CORAM CAMPUS

WESTERN ENTRANCE BUILDING, PAVILION AND WIDENED PATH

SUSTAINABILITY AND SERVICES STRATEGY

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CONTENTS

INTRODUCTION

This report gives a high level appraisal of the sustainability and services principles that will be adopted for the new western entrance building and pavilion at the Coram campus. The report should be read in conjunction with the Meadowcroft Griffin planning application September 2011.

The London plan outlines a layered approach to the reduction of energy use. The roadmap approach to zero carbon prioritises passive design measures and making active systems efficient before applying low or zero carbon technologies.

SUSTAINABILITY STATEMENT

The Sustainability Statement sets out the environmental sustainability and energy strategy for the proposed new pavilion and western entrance building.

By adopting a sustainable approach in design, construction and operation, the proposed development aims to satisfy the requirements of the local planning policy and the Building Regulations standards. The buildings will be designed and built to the highest standards and will achieve a minimum BREEAM 'Very Good' rating, thus satisfying the local planning policy.

The design for the new buildings will tackle the following key environmental issues: management, health and wellbeing, transport, water, materials, waste, land use and ecology, pollution and energy.

Through a consultation process, relevant stakeholders will be involved in the design process. Inclusive design principles will be applied to promote equality and diversity. The implementation of effective measures will reduce the opportunity for crime. The building contractor site management will be contractually required to comply with best practice principles under the Considerate Constructors Scheme (CCS) or equivalent.

An appropriate level of building services commissioning will be carried out during construction and operation to ensure optimum performance under occupancy conditions. A building user guide will be provided to the occupiers to enable them to operate the building efficiently.

The health and well-being of the building occupants will be promoted by ensuring a good access to daylight and view out, adequate glare and solar overheating control, internal and external lighting compliant with best practice for visual performance and comfort, adequate indoor ambient noise levels and sound insulation levels, internal finishes and fittings with low emissions of volatile organic compounds (VO Cs), good indoor air quality, appropriate thermal comfort levels, drinking water supply and water systems that reduce the risk of legionellosis.

The use of private vehicles to move building users to and from the site will be minimised by the close proximity to a good public transport network and local amenities, the provision of adequate dedicated cycle storage spaces, changing facilities and travel information, and the development of a travel plan.

A well-planned site layout will provide safe and secure pedestrian and cycle access routes and delivery and manoeuvring operations.

The consumption of potable water in sanitary applications will be minimised through the adoption of low water use fixtures and fittings, rainwater recycling and water sub-metering. The risk of leaks on the mains water supply and in toilet facilities will also be reduced through appropriate systems.

The use of construction materials with a low environmental impact over the full life cycle of the building will be ensured by specifying materials with a minimum 'Green Guide to Specification' rating of A, wherever feasible. These materials aspire to be responsibly sourced (i.e. EM S certified). Any timber will be legally sourced and FSC certified. The frequency of material replacement will be minimised by protecting vulnerable parts of the building and landscape. Waste sent to landfill will be minimised during the building's construction and operation through the development and implementation of a Site Waste Management Plan (SWMP), the use of recycled and/or secondary aggregates and the provision of adequate dedicated storage space for recyclable and compostable waste.

The proposed buildings will be developed on a brown-field site and its impact on the existing site ecology will be minimised during both construction and operation. A landscape and habitat management plan will be produced to protect and enhance local biodiversity.

Night time light pollution will also be minimised. Potential noise from the new building affecting nearby noise-sensitive buildings will be reduced by adopting noise attenuation measures, if required. An energy hierarchy has been applied to the design strategy of the development to minimise CO2 emissions.

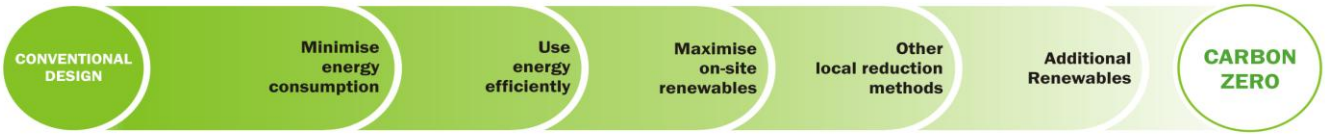
Passive design measures will be adopted, such as efficient built form, daylight enhancement, solar overheating control optimization, and high levels of insulation and airtightness. In particular the proposed U-values and air permeability will be in line with the Building Regulations 2010 standards. Active energy efficient systems will be integrated. These will include mixed mode ventilation, including heat recovery, energy efficient internal and external lighting, efficient office equipment and appliances, a building energy management system (BMS), energy sub-metering

SUSTAINABLE DESIGN MEASURES

The local planning authority does not require the proposed development to be benchmarked against BREEAM. However the client has high sustainability aspirations and will, where possible, limit energy usage and embodied carbon for the proposed development. The following headings outline the sustainability features that have been considered in more detail within this report.

- Management
- Energy
- Transport
- Pollution
- Materials
- Health and Wellbeing
- Water
- Land use and Ecology

This report outlines the sustainability and services strategy for the Pavilion and Western extension. It should be noted that the Pavilion building which is a new build has a greater potential to minimise energy usage through passive design, efficient equipment selection and introduction of low carbon and/or renewable technologies.



MANAGEMENT

Through a consultation process the project team has involved the relevant stakeholders in the design process in order to provide buildings fit for purpose and to increase local “ownership”.

The implementation of effective design measures will reduce the opportunity for and fear of crime in the new development. The final design will embody the recommendations of the local Crime Prevention Design Advisor (CPDA) on designing out the opportunity for crime.

An appropriate level of building services commissioning will be carried out in a co-ordinated and comprehensive manner, thus ensuring optimum performance under actual occupancy conditions.

The development will promote equality and diversity through good access to the built environment for all and through the application of inclusive design principles.

HEALTH AND WELLBEING

The building envelope will ensure good access to daylight and a view out for the building users. Adequate glare and solar overheating control will be provided to the occupied areas.

A combination of an occupant-controlled shading system in the form of manually-operated internal blinds will be fitted in the building. Internal and external lighting will be designed in line with best practice for visual performance and comfort.

Occupants will have easy and accessible control over lighting within each space. Daylighting dimming sensors will be specified to the work-space and circulation areas, occupancy sensors to the storage spaces, toilets and changing facilities.Fluorescent and compact fluorescent lamps will be fitted with high frequency ballasts. This will reduce the risk of health problems related to the flicker of fluorescent lighting.

The building will achieve adequate indoor ambient noise levels and appropriate sound insulation levels. All areas used for speech such as the interactive room and spaces for educational purposes will aim for reverberation times compliant with best practice.

The specification of internal finishes and fittings with low emissions of volatile organic compounds (VOCs) will ensure a healthy internal environment.

The ventilation strategy of the building will be designed to supply sufficient fresh air to the occupied spaces. This will remove any pollutants, reduce the risk to health associated with poor indoor air quality and prevent summertime overheating.

The heating strategy of the building will be designed to achieve appropriate thermal comfort levels and allow independent adjustment of heating systems within each occupied space.

All water systems in the building will be designed in order to reduce the risk of legionellosis in operation.

ENERGY

The buildings will be designed to minimise the CO2 emissions associated with its operational energy consumption. Further calculations to assess the energy performance of the building will be carried out as part of the detailed design, where initial assumptions regarding the building envelope and services will be refined.

Passive and active measures will be taken to minimise heat loss and air infiltration through the building fabric. Energy-efficient light fittings will be specified for internal and external areas of the building. External light fittings will be controlled through a time switch and daylight or occupancy sensors to prevent operation during daylight hours.

Two heating technologies are proposed to be considered for the pavilion either the installation of a dedicated condensing boiler or connection to the ground source heat pump system serving the proposed new east block building. The western entrance building extension will utilise the heating infrastructure serving the existing building.

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TRANSPORT

The proposed development is in good proximity to a public transport network which limits transport-related emissions and traffic congestion around the site.

Adequate dedicated cycle storage spaces and changing facilities, including showers, will be provided for the building users to encourage cycling (see MGA Landscape proposals)

Buggy storage has been provided for the existing nursery with extra space provision available for the pavilion building to encourage walking to the development.

The site layout will be designed in order to provide safe and secure pedestrian and cycle access routes within the development.

A well-planned site layout and access to the site will also ensure that safety is maintained during deliveries and manoeuvring, and disruption due to delivery vehicles minimised.

WATER

The buildings will minimise the consumption of potable water in sanitary applications. Low water use fixtures and fittings, such as timed automatic shut-off taps (e.g. push taps), electronic sensor taps, low flow screw down/lever taps and/or spray taps, will be specified where possible. Flow restrictors will be fitted in showers.WCs will be provided with dual flush cisterns and fitted with delayed action inlet valves.

MATERIALS

Construction materials with a low environmental impact over the full life cycle of the building will be specified. Materials for major building elements, external hard landscaping and boundary protection, including thermal insulation materials, will aim to achieve a 'Green Guide to
Specification' rating of A or A+, wherever feasible.

Responsibly sourced materials for key building elements, including thermal insulation materials, will be specified whereever feasible. Additionally, any timber used in these elements will be legally sourced and FSC certified. The intent of the project is to select suppliers who can provide an environmental management system (EMS) certificate (e.g. EMAS/ISO14001 certificate).

Adequate protection will be given to vulnerable parts of the building and landscape to minimise the frequency of material replacement. Areas exposed to high pedestrian traffic, vehicular and trolley movements will be considered for such treatment.

WASTE

The contractor will be encouraged to implement a Site Waste Management Plan (SWMP) to maximise the sustainability value of the construction process.

Construction waste materials will be sorted into separate key waste groups either on-site or off-site and diverted from landfill. Wherever feasible, non-hazardous construction waste generated by the project will be reused, salvaged/reclaimed, recovered, recycled on-site or off-site and/or returned to the supplier.
Recycled and/or secondary aggregates will be used in construction, thereby reducing the demand for virgin material.

An adequate dedicated storage space for recyclable waste generated by the building's occupants will be provided. This will enable appropriate management of waste disposal during the building's operation.

A dedicated space for compostable food waste will be located next to the recyclable and non-recyclable waste storage. Compostable food waste will be stored prior to collection and delivery to an alternative composting facility. This will enable reduction of compostable organic waste sent to landfill during the building's operation.

LAND USE & ECOLOGY

Existing ecological features surrounding the construction zone and site boundary area, such as trees of significant ecological value, will be adequately protected from damage during site preparation and construction works.

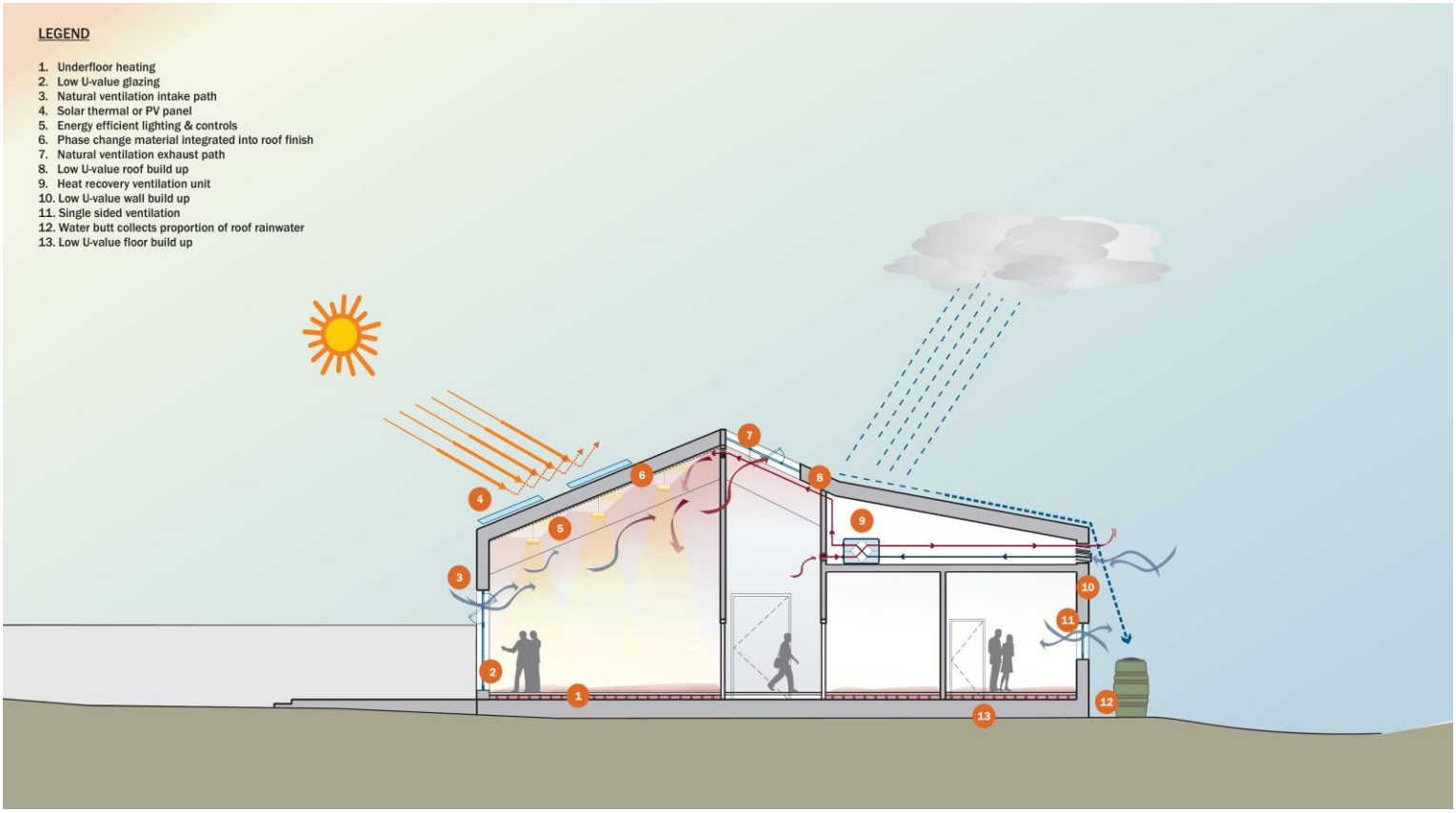
The impact of the building development on the existing site ecology will be minimised. The change in ecological value of the site in terms of plant species will be positive. The ecological value of the site will be maintained and enhanced as a result of development.

The long term impact of the development on the site's, and surrounding area's, biodiversity will be minimised. All relevant UK and EU legislation relating to protection and enhancement of ecology will be complied with during the design and construction process.

POLLUTION

The refrigerants used within the building services will have a global warming potential (GWP) less than five to reduce their contribution to climate change.

PAVILION BUILDING ENVIRONMENTAL SECTION



PAVILION/CARETAKER HOUSE SERVICES

The pavilion building consists of living quarters for the caretaker, flexible teaching spaces, office and ancillary accommodation. The pavilion building services strategy will comply with the building Bulletin guidelines for schools and the building regulation requirements.

Natural Ventilation

The proposed building usage and load profile enables a natural ventilation solution to be utilised. A passive ventilation solution has negligible running cost which will help achieve a low EPC rating for BREEAM. The effectiveness of a natural ventilation solution is dependent on the thermal mass of the building and providing high ventilation rates through the building.

It should be noted that natural ventilation is reliant on the ambient temperature so if there is a number of days in the year when the outside temperature is above average the spaces will be a little warmer. The building regulations and building Bulleting guidelines captures this by allowing the internal temperature to exceed 28 deg C for 1 % of the occupied hours.

The play and creative spaces will adopt a cross flow ventilation strategy, fresh air will be introduced to the spaces by openable windows or dampers integrated with external louvers within. Stale exhaust air from the space will be exhausted through shafts at the opposite end of the room or an air path created above the storage area to an external louvre.

The adult space will also adopt a cross flow ventilation strategy, windows or louvres will be provided in both external walls to provide a ventilation path. The smaller rooms will have an opeanble window or louvre to provide single sided ventilation.

A successful natural ventilation system allows the spaces to be night purged during the summer nights to exhaust residual heat build up and to store 'Coolth' within the structure help to modulate internal temperatures for the next warm day. The windows could be left open during the night to allow night cooling however this presents a security risk. Providing ventilation through a louvre and damper arrangement reduces the security risk and still allows an air path into the building.

The free area opening for the fresh air intake and exhaust should each have a free area equal or greater than 8% of the floor area served. The smaller rooms using a single sided ventilation solution should have a free area equal or greater than 12% of the floor area served. The night time purge area should be 2.5% of floor area or greater.

Mechanical Ventilation

The play, creative and adult space may also be mechanically ventilated during the winter months. The ventilation unit for this would incorporate a heat recovery element that uses the warmer extract air to heat the incoming cold ambient air. The alternative option is to open windows to provide ventilation which will result in draughts for the occupants and increased heating energy consumption and cost.

The heat recovery unit will be ceiling mounted and requires an approx area of 2500mm (L) x 1000mm (W) x 300mm(D) this unit will serve all zones. The ductwork distribution requires a clear ceiling void of between 200-250 mm to the spaces.

In addition to the above extract fans will be provided to the kitchen and toilet areas to comply with building regulations. The kitchen ventilation capacity will need to align with the kitchen equipment (fryers, oven etc) and usage. It is envisaged that the kitchen will utilise a domestic size canopy and fan rather than a commercial type set up

Caretaker House Ventilation

The caretaker accommodation will be naturally ventilated via openable windows. A whole house heat recovery ventilation system may also be incorporated to provide continuous fresh air during the year and heat recovery during the winter months.

This unit would be located within the roof space and requires a zone of 400mm (L) x 400mm(W) x250mm (D)

Pavilion/Caretaker Heating and hot water generation

There are three options that can be considered for providing heating and hot water to the pavilion building, options are outlined as follows:-

a) Dependant on program and procurement the pavilion hot water could be provided from the new east building which will have a ground source heat pump system and boilers.

b) Heating pipework could be extended from the existing building. The capacity of these boilers will not be able to cater for the additional heating load of the pavilion and western entrance works. Therefore upgrade of the equipment will be required.

c) Install a dedicated boiler to serve the Pavilion. Building.

Options a) and c) can be developed for the pavilion building heating and are both viable. If the pavilion is to be built before the east building a modular boiler can be installed with heating pipework configured to allow for a future connection to the ground source heat pump system.

The boiler and ancillary equipment requires a zone 1000mm (W) x 800mm(D) x 2000mm(H) , an additional zone of 800mm (W) x 800mm (D) x 2000mm(H) should be provided for the domestic hot water cylinder and ancillary equipment.

The heat emitters for the building will be either underfloor heating or radiators. The underfloor heating solution provides good occupancy comfort and the low flow and return temperatures complements the ground source heat pump system. The integration of the pipework within the floor compared to a radiator solution gives the user group more flexibility for furniture and room layouts.

The underfloor heating manifold requires a zone at low level and will be ideally located within the same cupboard as the boiler.

Drainage Services

The above ground drainage and rainwater will be connected to the existing below ground drainage infrastructure distributing around the site.

Electrical Services

It is anticipated that the pavilion will be served from the electrical supply that currently serves the Portakabin accommodation on the site. An electrical load test on the existing building will need to be carried out to verify the spare capacity available for the pavilion.

WESTERN ENTRANCE BUILDING

The western entrance building incorporates an entrance Gallery Space, Reception, interactive education classroom and ancillary spaces. The teaching spaces will be designed to comply with the building Bulletin for schools guidelines and building regulations.

Natural Ventilation

The introduction of fresh air to the western entrance building needs to be carefully controlled to ensure the rooms do not overheat in summer and can be controlled in winter to provide fresh air to the occupants. A passive ventilation strategy would offer a low cost approach for this type of building and usage.

The entrance gallery, training Hub, meeting room, resource centre and office will adopt a cross flow ventilation solution in the form of openable windows or louvers within the facades to allow fresh cooler air into the rooms and stale exhaust air to outside.

A good natural ventilation strategy allows the spaces to be night purged during the summer nights to allow the internal space to store 'Coolth' for the next day. The windows could be left open during the night to allow for cooling but this presents a security risk. Providing ventilation through a louvre arrangement reduces the security risk.

The free area opening for the incoming fresh air and exhaust from the various spaces should be based on 8% of the floor area. Night cooling area should be 2.5% of floor area.

Mechanical Ventilation

The gallery space, Interactive education space creative and adult space may be served by a heat recovery ventilation unit.

The heat recovery ventilation unit would be ceiling mounted and requires an approx area of 2500mm (L) x 1000mm (W) x 300mm(D) for the unit to be located. The ductwork distribution requires a clear ceiling void of between 200- 250 mm to the spaces.

Extract ventilation will be provided to the toilet areas to comply with building regulations.

Heating and hot water generation

The heating pipework from the existing building will be extended to serve the new rooms. The existing boiler pump circuits and controls will need to be modified to deliver the additional capacity to the new areas.

The heat emitters for the building are likely to be linked to the existing building heating system.

Drainage Services

The above ground drainage and rainwater will be connected to the existing below ground drainage infrastructure distributing around the site.

Electrical Services

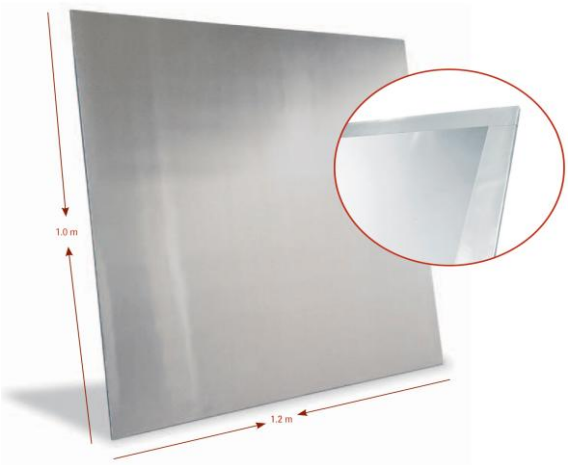
It is anticipated that the western building electricity supply will be taken from the local distribution boards. To determine the spare capacity available for the extension an electrical load test will need to be conducted.

BUILDING THERMAL PROPERTIES

The table below shows the thermal performance that the pavilion and western building will need to be designed to comply with the building regulations. For comparison the PassivHaus standard has been noted and shoud be considered as a target value if it can be afforded.

ELEMENT	PART L 2010	PASSIVHAUS
Walls	0.2 W/m2/K	0.1 to 0.15 W/m2/k
Exposed floor	0.2 W/m2/K	0.1 to 0.15 W/m2/k
Roof	0.2 W/m2/K	0.1 to 0.15 W/m2/k
Windows	1.8 to 1.5 W/m2/k	0.8 W/m2/k
Doors	1.8 to 1.5 W/m2/k	0.8 W/m2/k

The natural ventilation solution relies on the thermal mass of the building to abosrb heat during the warmest days of the year. If the building is a light weight structure a phase change material can be incorporated into the finishes buildup. This material absorbs heat when the internal temperature is above 24 degC and omits heat when the internal temperature drops to 18 degC.



Phase Change Material (PCM) : DuPont
Energain thermal mass panel

DESIGN CRITERIA

INTERNAL TEMPERATURES

OFFICES

SUMMER

Shall not exceed 28°C for more than 1% of annual occupied hours.

WINTER

20+/- 2°C

TEACHING SPACES

SUMMER

Shall not exceed 28°C for more than 1% of annual occupied hours.

WINTER

20+/- 2°C

WC

SUMMER

No control

WINTER

20+/- 2°C

VENTILATION RATES

WC areas	6 air changes hour
Kitchen (commercial)	25 air changes hour
Kitchen (domestic)	60 l/s
Bathroom (domestic)	15 l/s
Office	Natural vent
Teaching spaces	Natural vent + mech vent
Interactive space	Natural vent + mech vent

LIGHTING

Teaching spaces	300 – 350 lux
Corridors & stairs	200 lux
Toilet ares	200 lux
Offices	300 – 500 lux

WATER SERVICES

WC	4 litres/minute
Wash hand basin	6 litres/minute
Sink	6litres/minute
Shower	9 litres/minute

ELECTRICAL PROVISION

Lighting	10-12 W/m2
Small Power	25 W/m2