



Steris
Loverock Road Reading
Sustainability Statement

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Contents

<u>Section</u>	<u>Description</u>	<u>Page</u>
1.0	Introduction	3
2.0	Energy Efficiency	5
3.0	Appraisal of Renewable and Low Carbon Technology Energy Options	8
4.0	Summary and Conclusions	12

1.0 Introduction

In accordance with the Reading Borough Local Plan adopted November 2019 and the Reading Borough Sustainability Appraisal Scoping Report 2014 ,Couch Perry Wilkes (CPW) have produced the following Sustainability Statement to support the proposed alterations and refurbishment of industrial premises at Loverock Road Reading.

With the current emphasis placed on energy conservation the focus will be to enhance the development's sustainability credentials.

To this end, the proposed design shall promote reduced CO₂ emissions from delivered energy consumption by minimising operational energy demand through best-practice measures.

1.1 Approach to Addressing Planning Policy Requirements

With reference to the key requirements of the Reading Borough Local Plan parts CC2, CC3, CC4 and CC5 this sustainability statement serves to demonstrate how the proposed scheme will:

- Incorporate energy efficiency measures and best practice design to reduce the inherent energy demand of the scheme and achieve a carbon dioxide (CO₂) reduction against Building Regulations Part L 2013 standards.
- Incorporate recycled materials and materials with low embodied energy impact.
- Incorporate water efficiency measures.
- Incorporate measures to reduce waste.
- Incorporate measures to encourage sustainable transport

This report supplements and should be cross referenced to the SGP Design and Access Statement dated 25TH March 2021.

The Reading Borough Local Plan specifically states the following under CC2, CC3, CC4 and CC5 which are directly taken from the document

CC2: SUSTAINABLE DESIGN AND CONSTRUCTION

Proposals for new development, including the construction of new buildings and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.

CC3: ADAPTATION TO CLIMATE CHANGE

All developments will demonstrate how they have been designed to incorporate measures to adapt to climate change. The following measures shall be incorporated into development:

- *Wherever possible, new buildings shall be orientated to maximise the opportunities for both natural heating and ventilation and reducing exposure to wind and other elements;*
- *Proposals involving both new and existing buildings shall demonstrate how they have been designed to maximise resistance and resilience to climate change for example by including measures such as solar shading, thermal mass, heating and ventilation of the building and appropriately coloured materials in areas exposed to direct sunlight, green and brown roofs, green walls, etc;*
- *Use of trees and other planting, where appropriate as part of a landscape scheme, to provide shading of amenity areas, buildings and streets and to help to connect habitat, designed with native plants that are carefully selected, managed and adaptable to meet the predicted changed climatic conditions; and*
- *All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change*

CC4: DECENTRALISED ENERGY

In meeting the sustainability requirements of this plan, developments of the sizes set out below shall demonstrate how consideration has been given to securing energy for the development from a decentralised energy source.

Any development of more than 20 dwellings and/ or non-residential development of over 1,000 sq m shall consider the inclusion of decentralised energy provision, within the site, unless it can be demonstrated that the scheme is not suitable, feasible or viable for this form of energy provision.

Where there is existing decentralised energy provision present within the vicinity of an application site, further developments of 10 dwellings or more or non-residential development of 1,000 sq m or more will be expected to link into the existing decentralised energy network or demonstrate why this is not feasible.

CC5: WASTE MINIMISATION AND STORAGE

Development should demonstrate measures to minimise the generation of waste in the construction, use and life of buildings and promote more sustainable approaches to waste management, including the reuse and recycling of construction waste and the promotion of layouts and designs that provide adequate, well-designed space to facilitate waste storage, reuse, recycling and composting.

2.0 Energy Efficiency

In order to deliver environmentally responsible building stock, an exemplar approach is being proposed based on low energy design principles and this approach involves energy demand minimisation and proficient use of services.

Long term energy benefits are best realised by reducing the inherent energy demand of the building in the first instance. These benefits are described and quantified in the narrative which follows.

It is imperative that the lighting design philosophy provides the correct quality of lighting with minimum energy input and hence reduce internal heat gains. In the building energy efficient lighting (including LEDs with an efficacy of 80 lumens per circuit Watt,) will be deployed throughout and lighting schemes will be appropriately zoned to allow control of luminaires via switches/absence detection and daylight sensors. Output performance or Light Output Ratios (LORs) will exceed 80%.

To complement the significant improvements in lighting provision the building services heating and ventilation systems being proposed will also drastically reduce the inherent energy consumption of the site.

The provision of an effective control and metering philosophy is fundamental to the efficient operation of the building's environmental services. All development proposals will factor in high quality design and high environmental standards, demonstrating both sustainable and passive construction methods and the following provides an overview of the measures that are proposed:

- Use of air source heat pumps as low and zero carbon renewable energy systems
- Low NO_x high efficiency condensing gas boilers.
- Low temperature flow and return hot water heating to maximise heat generating efficiency and minimise distribution losses.
- High efficiency hybrid heat recovery ventilation with automatic control strategy to the office spaces.
- Extensive use of free air cooling when external ambient air temperature is suitable and can be used as part of the ventilation system to help cool the internal areas without the need to use mechanical cooling
- Zoning of mechanical ventilation systems.
- Modular open architecture controls systems and associated network.
- High efficiency low energy motors to be used to drive mechanical ventilation systems.
- Variable speed pumps and fans to be used to promote lower operating costs and help match energy usage with the operating profile and occupancy of the building.
- Sub-metering to be provided such that approximately 90% of the input energy from each utility service may be accounted for at end use. The Building Management System (BMS) will be interfaced to provide automatic monitoring and targeting of all sub-meters to promote energy management and deliver lower consumption.
- External lighting to the car parking and service yard areas will employ the latest lighting technology including LED's where appropriate.
- Low water use taps and WCs with automatic shut off valves to reduce water demand
- Water saving features are installed on the Porous Load Autoclaves to reduce water consumption

- Grey water recovery systems to capture water being discharged from the washers and autoclaves during stages of their work cycle and to then recycle this to mix with high temperature water discharge from the same machines to blend the hot discharge temperature down to less than 43 degrees C before release to the public sewer thus saving the need to use direct mains cold water to blend with the hot discharge
- Whole building power factor to be greater than 0.95
- Electric charging points for electric vehicles to be provided to cover 10% of the parking bays (4 bays)
- Incorporating the use of recycled and energy efficient materials Incorporating the use of locally sourced building materials
- Reducing waste and pollution and making adequate provision for the recycling of waste
- Non VOC paint and FSC accredited European sourced joinery

2.1 Building Design – Water Conservation

In order to reduce the environmental impact on water resources as a result of the development, it is proposed that all toilets will be low water capacity, taps will be push button type and water consumption will be tightly monitored. Sanitary supply shut-off control will also be incorporated into the design.

Water saving measures will be integral to the specialist autoclaves and a grey water recovery system shall be used to capture and recycle water discharged from the autoclaves and washers.

2.2 Building Design – Materials of Construction

The design intention is to use locally sourced A and A+ rated construction materials (as defined by the Green Guide to Specification), wherever practical, with associated low embodied carbon impact. Timber will be from certified and renewable FSC approved sources.

Construction product efficiency (off-site pre-fabrication) will be considered along with the utilisation of a local workforce to reduce the environmental impact over the construction life cycle.

2.3 Building Design – Operational Waste Management

Dedicated storage facilities and bin store for the building's operational related recyclable waste streams shall be utilised so that waste can be diverted from landfill or incineration...Facilities will be clearly labelled to assist with the segregation, storage and collection of the recyclable waste streams. A delivery and service management plan will be developed to support this.

2.5 Sustainable Transport

A travel plan is being developed as part of the process to consider all types of travel relevant to the building users; encouraging the reduction of user reliance on forms of travel that have the highest environmental impact.

Staff will be able to continue to work as they have previously as the refurbished facility in Loverock Road is within an approximate 200 metres distance from the facility in Portman Road where they currently work. There will be no increase in the use of cars for travel to work at the new facility. Those staff travelling to work by public transport, on foot or by bicycle will be able to continue to do so without any changes.

Sustainability Statement

For further information refer to the SGP Design and Access Statement dated March 2021

The travel plan will consider and include measures to minimise car-based travel patterns:

- Providing parking priority spaces for car sharers
- Providing electric vehicle (EV) charging infrastructure and conveniently located EV charging stations – EV charging points will be provided as part of the base build to a number of car park bays.
- Providing dedicated and convenient cycle storage and changing facilities

3.0 Appraisal of Renewable and Low Carbon Technology Energy Options

The technical feasibility and economic viability of installing each LZO technology at the Loverock Road development have been assessed in order to discount any unsuitable options at an early stage. A summary of the feasibility process is tabulated below and an overview of each viable technology is given subsequently.

Technology	Brief Description	Benefits	Issues/Limitations	Feasible for site
Solar Photovoltaic	Solar photovoltaic panels convert solar radiation into electrical energy through semiconductor cells. They are not to be confused with solar panels which use the sun's energy to heat water (or air) for water and space heating.	Low maintenance/no moving parts Easily integrated into building design	Any overshadowing reduces panel performance Panels ideally inclined at 30° to the horizontal facing a southerly direction	No because majority of the roof area is already fitted with roof lights and so there is little to no useable roof space that has safe and adequate access
Solar Thermal	Solar thermal energy can be used to contribute towards space heating and hot water requirements. The two commonest forms of collector are panel and evacuated tube.	Low maintenance Little/no ongoing costs Income generated from Renewable Heat Incentive (RHI) scheme	Must be sized for the building hot water requirements Panels ideally inclined at 30° to the horizontal facing a southerly direction	No due to limitations of available roof space as mentioned above
Ground Source Heat Pump (GSHP)	GSHP systems tap into the earth's considerable energy store to provide both heating and cooling to buildings. A number of installation methods are possible including horizontal trench, vertical boreholes, piled foundations (energy piles) or plates/pipe work submerged in a large body of water. The design, installation and operation of GSHPs is well established.	Minimal maintenance Unobtrusive technology Flexible installation options to meet available site footprint Income generated from Renewable Heat Incentive (RHI) scheme	Large area required for horizontal pipes Full ground survey required to determine geology More beneficial to the development if cooling is required Integration with piled foundations must be done at an early stage	No, prohibitively expensive installation costs
Air Source Heat Pump	Electric or gas driven air source heat pumps extract thermal energy from the surrounding air and transfer it to the working fluid (air or water).	Efficient use of fuel Relatively low capital costs Income generated from Renewable Heat Incentive (RHI) scheme	Specialist maintenance. More beneficial to the development if cooling is required Requires defrost cycle in extreme conditions Some additional plant space required	Yes

Sustainability Statement

Technology	Brief Description	Benefits	Issues/Limitations	Feasible for site
Wind Turbine (Stand-alone column mounted)	Wind generation equipment operates on the basis of wind turning a propeller, which is used to drive an alternator to generate electricity. Small scale (1kW – 15kW) wind turbines can be pole or roof mounted.	Low maintenance/ongoing costs Minimum wind speed available (www.bwea.com) Excess electricity can be exported to the grid	Planning issues Aesthetic impact and background noise Space limitations on site Wind survey to be undertaken to verify 'local' viability	No, not suitable on this site
Wind Turbine (Roof Mounted)	As above	Low maintenance/ongoing costs Minimum wind speed available (www.bwea.com) Excess electricity can be exported to the grid	Planning issues Aesthetic impact and background noise Structural/vibration impact on building to be assessed Proximity of other buildings raises issues with downstream turbulence Wind survey to be undertaken to verify 'local' viability	No, not suitable on this site
Gas Fired Combined Heat and Power	A Combined Heat and Power (CHP) installation is effectively a mini on-site power plant providing both electrical power and useful heat. CHP is strictly an energy efficiency measure rather than a renewable energy technology.	Potential high CO ₂ saving available Efficient use of fuel Excess electricity can be exported to the grid Benefits from being part of an energy centre/district heating scheme	Maintenance intensive Sufficient base thermal and electrical demand required Some additional plant space required	No, limited domestic hot water requirements
Bio-fuel Fired Combined Heat and Power	As above.	Potential high CO ₂ saving available Efficient use of fuel. Excess electricity can be exported back to the grid. Benefits from being part of an energy centre/district heating scheme Income generated from Renewable Obligation Certificates (ROCs) and Renewable Heat Incentive (RHI) scheme	Maintenance intensive. Sufficient base thermal and electrical demand required. Significant plant space required. Biomass fuelled systems are at early stages of commercialisation. Large area needed for fuel delivery and storage, Reliable biomass fuel supply chain required	No, not suitable on this site

Sustainability Statement

Technology	Brief Description	Benefits	Issues/Limitations	Feasible for site
Bio-Renewable Energy Sources <i>(Automated feed – wood-fuel boiler plant)</i>	Modern wood-fuel boilers are highly efficient, clean and almost carbon neutral (the tree growing process effectively absorbs the CO ₂ that is emitted during combustion). Automated systems require mechanical fuel handling and a large storage silo.	Stable long term running costs Potential good CO ₂ saving Income generated from Renewable Heat Incentive (RHI) scheme	Large area needed for fuel delivery and storage Reliable fuel supply chain required Regular maintenance required Significant plant space required	No, not suitable on this site
Fuel Cells and Fuel Cell Combined Heat and Power	Fuel cells convert the energy of a controlled chemical reaction, typically involving hydrogen and oxygen, into electricity, heat and water vapour. Fuel cell stacks operate in the temperature range 65°C – 800°C providing co-generation opportunities in the form of Combined Heat and Power (CHP) solutions.	Zero CO ₂ emissions if fired on pure hydrogen and low CO ₂ emissions if fired on other hydrocarbon fuels Virtually silent operation since no moving parts High electrical efficiency Excess electricity can be exported back to the grid Benefits from being part of an energy centre/district heating scheme	Expensive Pure hydrogen fuel supply and distribution infrastructure limited in the UK Sufficient base thermal and electrical demand required Some additional plant space required Reforming process, used to extract hydrogen from alternative fuels, requires energy; lowering overall system efficiency	No, expensive, emerging technology

Table 1. Summary of Renewable and Low Carbon Technology Energy Options

3.1 Air Source Heat Pumps

Electric driven air source heat pumps extract thermal energy from the surrounding air and transfer it to the working fluid (air or water). Like GSHPs they can provide both heating and cooling to buildings and have an associated Coefficient of Performance (COP). This is typically around 3 to 4 for heat pumps driven by compressors powered by electric motors and incorporating Variable Refrigerant Flow (VRF) technology. With VRF technology, there is an opportunity to heat and cool separate spaces and recover the heat between them.



Figure 1. Air Source Heat Pumps

Care should be taken when mounting the units to avoid any acoustic problems associated with operating the fans. The outdoor units normally operate with sound levels typically in the range 55 - 60dB(A).

A downside of electric driven air source heat pumps is that they require a defrost cycle in extreme conditions which impacts on the system efficiency. Heating capacity also falls off as the ambient temperature drops below 5°C but still maintains 80% capacity at -5°C.

Stiebel Eltron offer a small footprint (1.7m width x 2.0m depth x 1.5m height) air-to-water unit, rated at 30kW (ambient air temperature of +2°C and a flow temperature of +35°C to the heating system – ideally under floor). Units are either roof or ground mounted and coupled to a thermal buffer store with additional back-up electric immersion heaters in the cylinder, to make up any shortfall. Alternative heat pump solutions can be supplied for internal installation within a plant room.

Air source heat pump systems are scalable to meet the specific demands of the development, but for this study, assume that the office areas are being targeted.

4.0 Summary and Conclusions

A Sustainability Statement has been produced for the proposed alterations and refurbishment of industrial premises at Loverock Road Reading in order to meet with the aspirations of the Reading Borough Local Plan adopted November 2019 and the Reading Borough Sustainability Appraisal Scoping Report.

In order to deliver environmentally responsible building stock, an exemplar approach is being proposed based on low energy design principles. In summary, this approach involves energy demand minimisation through effective use of building services.

Long term energy benefits are best realised by reducing the inherent energy demand of the buildings in the first instance before considering deployment of appropriate renewable technologies to decarbonise the development's energy supply albeit to this effect air source heat pump installations shall be employed as a renewable technology for the heating and cooling needs along with the use of free air cooling and heat recovery ventilation systems.

Extensive water saving measures shall be employed throughout.

A travel plan will be developed as part of the process to consider all types of travel relevant to the building users; encouraging the reduction of user reliance on forms of travel that have the highest environmental impact.

Dedicated storage facilities for the building's operational related recyclable waste streams, so that waste can be diverted from landfill or incineration.