Environmental Sustainability Plan

Building H & Associated Public Realm

King's Cross Central General Partner Ltd

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King's Cross

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Audit sheet

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Contents

Audit sheet	3
1. Executive summary	6
1.1 OPP Condition 17(a) and S 106 Section X - Energy efficiency measures proposed	6
1.2 OPP Condition 17(b) and S106 Section X - Reduction in carbon emissions	7
1.3 OPP Condition 17(d) and S106 Section X - Energy Supply	7
1.4 OPP Condition 17(c) and Condition 46 - Green and / or Brown Roofs	7
1.5 OPP Condition 17 (e) and S106 Section AA - BREEAM Rating	7
1.6 OPP Condition 17 (f) – Wildlife Features	8
1.7 OPP Condition 45 - Drainage	8
1.8 S106 Section AA - Water Efficiency	8
1.9 S106 Section Y - Construction materials and waste	8
1.10 S106 Section Z - Operational waste management	9
2. Introduction	0
2.1 Background and existing Outline Planning Permission	0
2.2 Approach to Part L of the Building Regulations10	0
3. Response to Outline Planning Permission (OPP) Conditions12	2
3.1 Condition 17 (a) - Energy efficiency (also relevant to S106 Section X – Energy)12	2
3.2 Condition 17(b) – Reduction in carbon emissions (also relevant to S106 Section X – Energy)	5
3.3 Condition 17(d) – Energy supply (also relevant to S106 Section X – Energy)	6
3.4 Summary of energy and carbon reduction targets18	8
3.5 Condition 46 – Green and/or brown roofs (also relevant to condition 17(c))	9
3.6 Condition 17 (e) – BREEAM20	0
3.7 Condition 17 (f) – Wildlife features23	3
3.8 Condition 45 – Drainage infrastructure24	4
4. Response to Section 106 Obligations	8
4.1 S106 - Section AA – Water	8
4.2 S106 - Section Y – Construction Materials and Waste	0
4.3 S106 - Section Z – Operational Waste	1
5. Conclusion	3
5.1 OPP Condition 17(a) and S 106 Section X - Energy efficiency measures proposed (Be	a
5.2 OPP Condition 17(b) and S106 Section X - Reduction in carbon emissions 34	4
5.3 OPP Condition 17(d) and S106 Section X - Energy Supply (Be Clean)	4
5.4 OPP Condition 17(c) and condition 46 - Green and / or Brown Roofs	4



5.5 OPP Condition 17 (e) - BREEAM Rating	34
5.6 OPP Condition 17 (f) – Wildlife features	35
5.7 OPP Condition 45 - Drainage	35
5.8 S106 Section AA - Water Efficiency	35
5.9 S106 Section Y - Construction materials and waste	35
6. Appendix A - Indicative Part L2A results (passive design and energy efficiency)	37
7. Appendix B - BREEAM 2014 New Construction Pre-Assessment Report (Shell and Core)	39
8. Appendix C - Drainage and Highway Proposals for Pavilion H and Granary Square	40



1. Executive summary

Hoare Lea has been instructed by King's Cross Central General Partnership Limited ('KCCGPL') to produce an Environmental Sustainability Plan ('ESP') to accompany the Reserved Matters submission for the proposed Building H (referred to in this report as 'Pavilion H'), which is located in Development Zone H, in the southwest corner of Granary Square, within the northern part of the King's Cross Central ('KXC') development. It is surrounded by significant historic buildings, with modern refurbishments and additions, including the listed Granary Building to the northwest, the Coal Drops Yard to the west and the Fish and Coal building to the south, with the Regent's Canal and Goods Way beyond this. The location of Pavilion H and the Reserved Matters submission boundary are shown in Figure 1 in Section 2 of this report.

The proposed development comprises the erection of a single storey building for A1/A3 use (Retail/Café), located at the Coal Drops Yard Level and details of new public realm at Granary Square level. The proposals also include public washrooms to the north of the retail unit, to serve users of Granary Square and the wider Coal Drops Yard development, and a public lift from Granary Square to Lower Stable Street. The building will provide a total floorspace of 209m² (GEA), of which 117m² is retail/Café (A1/A3) space and 92m² is public washrooms.

This Environmental Sustainability Plan is to be read in conjunction with and in the context of all the other documents forming the Pavilion H submission, including the Urban Design Report, the Planning Compliance Report and BREEAM pre-assessment, the latter being included within this document as Appendix B.

This ESP describes the strategies that have been incorporated in the design of the proposed building in response to the conditions of the KXC Outline Planning Permission (ref. 2004/2307/P) granted on the 22nd of December 2006 (The 'Outline Planning Permission' or 'OPP'). In particular, this document provides information in response to planning conditions 17, 45 and 46 of that permission, demonstrating that the building achieves a high standard of sustainability for a development of this scale in an urban environment. Furthermore, it details how relevant obligations included within sections AA, X, Y and Z of the KXC S106 Agreement will be met.

In summary, the main environmental and sustainability measures that are proposed include, but are not limited to, the following:

1.1 OPP Condition 17(a) and S 106 Section X - Energy efficiency measures proposed

Pavilion H will apply a 'fabric-first' approach to energy efficiency (i.e. passive design with focus on energy efficiency of the fabric first and foremost), and will encourage the incorporation of very efficient mechanical and electrical systems from the tenant fit-out. The tenant will be required to connect to the KXC district energy network for all heating, cooling and domestic hot water consumption.

Proposed measures include:

- Use of double glazing with solar control and good thermal performance.
- Efficient services
- Energy efficient lighting
- Metering of heating, cooling, water and electricity, encouraging the tenant to monitor and reduce consumption



1.2 OPP Condition 17(b) and S106 Section X - Reduction in carbon emissions

The energy efficiency measures set out above are expected to lead to the following carbon emission reductions prior to the connection to the King's Cross Central (KXC) District Energy Network:

 5% carbon emissions reduction over Part L2A 2013 prior to connection to the KXC District Energy Network.

Where carbon reductions are influenced by the efficiency of measures installed as part of the tenant fit-out, KCCGPL will work with the tenant to achieve the targets set within this ESP.

1.3 OPP Condition 17(d) and S106 Section X - Energy Supply

District Heating including Combined Heat and Power (CHP) has already been implemented on the wider King's Cross site as part of King's Cross Central General Partner Ltd's overall commitment to low-carbon energy distribution for the wider site. As a recent commitment, it has been decided to also implement cooling in the district energy network. This will be fed by a low carbon Combined Heating, Cooling and Power (CCHP) network. This is a low carbon cooling method, and in line with the Mayor of London's preferred strategy.

It is estimated that this connection will lead to an over-all carbon emission reduction for Pavilion H of 19-23% over the Part L2A 2013 baseline when added to the savings expected from the energy efficiency measures implemented in the design.

A review of low carbon and renewable technologies has been carried out to assess their suitability for Pavilion H.

Photovoltaic panels and Ground Source Heat Pumps were assessed in greater detail, in line with the Outline Planning Permission requirements. However, both types of systems were discounted due to site limitations, and due to the site's commitment to connect to the King's Cross District Energy Network for all heating, cooling and hot water, resulting in much greater savings in carbon emissions than either of these two systems would be expected to achieve.

1.4 OPP Condition 17(c) and Condition 46 - Green and / or Brown Roofs

No green or brown roofs are proposed on Pavilion H. The Outline Planning Permission does not, within Parameter Plan KXC 021, define Plot H as a priority location for green and/or brown roofs. The roof area of Pavilion H is proposed to be small (approx. 200 m²), and thus the ability for the roof to add to the site-wide biodiversity by implementing a green roof is very limited. Instead, the roof of Pavilion H will be incorporated as part of the Granary Square public realm, providing amenity space for the wider KXC development. Consequently, Pavilion H does not include a green or brown roof.

1.5 OPP Condition 17 (e) and S106 Section AA - BREEAM Rating

Initial pre-assessment indicates that Pavilion H could achieve a BREEAM New Construction 2014 'Very Good' rating for shell and core areas. A potential route to achieving this rating is confirmed in the BREEAM pre-assessment provided in Appendix B of this report.

Further, as part of the KXC retail delivery process, the cafe fit-out is expected to comply with the Green Guide to Retail Delivery for Small Units (<500m²). This will pose requirements on the fit-out delivery team, such as:

- Procuring energy star rated office equipment and small power items
- Metering of mains supply energy during fit-out works
- Provision of EPC with requirement to meet Part L of the Building Regulations



- Metering of at least 90% of operational energy uses
- · Commissioning of electrical and heat metering
- Restrictions on flow rates for taps and WCs
- Requirement for sustainable procurement of timber
- Requirement for paints and varnishes with low contents of volatile organic compounds (VOCs)
- Waste storage to be provided with segregated space for recyclable sand non-recyclable operational waste
- > High frequency ballasts provided on all fluorescent and compact fluorescent lighting

1.5.1 Specific BREEAM section targets within the S106 agreement Section AA

The specific target against the BREEAM Water section set within the S106 Section AA is expected to be met (40% of un-weighted credits within the water section).

1.6 OPP Condition 17 (f) – Wildlife Features

Due to the nature of the site constraints, building massing and aesthetics, there is no possibility of providing a secure and sheltered place for bat and bird boxes on the Pavilion H façade. However, a new tree is being planted as part of the proposed Pavilion H works.

1.7 OPP Condition 45 - Drainage

Peak discharge flows for the buildings have been calculated, and these flows will contribute towards meeting the KXC site wide maximum peak (storm and foul) discharge limit of 2,292l/s. Surface water run-off from the Pavilion H site is not expected to be greater than it was pre-development and there is no increase in impermeable areas. The drainage networks have been designed on SUDS principles, providing an overall peak flow reduction of 10% (based on a 1 in 30 year storm) across the King's Cross Central (KXC) development.

A Flood Risk Assessment for the wider King's Cross site has been produced. The KXC areas have been confirmed to lie within a low flood risk zone.

1.8 S106 Section AA - Water Efficiency

The development will incorporate water efficient sanitaryware in the public washroom, such as lowflow taps and low-flush WCs. All parts of the building will be supplied with water meters with a pulsed output which allows effective water management and monitoring to take place, and sanitary supply shut off systems will be installed to avoid water waste when rooms are unoccupied. Major leak detection will also be provided to the mains water supply.

1.9 S106 Section Y - Construction materials and waste

1.9.1 Strategy for materials and responsible sourcing

Studies have been carried out since the early stages of design to ensure measures are implemented for efficient use of materials and flexibility for future uses of the building.

The King's Cross Central site-wide Construction Materials and Purchasing Strategy will be adopted and materials will be responsibly sourced where possible. All timber will be sourced following the UK Government's Timber Procurement Policy, and will be legally sourced.

1.9.2 Reduction in construction waste

The project team intends that best practice will be followed at Pavilion H in order to maximise resource efficiency. Packaging used to protect construction materials and assemblies in transportation will be



kept to a minimum and wherever possible, will be returned to the supplier to be reused. Careful planning and effective control will ensure that waste during the construction phase is minimised.

1.10 S106 Section Z - Operational waste management

A sustainable waste strategy will be applied to the building through the provision of segregated refuse storage, and the provision of Waste Information Packs to the occupier. The waste strategy will be monitored regularly to encourage waste minimisation.



2. Introduction

Hoare Lea has been instructed to produce an Environmental Sustainability Plan to accompany the Reserved Matters Submission for the proposed Building H (referred to in this report as 'Pavilion H'), which is located in Development Zone H, in the southwest corner of Granary Square, within the northern part of the King's Cross Central ('KXC') development. It is surrounded by significant historic buildings, with modern refurbishments and additions, including the listed Granary Building to the northwest, the Coal Drops Yard to the west and the Fish and Coal building to the south, with the Regent's Canal and Goods Way beyond this. The location of Pavilion H and the Reserved Matters submission boundary are shown in Figure 1 below.

The proposed development comprises the erection of a single storey building for A1/A3 use (Retail/Café), located at the Coal Drops Yard Level and details of new public realm at Granary Square level. The proposals also include public washrooms to the north of the retail unit, to serve users of Granary Square and the wider Coal Drops Yard development, and a public lift from Granary Square to Lower Stable Street. The building will provide a total floorspace of 209m² (GEA), of which 117m² is retail/café (A1/A3) space and 92m² is public washrooms.

This Environmental Sustainability Plan is to be read in conjunction with and in the context of all the other documents forming the Pavilion H submission, including the Urban Design Report, the Planning Compliance Report and BREEAM pre-assessment, the latter being included within this document as Appendix B.

2.1 Background and existing Outline Planning Permission

This Environmental Sustainability Plan describes the strategies that have been incorporated in the design of the proposed building in response to the conditions of the KXC Outline Planning Permission (ref. 2004/2307/P) granted on the 22nd of December 2006 (the 'Outline planning Permission' or 'OPP'). In particular, this document provides information in response to planning conditions 17, 45 and 46 of that permission, demonstrating that the building achieves a high standard of sustainability for a development of this scale in an urban environment. Furthermore, it details how relevant obligations included within sections AA, X, Y and Z of the KXC S106 Agreement will be met.

2.2 Approach to Part L of the Building Regulations

The development will be a new-build pavilion, and is therefore being compared against Approved Document Part L2A 2013 of the Building Regulations (*Conservation of Fuel and Power in New non-residential buildings*) – incorporating 2016 amendments. Development Zone H of the KXC site is located to the south of the Western Transit Shed, south-east of the Coal Drops Yard, to the south of Granary Square and to the north of the Fish & Coal Offices.





Figure 1: Site Plan showing Pavilion H footprint (red) and Reserved Matters Submission Boundary (Purple)



3. Response to Outline Planning Permission (OPP) Conditions

The energy strategy for Pavilion H follows the principles established within Condition 17 of the Outline Planning Permission, which is also in line with the Mayor of London's energy hierarchy (Be Lean – Be Clean – Be Green).



Figure 2: The Energy Hierarchy

In addition to following the principles of the KXC Outline Planning Permission (OPP) and Section 106 Agreement, a holistic approach has been adopted for the energy and carbon reduction strategy for Pavilion H. A summary of this strategy is described in this section.

3.1 Condition 17 (a) - Energy efficiency (also relevant to S106 Section X – Energy)

"Explain how the proposed building design realises opportunities to include design and technology energy efficiency measures."

Pavilion H has been designed with a 'fabric-first' approach to energy efficiency. This design method places a focus on passive design by reducing the amount of energy required to run the building first and foremost and encouraging the incorporation of efficient mechanical and electrical systems that will use as little energy as possible when in operation.

The building's positioning beside two retaining walls to the north and east provide an additional and inherent benefit by effectively utilising the ground as additional insulation and therefore losing less heat through the building fabric than a building of the same size and form, but with exposed walls on all sides. This is due to the ground maintaining a temperature above zero throughout the year, reducing the temperature gradient across the walls in question and therefore resulting in less heat transfer across the building fabric.

For the remaining building fabric that is exposed to external air (glazed southern and western elevations and the roof) highly efficient systems are proposed which will achieve U-values that will be 20-30% better than the minimum standards set out in Part L2A of the (2013) Building Regulations.

Other passive design and energy efficiency measures can be described as follows:

- Integrated solar control glass helping to manage solar gains in summer, maintaining suitable internal temperatures and preventing overheating and excessive cooling requirements.
- > Efficient services, including a ventilation system with a low Specific Fan Power
- Energy efficient lighting, targeting 75 lumen/Watt in all areas, and with daylight dimming for zones that have access to daylight
- ► Large openable windows enabling natural ventilation when external temperatures permit and promoting natural daylight penetration. The proposed south and west elevations, showing the openable glazing, are shown in Figure 3 and Figure 4 below.
- Metering provided for heating, cooling, water and electricity, encouraging the tenant to monitor and reduce consumption when in operation.



To further reduce energy used to operate the building, Pavilion H will be connected to the highly efficient KXC district energy network for all heating, cooling and domestic hot water consumption as described in Section 3.3 below.

It is anticipated that these measures will achieve a minimum of 42.9% of the credits under the 'energy' section of the BREEAM assessment, helping to facilitate Pavilion H achieving a BREEAM 'Very Good' rating for the Shell&Core areas under the BREEAM New Construction 2014.

It is recognised that tenant fit-out of the café unit could have a significant impact on the energy consumption and resulting carbon emissions of Pavilion H. Therefore where measures installed as part of the tenant fit-out could impact performance, KCCGPL will work with the tenant to achieve the targets set within this ESP. Guidance to this effect is provided as part of the King's Cross retail delivery process, which expects the retail fit-out to comply with the Green Guide to Retail Delivery for Small Units (<500m²). This document set-outs energy efficiency requirements for the fit-out delivery team such as:

- > Procuring energy star rated office equipment and small power items
- > Metering of mains supply energy during fit-out works
- > Provision of EPC with requirement to meet Part L of the Building Regulations
- > Metering of at least 90% of operational energy uses



Figure 3: South elevation of Pavilion H demonstrating glazing proposals; promoting natural daylight and allowing natural ventilation through sliding framed windows (02 – marked in green) when possible





Figure 4: West elevation of Pavilion H demonstrating glazing proposals; promoting natural daylight and allowing natural ventilation through openable doors (01) and sliding framed windows (02 – marked in green) when possible



3.2 Condition 17(b) – Reduction in carbon emissions (also relevant to S106 Section X – Energy)

"Explain the reduction in carbon emissions achieved through building design and technology energy efficiency measures, compared with the emissions permitted under the national Building Regulations prevailing at the time the application for approval of reserved matters is submitted."

The development will be a new-build and is therefore being compared against Approved Document Part L2A of the Building Regulations - Conservation of Fuel and Power in non-residential buildings – incorporating 2016 amendments ('Part L2A 2013'). The energy efficient design measures for Pavilion H, as summarised in section 3.1, seek to maximise efficiency as far as possible to achieve compliance with Part L2A 2013.

The KXC Section 106 Agreement, Section X, requires developments to use reasonable endeavours to achieve a 5% improvement on the Target Emissions Rate (TER) for new buildings (i.e. Part L2A 2013), using good passive design and energy efficient measures (disregarding any carbon savings that will be achieved by using the low carbon district energy system and any renewables).

The energy efficiency measures set out in section 3.1 above are expected to lead to a 5% carbon emissions reduction over Part L2A 2013 prior to connection to the KXC District Energy Network (subject to tenant cooperation).

The feasibility of achieving this target has been subject to an initial review through preliminary Part L modelling of the building (see Appendix A for indicative results), confirming this target is achievable, subject to tenant cooperation for the installation of energy efficient ventilation and lighting systems. KCCGPL will work with tenants to achieve this.

The KXC Section 106 Agreement includes an obligation to carry out the development with the objective of achieving a site wide 32% reduction in carbon emissions compared to the 'Business as Usual Benchmark' as identified in Appendix 2 of the Energy Assessment which supported the outline planning application (2005).

Since completion of the Section 106 Agreement in 2006, Part L of the Building Regulations has been updated to include more stringent requirements in terms of the energy efficiency of a building and is now considered the primary method of assessment of a building's performance. By meeting the requirements the current version of Part L (2013), the building will be achieving a reduction in carbon emissions that meets (and indeed exceeds), the Business as Usual Benchmarks set out in the original KXC Energy Assessment, thus making a contribution to achieving the 32% target set out in the KXC Section 106 Agreement.



3.3 Condition 17(d) – Energy supply (also relevant to S106 Section X – Energy)

"Explain how energy shall be supplied to the building, highlighting:

- i. How the building relates to the site-wide strategy for district heating incorporating trigeneration from distributed combined heat and power.
- ii. How the building relates to the strategy for using bio-fuel boilers to supplement the energy supplied through the district heating system.
- iii. The assessment of the cost-effectiveness and reliability of the supply chain and biofuels.
- iv. Any other measures to incorporate renewables."

3.3.1 Connection to site-wide strategy for district heating incorporating tri-generation and use of biomass fuel

Combined Heat and Power (CHP) has already been implemented on the wider King's Cross site as part of KCCGPL's overall commitment to low-carbon energy distribution. It has been chosen to also implement cooling in the district energy network, making it a Combined Heating, Cooling and Power (CCHP) network, also known as trigeneration.

This is a low carbon cooling method, and in line with the Mayor of London's preferred strategy within the current London Plan.





Pavilion H will be connected to the King's Cross Central District Energy scheme for all space heating, hot water and cooling. It is estimated that this connection will result in further a 14-18% reduction in carbon emissions on Part L2A 2013 after the implementation of fabric improvements and energy efficiency measures. The range of results given is due to potential fluctuations in the cooling seasonal efficiency from the district energy network. To date, information on its operating efficiency is limited and therefore an estimated range of performance has been made in order to estimate building performance for Pavilion H. The following assumptions have been used in the dynamic modelling undertaken to assess compliance:

- Seasonal Energy Efficiency Ratio ('SEER') (lower estimate) = 3.0
- SEER (higher estimate) = 5.0



It is understood that future provision has been made within the KXC low-carbon district energy system for inclusion of biomass boilers and/or potentially fuel cell(s). At this time, a robust commercial case to support the inclusion of biomass cannot yet be made, however, this position continues to be actively monitored. In particular, there remain concerns on air and fuel quality, particularly as the KXC site (together with the vast majority of London), is situated within an Air Quality Management Area. NOx levels are already high in this area and this is expected to be exacerbated in the Kings Cross locality by biomass emissions and increased lorry movements required to deliver the fuel. There are also concerns regarding supply, with expected limitations on biomass growth in the UK (driven, for example, by air quality) affecting the harvesting rates and potentially increasing the cost of fuel. Large amounts of biomass would also need to be stored on site and could in fact result in an increase in carbon emissions as the process of burning biomass for energy is not as efficient as Combined Heat and Power which produces heat and electricity from the burning of a single fuel. On this basis biomass has not been considered further in this assessment.

3.3.2 Other renewable energy sources

A review of renewable technologies, including ground source heat pumps (GSHP) which are identified in the Section 106 Agreement for potential installation within Development Zone H, has been carried out to assess their suitability for the specific building proposed.

3.3.2.1 Ground Source Heat Pump (GSHP)

A detailed analysis of this strategy was carried out as part of the Reserved Matters Application for the neighbouring Fish & Coal development (ref 2014/5272/P), which concluded that connection to the King's Cross district energy network would provide greater carbon emissions savings than a GSHP. Reserved Matters approval was granted for the Fish & Coal Offices in October 2014 based on this approach, and the approval for the Coal Drops Yard in January 2016 (ref 2015/6018/P) followed the same approach.

The proposal for Pavilion H follows in this vein - the scheme is proposing to connect to the King's Cross District Energy Network for all heating, hot water and cooling, providing greater carbon emissions savings than a GSHP system would be expected to provide.

3.3.2.2 Photovoltaic panels

The outline planning application does not identify Pavilion H roof areas as prioritised for PVs.

The roof of Pavilion H is proposed to be used as an extension to the Granary Square public realm. It will provide additional public seating of two timber benches and enable people to access the edge of the square to look down towards the Coal Drops Yard. The Pavilion H roof will also provide entry and a waiting area for the lift which connects Granary Square to the Coal Drops Yard/Lower Stable Street below.

Further, due to the small size of the building, it is considered that implementing PVs would result in a negligible carbon reduction for the KXC site overall. Consequently, Pavilion H does not include PVs.

3.3.2.3 Site-wide Photovoltaic Panels commitment for the King's Cross Central Masterplan

To date, it is estimated that between 430 and 470 kWp of PV array has either been installed or is proposed on plots at the KXC development which have been submitted for Reserved Matters approval. Of this total, between 180 and 205 kWp of PV are located on plots which were identified in the 2005 Energy Assessment for the KXC outline planning application as suitable locations for wind turbines or solar hot water panels. Therefore these PV arrays fulfil the Low or Zero Carbon Technology (LZCT) commitment for the associated plot. It is therefore considered that these areas may not count toward the overall commitment to PV. This leaves approximately 225-290 kWp of PV installed or proposed that contributes to the site wide PV commitment made in 2005.



The already installed or proposed PV arrays across the KXC site are expected to exceed the targets set out in the 2005 Energy Assessment. The total PV array for the KXC development is being closely monitored, and separate discussions undertaken to ensure this over-all target can be met. The exclusion of PV at Pavilion H is not expected to hinder site-wide commitments to PV.

3.4 Summary of energy and carbon reduction targets

Pavilion H is expected to achieve CO_2 savings of 5% over Part L2A 2013 from passive design & energy efficiency alone (Be Lean) and a total 19-23% carbon emission reduction over Part L2A 2013 when combined with the connection to the KXC District Energy scheme, as shown in Figure 6 below.



Figure 6: Comparison between carbon emissions for the Baseline (Part L 2013), Be Lean and Be Clean scenarios

The feasibility of achieving these savings has been subject to an initial review through preliminary Part L modelling of the building (see Appendix A for preliminary results), confirming this target is achievable, subject to tenant cooperation for the installation of energy efficient ventilation and lighting systems. The targets are currently expected to be achieved by installation of efficient lighting and ventilation systems throughout the building, including tenant and landlord areas.

Where carbon reductions are influenced by the efficiency of measures installed as part of the tenant fit-out, KCCGPL will work with the tenant to achieve the targets set within this ESP.

*) The range of results given is due to potential fluctuations in the cooling seasonal efficiency from the district energy network. To date, information on its operating efficiency is limited and therefore an estimated range of performance has been made in order to estimate building performance for the Proposed Development. The following assumptions have been used in the dynamic modelling undertaken to assess compliance:

- Seasonal Energy Efficiency Ratio ('SEER') (lower estimate) = 3.0
- SEER (higher estimate) = 5.0



3.5 Condition 46 - Green and/or brown roofs (also relevant to condition 17(c))

Condition 17 (C):

"Explain the specification for any green and/or brown roof."

Condition 46:

"At least 15% of the roofs of new buildings constructed pursuant to the planning permission shall be green and/or brown roofs as defined in the Revised Development Specification dated September 2005."

The Outline Planning Permission does not, within Parameter Plan KXC 021 (see Figure 7 below), define Plot H as a priority location for green and/or brown roofs. Nonetheless, the possibility of a green roof was explored in the early concept design stages, to provide some ecological enhancement to the site.

Due to the small size of the building, the scope for enhancing site-wide ecology through green or brown roofs at Pavilion H is very limited. Instead, the roof of Pavilion H will be incorporated as part of the Granary Square public realm, providing amenity space for the wider KXC development. Consequently, Pavilion H does not include a green or brown roof.



Figure 7: Parameter plan KXC 021, which does not identify Plot H as a priority zone for Green/Brown Roofs.



3.6 Condition 17 (e) – BREEAM

"Explain how the proposed building has been designed to achieve a BREEAM and/or Ecohomes rating of 'Very Good' (or an equivalent assessment method and rating) or better."

A BREEAM workshop has been held with the design team to ensure successful integration of BREEAM requirements into the design specification. The workshop was led by a certified BREEAM Assessor and was initiated at an early stage of design to ensure the design team has a robust understanding of minimum standards, voluntary credits, and best practice.

The site-specific BREEAM pre-assessment for Shell & Core areas of Pavilion H is available in Appendix B of this ESP. A summary of the approach is provided below.

3.6.1 BREEAM New Construction 2014 - Retail Shell&Core

Pavilion H will target a BREEAM New Construction 2014 'Very Good' rating for the shell and core areas. A pre-assessment has been carried out to ensure this target is achievable. This is included in this ESP as Appendix B.

The current pre-assessment indicates the following:

'Baseline' score of 57.6%, equivalent to BREEAM 'Very Good', i.e. a 2.6% margin over the 55% required for BREEAM 'Very Good'

It is expected that the BREEAM assessment will be carried out alongside the similar assessment being carried out for the Shell&Core areas of Lower Stable Street, potentially seeking a joint certificate to cover all of these areas.

Further, as part of the KXC retail delivery process, the café fit-out is expected to comply with the Green Guide to Retail Delivery for Small Units (<500m²). This will pose requirements on the fit-out delivery team such as:

- Procuring energy star rated office equipment and small power items
- Metering of mains supply energy during fit-out works
- Provision of an Energy Performance Certificate (EPC)
- Metering of at least 90% of operational energy uses
- · Commissioning of electrical and heat metering
- Restrictions on flow rates for taps and WCs
- Requirement for sustainable procurement of timber
- Requirement for paints and varnishes with low contents of volatile organic compounds (VOCs)
- Waste storage to be provided with segregated space for recyclable sand non-recyclable operational waste
- > High frequency ballasts provided on all fluorescent and compact fluorescent lighting

A summary of the strategies/measures under BREEAM New Construction 2014 which are included in the Pavilion H scheme is provided in Table 1 below.



Table 1 - Summary of strategies for BREEAM New Construction 2014 included at Pavilion H

nergy	 Ambitious building emission rate based on passive design, energy efficiency, and connection to the KXC District Energy Network, resulting in overall 19-23% CO₂ reduction on Part L2A 2013 from: Use of double glazing with solar control and good thermal performance. Efficient services Energy efficient lighting, and daylight dimming to zones with daylight access Metering of heating, cooling, water and electricity, and encouraging the tenant to monitor and reduce consumption
Transport E	 KXC has excellent public transport links and good availability of local amenities A Transport Statement has been produced for the wider KXC site which will inform the development at Pavilion H
Water	 Water metering will be incorporated in the building. Flow control devices will be incorporated to taps Low flow dual-flush WCs will be installed in the public washrooms Leak detection and flow control monitoring implemented on mains water supply
Materials	 Materials will be responsibly sourced where possible. For timber products, FSC or similar certification will be required, and for non-timber products the materials will be required to have EMS certification at either the process stage or process <u>and</u> extraction phases. By means of consultation with the BRE Green Guide to Specification, the team will, as far as is practical and feasible, specify products of low environmental impact.
Surface Water Run-Off	 A Flood Risk Assessment has been carried out for the wider KXC site, which incorporates the Pavilion H area. Surface water run-off from the site is not expected to be greater than for the pre-development site as there is no increase in impermeable area. The design for the treatment of storm water run-off incorporates, where practicable, filtration, attenuation and other techniques that is consistent with current best practice on SUDS, to control the timing and volume of flows.
Waste	 A centralised waste storage area will be provided for recyclable and non-recyclable waste within the neighbouring Coal Drops Yard waste storage room. A Resource Management Plan will be implemented for the development.
Pollution	 Insulants with a low global warming potential (GWP < 5) will be used where feasible. The contractor will be expected to follow best-practise guidance in terms of minimising air (dust) and ground (water) pollution during construction.
Health and well-being	 The development will seek to incorporate advice from the local Architectural Liaison Officer and adhere to the principles of Secured by Design for the development where possible.



Management	►	A building user guide will be produced on completion to give details of operation and energy performance to each building occupant
	•	The main contractor will be required to achieve a best practice score of at least 35 under the Considerate Constructors Scheme
	•	Energy and water use and waste production related to the site procedures will be monitored for the duration of the construction.
	►	An ecologist has been appointed to advise on current ecological value and possible improvements
Ecology	•	An ecological survey was carried out as part of the works on the Coal Drops Yard site, and the assessment also covers the Pavilion H site. The site is of low ecological value. The development is not expected to result in net loss of biodiversity or access to nature.

3.6.2 Specific BREEAM section targets set in the Section 106 Agreement

There is a specific requirement within the S106 Agreement, section AA to achieve at least 40% of the credits (un-weighted score) under the Water heading within BREEAM. The current target baseline score for Pavilion H is 55.6%, with an estimated potential score of 77.8%, both of which exceed the 40% requirement, as shown in Table 2 below.

Table 2: Current estimated BREEAM targets against specific requirements set out in the S106 Agreement

BREEAM Credit section	Current target 'baseline' score	Current estimated potential score	S106 Requirement	Requirement met?	Comments
Water	55.6%	77.8%	40%	(S106 met in baseline score)	Guidance for 40% of credits targeted is met with targeted baseline score.



3.7 Condition 17 (f) - Wildlife features

"Explain the incorporation of bird boxes, bat roosts and other wildlife features on the building."

An ecologist has been be appointed and a site survey carried out to assess the existing biodiversity and ecological value of the adjacent Coal Drops Yard development site, which was granted Reserved Matters approval in January 2016 (ref. 2015/6018/P). The assessment has been confirmed to also cover the area included within the Pavilion H submission. The site is assessed to be of low ecological value, and no protected species have been found on the site.

Pavilion H has only two visible facades due to the nature of the site plan which essentially 'embeds' the building into the edge of the south-west corner of Granary Square abutting the existing retaining wall. The building roof is effectively the completion of the south-west corner of Granary Square.

The building façade at South and West elevations forms the balustrade at the Granary Square level and is designed to maintain the views towards Coal Drops Yard from Granary Square, giving greater prominence and visibility to the listed Eastern Coal Drops and the historic Coal Drops Ramp.

The lift shaft at the north-west corner of Pavilion H is be the only element that is easily identifiable. The height of the lift parapet will be approximately 5m above finished ground level at Granary Square.

Due to the nature of the site constraints, building massing and aesthetics, as described above, there is no possibility of providing a secure and sheltered place for bat and bird boxes on the Pavilion H façade. However, proposals do seek to include a further 1no. London Plane Tree (Platanus Acerifolia) alongside the 3 existing London Plane Trees adjacent to the Pavilion H site. This will create a grouping of 4 trees and in combination will help promote wildlife and provide a nesting place for birds.



3.8 Condition 45 – Drainage infrastructure

"The new drainage infrastructure within the site shall be designed to achieve a combined (storm and foul) peak discharge to the existing combined sewer of 2,292 l/s or less."

Surface water run-off from the Pavilion H site is not expected to be greater than it was predevelopment and there is no increase in impermeable areas. However some attenuation is still required. Sitewide there is a 10% improvement on the 1:30 year run off from the pre-development condition.

3.8.1 Site wide Drainage Infrastructure

The figure of 2292 l/s in the wording to Condition 45 describes the maximum peak (storm and foul) discharge which is permissible for the site as a whole to discharge to the existing combined sewers. The peak discharge will be split between the Camden Sewer and York Way Sewer (for Northern Area) and the Camley Sewer / Fleet Sewer (for the Southern Area).

The cumulative peak discharge from the many building plots and areas of infrastructure will exceed 2292 l/s under certain weather conditions. In these instances, the site wide drainage infrastructure, including online and offline attenuation (see below), will attenuate peak flows discharging from individual plots, adopted highway and public realm, enabling cumulative peak flows to be reduced to 2292 l/s or less.

The site wide surface and foul water disposal strategy can be summarised as follows:

- To provide separate surface and foul water networks, combining only at the final manhole prior to connection into the existing Thames Water sewerage network
- To provide online attenuation (for example oversized pipe work) and offline attenuation (for example proprietary modular underground storage systems / tanks) to buffer peak flows generated within the site down to the agreed discharge rates into the existing Thames Water sewerage network
- To ensure that no above ground flooding occurs during the worst case 1 in 30 year storm event;
- To ensure that no internal building flooding occurs during the worst case 1 in 100 year (+20%) storm event
- To accord with PPS 25 and Sewers For Adoption 6th Edition
- > To discharge at various locations into the sewerage network; and
- To design the above infrastructure such that combined surface and foul water flows do not exceed 2292 I/s during a 1 in 30 storm event.

The site wide drainage infrastructure at King's Cross Central can be described in terms of three drainage infrastructure areas, incorporating both building plots and infrastructure/public realm. These are described in Table 3 below.



Table 3: Drainage Infrastructure Areas

Drainage infrastructure area	Plot Developments	Infrastructure / Public Realm
Eastern Goods Yard	The Granary Complex, Q1, Q2, R1, R2, R3, R4, R5, 50% of T1, T2, J1, H1 , K1, K2, K3, K4 and 50% of I1	Stable Street, Wharf Road, Handyside Street, Granary Square, Cubitt Park and Handyside Gardens
Southern Area Infrastructure	A1, A2, A3, A4, A5, B1, B2, B3, B4, B5, B6, D1, D2, F1 and V1	The Boulevard, Goods Way, Station Square and Pancras Square
Remainder of the Northern Area including the Triangle Site	50% of I1, M1, M2, M3, N1, P1, P2, S1, S2, S3, S4, S5, 50% of T1, T3, T4, T5, T6 and W1	Canal Reach and Cubitt Square

Table 4 identifies the assumed peak foul and surface water flows from each of the building plots which underpins the design of the site-wide infrastructure. The foul water figures are based on CIRIA 177 Variable Peaking Factor and the assumed foul water discharges from various land uses identified in Table 5. The surface water peak flows are based on a 1 in 30 year storm. It should be noted that it is most unlikely that the foul and surface water peak discharges from each individual plot will coincide with each other.

Generally, foul water discharges represent small but consistent flows subject to diurnal patterns. For example, residential properties will exhibit two peaks within their diurnal flow pattern, one in the morning and one in the early evening.

Surface water discharges, on the other hand exhibit extreme variations in flow, directly related to rainfall intensity.

The surface water discharge from each plot development will have its own unique hydrograph (identifying the variation between flow and time – the peak of which only lasting for a few minutes in most cases). Each one of these peaks (within the hydrographs) combine within the main drainage infrastructure at different points in time during the storm event creating an averaged flow within the pipe network.

These flows will discharge into the Thames Water network via flow hydraulic controls at the downstream end of each network. These hydraulic controls limit the discharges to a combined maximum of 2292l/s. Where the plot development discharges combine to produce flows in excess of the maximum allowable discharge, water will be held within the drainage infrastructure which has been specifically sized to accommodate these flows.



	Assumed Peak Flows (I/s)					
Plot reference	Surface Water (1 in 30 year event)	Foul Water				
Eastern Goods Yard						
G1	25	4.9				
H1	15	6.7				
J1	147	6.0				
К1	24	0.9				
К2	101	0				
КЗ	150	(incl in K4)				
К4	117	2.4				
L1-L7	1105	23.6				
Q1 & Q2	191	5.1				
R1	57	4.1				
R2	257	17.6				
R3	128	3.3				
R4	127	3.7				
R5	173	7.7				
T1 (50%)	96	2.35				
T2	162	7.05				
I1 (50%)	25	3.3				
Total	2900	98.7				

Table 4: Peak Surface and Foul Water Flows for the Eastern Good Yard

Table 5: Foul water discharges from various land uses

Land Use	Demand Options	Discharge to Sewer (l/day/hd)	l/s/head	Operational Hours	Population Density (m ² per person)
Residential	-	152	0.0023457	18	36.2
Student Accommodation	-	152	0.0023457	18	19.5
Retail	Large Retail	26.6	0.0009236	8	40
Food/Drink	Customer/day 2hr sittings	28.5	0.0009896	8	1.4
Education	General	19	0.0006597	8	10
Business	Without Canteen	41	0.0014236	8	12
Hotel		133	0.0046181	8	20
Leisure	Sports club	142.5	0.0049479	8	40



3.8.2 Drainage Infrastructure relating to Plot H

Plot H is serviced by the Eastern Goods Yard drainage systems (Plot H1 in Table 3), and discharges via a restricted discharge in to the combined Thames Water Camden Sewer. The drainage networks have been designed on SUDS principles providing an overall peak flow reduction of 10% (based on a 1 in 30 year storm).

Thames Water has approved the surface water discharge into the Camden Sewer for the network serving Plot H. The approved discharges reflect the assumptions described in Table 4 and Table 5 (above). The approved surface water discharge peak flows for Building H are 15 I/s and 6.7 I/s for surface water and foul water, respectively. It should be noted that the figures in Table 4 do not specifically include public realm areas. However, the Eastern Goods Yard Area public realm was included in the hydraulic model used during the design of the infrastructure to ensure that each of the drainage sub catchments (buildings and public realm) are attenuated and the flows into the combined Thames Sewer restricted so that the permissible discharges set out in the Outline Planning Permission are not exceeded.

The drainage proposals drawing included in Appendix C identifies both the Pavilion H proposals and the proposed Granary Square alterations, which are covered under a parrallel Reserved Matters Submission.



4. Response to Section 106 Obligations

4.1 S106 - Section AA - Water

Section AA of the Section 106 Agreement places an obligation to use reasonable endeavours:

- To incorporate within the detailed design water efficiency measures such that the design secures at least 40% of the potable water consumption credits available under the BREEAM methodology which represents a reduction of approximately 20-30% against typical water consumption,
- To incorporate one or more of groundwater abstraction, grey-water and black-water recycling and rainwater harvesting as alternative water supplies to meet 5% or more of the non-potable water needs and
- To ensure that the design for the treatment of storm water run-off incorporates, where practicable, filtration, attenuation and other techniques that is consistent with current best practice on SUDS, to control the timing and volume of flows.

4.1.1 Water credits under BREEAM

It is currently anticipated that with the inclusion water efficient sanitary ware, metering and leak detection measures, Pavilion H could secure 5 of the potable water credits (55.6%) in the BREEAM Retail Assessment, with the potential to achieve up to 78% of the credits. This exceeds the 40% required under the S106 Agreement.

4.1.2 Water use and reuse

In the southeast of England, climate change is predicted to reduce summer rainfall by up to 30% by 2080. Furthermore, the transport, treatment and delivery of potable water involve the consumption of energy and resources. All these issues highlight the need to include design that reduces water demand in new developments.

The development will target a reduction in water consumption of at least 25% in line with the requirements of BREEAM by use of water efficient fixtures and fittings.

The building will be supplied with a water meter with a pulsed output which allows effective water management and monitoring to take place, and sanitary supply shut off systems will be installed to avoid wastage when toilet areas are unoccupied. Major leak detection will also be provided to the mains water supply if possible.

Water efficient sanitary ware will be installed as part of the public WCs being installed:

- Dual-flush WCs
- Low flow rates and / or aerators on hand basin taps

Rainwater harvesting has been discounted for Pavilion H because of space constraints within the small footprint of the building. Pavilion H is to be drained externally, and given that the surrounding external yard areas are heavily congested below ground with a complex network of utilities, there is no opportunity to locate a below ground rainwater collection tank on the site in a cost effective manner.



4.1.3 Sustainable drainage

Surface water drainage methods that take account of quantity, quality and amenity issues are collectively referred to as Sustainable Urban Drainage Systems ('SUDS'). These systems provide a natural approach to managing drainage by lowering flow rates, increasing water storage capacity and reducing the transport of pollution to the water environment. SUDS aim to reduce surface water flooding, improve water quality and enhance the amenity and biodiversity value of the environment and are thus considered to be more sustainable than conventional methods. Typical SUDS techniques include the use of:

- green/brown roofs
- permeable surfaces
- infiltration trenches filter drains and filter strips
- swales shallow drainage channels
- detention basins, purpose built ponds and wetlands

Not all of these systems are suited to dense urban environments such as King's Cross and in particular the Pavilion H scheme is such that there is no scope for any of the these features within the submission boundary. However, the sitewide drainage and attenuation strategy (see Section 3.8) has been designed holistically on SUDS principles and additional opportunities for incorporating SUDS are considered on a plot-by-plot basis, usually through soft landscaping and/or the provision of green/brown roofs.

In this case, the Reserved Matters submission for Pavilion H includes only a limited area of public realm, which is largely hard landscaped. The Outline Planning Permission does not, within Parameter Plan KXC 021, define Plot H as a priority location for green and/or brown roofs. The roof area of Pavilion H is proposed to be small (approx. 200 m²), and thus the ability for the roof to add to the site-wide biodiversity by implementing a green roof is very limited. Instead, the roof of Pavilion H will be incorporated as part of the public realm of Granary Square, providing amenity space for the wider KXC development.



4.2 S106 - Section Y - Construction Materials and Waste

Section Y of the Section 106 Agreement imposes obligations to:

- Implement the Construction Materials and Purchasing Strategy.
- Apply the Construction Materials and Purchasing Strategy to agreeing specifications and targets in contracts with contractors, designers and suppliers of services in relation to construction.
- Use reasonable endeavours:
 - > To minimise packaging waste associated with the delivery of construction materials.
 - > To produce topsoil and subsoil that uses subsoil and crushed rubble from the site combined with organic material for use in areas of landscaping.
 - > To achieve the Construction Targets.

4.2.1 Reduction in construction waste

The project team intends that best practice will be followed for the Pavilion H development, in order to maximise resource efficiency. The development is targeting to divert a minimum of 80% of waste from landfill (by weight), and to generate a maximum of 11.1 tonnes of waste per 100m² gross internal floor area.

4.2.2 Construction materials and purchasing strategy

- The King's Cross Central Construction Materials and Purchasing Strategy, referenced in Section Y of the Section 106 Agreement, will be adopted, and materials used in the development will be responsibly sourced where possible.
- All timber will be sourced following the UK Government's Timber Procurement Policy, and will be legally sourced.
- Materials will be responsibly sourced where possible. For timber products, FSC or similar certification will be required, and for non-timber products the materials will be required to have EMS certification at either the process stage or process and extraction phases.
- By means of consultation with the BRE Green Guide to Specification, the team will, as far as is practical and feasible, specify products of low environmental impact.

4.2.3 Packaging Waste

Packaging used to protect construction materials and assemblies in transportation will be kept to a minimum and wherever possible, will be returned to the supplier to be reused. Careful handling of materials and planning of their storage and delivery times will reduce unnecessary packaging to protect against damage.

4.2.4 Soil

Due to the small size of the building footprint, it is expected that very little new sub-soil will be needed for or generated by the proposed works. Trial pit investigations for the neighbouring Coal Drops Yard (CDY) and Gasholder Triplets sites have identified some contamination in certain areas of the KXC site. For neighbouring sites, most of this has been removed as part of constructions works. Contamination testing at CDY showed low levels of contaminants, and no asbestos was identified in any of the samples. A separate Earthworks and Remediation Plan, which forms part of this Reserved Matters submission for Pavilion H, addresses the nature and quantity of waste arising from construction of the building and associated public realm, and the arrangement for their re-use and disposal.

Please refer to section 3.6 for an overview of the BREEAM credits targeted under the Materials and Waste sections for Pavilion H.



4.3 S106 - Section Z - Operational Waste

Section Z of the Section 106 Agreement imposes obligations to:

- Provide occupiers with Waste Information Packs and use reasonable endeavours to obtain feedback on the success or popularity of the initiatives contained within the Packs.
- Use reasonable endeavours to incorporate within the detailed design best practice design solutions that provide for waste segregation and storage areas and to maintain the solutions that are implemented.
- Provide and maintain segregated waste containers within the Public Realm areas at suitable locations and in appropriate numbers.

The project team intends that best practice will be followed and surpassed where possible, in order to maximise resource efficiency. Careful planning will reduce waste of materials. This will include careful handling and storage of materials, timely delivery and avoidance of excess packaging where possible.

A Resource Management Plan will be produced for the development, and the strategy for minimising waste will follow the waste hierarchy: Reduce – Re-use – Recycle – Energy Recovery – Disposal.



Least preferred Environmental Option

Figure 8: The Waste Hierarchy

A sustainable waste strategy will be applied to the development through the provision of segregated refuse storage, and the provision of Waste Information Packs to all occupiers. The refuse storage will be conveniently located (as described below) and will provide sufficient space for general and recycled waste. The waste strategy will be monitored and updated regularly to encourage waste minimisation.

4.3.1 Waste segregation area

A temporary refuse store within the retail/cafe unit will be located by the tenant with capacity for at least one days' storage. Refuse will be collected by the KXC Estate Management Team and will be transferred to the Central Waste Room located adjacent to the Western Coal Drops and approved with details of Reserved Matters for the Gas Holder Triplets (ref 2014/6383/P) before being collected by a commercial refuse contractor.

Waste storage in the Central Waste Room allows for two days waste storage to account for peaks and disruptions in collection. Multiple waste streams are provided including cardboard, glass, non-recyclable and mixed dry recyclable and will be stored and collected. Food waste is not expected to be stored here initially, however the Central Waste Room has capacity to in future if demand dictates.

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Further details of the Waste and Refuse Strategy for the building are provided in the submitted Urban Design Report, which accompanies this report as part of the Reserved Matters submission.

4.3.2 Waste information packs

To encourage the minimisation of waste generated during the operational life of the building, Waste Information Packs will be provided to occupiers of the building and will include information on recycling, re-use of materials and sustainable purchasing. This information is intended to be provided within the Building User Guide. Arrangements will be made to monitor their effectiveness in encouraging waste minimisation.



5. Conclusion

Hoare Lea has been instructed to produce an Environmental Sustainability Plan ('ESP') to accompany the Reserved Matters submission for the proposed Pavilion H. Pavilion H is located in Development Zone H, in the southwest corner of Granary Square, within the northern part of the King's Cross Central (KXC) development. It is surrounded by significant historic buildings, with modern refurbishments and additions, including the listed Granary Building to the northwest, the Coal Drops Yard to the west and the Fish and Coal building to the south, with the Regent's Canal and Goods Way beyond this. The location of Pavilion H and the Reserved Matters submission boundary are shown in Figure 1 of this report (please refer to section 2).

The propose

d development comprises the erection of a single storey building for A1/A3 use (Retail/Café), located at the Coal Drops Yard Level and details of new public realm at Granary Square level. The proposals also include public washrooms to the north of the retail unit, to serve users of Granary Square and the wider Coal Drops Yard development, and a public lift from Granary Square to Lower Stable Street. The building will provide a total floorspace of 209m² (GEA), of which 117m² is retail/café (A1/A3) space and 92m² is public washrooms.

This Environmental Sustainability Plan is to be read in conjunction with and in the context of all the other documents forming the Pavilion H submission, including the Urban Design Report, the Planning Compliance Report and BREEAM pre-assessment, the latter being included within this document as Appendix B.

This ESP describes the strategies that have been incorporated in the design of the proposed building in response to the conditions of the KXC Outline Planning Permission (ref. 2004/2307/P) granted on the 22nd of December 2006 (the 'Outline planning Permission' or 'OPP'). In particular, this document provides information in response to planning conditions 17, 45 and 46 of that permission, demonstrating that the building achieves a high standard of sustainability for a development of this scale in an urban environment. Furthermore, it details how relevant obligations included within sections AA, X, Y and Z of the KXC S106 Agreement will be met.

In summary, the main environmental and sustainability measures that are proposed include, but are not limited to, the following:

5.1 OPP Condition 17(a) and S 106 Section X - Energy efficiency measures proposed (Be Lean)

Pavilion H will apply a 'fabric-first' approach to energy efficiency (i.e. passive design with focus on energy efficiency of the fabric first and foremost), and will encourage the incorporation of very efficient mechanical and electrical systems from the tenant fit-out. The tenant will be required to connect to the KXC district energy network for all heating, cooling and domestic hot water consumption.

Proposed measures include:

- Use of double glazing with solar control and good thermal performance.
- Efficient services
- Energy efficient lighting
- Metering of heating, cooling, water and electricity, encouraging the tenant to monitor and reduce consumption



5.2 OPP Condition 17(b) and S106 Section X - Reduction in carbon emissions

The energy efficiency measures set out above are expected to lead to the following carbon emission reductions prior to the connection to the King's Cross Central (KXC) District Energy Network:

 5% carbon emissions reduction over Part L2A 2013 prior to connection to the KXC District Energy Network

Where carbon reductions are influenced by the efficiency of measures installed as part of the tenant fit-out, KCCGPL will work with the tenant to achieve the targets set within this ESP.

5.3 OPP Condition 17(d) and S106 Section X - Energy Supply (Be Clean)

District Heating including Combined Heat and Power (CHP) has already been implemented on the wider King's Cross site as part of King's Cross Central General Partner Ltd's overall commitment to low-carbon energy distribution for the wider site. As a recent commitment, it has been decided to also implement cooling in the district energy network. This will be fed by a low carbon Combined Heating, Cooling and Power (CCHP) network. This is a low carbon cooling method, and in line with the Mayor of London's preferred strategy.

It is estimated that this connection will lead to an over-all carbon emission reduction for Pavilion H of 19-23% over the Part L2A 2013 baseline when added to the savings expected from the energy efficiency measures implemented in the design.

A review of low carbon and renewable technologies has been carried out to assess their suitability for Pavilion H.

Photovoltaic panels and Ground Source Heat Pumps were assessed in greater detail, in line with the Outline Planning Permission requirements. However, both types of systems were discounted due to site limitations, and due to the site's commitment to connect to the King's Cross District Energy Network for all heating, cooling and hot water, resulting in much greater savings in carbon emissions than either of these two systems would be expected to achieve.

5.4 OPP Condition 17(c) and condition 46 - Green and / or Brown Roofs

No green or brown roofs are proposed on Pavilion H, consistent with Parameter Plan KXC 021 and the Development Specification which formed part of the Outline Planning Permission.

The Outline Planning Permission does not, within Parameter Plan KXC 021, define Plot H as a priority location for green and/or brown roofs. The roof area of Pavilion H is proposed to be small (approx. 200 m²), and thus the ability for the roof to add to the site-wide biodiversity by implementing a green roof is very limited. Instead, the roof of Pavilion H will be incorporated as part of the Granary Square public realm, providing amenity space for the KXC development. Consequently, Pavilion H does not include a green or brown roof.

5.5 OPP Condition 17 (e) - BREEAM Rating

The initial pre-assessment indicates that Pavilion H will achieve a BREEAM New Construction 2014 'Very Good' rating for the shell and core areas, as confirmed within the pre-assessment (please refer to Appendix B).

Further, as part of the KXC retail delivery process, the cafe fit-out is expected to comply with the Green Guide to Retail Delivery for Small Units (<500m²). This will pose requirements on the fit-out delivery team, such as:

• Procuring energy star rated office equipment and small power items



- Metering of mains supply energy during fit-out works
- Provision of EPC with requirement to meet Part L of the Building Regulations
- Metering of at least 90% of operational energy uses
- Commissioning of electrical and heat metering
- Restrictions on flow rates for taps and WCs
- Requirement for sustainable procurement of timber
- Requirement for paints and varnishes with low contents of volatile organic compounds (VOCs)
- Waste storage to be provided with segregated space for recyclable sand non-recyclable operational waste
- High frequency ballasts provided on all fluorescent and compact fluorescent lighting.

5.5.1 Specific BREEAM section targets with in the S106 agreement

The specific target against the BREEAM Water sections set within S106 Section AA is expected to be met (40% of un-weighted credits within the water section).

5.6 OPP Condition 17 (f) – Wildlife features

Due to the nature of the site constraints, building massing and aesthetics, there is no possibility of providing a secure and sheltered place for bat and bird boxes on the Pavilion H façade. However, a new tree is being planted as part of the proposed Pavilion H works.

5.7 OPP Condition 45 - Drainage

Peak discharge flows for the buildings have been calculated, and these flows will contribute towards meeting the KXC site wide maximum peak (storm and foul) discharge limit of 2,292l/s. Surface water run-off from the Pavilion H site is not expected to be greater than it was pre-development and there is no increase in impermeable areas. The drainage networks have been designed on SUDS principles, providing an overall peak flow reduction of 10% (based on a 1 in 30 year storm) across the King's Cross Central (KXC) development.

A Flood Risk Assessment for the wider King's Cross site has been produced. The KXC areas have been confirmed to lie within a low flood risk zone.

5.8 S106 Section AA - Water Efficiency

The development will incorporate water efficient sanitaryware in the public washroom, such as lowflow taps and low-flush WCs. All parts of the building will be supplied with water meters with a pulsed output which allows effective water management and monitoring to take place, and sanitary supply shut off systems will be installed to avoid water waste when rooms are unoccupied. Major leak detection will also be provided to the mains water supply.

5.9 S106 Section Y - Construction materials and waste

5.9.1 Strategy for materials and responsible sourcing

Studies have been carried out since the early stages of design to ensure measures are implemented for efficient use of materials and flexibility for future uses of the buildings.

The King's Cross Central site-wide Construction Materials and Purchasing Strategy will be adopted and materials will be responsibly sourced where possible. All timber will be sourced following the UK Government's Timber Procurement Policy, and will be legally sourced.



5.9.2 Reduction in construction waste

The project team intends that best practice will be followed at Pavilion H in order to maximise resource efficiency. Packaging used to protect construction materials and assemblies in transportation will be kept to a minimum and wherever possible, will be returned to the supplier to be reused. Careful planning and effective control will ensure that waste during the construction phase is minimised.

5.9.3 S106 Section Z - Operational waste management

A sustainable waste strategy will be applied to the building through the provision of segregated refuse storage, and the provision of Waste Information Packs to the occupier. The waste strategy will be monitored regularly to encourage waste minimisation.



6. Appendix A - Indicative Part L2A results (passive design and energy efficiency)

Project name					Shell and Co
170404 Pavilion 12-00 60ImcctW	09 0	GO_6	60 L	tg	As desigr
Date: Fri Jun 23 10:59:06 2017					
Administrative information					
Building Details		Ov	vner D	etails	
Address: Pavilion 12 Cold Drops Yard London, 0_0719 CEF, Postcode	Argent [DH N	ame: Na	me e number:	Phone
Certification tool		A	ddress:	Street Add	fress, City, Postcode
Calculation engine: Apache				000001100	
Calculation engine version: 7.0.6		Ce	rtifier	details	
Interface to calculation engine: IES Virtual En	vironme	nt N	ame: Tir	m Young	
Interface to calculation engine version: 7.0.6		Т	elephon	e number:	01454201020
BRUKL compliance check version: v5.2.g.3		A	ddress:	155 Aztec	West, Bristol, BS32 4UB
Are as built details the same as used in the					e e a de el co e de cine de cine
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SUSTAINABILITY

Building H Environmental Sustainability Plan



Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters				Building Use		
	Actu	al Notiona	% A	rea Building Type		
Area [m²]	201.1	201.1		A1/A2 Retail/Financial and Professional services		
External area [m ²]	630	630	100	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways		
Weather	LON	LON		B1 Offices and Workshop businesses		
Infiltration (m³/hm²@ 50Pa)	5	5		B2 to B7 General Industrial and Special Industrial Groups B8 Storage or Distribution		
Average conductance [W/K]	227.4	201.62		C1 Hotels		
Average U-value [W/m ² K]	0.36	0.32		C2 Residential Inst.: Hospitals and Care Homes		
Alpha value* [%]	9.31	10		C2 Residential Inst.: Residential schools		
* Percentage of the building's average heat to	anske coeffi	ion which is due to thermal	ridaina	C2 Residential Inst.: Universities and colleges		
F			1- / ði	D1 Non-residential Inst.: Community/Day Centre D1 Non-residential Inst.: Libraries, Museums, and Galleries D1 Non-residential Inst.: Libraries, Museums, and Galleries D1 Non-residential Inst.: Primary Health Care Building D1 Non-residential Inst.: Orown and County Courts D2 General Assembly and Leisure, Night Clubs and Theatres Others: Passenger terminals Others: Emergency services Others: Car Parks 24 hrs Others - Stand alone utility block		
Energy Consumpti	on by Actual	End Use [kw	/n/m-j			
Heating	36.72	33.87				
Cooling	10.95	5.22				
Auxiliary	35.15	31.15				
Lighting	23.73	40.63	40.63			
Hot water	33.92	64.06	64.06			
Equipment*	22 47	92.47	92.47			
	170.49	174.04	174 94			
* Energy used by equipment does not count to	wards the t	stal for calculating emissions.				
Energy Production	by T	echnology [k	Wh/m²]			
Dhotouoltais sustance	Actual	Notion	ai			
Mind turbings		0				
CHR generators		0				
Conr generators (0				
Solar thermal systems	,	0				
Energy & CO ₂ Emis	ssion	s Summary				
		Actual	Notional			
Heating + cooling demand f	MJ/m ² 1	214.26	176.33			
Primary energy* IkWh/m ² 1		331.81	349.97			
Total emissions [kn/m ²]		57.1	60.1			
* Dimensional and an advantage	v disadana -	u ChR assessment a section	No. 1			
				Page 5 of 7		



7. Appendix B - BREEAM 2014 New Construction Pre-Assessment Report (Shell and Core)







King's Cross Building H

Revision C August 2017

BREEAM New Construction 2014 – Shell and Core Pre Assessment

Rev. Description		Prepared and checked by	Reviewed by	Date
A	First draft for review with team	W. White	S. Lloyd / L. Wille	05.04.2017
В	Updated following review with team at argent offices 06.04.2017 and alignment of assessment with Lower Stable Street	W. White / S. Lloyd	-	19.04.2017
С	Issued for Reserved Matters Application	L. Wille	S. Lloyd	09.08.2017

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BREEAM New Construction 2014 – Shell and Core Pre Assessment

Contents

1.0	Executive Summary4
1.1	Targets4
2.0	Introduction5
2.1	Mandatory credit issues5
2.2	Design team members5
3.0	Summary Indicative Assessment Score Sheet6
Appendix A:	Credits Requiring Early Action7
Appendix B:	Detailed Credit Assessment9



BREEAM New Construction 2014 – Shell and Core Pre Assessment

I.0 Executive Summary

This document contains the initial pre-assessment score against BREEAM 2014 New Construction (BREEAM NC) for the new-build Building H café and toilet areas located adjacent to the Coal Drops Yard, part of the King's Cross Central development in the London Borough of Camden. The building is (referred to in this report as 'Pavilion H').

The score given within this document applies to the **assessment of the shell and core areas only**.

This version of the document aligns the pre-assessment with the adjacent Lower Stable Street areas of the Coal Drops Yard development, also assessed under BREEAM 2014 New Construction. The intention is to combine both areas under one BREEAM NC assessment.

A BREEAM rating of 'Very Good' is being targeted and this report identifies a potential route to achieving this score. This will be explored further as design develops, as collaboration occurs with adjacent sites (Coal Drops Yard (CDY)).

I.I Targets

The target for Pavilion H is to achieve a BREEAM 'Very Good' rating (>55%).

Current estimate score

The current estimated score is 57.62%, equivalent to a BREEAM 'Very Good' rating. A margin of minimum 3-5% is recommended above the minimum required score to ensure that the targeted rating can be achieved at the final post fit-out stage.

Specific BREEAM section targets within the S106 agreement Section AA

There is a specific requirement within the S106 Section AA to achieve at least 40% of the credits (un-weighted score) under the Water heading of BREEAM.

Pavilion H is currently expected to achieve this target (see table 1.2).

Pavilion H	Score	Rating
BREEAM NC 2014 – Indicative baseline score	57.62%	'Very Good'

Table 1.1 Current target score and potential achievable score.

Credit section	Current target score baseline	Comment	
Water	55.6% SIO6 target 40%	Target met within the current estimated score.	

 Table 1.2: Current estimated BREEAM targets against \$106 (Section AA)

 specific section requirements



Figure 1.1 BREEAM 2014 New Construction scale showing Pre-Assessment 'indicative rating' and 'potential achievable' Scores



BREEAM New Construction 2014 – Shell and Core Pre Assessment

2.0 Introduction

The 'Building Research Establishment Environmental Assessment Method' (BREEAM) 2014 New Construction is being used as a benchmarking tool for the design of new developments. The aim is to estimate the sustainability credentials of buildings and to promote a programme of design improvement.

2.1 Mandatory credit issues

BREEAM sets minimum standards of performance in key areas e.g. energy, water etc. These must be met to achieve the overall performance score. The required minimum standards vary depending upon the applicable assessment parts. Table 2.2 identifies the mandatory requirements relevant the assessment of the Pavilion H shell and core areas.

Failure to meet the mandatory criteria may restrict a development to an UNCLASSIFIED rating, regardless of the overall percentage achieved.

2.2 Design team members

Team member/s has been identified as responsible for each credit issue. Table 2.1 summarises the appointed responsible team members.

Responsibility	Team Member Shell and Core			
Project Manager	Argent			
Architects	Bell Phillips			
MEP	Hoare Lea MEP (HL) including Acoustics & Vertical Transportation			
Contractor	BAM Construction			
Structural Engineers	-			
Landscape Architects	-			
Civil Engineers	Peter Brett Associates			
Ecologist	RPS			
Transport & Waste Consultant	Arup			
External Lighting	Speirs and Major			

Table 2.1: Responsible team members

	BREEAM Rating	Pass	Good	Very Good	Excellent	Outstanding
Min	imum Score Required	30%	45%	55%	70%	85%
MANAGEMENT	Man 03: Responsible Construction Practices	-	-	-	One credit (Considerate construction)	Two credits (Considerate construction)
	Man 04: Commissioning and handover	-	-	-	Criterion 10 (Building User Guide)	Criterion 10 (Building Use Guide)
	Man 05: Aftercare	-	-	-	One credit (Seasonal Commis- sioning)	One credit (Seasonal Commissionin
ENERGY	Ene 01: Reduction of energy use and carbon emissions	-	-	-	Five credits	Eight credits
	Ene 02: Energy Monitoring	-	-	One credit (First submetering credit)	One credit (First submetering credit)	One credit (First submeter credit)
	Wat 01: Water consumption	-	One credit	One credit	One credit	Two credits
WATER	Wat 02: Water monitoring	-	Criterion I	Criterion I	Criterion I	Criterion I
MATERIALS	Mat 03: Responsible sourcing of materials	Criterion I	Criterion I	Criterion I	Criterion I	Criterion I
WASTE	Wst 01: Construction Waste Management	-	-	-	-	One credit
	Was 03: Operational Waste	-	-	-	One credit	One credit
LAND USE & ECOLOGY	LE 03: minimising impact on existing site ecology	-	-	One credit	One credit	One credit

Table 2.2: Minimum score and mandatory requirements for BREEAM 2014 New Construction





BREEAM New Construction 2014 – Shell and Core Pre Assessment

Summary Indicative Assessment Score Sheet 3.0

The credits assumed in the pre-assessment score and associated weightings are shown in the score breakdown below.

Overall Credit Allocation	Mandatory elements currently targeted	Value of I credit	No. Credits Available	No. Credits Assumed Baseline score	% of Available Credits Assumed Baseline score	Overall Weighted POINTS score (Baseline)
Management	1	0.61%	18	11	61.11%	6.71%
Health and Wellbeing		0.95%	11	4	36.36%	3.80%
Energy	1	0.71%	21	9	42.86%	6.39%
Transport		1.11%	9	7	77.78%	7.77%
Water	✓	0.83%	9	5	55.56%	4.15%
Materials	✓	1.12%	13	6	46.15%	6.72%
Waste	✓	1.19%	8	4	50.00%	4.76%
Land Use and Ecology		1.10%	10	8	80.00%	8.80%
Pollution		0.85%	13	10	76.92%	8.50%
Innovation		1.00%	16	0	0.00%	0.00%
Tradable score					57.62	
Exemplary Level Credits					-	
Total BREEAM score					57.62%	
Rating targeted					'VERY GOOD'	



SUSTAINABILITY

Building H Environmental Sustainability Plan



8. Appendix C - Drainage and Highway Proposals for Pavilion H and Granary Square



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