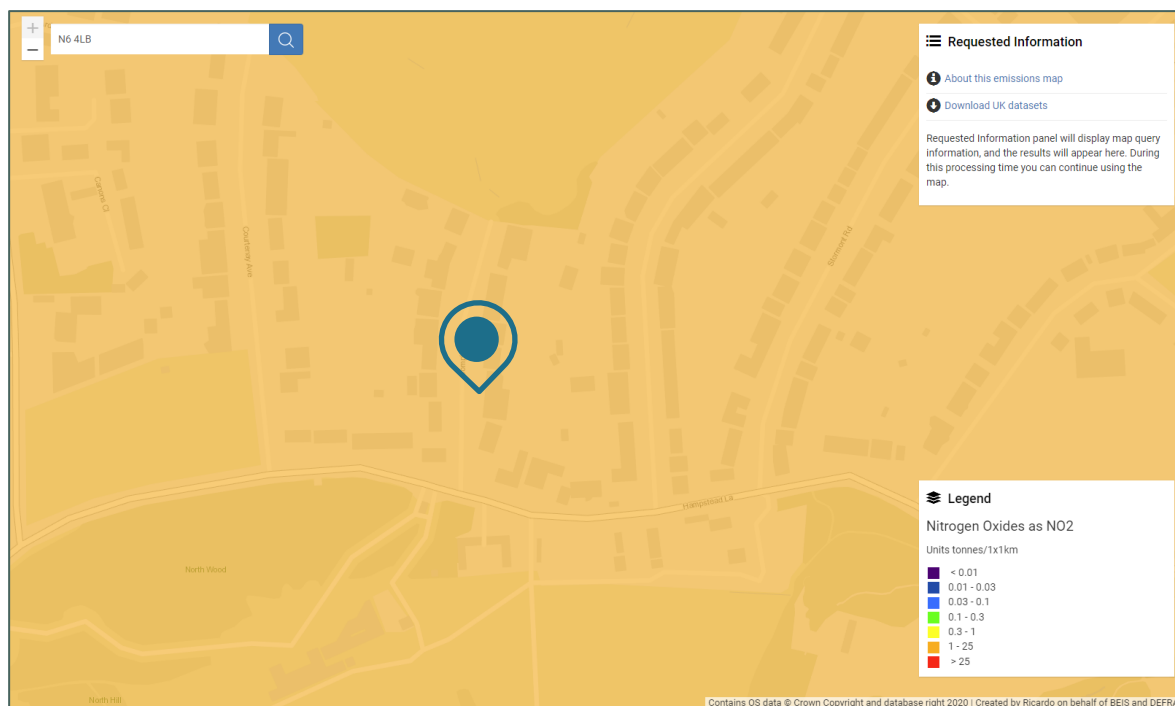


Figure 4 – UK Air Pollution Map showing pollution from Nitrogen Oxides as NO₂ (<https://naei.beis.gov.uk/emissionsapp/>)

The installation of MVHR will help maintain air quality within the buildings as will further measures such as the careful placement of equipment and the selection of finishings and furnishings with minimal associated Volatile Organic Compounds (VOCs) emissions.

Air pollution will be reduced as much as practicable during construction and new materials will be sourced locally where possible to reduce air pollution associated with the transport of materials. Dust management will also be extremely important for controlling air quality on-site during construction and mitigation measures such as water suppression to damp down dust will be implemented where necessary. Figure 5 shows the UK Air Pollution from particulate matter 10 micrometres (PM₁₀) in the area of the Proposed Development.

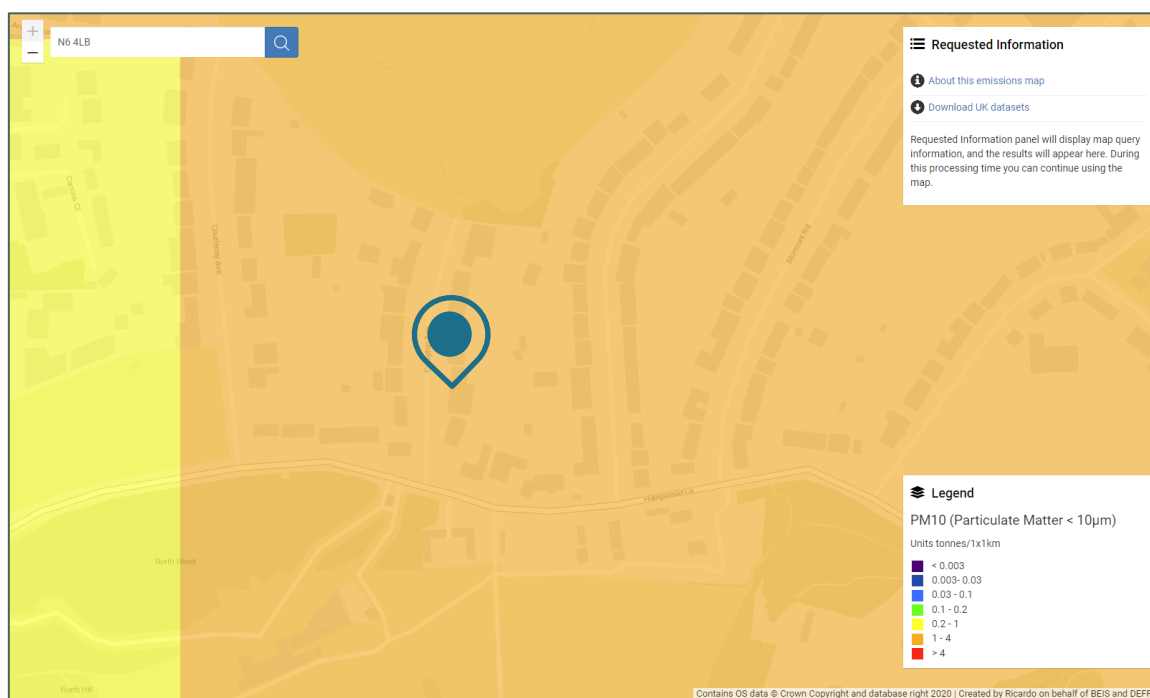


Figure 5- UK Air Pollution Map showing pollution from PM₁₀ (<https://naei.beis.gov.uk/emissionsapp/>)

3.2.2 Noise

The Proposed Development is the construction of a redesigned residential dwelling to replace the existing dwelling on site and is unlikely to produce any greater noise pollution than was generated during the operation of the previous building. Furthermore, the Proposed Development will be a highly insulated building with excellent air-tightness which should limit any noise from inside the building, far below that of the existing.

The plant of both the house and the swimming pool will be located in the basement within 2 no. different plant rooms and will be enclosed with a suitable acoustic barrier.

The Proposed Development will provide 3 no. proposed car parking spaces, the same number of spaces as the existing dwelling. Therefore, no additional noise pollution attributed to personal vehicles is anticipated.

3.2.3 Light

The design and layout of the site for practical use has been considered while trying to maximise internal daylight levels. All spaces occupied by residents have glazing to provide natural daylight, and light-coloured curtains or roller blinds will be provided to enable glare control and privacy.

Light Pollution will be minimised where possible through the careful specification and positioning of external lighting around the Proposed Development, ensuring minimal light pollution from the site. Special attention will be given to security lighting (where fitted) to ensure it is appropriately focused and controlled.

All external space lighting will be provided through low energy fittings, with security lighting being PIR and daylight/timer controlled. Any external signage, where installed and lit, will be installed and controlled in line with best practice.

3.3 Flood Risk

The selected site is at very low risk of flooding from both rivers and seas (Figure 6) and from surface water (Figure 7). To the North of the site there is a small area of low to high risk of flooding from surface water.

It is likely that there will be no change to the impermeable area of the site since the Proposed Development is the construction of a redesigned development of a residential dwelling. However, it is recommended that the Proposed Development reviews the site-specific flood risk assessment to confirm and address the ongoing drainage of the site.

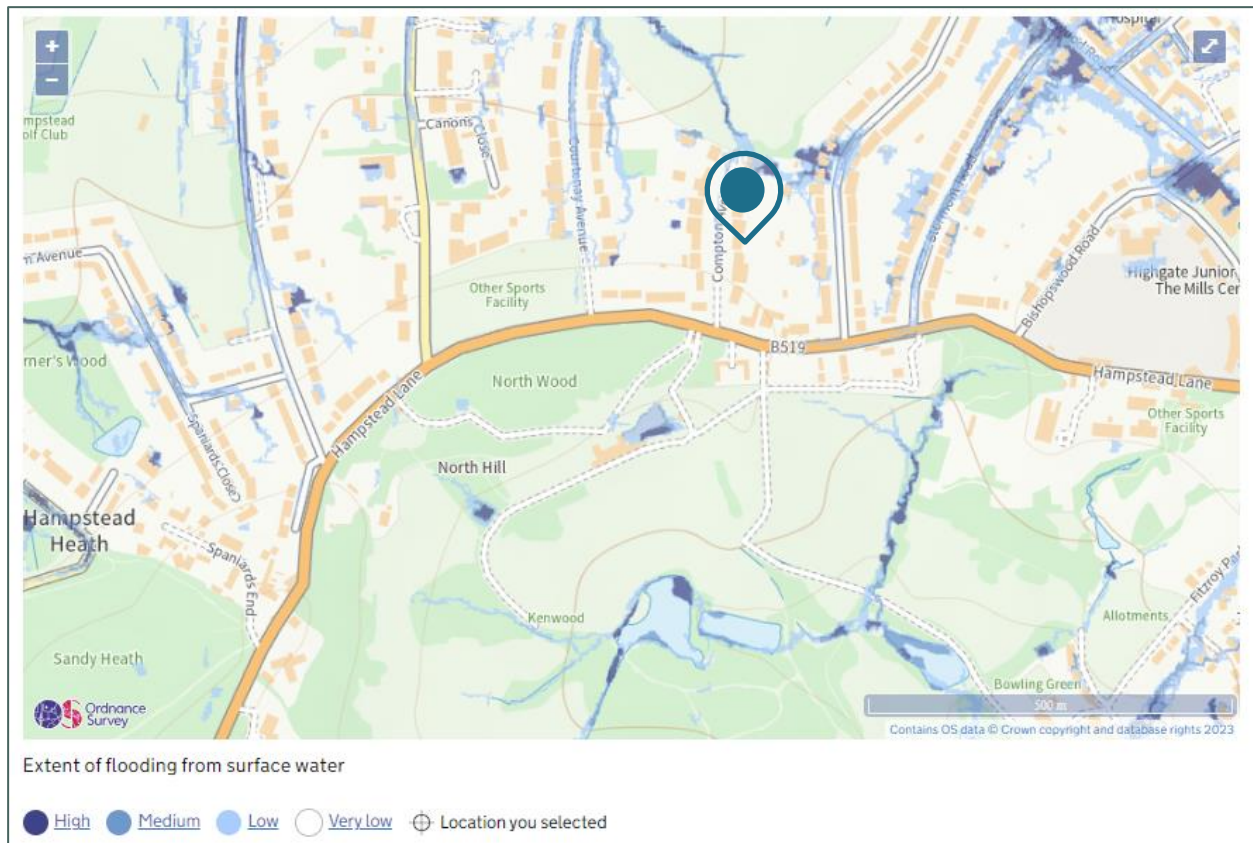


Figure 6 – Flood map showing risk of flooding from rivers or the sea (<https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>)

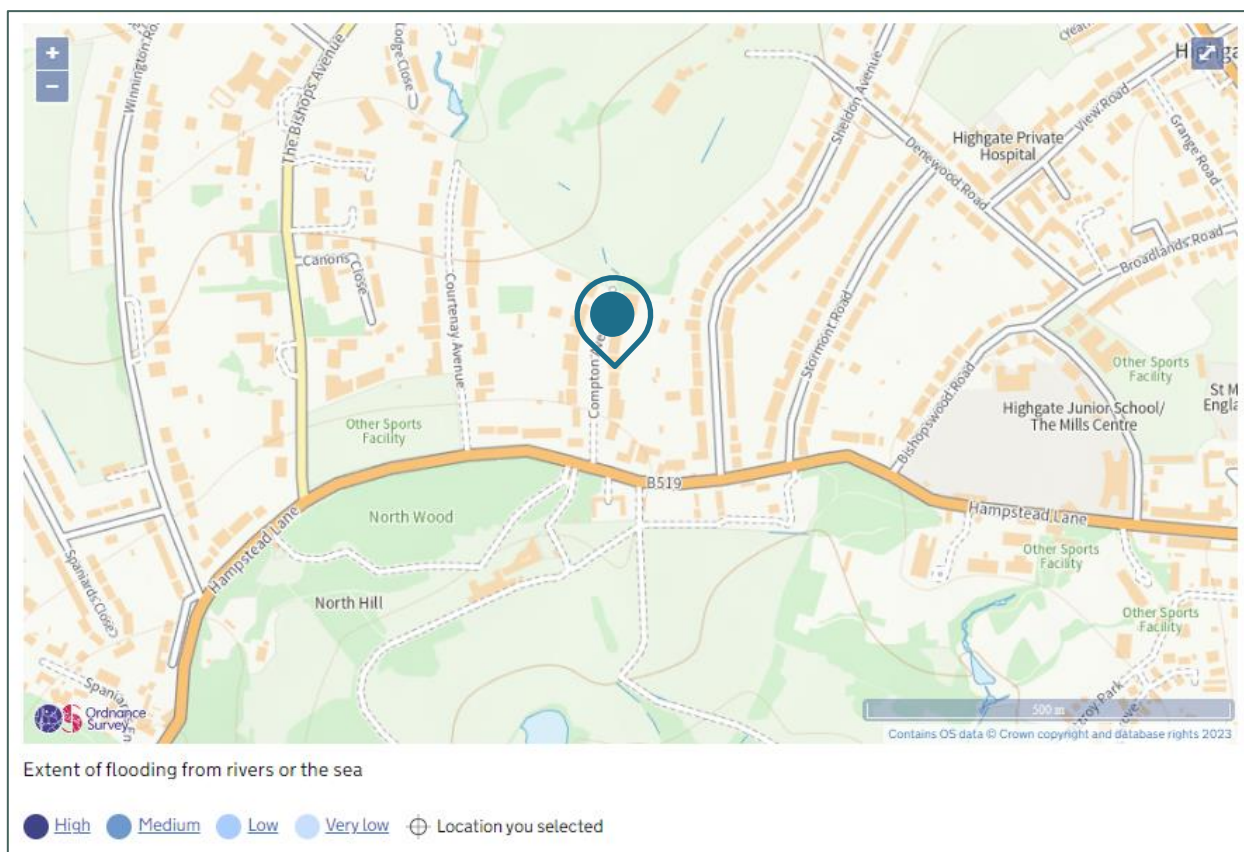


Figure 7 – Flood map showing risk of flooding from surface water (<https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>)

3.4 Transport

3.4.1 Public Transport

The site has multiple bus stops in the surrounding area with several on Hampstead Ln/B519, the closest being a 2-minute walk to the South.

The nearest tube stations from the site are Highgate which is a 23-minute walk to the West, and East Finchley which is a 28-minute walk to the North, both of which operate on the Northern Line and provide access to wider areas of London and the wider public transport network.

3.4.2 Parking

The Proposed Development will provide 3 no. parking spaces, the same number of parking spaces as the existing dwelling. The limited on-site parking will promote the use of public transport by visitors.

3.4.3 Electric Vehicle Charging

The capacity for and the installation of electric vehicle charging point will align with Building Regulations 2021 Part S standards.

3.4.4 Cycle Storage

A cycle store will be located in the garden to the Northern side of the carriage drive in front of the Proposed Development, which will include up to 10 no. cycle spaces, which will be suitably secure, covered and lit to encourage the use of a bicycle to travel, rather than vehicles.

3.4.5 Cycle Rental

The nearest cycle rental station is the 'Brompton Bike Hire Dock' located just outside Whittington Hospital on Magdala Avenue, 1.5 miles (a 29-minute walk) away from the site.

3.5 Biodiversity

Biodiversity is generally considered to be the variety of life forms within a certain ecosystem. The Proposed Development is the construction of a redesigned residential dwelling and may require significant landscaping. An ecological report should be undertaken by a suitably qualified ecologist in order to determine the initial findings of the site and advise if there is any potential of enhancing and/or protecting any biodiversity elements on site. The loss of ecological value will be minimised as far as practicable, and the total ecological value of the site will likely be maintained or increase. Rainwater harvesting is proposed for the dwelling, and will be used for maintaining the garden area in an effort to reduce overall water use.

Urban greening has been taken into account, being a fundamental element of this site. Thus, the building design will be in line with Policy G5 of the London Plan. A range of urban greening measures are included on site of the Proposed Development, including high-quality landscaping oak and willow trees, hedges, amenity grassland, and permeable area in the garden and front of house, all of which result in an increase in green cover. An Urban Greening Factor (UGF) has been calculated and included in Appendix C. The results indicate that an UGF of 0.53 can be achieved, exceeding the recommended target score of 0.4 set out under the London Plan.

In addition to the high quality and diverse range of flowering species, the Proposed Development will aim to enhance connections to the wider wildlife corridor by including bird and bat boxes onsite.

3.6 Resource efficiency

3.6.1 Construction Phase Waste Management

The Proposed Development will aim to minimise the waste produced from the site during the construction phase.

A comprehensive Construction Management Plan will be implemented from the outset of site works and will follow the principles of the waste hierarchy. Targets have been set in relation to volume of construction waste and diversion from landfill, and these can be viewed within the respective Pre-Assessments for the building.

The construction waste generated as part of the redevelopment will be segregated and monitored as per best practice, with suitable materials being recycled as part of this process, either to be reused on site or introduced back into the supply chain through recycling by a Licensed Contractor, therefore minimising the amount of waste being disposed of in landfill sites.

Reusing materials on site will reduce the embodied energy of the development through the reuse of the energy that exists in that material. Transportation of new material to the site will be reduced, reducing the CO₂e emissions associated with transportation and material manufacture.

Where waste will need to be disposed of, this will be done in line with the Waste Hierarchy, with as much as practicable being recycled, and the remainder being dealt with through a specialist waste recycling contractor. Nominal construction waste should be sent to landfill or for incineration unless this is unavoidable due to the materials found on the existing site.

As the Proposed Development includes the demolition of the existing house and reconstruction of a new replacement dwelling, a demolition audit will be carried out prior to demolition works, with materials from the existing building largely reclaimed, reused or recycled including brickwork, concrete and screed to minimise waste and reduce the carbon impact of the development.

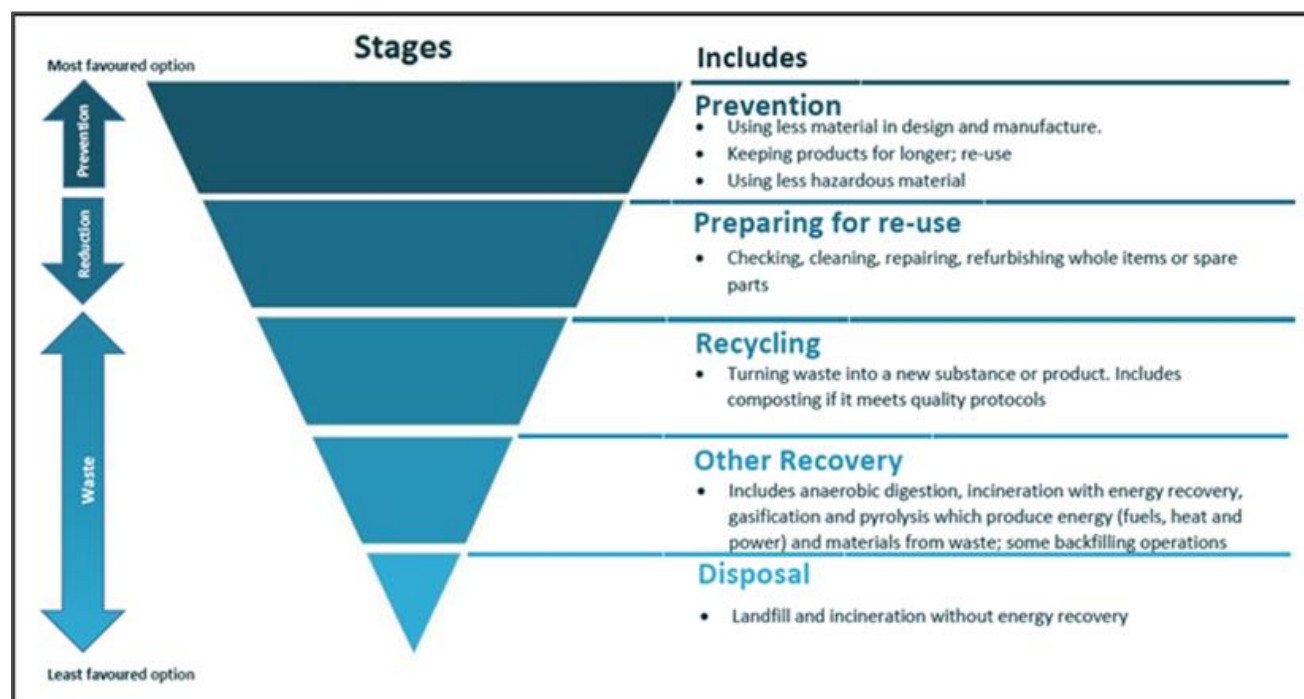


Figure 8 – The waste hierarchy

3.6.2 Resource Management

Policies will be put in place for management of site impacts such as air and water pollution in line with industry best practice. Monitoring and reporting on CO₂e emissions and water use from site related activities will take place in line with national benchmarks.

The construction waste generated as part of the redevelopment will be segregated and monitored as per best practice, with suitable materials being recycled as part of this process, either to be reused on site or introduced back into the supply chain through recycling by a Licensed Contractor, therefore minimising the amount of waste being disposed of to landfill.

Reusing materials on site will reduce the embodied CO₂e and support our transition to a more circular economy. Transportation of new material to the site will be reduced, reducing the CO₂e emissions associated with transportation and material manufacture.

Where waste will need to be disposed of, this will be done in line with the Waste Hierarchy (Figure 8), with as much as practicable being recycled, and the remainder being dealt with through a specialist waste recycling contractor. Nominal construction waste should be sent to landfill or for incineration unless this is unavoidable due to the nature of the materials found on the existing site.

The overall management of the construction waste will be monitored through the Considerate Constructors Scheme as part of Best Practice Site Management.

3.6.3 Materials

The Proposed Development is to use high quality, low impact materials in order to minimise the overall impact on the environment as far as possible.

All timber and timber-based products used on-site will be legally sourced from a reputable forest certification scheme, such as Forest Stewardship Council (FSC) with appropriate Chain of Custody certification to confirm this. All other materials sourced from suppliers who have an accredited Environmental Management System (EMS) certified through ISO 14001 or the Eco-Management and Audit Scheme (EMAS) ensuring that any

environmental impacts caused are managed and reduced. BES 6001 certification should also be considered to ensure products have been made with constituent materials that have been responsibly sourced.

As standard industry best-practice, all insulation on the site will have an Ozone Depletion Potential (ODP) of zero, and a Global Warming Potential (GWP) of <5, further minimising the Proposed Developments effect on global Climate Change.

3.6.4 Water

The South East of England and London has been declared an area of 'serious water stress' by the Environment Agency. Water is a vital resource and efficient usage should be encouraged in all new buildings. Average water use in the UK is in the region of 139 litres/person/day⁵ and the Proposed Development aims to significantly reduce mains water use through a combination of efficiency measures. These should include the use of fittings with a low capacity or flow restrictors.

Internal water use will be reduced in line with Planning Policy and 'enhanced' water standards in Building Regulations Part G for all dwellings of 110l/person/day (including 5l/person/day external water use). The following specification provides an indicative method, subject to manufacturers information on the installed white goods and sanitary ware, of achieving this level of water use:

- WCs: 4/2.6 litre dual flush
- Kitchen Taps: 5.00 litres/minute
- Taps (all other): 4.00 litres/minute
- Baths: 175 litres to overflow
- Showers: <9.00 litres/minute
- Washing Machine: Max. 8.17 litres/kg dry load
- Dishwasher: 1.25 Litres/place setting

Under the London Plan, The Proposed Development will also incorporate water conservation measures to achieve water use of 105 litres per person per day for homes under the optional national technical standard.

3.7 Sustainability Summary

Careful considerations regarding sustainable design and construction have been made for the Proposed Development. These considerations have considered the impacts of climate change and will result in measures to reduce CO₂e emissions through the use of a highly efficient energy strategy on-site.

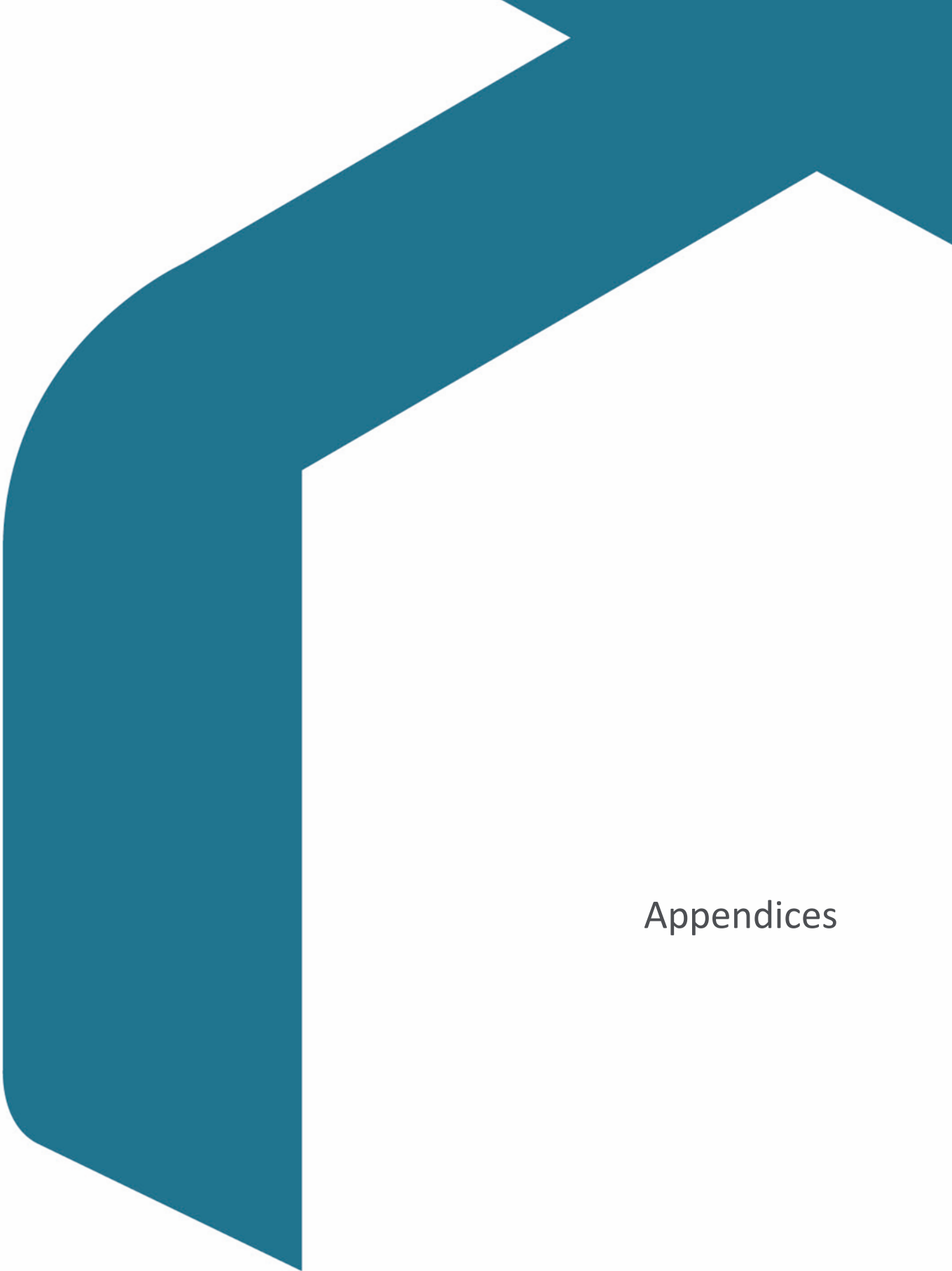
Overall, the Proposed Development has aimed to minimise its impact on the environment at both construction and operational phases and will provide a sustainable series of dwelling units which respond positively to the surroundings, and local and regional policy.

The net result of the sustainability measures implemented meets and exceeds the targets set out by planning policy through the following:

- Air pollution contributions will be reduced on site where possible through the use of an ASHP.
- Noise pollution measures have been taken by minimising air infiltration and enhanced fabric and design, ensuring neighbours and occupants are not impacted as well as providing acoustic screening for the ASHP.
- Sustainable transport provision has been provided onsite in the form of secure cycle storage. Design locality has also been considered with respect to proximity to public transport systems and car rental.

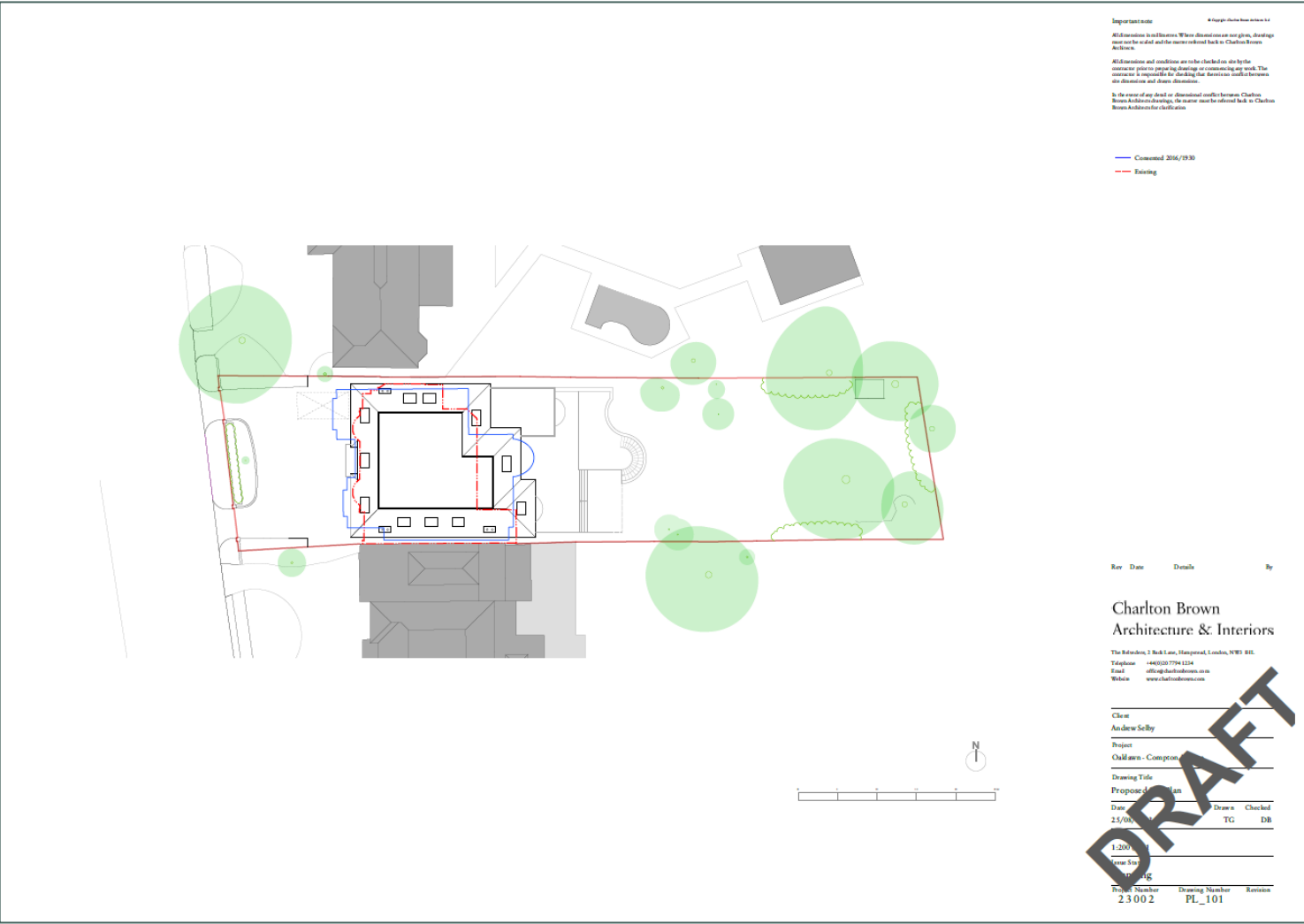
⁵ Energy Savings Trust: [Advice to help you save water at home - Energy Saving Trust](#) & [AHHW2 final.pdf](#) (energysavingtrust.org.uk)

- The Proposed Development will enhance the biodiversity of the area providing green spaces around the site.
- Waste management will be ensured following the waste hierarchy and adopting the reuse, recycle and recovery methodology for construction and demolition meeting all policy requirements.
- Implementation of sustainable construction techniques and materials, inclusive design, site management and procurement procedures.
- Internal Water Use will be controlled in alignment with Part G requirements.

A large, teal-colored abstract graphic on the left side of the page. It consists of a thick, curved line that starts from the top left, curves downwards and to the right, then turns back to the left, forming a large, open 'C' shape. The line is solid and has a consistent thickness.

Appendices

Appendix A – Site Plan



Appendix B – SAP Summary Sheet

Oak Lawn



REV A

Stage 1/1/2021																					
Options	Units	Basement Walls	External Walls	Dwarf Walls Loft	Dormer Walls	Ground Floor	Basement Floor	Terrace Deck Over Basement	Pitched/Flat Roof	Flat Loft Insulation	Crown Roof	Windows/Glazed Doors	Heating System	Delayed Start Thermostat	HW Cylinder	Renewables (PV)	Mechanical Ventilation	Alc - Permeability	DER vs TLR Ingress resistant	GLER vs TLR Ingress resistant	DPER vs TLR Ingress resistant
Type	Plot No	U Value	U Value	U Value	U Value	U Value	U Value	U Value	U Value	U Value	U Value	U Value	Make	Y/N	(litres)	(kWp)	Type	m ² /hr/m ²	%	%	%
House	1	0.18	0.17	0.17	0.20	0.13	0.10	0.18	0.12	0.13	0.10	1.20	Ecodan 14.0kW	Y	570.00	n/a	MVHR	3	83.42	2.54	65.69
Element		U Values		Description																	
Basement Wall		0.18		Modelled as: 100mm Kingspan Styrozone N 300 R Insulation over membrane and 100mm Hanson Thermalite H-Strength 7 block over insulation with 20mm plaster finish																	
External Wall		0.17		Modelled as: Bricks in Flemish bond with snapped headers; 150mm cavity with wall ties; with 100mm Kingspan Kooltherm KB or equivalent approved insulation; 140mm Hanson Thermalite H-Strength 7 block inner leaf with 20mm plaster.																	
Dwarf Walls Loft		0.17		Modelled as: 50mm unventilated cavity and 75mm Kingspan K107 with softwood timber studs, 25mm Kingspan K118, 12.5mm Gyproc plasterboard (shelter resistance of 0.5 applied)																	
Dormer Walls		0.20		Modelled as: 25mm slightly vented air layer with softwood timber studs, 20mm Softwood timber, 135mm Kingspan K103 with 90mm softwood timber studs, 12.5mm acoustic/fire resistant plasterboard																	
Ground Floor		0.13		Modelled as: 250mm thick Concrete Floor, 25mm Kingspan Kooltherm K103 insulation with 500 gauge slip sheet over. Min 65mm reinforced screed with underfloor heating																	
Basement Floor		0.10		Modelled as: 65mm screed, 125mm Celotex GA4000 PIR insulation, 75mm XPS over concrete floor																	
Basement Pool Floor		0.22		Modelled as: 65mm Screed, 90mm Celotex GA4000 PIR insulation, 100mm Concrete																	
Terrace Deck Over Basement		0.18		Modelled as: 250mm thick reinforced concrete deck, Liquid Membrane waterproofing barrier, drainage / protection layer over waterproofing and 200mm Kingspan Styrozone N 300 insulation																	
Pitched/Flat Roof		0.12		Modelled as: 25mm slightly vented air layer and 180mm Kingspan K107 between rafters, 32.5mm K118 to underside																	
Flat Loft Insulation		0.13		Modelled as: 25mm Gyproc SoundBloc, Vapour control layer (4000Mq), 150mm Kingspan K107 with 100mm Softwood Timber battens (shelter resistance of 0.5 applied)																	
Crown Roof		0.10		Modelled as: Kingspan Thermaflo TR27, 18mm WSP play laid to falls with Liquid VCI applied to top, 100mm TR27 first then 120mm TR27 over ready for Single Ply membrane																	
Windows / Glazed Doors		1.20		Double Glazed, Low E, G - Value (0.7)																	
Roof Lights		1.20		Double Glazed, Low E, G - Value (0.63)																	
Construction Details (Psi values)		-		Notional Values used - SRI recommend calculating Psi values at detailed design stage																	
Boiler		-		Modelled as: Mitsubishi Ecodan 14.0kW 35°C																	
Controls		-		Time and Temperature Zone Control																	
Heating Emitters		-		Underfloor Heating																	
HW Cylinder		-		570 Litres, Standing Heat Loss of 2.44 kWh/day - model based on MEGAFL0 Eco Plus Unvented Hot Water Cylinder																	
Secondary Heating		-		n/a																	
Mechanical Ventilation		-		Modelled as: Balanced Mechanical Extract Ventilation with Heat Recovery (MVHR), Vectaire WHHR-Maxi Plus BY (MVHR Efficiency: 84, SFP: 0.94)																	
Lighting		-		100% Low Energy Lighting - CFL or LED																	
Renewables		-		n/a																	
Overheating		-		Overheating Assessments will need to be carried out as part of Building Regulations 2021 Part O																	
Notes																					
Sign Off of details		Name		PP M Maclean		Date		24.11.2023		On behalf of the contractor/client:		Name				Date					
		Sign		(on behalf of SRI)				Sign													

Appendix C – Urban Greening factor calculation sheet

SRE URBAN GREENING FACTOR CALCULATOR			
London Plan 2021			
Policy G5 Urban Greening:			
A. Major development proposals should contribute to the greening of London by including urban greening as a fundamental element of site and building design, and by incorporating measures such as high-quality landscaping (including trees), green roofs, green walls and nature-based sustainable drainage.			
B. Boroughs should develop an Urban Greening Factor (UGF) to identify the appropriate amount of urban greening required in new developments. The UGF should be based on the factors set out in Table 8.2, but tailored to local circumstances. In the interim, the Mayor recommends a target score of 0.4 for developments that are predominately residential, and a target score of 0.3 for predominately commercial development (excluding B2 and B8 uses).			
C. Existing green cover retained on site should count towards developments meeting the interim target scores set out in (B) based on the factors set out in Table 8.2			
DEVELOPMENT TYPE:	Predominantly Residential		
Urban Greening Factor Target:	From GLA		
PROJECT ADDRESS:	Version:	1	Rev: A
Oak Lawn, Compton Avenue, London, N6 4LB	DATE:		03.08.2021
Surface Cover Type	UG Factor	Area (sqm)	UGF
Semi-natural vegetation (e.g. trees, woodland, species-rich grassland) maintained or established on site	1	344.45	344.45
Wetland or open water (semi-natural; not chlorinated) maintained or established on site.	1		0
Intensive green roof or vegetation over structure. Substrate minimum settled depth of 150mm – see livingroofs.org for descriptions.	0.8		0
Standard trees planted in connected tree pits with a minimum soil volume equivalent to at least two thirds of the projected canopy area of the mature tree – see Trees in Hard Landscapes for overview	0.8		0
Extensive green roof with substrate of minimum settled depth of 80mm (or 60mm beneath vegetation blanket) – meets the requirements of GRO Code 2014.C	0.7		0
Flower-rich perennial planting – see RHS perennial plants for guidance	0.7		0
Rain gardens and other vegetated sustainable drainage elements – See CIRIA for case-studies	0.7		0
Hedges (line of mature shrubs one or two shrubs wide) – see RHS for guidance	0.6	105.95	63.57
Standard trees planted in pits with soil volumes less than two thirds of the projected canopy area of the mature tree.	0.6		0
Green wall –modular system or climbers rooted in soil – see NBS Guide to Façade Greening for overview	0.6		0
Groundcover planting – see RHS Groundcover Plants for overview	0.5		0
Amenity grassland (species-poor, regularly mown lawn).	0.4	150.78	60.312
Extensive green roof of sedum mat or other lightweight systems that do not meet GRO Code 2014	0.3		0
Water features (chlorinated) or unplanted detention basins.	0.2		0
Permeable paving – see CIRIA for overview	0.1	339.01	33.901
Sealed surfaces (e.g. concrete, asphalt, waterproofing, stone).	0		0
Other, non-specified: no greening factor applied	0		0
SITE AREA:	940.19 sqm		
Urban Greening Factor (From GLA)	0.4		
URBAN GREENING FACTOR	0.53		

Appendix D – GLA Carbon Emissions Reporting Spreadsheet

Residential**Table 1:** Carbon Dioxide Emissions after each stage of the Energy Hierarchy for residential buildings

	Carbon Dioxide Emissions for residential buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	13.7	
After energy demand reduction (be lean)	9.6	
After heat network connection (be clean)	9.6	
After renewable energy (be green)	2.5	

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for residential buildings

	Regulated residential carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	4.0	30%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	7.1	52%
Cumulative on site savings	11.1	81%
Annual savings from off-set payment	2.5	-
	(Tonnes CO₂)	
Cumulative savings for off-set payment	76	-
Cash in-lieu contribution (£)	7,239	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development

Appendix E – Unfeasible Low and Zero Carbon Technologies

Biomass Boiler

Biomass boilers generate heat from the burning of renewable or 'waste' fuels. They require a regular feed of fuel and regular heat demand to operate efficiently. A flue taller than the surrounding buildings must be incorporated into the design to minimise air pollution impacts at ground level from particulate emissions.

The use of a biomass boiler system to supply space heating and domestic hot water (DHW) has been deemed unsuitable due to the high level of particulates emitted from their use. The use of such a system would negatively impact the air quality of the surrounding area and furthermore, could impact the usability of the roof terrace amenity.

Wind Power

Wind power is a developed and productive method of renewable energy generation, however the main limiting factor to its implementation is opposition at a local public and local government level.

To generate a meaningful amount of electricity, large-scale turbines are required which have noise and the visual impacts for the local area. The use of wind turbines has therefore been deemed unsuitable.

Solar Water Heating

Solar Water Heating (SWH) can be used to offset a proportion of the DHW within a building.

However, due to the low DHW demand at the Proposed Development it is likely to provide minimal CO₂e emissions reductions, while taking up roof-space, better utilised for PV.

Ground Source Heat Pump

As with ASHP, ground source heat pump (GSHP) systems consume electricity in order to operate.

Beyond 1m below ground level, an average temperature of 10°C is maintained throughout the year. Because of the ground's high thermal mass, it stores heat from the sun during the summer. GSHP can transfer this heat from the ground into a building to provide space heating by a similar process to an ASHP.

It is recommended that the ground conditions of the site be assessed in detail (through consultation with a GSHP manufacturer and/or purchase of a Ground Conditions report from the British Geological Survey) before a system is installed – the primary heat source that GSHP relies on is solar derived, and shading can affect the 're-charge' of the ground within which the ground loop is laid. This can affect year-on-year CoPs, steadily increasing running costs and reducing CO₂e offset.

Although GSHP can provide a greater efficiency performance than ASHP, it comes at a significantly higher capital cost, due to the extensive groundworks needed to install either 'slinky' ground loops or 50-100m deep boreholes.

The significantly higher capital costs of installing a GSHP system, it is not considered to be financially viable for the scheme.



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