

1647 - The HexBox

Sustainability Statement

On behalf of Reading Borough Council
Rev 4.0 / 12/01/2024/ Planning

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1 Executive Summary

1.1 Project Summary

The following Sustainability Strategy Statement has been prepared by Skelly and Couch Ltd, on behalf of Reading Borough Council, to support their planning application for the extension of the Hexagon Theatre to provide a new Studio Theatre.

The proposal for the scheme is to:

- Demolition of an existing extension and provision of a new Studio Theatre.
- Internal alterations to the Hexagon to enable this.
- Provision of new roof plant for the extension (located on the roof of the Hexagon Theatre).
- Installation of roof mounted PV panels.
- Provision of a foyer, Rehearsal Room, Community Room, workshop, and back of house ancillary spaces.

Further associated works include landscaping (at ground and roof level).

This sustainability strategy statement has been written to demonstrate how the scheme design meets the requirements of the Reading Borough Council and any relevant National policies and regulations, regarding sustainable development.

1.2 The Site

1.2.1 Location

The Site is located within the Minster Quarter of Reading and is bounded by the A329 to the west, Multi-Storey student residential accommodation to the north and open park land to the southeast. The ground level extension to the north of the Hexagon Theatre is to be predominantly demolished to enable the Project.



Figure 1 Site location

1.3 Client Sustainability Aspirations

Reading Borough Council has declared a climate emergency in 2019 and is seeking a strategic and coordinated approach across the Borough to mitigate climate change. The Council's Climate Emergency Action Plan sets out a commitment to work towards achieving a carbon neutral Reading by 2030.

2 Planning Context and Policies

2.1 Introduction

The need to create a more sustainable built environment for future generations has led to the introduction of a series of minimum design standards for sustainable design and construction of new and refurbished buildings. This section summarises the requirements for sustainable design from society.

2.2 National Regulations

The Building Regulations

The Building Regulations Part L - Conservation of Fuel and Power set the standards of energy efficiency that new and refurbished building work must meet when inspected by Building Control or an approved inspector.

These standards are to be achieved by limiting heat losses and excessive solar gains, installing energy-efficient fixed building services, and providing the owner with the information required to maintain the building and its services.

- Part L2A describes the requirements for new buildings
- Part L2B describes the requirement for refurbishing existing

It should be noted that the building regulations consider only regulated loads - loads that directly relate to the design of the building itself, not its use or function.

The Building Regulations only apply to new work; there is no general requirement to upgrade all existing buildings. Where a building did not initially comply with the Regulations, the alteration work should be such that afterwards, the building's compliance with the Regulations is no more unsatisfactory.

The Consequential Improvements (defined in L2B) in the table below are considered to be possible (technically, functionally and economically) and included for the redevelopment scheme accordingly.

This also includes addition of insulation to roof constructions for roofs which are not otherwise being substantially altered.

For new fabric elements, i.e. those forming the new Archive extension and any new roofs – it is proposed to meet the requirements of Approved Document L2A for new buildings as a minimum.

Table 1: Consequential Improvement option	Possible?	Included?
Upgrading heating systems more than 15 years old by provision of new plant or improved controls.	Yes	Yes
Upgrading cooling systems more than 15 years old by provision of new plant or improved controls.	no	no
Upgrading heating systems, cooling systems, air conditioning or air handling systems more than 15 years old by provision of new plant or improved controls.	Yes	Yes
Upgrading air conditioning systems more than 15 years old by provision of new plant or improved controls.	no	no
Upgrading air handling systems more than 15 years old by provision of new plant or improved controls.	no	no
Upgrading general lighting systems that have an average lamp efficacy of less than 40 lamp - lumens per circuit watt – and that serve areas greater than 100m ² by the provision of new luminaries or improved controls.	Yes	Yes
Installing energy metering.	Yes	Yes
Upgrading thermal elements having a 'U' value worse than table 5 of Part L.	Yes	Yes
Replacing existing windows, roof lights and doors	Yes	Yes
Increasing on-site low and zero carbon energy generating systems.	Yes	Yes
Other measures recommended because of the EPC.	Yes	Yes

Further, where there is an intention to add a fixed building service (such as cooling) to a part of the building that did not previously have it, or if the capacity of any fixed building service is increased (heating or cooling) then consequential improvements must be instituted. This will include implementing all technically, functionally, and economically feasible measures to improve U values of the building fabric or glazing, improving airtightness, improving controls, including renewables, or improving controls.

2.3 Local Planning Policy and Regulations

2.3.1 Reading Local Plan

The HexBox development will be expected to comply with the Reading Local Plan 2019 to meet its sustainability objectives.

The Local Plan sets out strategic planning requirements and how the council seeks to address the demands of the borough's residents and built environment. Additional detail is provided in the Sustainable Design and Construction Supplementary Planning Document 2019

which sets out the content of the Sustainability Statement in support of a planning application.

Many of the policies in the plan are applicable to major developments, for which the definition is developments over 1,000m² Internal area. It is considered that the HexBox will therefore be regarded as a major development.

The key Sustainable Development policies in the Plan are as follows:

CC2 – Sustainable Design and Construction

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.

To meet these requirements:

- All major non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Excellent' standards, where possible;
- All minor non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Very Good' standard as a minimum;
- All non-residential development or conversions to residential should incorporate water conservation measures so that predicted per capita consumption does not exceed the appropriate levels set out in the applicable BREEAM standard. Both residential and non-residential development should include recycling greywater and rainwater harvesting where systems are energy and cost effective.

CC3 – Adaption to 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

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

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.

EN18 – Flooding and Sustainable Drainage Systems

EN18: FLOODING AND SUSTAINABLE DRAINAGE SYSTEMS

Development will be directed to areas at lowest risk of flooding in the first instance, following the Sequential and Exceptions Test set out in the NPPF, and taking into account the effects of climate change. It will consider flooding from all sources, including fluvial, surface water, groundwater and sewer flooding. Where development in areas at risk of flooding is necessary, it will not reduce the capacity of the flood plain to store floodwater, impede the flow of floodwater or in any way increase the risks to life and property arising from flooding. Wherever possible, development should be designed to reduce flood risk, both on- and off-site.

All major developments³⁰ must incorporate sustainable drainage systems (SuDS) as appropriate and in line with the Government's Technical Standards³¹. Smaller schemes are encouraged to incorporate SuDS, where possible. Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site. Schemes should ensure that the movement of water through vertical infiltration as well as horizontal run-off does not worsen contamination effects. Wherever possible, SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid damage to existing significant trees, including through changes to the site hydrology. All new developments in areas of flood risk should give priority to SuDS.

3 Sustainability Strategy

3.1 Overview

A holistic sustainable design approach has been adopted when developing the design of the HexBox. The key sustainability and energy strategy measures are described within this section. The Sustainable Design Checklist for non-residential development contained within the SPD has been adopted.

The accompanying reports below should also be referred to for further details:

- Design and Access Statement (prepared by Haworth Tompkins Architects)
- Indoor Air Quality Plan (prepared by Tetra Tech).
- Ecological Assessment (prepared by Tim Moya Associates)
- Flood Risk Assessment and SUDs Report (prepared by Momentum)
- BREEAM Assessment (prepared by B-sussed).
- Acoustic Report (by Charcoalblue).
- Energy Statement (prepared by Skelly & Couch Ltd).
- Life Cycle Cost (LCC) Assessment (prepared by Verte).
- Life Cycle Assessment (LCA) (prepared by Verte).
- Pre-demolition Audit (prepared by Encore Environment).
- Security Needs Assessment (prepared by Kabsec).
- Transport Statement (prepared by Caneparo Associates).

3.2 Management

Management
<i>Aim: To recognise and encourage environmentally and socially considerate development.</i>
1. Will guidance for the non-technical building user be provided so they can understand and operate the building efficiently and understand how the design reduced the overall environmental impact of the building and raise environmental awareness? 2. What consideration has been given to resource use, energy consumption and pollution in terms of the construction site impacts? 3. Will site investigation and appropriate remedial action be undertaken? 4. Will the community and stakeholders be involved in the design process encouraging flexibly designed buildings which cater for shared use with the local community? 5. How has the building been designed to reduce the opportunity for and the fear of crime? 6. What consideration has been given to the maintenance of the building?

A Building User Guide and training schedule will be developed to provide non-technical guidance for the efficiency operation of the building and how it has been designed to reduce environmental impact and raise environmental awareness. The content of this Guide will be in accordance with BREEAM Credit Man04.

A Pre-Demolition Audit has been carried out by Encore Environment in support of the planning application and to demonstrate compliance with BREEAM WST01 project waste management credit. This audit sets targets for waste management and provides details how contractors will be engaged in the process of maximising high grade reuse and recycling opportunities as part of the project. Construction site impacts and dust management plans will be picked up in the construction method statement.

A desk study has been carried out by GEA Limited and has concluded there is considered to be a LOW RISK of there being significant contamination linkage at the site.

The Hexagon stakeholder group has been heavily involved throughout the design process and have informed both the development of the brief and design. At the outset of the project, this included the introduction of a community room for public hire, as a core component of the brief.

In December 2023, a public consultation exhibition was set up at the Hexagon to provide the opportunity for visitors and local residents to review the proposals and submit comments. The feedback from the plans have been positive. In the new year, the proposals will also be presented to an Access & Disability Working Group, and to the Reading Arts & Heritage Forum to ensure that a wide range of users are consulted, and their needs and expertise considered.

The new proposal will inherently reduce the opportunity for and the fear of crime, by increasing footfall and having an improved presence on Queens Walk. A Security Needs Assessment has also been carried out by Kabsec to support compliance with BREEM NC 2018 Hea 06 security credit. The findings have been reviewed with the client, and the recommendations have been included within the design proposals. This includes CCTV coverage, access control, clear delineation between public and staff areas and illumination to areas around the building.

The strategy for cleaning and maintenance has been carefully considered. In the first instance, Haworth Tompkins have specified a brick facade and zinc cladding system which rarely need cleaning or replacing. Brick is a robust material, and zinc is a metal which requires little maintenance. The rinsing effect of the rain is often sufficient to keep the zinc in ideal condition.

The primary issue in terms of cleaning and maintenance, is the cleaning of curtain walling concealed by the perforate zinc screen. The perforate screen is held off the glazing to enable cleaning between the two layers, which can be reached with a telescopic pole from street level. When the curtain walling needs replacing, the

cladding will need to be removed. Haworth Tompkins have designed the cladding so that it is a series of cassettes which can be individually removed, therefore, only those obstructing the glass need disassembling. The standing seam zinc can also be replaced as individual sheets, which is efficient both economically and environmentally. All other windows, such as those to the dressing rooms, have been designed based on reach and wash principals.

A series of access hatches with integrated ladders have been specified for access to the different roof levels for maintenance. When on the roof, there is a man safe system to prevent falling, which is to be used by operators who are adequately trained. This strategy has been reviewed with Haworth Tompkins’ independent CDM advisors.

A plant replacement and maintenance strategy has been developed by Skelly & Couch Ltd to enable future maintenance of main plant.

3.3 Health and Well-being

Health and Well-being
<i>Aim: To ensure a good quality amenity level is afforded to occupants of buildings.</i>
7. How has the development been designed to ensure users have sufficient daylight, an external view, adequate and appropriate lighting, ventilation, air quality and drinking water?

The following studies have informed the design:

- An Indoor Air Quality Plan by Tetra Tech (see accompanying report) that has informed the design of appropriate ventilation, furnishing and finishes to achieve adequate air quality. Natural and mechanical ventilation intakes have been located to minimise the impact of external pollutants.
- A TM52 overheating study has been carried out to ensure thermal comfort now and in future climate change scenarios. Natural ventilation will be provided to the foyer and auditorium (during non-performance mode) to minimise energy demand and optimise air quality. The provision of natural ventilation is via thermal louvres to enable secure nighttime ventilation. Where the use of the space demands high acoustic separation, precluding natural ventilation, mechanical ventilation with heat reclaim and cooling has been adopted to ensure comfort conditions.
- An internal daylight study has been carried out by Skelly & Couch Ltd detailing how the daylighting to occupied spaces such as the foyer, community space has been optimised. Daylight provision has been made to the main auditorium for

non-performance mode to enable a more pleasant working environment during rehearsal and get-in.

- Internal and external lighting will be specified to SLL and CIBSE standards, with appropriate zonal and daylight dimming control where appropriate.

3.4 Energy

Energy

Aim: To conserve energy and maximise the use of energy efficiency techniques.

8.

How has the building been designed to minimise CO2 emissions associated with their operational energy consumption?

9.

How has the development been designed to optimise the use of the energy from the sun, natural daylighting and controlled natural ventilation?

10.

How will the design of the building make efficient use of energy? (e.g. use of thermally massive materials, levels of insulation and use of green/brown roofs etc.).

11.

Have renewable energy sources or decentralised energy been considered for this development and if so, how would they be incorporated within the development?

The Energy Statement accompanying the planning submission details however the project will conserve energy and maximise the use of energy efficiency techniques.

3.5 Transport

Transport

Aim: To reduce the need to travel through appropriately located development.

12.

How has the design and layout incorporated measures to reduce the need to travel, especially by car, and promote alternative and sustainable modes of transport such as walking, cycling and the use of public transport?

13.

How have public transport networks been considered in terms of the location of the development and proximity to local amenities?

14.

How have deliveries and the manoeuvring of delivery vehicles been considered?

The proposals include improved cycle parking facilities for staff and a Travel Plan to ensure that staff and users of the development will be further encouraged to travel to the site by sustainable modes of transport.

The site is accessible by all modes with a good network of footways, cycle facilities and public transport services in the immediate vicinity. Section 3 of the Transport Statement sets out the local facilities and transport options.

The proposals include a revised servicing arrangement which separates large service vehicles from other traffic, with the swept path drawings included within the Transport Statement.

3.6 Water

Water

Aim: To improve efficiency in the use of water, conserve water resources and minimise vulnerability to flooding.

15.

How will the development incorporate the use of water saving devices to achieve a maximum consumption of 5.5 cubic m per year per person for office developments? (or the most appropriate benchmark for other types of development).

16.

Will the development and access to and from it such as roads and paths be located away from areas of potential flooding?

17.

How will the development incorporate harvesting and re-use of rainwater?

18.

Does this development meet the requirements of EN18?

The following measures into the design to ensure efficient water use:

- A water meter will be located on the mains supply to the Studio Extension and connected to a smart meter. The system will monitor use over time and will be able to detect anomalous use, for example owing to overconsumption or leakages.
- Low water use appliances meeting modern standards of water efficiency will be used. The system will also include flow-limiting devices on taps, dual-flush WC cistern controls with flow control devices and water efficient showers.
- Target sanitaryware flow rates at 1.5 bar for the installed appliances will be as follows:

Appliance	Flow rate
WC (dual flush)	6/4 litre
Showers (aerated)	< 6 litres/min
Urinals (inc. control devices)	< 1 litres/hour
Kitchenette Taps (should be aerating)	<4 litres/min
Basin Taps (should be aerating and with minimised percussion timing)	<4 litres/min

The Environment Agency flood zone mapping for planning shows the site lies entirely within Flood Zone 1 with no areas of higher flood risk nearby. There is a small area of pluvial flood indicated to the east of the site on the Environment Agency Long Term Flood Risk mapping with a low risk of an annual probability of between 0.1% (1:1000 year return period) and 1% (1:100 year return period).

The site is not considered suitable for infiltration drainage or soakaway due to the proximity of existing foundations and limited space and presence of shallow clay soils. The extension will have a

relatively low use of non-potable water and inclusion of rainwater harvesting for re-use within the building is not proposed.

The proposed scheme is to be drained using a sustainable urban drainage system based on the use of green roofs, permeable paving and attenuation with controlled outflow discharging into the existing private drainage system.

3.7 Materials

Materials

Aim: To retain local character and promote the use of materials with a low environmental impact.

19.

How will the selected materials help retain local character, ensure long life and ensure a low environmental impact, including consideration of embodied energy?

20.

What consideration has been given to reusing materials in-situ, responsibly sourcing materials and re-using existing structures?

The materiality of the new studio theatre has been carefully considered. Whilst the Hexagon is not a listed building, it is architecturally significant within Reading, and the new extension must be respectful of its materiality and scale. The predominant material of the local context is concrete, therefore, due to the high embodied carbon of concrete, we have considered materials which compliment this, rather than replicating it.

The external materiality can be broken into three distinct parts:

1. A brick plinth forming the base of the new theatre, acting as a continuation of the Hexagon, and referencing the materiality of the neighbouring Queen’s Court. The brick base will provide a robust and strong façade, which is especially important at the get-in and loading bay, offering longevity to the building. Unfortunately, following a pre-demolition audit, it is not possible to reuse the existing bricks on site. It is unlikely that an exact match will be found, but it is important that the tone and texture of the brick complement the existing.
2. Above podium level, the main mass of the building will be wrapped in a standing seam zinc cladding, to match the module of the Hexagon’s standing seam lead roof. The zinc will be pigmented red, to give the new studio its own unique character and bring some warmth to the site. Zinc has been chosen for its high sustainability properties. It is a natural material with low manufacturing energy expenditure when compared to other principal metals. Zinc is also 100% recyclable and has a low corrosion rate, therefore an inherently long lifespan.

3. The third component to the external facade, is a perforate zinc cladding system, fixed to a glazed curtain wall. The zinc will be folded into a series of trays, which when mechanically fixed to one another, will create a vertical rhythm on the facade, which references the Hexagon’s standing seam roof. The perforate screen provides solar shading whilst simultaneously permitting natural daylight internally, thus minimising energy needed for heating, cooling, and lighting.

A key strategy for keeping the embodied carbon of the new studio theatre down, is to reuse as much of the existing concrete ground floor slab as possible. The existing WC and shower block is also being retained and reused in almost its entirety. The existing blockwork walls, including those to the Hexagon Back of House corridor, will be left exposed, to minimise embodied carbon and material use. The remaining structure to be demolished is not considered suitable for reuse or recycling due to the presence of RAAC, and asbestos. Much of the proposed new structure will be timber, with low environmental impact in mind.

3.8 Waste

Waste
<i>Aim: To minimise the production of waste and maximise re-use and recycling.</i>
21. Has an audit of the materials present on the site been conducted with an assessment of the extent to which materials could be re-used?
22. How will the development make the maximum use of construction, demolition waste and recycled materials?
23. How will provision be made for the storage and recycling of waste for all users of the site?

A Pre-Demolition Audit has been carried out by Encore Environment in support of the planning application and to demonstrate compliance with BREEAM WST01 project waste management credit. This audit sets targets for waste management and provides details how contractors will be engaged in the process of maximising high grade reuse and recycling opportunities as part of the project. Construction site impacts and dust management plans will be picked up in the construction method statement.

The pre-demolition audit revealed that most of the materials on site will not be suitable for reuse within the new development. Therefore, the appointed contractor will be responsible for segregating these materials and ensuring that they are recycled.

Whilst the materials on site aren’t suitable for reuse within the project, Haworth Tompkins have specified materials with low embodied carbon and high recycled content, including timber, zinc, recycled rubber, and woodwool. Where possible, these materials will

be manufactured as locally as possible or supplied from circular sources to minimise their embodied carbon.

The existing Hexagon theatre have a centralised bin store, located below the Queen’s Court student accommodation, north of the site. The proposal for the new studio theatre is to maintain the existing waste and refuse strategy. Each room, and the foyer bar, will have dedicated waste and recycling bins. These can be emptied during intervals or after productions, as the route from the foyer bar to the external bin is through the Front of House spaces. A new food waste refuse has been proposed in the same location as the centralised store, which will require running water.

3.9 Land Use and Ecology

Land Use and Ecology
<i>Aim: To retain, protect and enhance wildlife habitats and natural features.</i>
24. How have the wildlife habitats and natural features on and adjacent to the site been considered and how will they be retained, protected and enhanced?
25. What consideration has been given to not using previously undeveloped land?
26. What consideration has been given to the removal of contamination from the land?

The project seeks to maximise Biodiversity Net Gain on site. The key ways of achieving this are proposals of biodiverse green roofs and retention of trees within the site. An important habitat adjacent to the site is the hedgerow that creates a physical buffer to the Inner Distribution Road. The hedge lies predominantly outside of the site boundary, with a small area (approx. 0.014 km) encroaching onto the site. Due to the limited area within the site, it is not considered viable to enhance the condition of the hedgerow.

All of the proposals are limited to areas of previously developed land.

3.10 Pollution

Pollution
<i>Aim: To minimise damage to the environment through air, ground/surface water, land, noise or light pollution.</i>
27. What measures have been incorporated to ensure that noise and light pollution plus pollution transported through surface water runoff or infiltration will be minimised through the development?
28. What measures have been incorporated to ensure that light pollution will be minimised through the development?
29. What consideration has been given to reducing refrigerants and minimising nitrogen dioxide emissions?
30. How has the development been sited to minimise the impact of flooding?
31. How has the design considered the use of sustainable drainage systems (SuDS) and how will they be incorporated within the development?

The site is not considered suitable for infiltration drainage or soakaway due to the proximity of existing foundations and limited space and presence of shallow clay soils. In the event of rainfall exceeding the capacity of the drainage systems, overland flows could

develop from the drainage systems on the site. The proposed building is in replacement of an existing building at the same location, and the paved areas to east and west will be at broadly the same levels as the existing paved areas. Therefor the overall exceedance flow routes and risks will not be significantly changed in the proposed situation.

An environmental noise impact assessment has been carried out by Charcoalblue. This includes a background noise level survey to establish existing background noise levels and design criteria at the nearest noise sensitive receptors (10dB below existing, encompassing an aggregate of all new noise sources). These target levels have been used to inform the design of the project.

The ‘ILE Guidance Notes for the Reduction of Light Pollution’ and BS EN 5489-Part 1 have been used as guidance on the appropriate exterior luminance criteria and light levels to design to. The following criteria has been used, assuming that the HexBox is best classed as an E4 Zone rating:

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

ILE Guidance Notes for the Reduction of Light Pollution sets out the following limitations on external lighting installations within E4 environmental zones:

Light technical parameter	Application conditions	Environmental zone				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (E _v)	Pre-curfew	n/a	2 lx	5 lx	10 lx	25 lx
	Post-curfew	n/a	<0.1 lx*	1 lx	2 lx	5 lx

There is minimal external lighting proposed as part of the scheme and it consists of the following features:

- Surface mounted downlights to the underside of building overhangs, to provide illumination to the road and building entrances.
- Building wall mounted fittings to provide illumination for pedestrians to key site areas and emergency lighting adjacent to entrance/exit doors.

- Wall/fence mounted fittings, providing illumination for pedestrians to key site areas (to replicate the existing lighting provision to the pedestrian walkway to the north of the building.
- Recessed downlights to the new entrance canopy to the foyer.

The following criteria from BS EN 5489-Part 1 has been used to ensure the proposed lighting scheme provides acceptable levels of illuminance for navigation across key areas of the site, during non-daylight hours.

External area	Lux level
External walkways	5
External entrances	20

The ASHPs will be hermetically sealed and utilise R454B refrigerant with Global Warming Potential (GWP100) of 467 and DELC CO₂e of <1000 kgCO₂e/kW to achieve the BREEAM Excellent minimum Standard for Pol 01 Impact of Refrigerants.

Gas Boilers will not be installed as part of the scheme and Nitrogen Dioxide emissions are therefore not envisaged.

Refer to Section 3.6 of this Sustainability Statement for details of how the development has been sited to minimise the impact of flooding and how SUDs has been incorporated into the design.

3.11 Innovation

Innovation
<i>Aim: To recognise innovation in the field of sustainability.</i>
32. What consideration has been given to innovative sustainability measures in terms of a procurement strategy, design feature, management process or technological

Innovative sustainability measures included within the scheme include:

Auditorium Natural Ventilation:

A secure means of nighttime ventilation will be provided by low and high level louvres with thermally insulated and automated louvres behind. A thermally insulated supply plenum will run from roof level to the ground floor acoustically attenuated sub-stage plenum with a dedicated acoustically attenuated exhaust chimney at roof level. The automated louvres will be controlled on temperature and CO₂ levels in the space in order to minimise fan energy use. During periods of high occupancy and peak summer/winter a mechanical supply fan will be brought on to provided heated air in winter and cooled air in summer.

Foyer Natural Ventilation:

A secure means of nighttime ventilation will be provided by low and high level louvres with thermally insulated and automated louvres behind. They will be controlled on temperature and CO₂ levels in the space. During periods of high occupancy and peak summer the doors to the foyer at podium level will be left open for boost ventilation. Cooling provision has been made to the fan coil units in the foyer to enable climate resilience for future climate change scenarios.

4 Appendix I Overheating report.