ENERGY & SUSTAINABILITY STATEMENT

ESCP Business School Temporary Extension

Produced by XCO2 for ESCP Business School

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EXECUTIVE SUMMARY

The sustainability and energy strategy for the temporary extension to the ESCP Business School development has been developed to comply with the relevant policies of the London Plan and of the London Borough of Camden's Local Plan.

The proposals incorporate a range of sustainable design and construction measures, primarily addressing the sustainable management of resources, the protection and enhancement of the environment and the effective adaptation and mitigation of the development to climate change.

This report presents the sustainability strategy and assesses the predicted energy performance and carbon dioxide emissions of the proposed temporary extension to the ESCP Business School, located in the London Borough of Camden.

The proposed development comprises one modular building containing two classrooms to be erected as a temporary 3-year extension to the existing business school.

This document is divided into three parts:

1. Planning policies;
2. Proposed sustainability measures; and,
3. Energy Strategy.

The Planning Policy section provides an overview of the site and planning policies applicable to this development in accordance with the London Borough of Camden's Local Plan and the London Plan.

The second section on proposed sustainability measures outlines the sustainability measures that have been adopted in the team's aim to maximise sustainability within the site.

The third section describes the predicted energy performance and carbon dioxide emissions of the proposed development at ESCP Business School Temporary Extension. The development will be compared to a notional building constructed to Part L1A standards for a 'Modular and Portable' scheme.

Key sustainability features of the proposals include:

- The re-use of previously developed land;
- Effective site layout in response to the neighbouring context;
- Efficient design of the proposed massing, openings and internal layout so that occupied spaces benefit from abundant daylight and sunlight levels, whilst impacts to neighbouring buildings are kept to a minimum;
- Re-use of unit modules from previous project improves the circular economy of the development.
- Off-site modular production results in short on-site build times, reducing the impact on traffic and disturbance to neighbours, and minimises on-site air pollution, waste and energy consumption.
- Further benefits of off-site modular production are greatly reduced construction waste aerosol.
- Effective pollution management and control: the development is not expected to have any significant adverse effects to air, noise, land or watercourses.

The energy strategy for the scheme focuses on the efficiency of the fabric and building services, so that the energy demand is reduced to the extent feasible. Energy efficiency is primarily achieved through a highly insulated building envelope, a good air permeability rate and a satisfactory thermal bridging y-value. Highly efficient lighting and space conditioning systems, as well as appropriate controls further reduce the regulated energy demand and consumption of the development.

The Camden Local Plan does not set specific CO_2 reduction targets for minor developments such as that at ESCP Business School Temporary Extension. However, CO_2 emissions have been reduced as far as is feasible, and it is currently expected the temporary development will achieve a 15.1% reduction in regulated CO_2 emissions compared to a Part L 2021 'Modular and Portable' compliant scheme through energy efficiency measures and the incorporation of efficient building services.

The proposals in their entirety reflect the client and design team's aspirations in delivering a high-quality, energy efficient development that underpins the sustainability of the built environment.

INTRODUCTION

The proposed educational development is located in West Hampstead, within the London Borough of Camden. This section presents the description of the site and of the development proposal.

SITE & PROPOSAL

The proposed development includes the erection of a 274sq.m modular building to consist of two classrooms. This site is adjacent to the existing ESCP Business School, to which this proposed building is a temporary extension, expected to be in place for 3 years. The site currently contains carparking space for the existing school, in addition to an access road to the southeast of the site.

The location of the development site is shown in Figure 1 below.

Figure 1: Location of the application site.

PLANNING POLICIES

The proposal will seek to respond to the energy and sustainability policies of the London Plan and of the policies within the Camden Local Plan.

The most relevant applicable energy policies in the context of the proposed development are presented below.

THE LONDON PLAN (2021)

The London Plan (2021) published 2nd March 2021 sets out the Mayor's overarching strategic spatial development strategy for greater London and underpins the planning framework from 2019 up to 2041. This document replaced the London Plan 2016.

The new Plan has a strong sustainability focus with many new policies addressing the concern to deliver a sustainable and zero carbon London.

Policy GG6 Increasing Efficiency and Resilience is an overarching policy references London's target to become zero carbon by 2050 and the need to design buildings and infrastructure for a changing climate, addressing water, flood and urban heat island.

Sustainability is a trend through the whole Plan but is particularly addressed in chapter 9 Sustainable Infrastructure. The following sections outline the key principles of sustainable design and construction to be incorporated in major proposals.

Policy SI1 Improving air quality requires development proposals to be at least air quality neutral and submit an Air Quality Assessment.

"...
Development plans, through relevant strategic, site specific and area-based policies should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality.
..."

Any mitigation required to meet the Air Quality Neutral target should be done on site preferably.

Policy SI2 Minimising greenhouse gas emissions sets the requirements for all major developments to follow the energy hierarchy and achieve net-zero-carbon for both residential and non-residential schemes (via on-site carbon reductions and offset payments) and introduces new targets at Lean stage:

"...
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.
..."

"...
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.
..."

This policy also sets the requirements to consider whole-life carbon emissions, including embodies carbon and unregulated emissions:

"...
Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.

Development proposals referable to the Mayor should calculate whole lifecycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.
..."

The policy supporting text provides additional clarifications on the requirements for major developments:

- Developments including major refurbishments should also aim to meet the net-zero carbon target.
- All developments should maximise opportunities for on-site electricity and heat production from solar technologies (photovoltaic and thermal), use innovative building materials and smart technologies.
- Recommendation to use SAP10 carbon factors as per GLA Energy Guidance.
- Recommended carbon offset price of £95 per tonne CO_2.
- Requirement for major developments to monitor and report operational energy performance to the GLA.

Policy SI 3 Energy Infrastructure requires all major developments within Heat Network Priority Areas will need to utilise a communal low-temperature heating system. Where developments are utilising CHP, this policy also requires them to demonstrate that 'the emissions relating to energy generation will be equivalent or lower than those of an ultra-low NOx gas boiler'. Any combustion on site should meet the requirements of part B of Policy SI1.

Policy SI 4 Managing heat risk requires:

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.

Policy SI5 Water infrastructure sets the requirements to manage water resources efficiently:

"...
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)
2) achieve at least the BREEAM excellent standard for the 'Wat 01' water category or equivalent (commercial development)
3) incorporate measures such as smart metering, water saving and recycling measures, including retrofitting, to help to achieve lower water consumption rates and to maximise future-proofing.
..."

Policy SI 7 Reducing waste and supporting the circular economy introduces the notion of circular economy whereby materials are retained in use at their highest value for as long as possible. For referable applications a Circular Economy Statement demonstrating how developments promote circular economy and aim to be net zero-waste must be submitted.

Policy SI12 Flood risk management and **Policy SI 13 Sustainable drainage** sets the requirements for development proposals to ensure that flood risk is minimised, and that sustainable drainage is incorporated. This should be pursued by integrating different strategies including natural flood management. Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. For this green features should be employed, following the drainage hierarchy.

Policy D14 Noise requires that noise impacts are minimised and mitigated to avoid any adverse impacts on health and quality of life and to reflect the principles set in **Policy D13 Agent of Change** that "*places the responsibility for mitigating impacts from existing noise and other nuisance-generating activities or uses on the proposed new noise-sensitive development.*"

Policy G5 Urban greening requires major developments to contribute to greening of London assessed by an Urban Greening Factor (UGF).

Boroughs should develop their UGF but *"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)."*

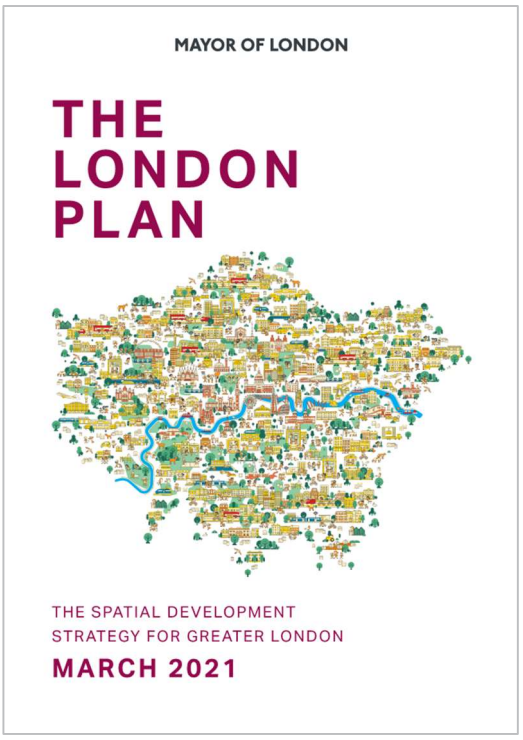
Separate guidance on UGF is under consultation in Spring/Summer 2021.

Policy G6 Biodiversity and access to nature states:

"...
Development proposals should manage impacts on biodiversity and aim to secure net biodiversity gain. This should be informed by the best available ecological information and addressed from the start of the development process.
..."

FOR MINOR SCHEMES ONLY - It is noted that the proposed scheme does not constitute 'major' development, and therefore London Plan policies, intended for major developments, are not applicable in this case.

The London Plan's Energy Hierarchy has however been followed in developing the energy strategy for the proposals, in line with Local Plan guidance. Further details on the Energy Hierarchy can be found in the Energy Strategy Summary section of this report.



GLA GUIDANCE ON PREPARING ENERGY ASSESSMENTS

This document (last updated in April 2020) provides guidance on preparing energy assessments to accompany strategic planning applications; it contains clarifications on Policy SI 2, of the new London Plan, carbon reduction targets in the context of zero carbon policy, as well as detailed guidelines on the content of the Energy Assessments undertaken for planning.

The guidance document specifies the emission reduction targets the GLA will apply to applications as follows:

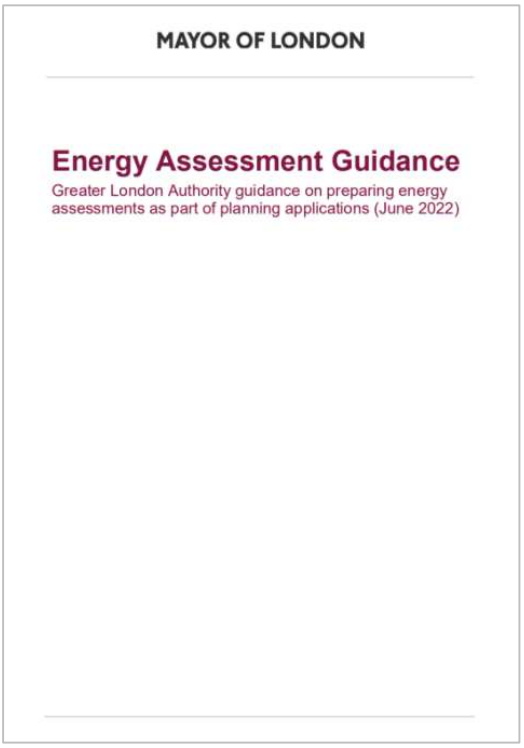
The regulated carbon dioxide emissions reduction target for major domestic and non-domestic development is net zero carbon, with at least a 35% on-site reduction beyond Part L 2021 of the Building Regulations.

The definition of zero carbon homes is provided on Page 54 of the guidance:

> *Zero carbon homes - homes forming part of major development applications (i.e. those with 10 or more units) where the residential element of the application achieves at least a 35 per cent reduction in regulated carbon dioxide emissions (beyond Part L 2021) on-site. The remaining regulated carbon dioxide emissions, to 100 per cent, are to be offset through a cash in lieu contribution to the relevant borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere.*

The new guidance also includes changes to technical requirements relating to the use of updated carbon factors, cost estimates, overheating risk analysis, the structure of the heating hierarchy and scrutiny over the performance of heat pumps.

The structure of this report and the presentation of the carbon emission information for the development follows the guidance in this document.


MAYOR OF LONDON

Energy Assessment Guidance

Greater London Authority guidance on preparing energy assessments as part of planning applications (June 2022)

CAMDEN LOCAL PLAN (2017)

The most relevant applicable energy and sustainability policies in the context of the proposed development are presented below.

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.

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.

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.

Other pertinent policies are noted as follows:

- Policy A3 Biodiversity
- Policy CC3 Water and Flooding
- Policy CC4 Air Quality
- Policy CC5 Waste
- Policy T1 Prioritising Walking, Cycling and Public Transport
- Policy T2 Parking and Car-Free Development


Camden Local Plan
2017
Camden

PROPOSED SUSTAINABILITY MEASURES

This part of the report presents the key elements of the proposal that underpin environmental sustainability, demonstrates how the development complies with sustainable development policies and incorporates guidance on sustainable design and construction.

LAND AND SITE LAYOUT

Land use

The land for this proposal is efficiently used as the scheme will be constructed on previously developed land. The site currently comprises landscaping, and both a tarmac and shingle carpark.

Reuse of Existing Buildings

As the site only comprises of hard and green landscaping, there isn't scope to reuse existing site building materials. However, as the units are a temporary installation, these modules will be deconstructed at the end of the 3-year period and reused in later Portakabin projects.

Land Form and Site Layout

Consideration has been given to the layout and scale of the surrounding buildings. The height of the surrounding context is between three and four storeys of residential and educational buildings. As the scheme comprises a one-storey modular building to be used as two classrooms, there will be no obstruction to the views of the surrounding buildings. This is a temporary extension to the existing business school on the adjacent site. The site currently has, and will continue to have, a green boundary of mature bushes to enhance privacy.

The scale of the development follows a principle of densification but, at the same time, it takes into account the neighbouring buildings with regard to height and overall volume.

Daylight & Sunlight Impacts

Consideration has been given to neighbouring amenity and open spaces; due to appropriate design of the building and overall site layout these will experience minimal overshadowing effects.

Micro-climate

A microclimate is the distinctive climate of a small-scale area and the variables within it, such as temperature, rainfall, wind or humidity may be subtly different to the conditions prevailing over the area as a while. The main characteristics of microclimates within London are temperatures and wind.

The proposed scheme is not of a scale that could potentially have any significant impact on wind conditions around the site or any adverse effects on pedestrian and residents' comfort.

Impacts on Neighbours from Demolition and Construction

Construction impacts such as dust generation and increased traffic movements will be minimised through adoption of best practice construction measures, such as damping down to reduce dust.

Land Contamination

In the event of any discovery of potentially contaminated soils or materials, this discovery will be quarantined and reported to the most senior member of site staff or the designated responsible person at the site for action. The location, type and quantity will be recorded and the Local Authority, a competent and appropriate third-party Engineer or Environmental consultant will be notified immediately. An approval from the Local Authority will be sought prior to implementing any proposed mitigation action.

HEALTH AND WELLBEING

Safety and Security

The design team will comply with the principles of Secured by Design to provide safe and secure spaces to all building users.

Open Spaces/Amenity

Students using the new classrooms will have access to communal open spaces, provided through existing landscaped areas at ground level to allow them to gather, socialise and connect to the natural environment. This will also enhance the occupant's wellbeing as nature can significantly improve mood and happiness.

Daylight/Sunlight

By incorporating large areas of glazing on the north and south façade, in addition to an open-plan internal layout, the proposed development ensures that occupants enjoy satisfactory levels of visual comfort and beneficial effects from daylight exposure, whilst also reducing energy consumption by minimising the use of artificial lighting as far as feasible.

Physical activity

The presence of amenity providers (shops, pharmacies, public park) within walking distance to the development will encourage occupants to walk rather than use personal vehicles. The existing provision of cycle storage spaces on the site will also encourage the use of alternative means of transportation for longer distances trips to the school.

ENERGY & CARBON DIOXIDE EMISSIONS

The Energy Strategy for the development has been designed in line with the London Plan's Policy SI2 which states that every effort should be made to minimise carbon dioxide emissions.

This is a temporary development intended to be in use for three years, while the existing school on the adjacent site develops a permanent extension.

The modular units will be energy efficient with good levels of insulation and air tightness, in addition to efficient building systems. The units will meet Part L 2021 of Building Regulations for a 'Modular and Portable' scheme as minimum.

NATURE CONSERVATION & BIODIVERSITY

The proposed development aims to maintain the green cover of the site by retaining the existing landscaped areas. Due to the temporary nature of this extension, there will be no explicit gain in biodiversity in the three years while the units are in place, however there will be no net loss either.

It is not feasible to incorporate a green roof within this development due to the weight restrictions and design of the roofs on the modular buildings.

MATERIALS AND WASTE

Responsible Sourcing

100% of the timber used during construction will be sourced from accredited Forest Stewardship Council (FSC) or Programme for the Endorsement of forestry Certification (PEFC) source.

Healthy Materials

To minimise potential sources of indoor air pollution, low VOC paints, finishes and other products will be prioritised as far as practically possible. Best practice design detailing and careful construction techniques will also be employed to reduce the risk of thermal bridging and condensation issues, limiting the potential for mould growth.

Circular Economy

Circular economy is based on three key principles: design out waste, keep products and materials in use, and regenerate natural systems. These principles will be applied during the design and construction of the proposed development by following the actions noted below:

- Design out the need for building components and materials;
- Use of reclaimed materials and remanufactured components over new;
- Product selection considering its entire lifecycle, such as products which can be remanufactured or reused; products with high recycled content; products designed for disassembly; and recyclable or compostable materials.

Construction Waste

All construction waste has been confirmed to be recoverable using the Main Contractor's (Portakabin) waste processing partners to obtain full breakdown of the materials and recovery. The Portakabin manufacturing site has been zero waste to landfill for over 10 years.

Operational Waste

The temporary classrooms will be connected to the existing school on the adjacent site, and so will use the existing waste and recycling facilities.

CLIMATE CHANGE ADAPTATION

Overheating

The potential risk of overheating will be mitigated by incorporating both passive and active design measures.

The space heating for the development will be provided by electric panel heaters and a split VRF system which can provide both heating and cooling. All pipe work will be sufficiently insulated to avoid condensation when in cooling mode and excess heat loss into internal space when in heating mode.

Efficient lighting will be used to further minimise internal heat gains and reduce energy expenditure.

Appropriately sized windows will reduce solar heat gains. Internal blinds will be included in the units to reduce the solar gains and reduce the risk of glare into the classrooms where required. Glazing with low transmittance will be used in the unit to reduce solar gains and reduce the risk of overheating.

Surface Water and Flooding

Sustainable urban drainage systems (SUDS), comprising permeable paving will be incorporated on site.

AIR, NOISE AND LIGHT

Air Quality

Air pollution risks from construction and demolition activities on site will be minimal in line with the SPG 'The control of dust and emissions from construction and demolition' under the following categories:

- demolition;
- earthworks;
- construction;
- trackout; and,
- non-road mobile machinery (NRMM).

The cabin manufacturer, Portakabin, has committed to follow specific company policies in order to minimise the dust and air pollution.

As the units consist of an off-site modular product, with a short on-site construction timeframe, the impact on air pollution is greatly reduced compared to if traditional construction methods were to be used. Where necessary, mitigation measures should be utilised to reduce any air quality impact.

During the operational phase of the development, the heating demand will be reduced via improved levels of insulation and air tightness for the buildings' fabric. There will be no combustion emissions due to the specification of wall panel heaters and a split variable refrigerant flow (VRF) system with both heating and cooling capacity (for further details please refer to the Energy Strategy section).

The site will be combustion free and no new car parking spaces are proposed. Overall, the development is expected to meet 'air quality neutral' benchmarks set out in the London Plan.

Noise

The development will incorporate design and building fabric measures to mitigate potential noise levels from the proposed development and ensure the impact of any external sources on internal ambient noise levels are within acceptable limits.

LIGHT POLLUTION

The lighting design of the proposed development will follow the recommendations of the Institution of Lighting Professionals' Guidance Notes for the

Reduction of Obtrusive Light (2021), to minimise light pollution.

Water Pollution

Portakabin will adopt best practice policies to mitigate water pollution from construction activities on site.

The development will discharge sewage via a connection to the public foul sewer or combined sewer network where it is reasonable to do so.

TRANSPORT

Alternative means of transportation

In order to underpin the reduction of emissions from transport, the development has been designed to encourage cycling for students by retaining the existing cycle storage stands throughout the scheme that are convenient to the building entrances.

Public Transport Accessibility

The proposed development is accessible by various means of public transport, with multiple bus stops under a 5-minute walk away, and less than 15 minutes to both an underground and overground train station. It has a PTAL rating of 4.

Proximity to Amenities

The site is in close proximity to numerous amenities, with green space, cash points and food outlets all within a 5–10-minute walk away.

ENERGY STRATEGY

This section describes the predicted energy performance and carbon dioxide emissions of the proposed ESCP Business School Temporary Extension development based on the information provided by the design team.

The overall regulated CO_2 savings *on site* against a Part L 2021 compliant 'Modular and Portable' scheme are currently expected to achieve an estimated 15.1%.

METHODOLOGY - BE LEAN, BE CLEAN, BE GREEN

The methodology used to determine CO_2 emissions is in accordance with the London Plan's three-step Energy Hierarchy (Policy SI2). The development is compared to a Building Regulations Part L 2021 compliant 'Modular and Portable' scheme. The reductions made through each step are outlined below.

BE LEAN – USE LESS ENERGY

The proposals incorporate a range of passive and active design measures that will reduce the energy demand for space conditioning, ventilation and lighting. Measures will also be put in place to reduce the risk of overheating.

PASSIVE DESIGN MEASURES

ENHANCED U-VALUES

The heat loss of different building fabric elements is dependent upon their U-value, which is a measure of the thermal transmittance through the element. An element with low U-value provides better levels of insulation and reduced heating demand.

The proposed development will incorporate high levels of insulation and high-performance glazing in order to reduce the demand for space conditioning (heating and/or cooling).

The tables to the right demonstrate the improved performance of the proposed building fabric beyond the Building Regulations requirements for non-domestic uses.

AIR TIGHTNESS IMPROVEMENT

Heat loss may also occur due to air infiltration. Although this cannot be eliminated altogether, good construction detailing and the use of best practice construction techniques can minimise the amount of air infiltration.

The proposed development will aim to improve upon the Part L 2021 minimum standards for air tightness by targeting air permeability rates of 5.0 m^3/m^2 at 50Pa.

Table 1: Thermal Envelope U-values

Non-domestic (U-values in $W/m^2.K$)	
Element	**Proposed**
Walls	0.35
Floor	0.23
Roof	0.25
Windows	1.34

REDUCING THE NEED FOR ARTIFICIAL LIGHTING

The design of the development incorporates large areas of glazing across all building elevations, to optimise daylight in occupied spaces. Good internal daylight levels will translate to less dependency on artificial lighting and will indirectly deliver energy and carbon savings, together with pleasant, healthy spaces for occupants.

ACTIVE DESIGN MEASURES

HIGH EFFICACY LIGHTING

The development intends to incorporate low energy lighting fittings throughout the spaces. All light fittings will be specified as low energy lighting and will primarily accommodate LEDs.

HEAT RECOVERY VENTILATION

There is no heat recovery ventilation proposed within this development. A standard fan extraction system is proposed to each classroom, with scope to include air conditioning. This may be supplemented by a CO_2 sensor and monitor in each classroom, if required.

HEAT GENERATION

Space heating will be provided in the units by wall panel heaters and a split VRF system which can provide both heating and cooling. The heating efficiency of the VRF system is 4.5 and the cooling efficiency is 4.24.

COMFORT COOLING

A split VRF system with high energy efficiency ratios may be used for both heating and cooling, therefore the impact of active cooling in terms of energy use and carbon emissions will be minimised.

BE CLEAN – SUPPLY ENERGY EFFICIENTLY

As this is proposed to be a 3-year temporary building, it is not practical to connect to a district heat network. Further to this, following a review of the London Heat Map, it was found that the nearest available connection to the site is 5km away at the Kings Cross Heat Network Energy Centre. This means connection would not be viable even, for permanent works.

Given that it has not been found feasible or viable for the proposed development to incorporate the supply of low carbon heating or cooling, no carbon savings are achieved for this step of the Energy Hierarchy.

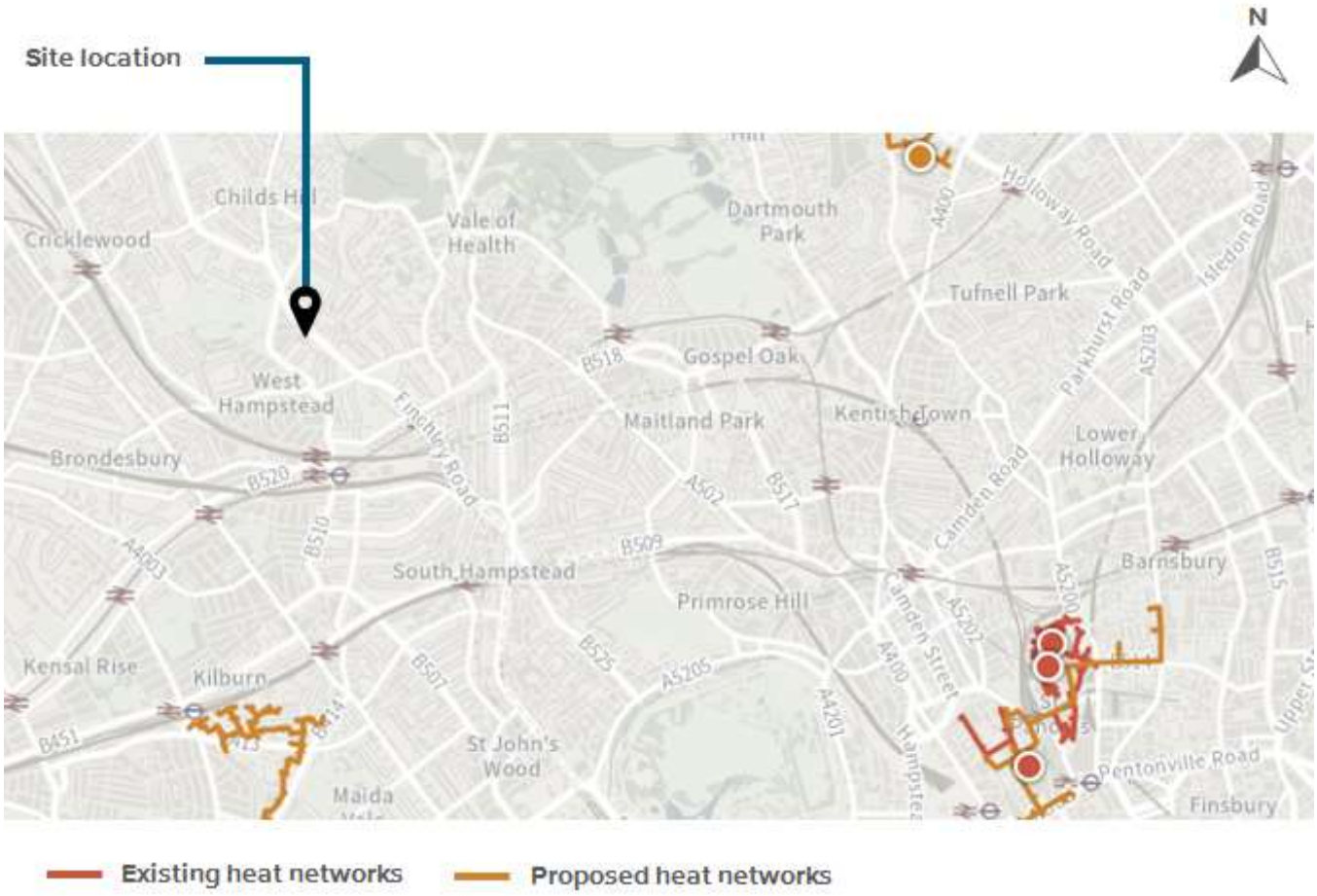


Figure 2: Excerpt from the London Heat Map. Existing district networks outlined in red, proposed networks in orange.

BE GREEN – USE RENEWABLE ENERGY

LOW CARBON TECHNOLOGIES FEASIBILITY STUDY

Methods of generating on-site renewable energy (Green) have been assessed, once Lean and Clean measures were considered.

The development of ESCP Business School will benefit from an energy efficient building fabric which will reduce the energy consumption of the proposed development in the first instance. The only suitable technologies for a temporary development of this size are:

- Air source heat pump / VRF;
- Photovoltaic panels.

In determining the appropriate renewable or low carbon technology for the site, the following factors were considered:

- CO_2 savings achieved;
- Site constraints;
- Any potential visual impacts, and,
- Compatibility with the 'Clean' stage proposals where applicable.

LOW CARBON ENERGY APPRAISAL SUMMARY

The table below summarises the factors considered in determining the appropriate renewable or low carbon technologies for this project. This includes estimated capital cost, lifetime, level of maintenance and level of impact on external appearance. The final column indicates the feasibility of the technology in relation to the site conditions (10 being the most feasible and 0 being infeasible). It is important to note that the information provided is indicative and based upon early project stage estimates.

The feasibility study demonstrates that a VRF system would be the most feasible low carbon technology for the proposed ESCP Business School development. PV has been found to not be feasible as the roof of the modular building has not been designed to support a PV panel array. It is also not appropriate to install due to the building only being in place for 3 years. Detailed assessments for the considered technologies can be found in Table 16.

SITE-WIDE CO2 SAVINGS

The development will comply with Part L 2021 of Building Regulations for a 'Modular and Portable' scheme and is proposed to be in place for just 3 years until the ESCP Business School constructs a permanent extension.

Table 2: Summary of renewable / low carbon technologies feasibility study

		Comments	Lifetime	Maintenance	Impact on external appearance	Site feasibility
PV		Not adopted – Roof of the modular building has not been designed to support a PV panel array.	25 yrs.	Low	Med	3
ASHP / VRF		Adopted.	20 yrs.	Med	Med	9

CONCLUSIONS

The sustainability strategy for the scheme at ESCP Business School has been developed in line with the relevant policies of the London Plan and of the Camden Local Plan, and aims at the efficient management of resources, environmental protection and the effective adaptation and mitigation of the development to climate change.

The energy strategy has been developed in line with the three-step Energy Hierarchy and the cumulative CO_2 savings on site are currently expected to achieve an estimated at 15.1% against a Part L 2021 compliant 'Modular and Portable' scheme.

SUSTAINABILITY

The proposed ESCP Business School development will meet the principles of the Camden Council and Greater London Authority (GLA) policy and guidance as far as is feasible for a small, modular and temporary project of this nature.

Key sustainability features of the proposals include:

- The re-use of previously developed land;
- Effective site layout in response to the neighbouring context;
- Efficient design of the proposed massing, openings and internal layout so that occupied spaces benefit from abundant daylight and sunlight levels, whilst impacts to neighbouring buildings are kept to a minimum;
- Re-use of unit modules from previous project improves the circular economy of the development.
- Off-site modular production results in short on-site build times, reducing the impact on traffic and disturbance to neighbours, and minimises on-site air pollution, waste and energy consumption.
- Further benefits of off-site modular production are greatly reduced construction waste aerosol.
- Effective pollution management and control: the development is not expected to have any significant adverse effects to air, noise, land or watercourses.

The sustainability measures incorporated reflect the client and design team's aspirations in integrating sustainability measures and demonstrates that the project is designed to exceed the planning policy sustainability requirements.

ENERGY STRATEGY

By implementing the three step Energy Hierarchy as detailed in the previous sections, the Regulated CO_2 emissions for the temporary development are expected to be reduced against a Part L 2021 compliant 'Modular and Portable' scheme through on-site measures alone by an estimated 15.1% (0.27 tonnes per annum). The formal reporting of these figures can be found in the BRUKL prepared by Portakabin in Appendix A.

Overall, the proposed development has been designed to meet energy policies set out by the GLA and the London Borough of Camden, which demonstrates the client and the design team's commitment to enhancing sustainability of the scheme.

APPENDIX A – BRUKL PREPARED BY PORTAKABIN

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