

SUSTAINABLE DESIGN AND CONSTRUCTION STATEMENT



THE HEIGHTS PRIMARY FREE SCHOOL

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1.0 EXECUTIVE SUMMARY

The Sustainable Design and Construction Statement (SDCS) has been undertaken by Building Services Design for the proposed development at The Heights Primary Free School, Mapledurham Playing Fields, Reading in order to address the requirements of the Reading Borough Council Core Strategy.

The existing site is approximately 25 acres comprising tennis courts, wooded areas and playground and is held in trust by Reading Borough Council. The new school shall be constructed on land purchased by the EFA and shall comprise 8no. Classrooms, WC facilities, a commercial kitchen and main hall.

Sustainability has grown in importance in recent times as a result of the growing concern of the impacts of climate change. This is reflected in the national planning policies, regional planning and is clearly a high priority for the Reading Borough Council.

The Sustainable Design and Construction Statement (SDCS) follows the guidance set out in the policy “Policy CS1: Sustainable Construction and Design”. The recommendations incorporated in to this statement to demonstrate that the proposed school development has been designed with sustainability in mind.

The report details how the design team has considered the sites potential environmental impacts and how those impacts have been managed and mitigated in line with the prevailing spatial planning policies.

The proposed school will minimise waste and will ensure sustainable procurement of materials during construction and operation. Energy and water efficiency have been addressed and will be an internal feature of the school and as a result of careful specification will be able to reduce their water consumption without any impact on quality. Pollution arising from site activities has been targeted and will be minimized at all times. Overall the proposed scheme achieves the high standards of sustainability as prescribed in planning policy and meets the criteria required by Reading Borough Council.

‘Best practice’, energy efficiency measures and renewable energy solutions are assessed for the proposed development, taking into consideration both the technical and the economic viability of the proposals in order to target the reduction of CO₂ emissions by a minimum of 20% in line with the requirements of Reading Borough Councils Policy CS1: Sustainable Construction and Design from their Core Strategy Document. For further details please refer to BSD’s Energy and Renewable Statement.

The purpose of this report is to assess the proposed development in relation to wider sustainability requirements including BREEAM, and due to the proposed building type and site location within Caversham the scheme can achieve a BREEAM “EXCELLENT” rating for the change of use works on the proposed building.

The proposed development goes as far as is practical in meeting the relevant requirements set out within the Reading Borough Council Core Strategy and Sustainable Design & Construction Supplementary Planning Document.

The following list some of the BREEAM criteria that have not been targeted:

- MAN 2 Elemental Life cycle cost (2 credits)
- MAN 2 Component Level LCC Plan (1 credit)
- MAN 4 Testing and Inspecting Building Fabric (1 credit)
- HEA 1 Daylighting (1 credit)
- HEA 2 Ventilation (1 credit)
- HEA 2 VOC emission tests (1 credit)
- HEA 2 Potential for Natural Ventilation (1 credit)
- HEA 4 Adaptability (1 credit)
- HEA 6 Safe Access (1 credit)
- ENE 4 Passive Design Analysis (1 credit)
- ENE 4 Free Cooling (1 credit)
- ENE 8 Energy Efficient Equipment (1 credit)
- MAT 6 Material Efficiency (1 credit)
- WST 2 Recycled aggregates (1 credit)
- LE 1 Site Selection (1 credit)
- LE 1 Contaminated land (1 credit)

The proposed development will minimise waste and will ensure sustainable procurement of materials during construction and operation. Energy and water efficiency have been addressed and will be an internal feature of the scheme. Pollution arising from site activities has been targeted and will be minimized at all times. The impact of the development on the surrounding environment and associated ecosystems has been minimized as much as possible. Overall the proposed scheme achieves the high standards of sustainability as prescribed in planning policy.

The key sustainability features outlined in this Sustainability Statement are listed below:

- The target reduction in regulated CO₂ emissions over the Building Regulations Part L (2013) baseline will be 20% in accordance with the London Plan policy and exceeds the reduction outlined by Reading Borough Councils Policy CS1

- Water efficiency measures and devices will be installed in the school to dramatically reduce the maximum daily water usage in accordance with Reading Borough Councils Policy CS1
- Recycling facilities will be provided for commercial and construction related waste;
- The use of sustainable transport modes will be encouraged, and the site benefits from local connections to a range of surrounding transport services. Access to the site will be improved to facilitate the development with minimal impact on existing infrastructure;
- The building will be designed to meet applicable Building Regulation Part M requirements;
- The proposed development includes the provision of dedicated cycle storage areas;
- Green Roofs have been incorporated into the scheme to maximize potential benefit to biodiversity;
- Sound insulation values are to be improved on Building Regulations Part E;
- Where practical, building materials will be sourced locally to reduce transportation pollution and support the local economy. All timber will be purchased from responsible forest sources. Materials will be selected based on their environmental impact, with preference given to high rated materials from the BRE Green Guide wherever possible, and,
- Construction impacts will be minimised and monitored;
- The existing ecology of the site and environs will be protected and enhanced through careful landscape planning and design;

The proposed development goes as far as is practical in meeting the relevant requirements set out within the Reading Borough Councils Policy Documents.

2.0 INTRODUCTION

- 2.0.1 The sustainable design and construction statement has been prepared by BSD to accompany the planning application for the proposed development at The Heights Primary Free School, Mapledurham Playing Fields, Reading.
- 2.0.2 The SDCS addresses the strategies set out by Reading Borough Council in both the Core Strategy and the Sustainable Design & Construction Supplementary Planning Document on sustainable buildings and is supported by the BREEAM Pre-assessment for The Heights Primary Free School, Mapledurham Playing Fields, Reading. Where a standard has not been met a justification has been provided.
- 2.0.3 This SDCS highlights where a sustainability standard will be met by the Building Research Establishment's Environmental Assessment Method (BREEAM) and how the principle will be achieved. The project is aspiring to achieve at least a BREEAM rating Very Good, with a minimum score of 65. This report assumes a basic understanding of BREEAM, for further information please refer to the BREEAM Technical Guide¹.
- 2.0.4 In order to develop the sustainability strategy at the planning application stage, the scheme has been assessed using the BREEAM 2014 New Construction 2014 scheme methodology..
- 2.0.5 This SDCS should be read alongside the Energy Statement produced by BSD, the Design and Access Statement produced by David Miller Architects and other supplemental environmental reports.
- 2.0.6 The SDCS details how the proposed development responds to the relevant planning requirements as part of an overall sustainability assessment, and addresses key factors in relation to sustainability under the following headings:
- Land use and location
 - Noise, pollution, flooding and micro-climate effects
 - Promoting sustainable waste and behaviour
 - Promoting sustainable use of materials
 - Sustainable construction
 - Transport and movement
 - Flood resistant design
 - Access

- Maximise the use of urban design and adapting to climate change
- Ensure developments are comfortable and secure
- Conserve and enhance the natural environment and biodiversity

2.0.7 Each section demonstrates how the sustainability standards are achieved and where a standard has not been met, a justification has been provided. The report looks at how the proposed school is in compliance with local policies on sustainable buildings. Each section summaries the policies and standards that have been addressed.

2.0.8 Broader sustainability aspects are also assessed within this report to ensure that all matters surrounding the issues of sustainable development are addressed by the client within the design. Details on the energy consumption, associated CO₂ emissions and energy efficiency measures, as well as methods to meet planning policy in this regards has been included in section 4 as part of the statement.

2.1 The Proposed Development

2.1.1 The proposed development at Mapledurham Playing Fields, 129 Upper Woodcote Rd, Reading RG4 7LH consists of a new build primary free school.

2.1.2 The proposed scheme comprises 8no. Classrooms, WC facilities, a commercial kitchen and main hall.

The Heights is a Government funded, non-selective, highly inclusive primary school for the Caversham Heights / Mapledurham area. The school opened in September 2014 with two reception classes and a Year 1 class in response to an increasing need for primary school places in West Caversham. The school intends to grow by adding two new reception classes of 25 children per class every year and will reach its full capacity of 350 children across reception to Year 6 in 2020.

The school is currently located on a temporary site on Gosbrook Road. The new development on Mapledurham Playing Fields offers an excellent location for a permanent school that will cater for the expected expansion of the school and the increasing demand for primary school places in the area.

2.1.3 Full details of the proposed development can be found in the supporting design and access statement and the submitted architectural drawings.

2.2 Sustainability Approach

- 2.2.1 The World Commission on the Environment and Development (WCED) report: Our Common Future, describes sustainable development as development that:-

‘Meets the needs of the present without compromising the ability of future generations to meet their own needs’

- 2.2.2 This broad concept of sustainable development is to be taken into account within the sustainability statement. However, the main focus will be on successfully meeting the requirements of planning policy and guidance, of which the key documents are listed below.

2.3 Sustainability Guidelines and Policy

- 2.3.1 Sustainable development is the core principle underpinning planning. At the heart of sustainable development is the simple idea of ensuring a better quality of life for everyone, now and for future generations. A widely used definition was drawn up by the World Commission on Environment and Development in 1987: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Planning has a key role to play in the creation of sustainable communities: communities that will stand the test of time, where people want to live, and which will enable people to meet their aspirations and potential.

The following planning policy and guidance has been used to inform the strategy and to ensure that the proposed development meets all requirements applicable to the site.

Key policies

- European Policy
- National Policy
- Regional Policy
- Local Policy

- 2.3.2 European Policy

EU Sustainable Development Strategy (SDS)

Sustainable development means that the needs of the present generation should be met without compromising the ability of future generations to meet their own needs. It is an overarching objective of the European Union set out in

the Treaty, governing all the Union's policies and activities. It is about safeguarding the earth's capacity to support life in all its diversity and is based on the principles of democracy, gender equality, solidarity, the rule of law and respect for fundamental rights, including freedom and equal opportunities for all. It aims at the continuous improvement of the quality of life and well-being on Earth for present and future generations. To that end it promotes a dynamic economy with full employment and a high level of education, health protection, social and territorial cohesion and environmental protection in a peaceful and secure world, respecting cultural diversity.

Key Objectives

- Environmental Protection
- Social Equity and Cohesion
- Economic Prosperity
- Meeting Our International Responsibilities

2.3.3 National Policy

National Planning Policy Framework Document (NPPF)

The NPPF sets out the overarching planning policies on the delivery of sustainable development through the planning system. The key principle of NPPE is that sustainable development should be pursued in an integrated manner, in line with the principles for sustainable development set out in the UK strategy. Regional planning bodies and local planning authorities should ensure that development plans promote outcomes in which environmental, economic and social objectives are achieved together over time.

There are three dimensions to sustainable development: economic, social and environmental. These dimensions give rise to the need for the planning system to perform a number of roles:

- **an economic role** – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation
- **a social role** – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services and support its health, social and cultural well-being;
- **an environmental role** – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to

improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

At the heart of the National Planning Policy Framework is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking.

For **plan-making** this means that:

- local planning authorities should positively seek opportunities to meet the development needs of their area;
- Local Plans should meet objectively assessed needs, with sufficient flexibility to adapt to rapid change, unless:
 - any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole; or
 - specific policies in this Framework indicate development should be restricted.

For **decision-taking** this means:

- approving development proposals that accord with the development plan without delay; and
- where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless:
 - any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole; or
 - specific policies in this Framework indicate development should be restricted

2.3.4 Regional Policy

Although superseded in 2011 by the Localism Act, Policy CC4: Sustainable Design and Construction of the South East Plan provides guidance on new developments, which shall be adhered to where appropriate.

The design and construction of all new development, and the redevelopment and refurbishment of existing building stock will be expected to adopt and incorporate sustainable construction standards and techniques. This will include:

- i. consideration of how all aspects of development form can contribute to securing high standards of sustainable development including aspects such as energy, water efficiency and biodiversity gain
- ii. designing to increase the use of natural lighting, heat and ventilation, and for a proportion of the energy supply of new development to be secured from decentralised and renewable or low-carbon sources
- iii. securing reduction and increased recycling of construction and demolition waste and procurement of low-impact materials
- iv. designing for flexible use and adaptation to reflect changing lifestyles and needs and the principle of 'whole life costing'.

Local planning authorities will promote best practice in sustainable construction and help to achieve the national timetable for reducing carbon emissions from residential and non-residential buildings. There will be situations where it could be appropriate for local planning authorities to anticipate levels of building sustainability in advance of those set out nationally, for identified development area or site-specific opportunities. When proposing any local requirements for sustainable buildings, local planning authorities must be able to demonstrate clearly the local circumstances that warrant and allow this and set them out in development plan documents.

2.3.5 Local Policy: A Sustainable Community Strategy for Reading, April 2011

- a. The replacement sustainable community strategy entitled 'A Sustainable Community Strategy for Reading'¹⁹ sets out a new vision for Reading for the next twenty years, with a strong emphasis and focus on people, place and prosperity. Environmental issues, climate change and sustainability are referred to within both the place and prosperity themes of the sustainable community strategy.
- b. Reading's Climate Change Strategy 2008-2013 'Stepping forward for Climate Change' includes facts about Reading and climate change, plus a vision for Reading. Part of the vision states that, 'In January 2008 the council passed a motion to become Zero Carbon by 2050. This ambitious goal will require year-on-year reductions beyond the national targets. Achieving this will require technology, more efficient buildings, non fossil fuel operated vehicles and energy provision, as well as a programme of behavioural change, including different working practices, such as remote working.'

2.3.5 Local Planning Policy: Reading Borough Local Development Framework: Core Strategy Adopted January 2008

The following Core Strategy policies are relevant:

- CS1 – Sustainable Construction and Design
- CS2 – Waste Minimisation
- CS7 – Design and the Public Realm
- CS8 – Waterspaces
- CS23 – Sustainable Travel and Travel Plans
- CS24 – Car/ Cycle Parking
- CS34 – Pollution and Water Resources
- CS35 – Flooding
- CS36 – Biodiversity and Geology
- CS38 – Trees, Hedges and Woodlands

2.3.6 SUSTAINABILITY TARGETS

BREEAM

- a) In accordance with Reading Borough Council (CS1) requirements, the proposed scheme targeted the achievement of BREEAM Excellent certification which represents a very high level of sustainable design and construction. The project is aspiring to achieve at least a BREEAM rating Excellent, with a minimum score of 70.
- b) The pre-assessment presented in **Appendix A** provides an illustrative route to achieving 'EXCELLENT' for the proposed development. Whilst this has been determined as an appropriate route to certification at this stage of the development proposals, the actual route to certification may vary as the design and assessment progress.

Energy Performance

- c) In accordance with Reading Borough Council planning policy the proposed development will target a 20% reduction in regulated CO₂ emissions over the Part L 2013 baseline.

Summary of Development Targets

- d) In summary, the Applicant is seeking to meet high levels of sustainability in accordance with planning policy and the latest guidance. The key targets for the proposed development are therefore as follows:
 - > The achievement of BREEAM 'Very Good'.
 - > A reduction in regulated CO₂ emissions of 20% over the Part L 2013 baseline.
 - > A level of water efficiency meeting the new tighter Building Regulations optional requirement.

3.0 SUSTAINABILITY ASSESSMENT

3.1.1 Environmental Rating - BREEAM

The building will be assessed against BREEAM 2014 New Construction 2014. BREEAM is a nationally recognised standard used to assess the environmental performance of buildings and aims to acknowledge improved environmental performance in design.

The scheme considers both broad environmental concerns (e.g. climate change, resources use) as well as site specific issues (e.g. energy use, ecology etc.) and these issues are balanced against the desire for high quality of life and a safe and healthy internal environment. The issues assessed are arranged into 9 key categories:

- Energy
- Water
- Materials
- Transport
- Waste
- Pollution
- Health and wellbeing
- Management
- Ecology and land-use

Each category consists of a number of issues and each issue seeks to mitigate the impact of a new or refurbished building on the environment by defining performance targets and assessment criteria.

The majority of BREEAM issues are tradable, meaning that a design team/client can pick and choose which to comply with in order to build up their BREEAM performance score. However, there are a few mandatory requirements which need to be met in order to achieve the aspired BREEAM level.

A scheme can be assessed at Design Stage (DS) - leading to an Interim BREEAM Certificate and/or Post-Construction Stage (PCS) – leading to a Final BREEAM Certificate.

BREEAM ratings are classified from 'Pass' to 'Outstanding' dependent on the total score received from achieving credits across the various categories. In order to achieve 'Outstanding' there are also additional criteria to be met. For more detail on this, please refer to the BREEAM website.

BREEAM Rating	% score
UNCLASSIFIED	<30
PASS	≥30
GOOD	≥45
V GOOD	≥55
EXCELLENT	≥70
OUTSTANDING*	≥85

As discussed previously, the most appropriate BREEAM scheme for The Heights Primary Free School is a BREEAM 2014 New Construction 2014.

The development of The Heights Primary Free School on Mapledurham Playing Fields requires aims to achieve the highest standards of sustainable development. The following section aims to demonstrate the commitment to sustainable design and construction of the development and is set out in accordance with Appendix 5 of Reading Borough Councils' Supplementary Planning Document.

3.1.2 Sustainability throughout the Construction Process – Facilities Output Specification (FOS)

The School will be designed to the baseline designs as stipulated within the Facilities Output Specification (FOS) as issued by the Education Funding Agency (EFA).

Initially, the baseline designs are used to help finalise briefs for school building projects and for discussion with local planning departments. Contractors can develop them into detailed schemes, or propose alternatives. The baseline designs cover a wide variety of services, but also provide detailed guidance on how services are provided during the design, construction and occupation phases. These guidelines include (but are not limited to):

- Integration of the Services with School policies and operations
- Quality Assurance
- Health & Safety
- Environmental Management Services
- Design Integration
- Interface Services and Individual Schools
- Soft Landings

- Performance Monitoring, Reporting and Record Keeping
- Interface Services
- Access and Building Security
- Asset Maintenance Service
- Energy and Utilities Management Plan
- Energy and Utilities Modelling and Payment

The specification also contains detailed guidance on Performance In Use (PIU) targets that should be achieved for the internal environment; these exceed the requirements of BREEAM.

Furthermore, there is a large emphasis on handover, commissioning, training as well as standard operation and maintenance. This emphasis is there to ensure that sustainable buildings are not only designed, but also operated in the fashion they were intended.

The specification details some 60no. Performance Standards (PS) that should be met by the contractor, design team and building users to ensure the building operates correctly. The specification details the frequency, method and consequences of enforcing the PS and are detailed in Appendix A of FOS.

The specification itself is a work in progress that will evolve and adapt to feedback from completed projects, with the Heights Free School contributing and aiding in the development of schools for the future.

In assessing the sustainability of the Heights Primary Free School, reference is made to both the BREEAM pre-assessment and to the Facilities output specification where necessary.

3.2 Management

Management
Aim: To recognise and encourage environmentally and socially considerate development. 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 reduces 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?

The school design is an integrated design process that optimises building performance – eliminating performance gaps that can emerge at any stage of the project. Not only have 17 of the available 21 BREEAM points been targeted for this aspect of sustainable design and construction, aspects of the Facilities Output Specification and BSRIA Soft Landings have been applied throughout.

The design process thus far has taken account of the extremely sensitive nature of the development, with consultation with a large number of interested parties, including the local community; as the design progresses and enters the construction phase, this document sets out the integrated and sensitive approach required to construct and operate a highly sustainable building.

3.2.1 Guidance for non technical building users is provided by a variety of mechanisms;

1. A Building User Guide (**MAN 04 & FOS PS25**) compliant to BSRIA BG 26/2011, and the Contractors Training Schedule shall be provided at practical completion of the Project.

2. A Commissioning Schedule (**MAN 04**) and a Commissioning Specialist (**MAN 04**) shall be appointed to ensure the building users have a functional building handed over to them. Further hand over procedures such as Service Delivery Proposals, Staff Induction and Soft Services & School Training will be provided (**FOS PS4, PS5, PS6, PS7, PS8, PS9**). As part of FOS, the project shall follow the protocols of BSRIA Soft Landings, with particular attention given to Soft Landings for Schools Case studies (BG 9/2010). The purpose of Soft Landings is to ensure that all parties involved with the school are aware of the role they play in the environmental impact of the school from design through to occupation.
3. A Post Occupancy Evaluation (**MAN 05, FOS PS1, PS2**) and PIU conformance testing (**FOS PS3**) will be undertaken to ensure that hand over protocols have been followed and problems rectified. In addition, Performance Monitoring, Reporting and Record Keeping will be undertaken by the contractor (**FOS PS31, PS32, PS33, PS34, PS35**)
4. Energy Monitoring (**ENE 02**) will be provided to allow all building users to compare actual energy usage with designed energy usage. These will be enhanced by the Energy and Utilities Management Plan, Energy & Utilities Consumption Monitoring and Energy Efficiency Assistance (**FOS PS47, PS48, PS49, PS50**) that shall be provided by the contractor.
5. The contractor shall provide Building Controls and Energy Management Systems, Utilities Invoice Verification and a Display Energy Certificate (**FOS PS57, PS58, PS59**) to further aide the building users in understanding the design and raise awareness.
6. In line with **FOS Appendix D**, the contractor shall provide appropriate training to user groups as below:
 - Training for the Contractor staff
 - Training for the School Premises Staff
 - Training for the School Teaching Staff

3.2.2 Consideration has been given to the sustainability during the construction phase in the following ways:

1. A Sustainability Champion has been appointed within the design team to set out and monitor sustainable design progress (**MAN 01, MAN 03**)
2. A Site Waste Management Plan (SWMP) (**MAN 03**) shall be provided which shall monitor and record energy consumption, transport of construction & waste materials and construction water consumption.
3. The Contractor shall further enhance this by providing Communications Contingency Planning (**FOS PS10, PS11, PS12, PS14,**

PS15) and extensive Health & Safety, Quality & Environment planning
(FOS PS16, PS17, PS18, PS19, PS20, PS21, PS22)

4. The contractor shall operate an environmental management system (EMS) and shall register the site for the Considerate Contractor scheme **(MAN 03)**.

3.2.3 Site investigation has been undertaken via a number of Surveys by Campbell Reith and is reported in the Preliminary Ecological Appraisal.

3.2.4 The Community and Stakeholders have been consulted throughout the design process **(MAN 01)** and the following aspects of the design reflect this:

1. A Multi Use Games Area (MUGA) pitch has been incorporated into the design to replace the lost sports fields.
2. The development will also include the repair and reopening of the pavilion and improved football pitch facilities around the site.

3.2.5 Sustainable communities will only be sustainable if they have been designed with people, as well as the environment, in mind. Developments must be comfortable and safe to use for all sections of society and all cultures and religions. This includes internal and external security design and safe transport links.

The development will conform to the requirements of Secured by Design where possible. In addition, consultation with a Designing Out Crime Officer (DOCO) will take place through the detailed design process to ensure the development provides a safer and more secure development.

The school has been designed to reduce the opportunity and fear of crime in a number of ways;

1. The external lighting has been designed to deter criminal activity, provide amenity and have minimal impact on the surrounding ecology, in compliance with BS 5489-1:2013
2. Consultation with the local ALO has taken place. **(HEA 06)**

Refer to Ryder Landscape Architects drawing number HPS-RYD-XX-XX-DR-L-0001 for further details of access provision on site.

Refer to BSD drawing number 170210-E207 for the external lighting scheme.

2.5.6 Consideration has been given to maintenance in a multitude of ways:

1. Helpdesk services (**FOS PS26, PS27, PS28, PS29, PS30**) will be provided both in and out of school hours, with predetermined response times from the contractor should any issues be identified.
2. A schedule of Maintenance and Lifecycles shall be kept by the contractor (**FOS PS36, PS37, PS38, PS39, PS40, PS41, PS42, PS43, PS44, PS45, PS46**). This includes a Five Year Maintenance Plan, Schedule of Programmed Maintenance, Statutory Testing & Inspection and Reactive Maintenance schedules.
3. The building has double door access to all main plant areas, and these are readily accessible to delivery areas.
4. All mechanical and electrical systems have been designed with maintenance as a priority to allow access and maneuverability should plant repair or maintenance be required.

3.3 Health and Wellbeing

Health and Well-being
Aim: To ensure a good quality amenity level is afforded to occupants of buildings. 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?

A high quality internal environment in a classroom is essential for learning and teaching. A concern that has been raised in recent years over PFI schools is internal environmental quality; to address this, the EFA has introduced a raft of new measures to significantly improve how schools are designed, built and operated. The process is ongoing and feedback from new schools is vital in developing new measures to improve the standard of education facilities across the UK. The Heights Primary Free School has an important role to play in this process, that will ultimately benefit not only the next generation of Caversham Heights, but also the country in general.

3.3.1 The Heights Primary Free School has been designed to meet or exceed the baseline designs as issued by the EFA for the Priority School Building Programme. A brief explanation is given below. Where no criteria is given in the baseline designs, the design uses guidance in BB87 or Part L2A of the Building Regulations, whichever is more onerous.

1. Daylighting and Lighting

Each class room has been designed using climate based daylight modeling (CBDM), with the focus of achieving two metrics as identified within the baseline design for daylighting:

- Spatial Daylight Autonomy (sDA) of more than 50% for more than 50% of the working plane, for the target illumination of 300 lux in teaching spaces, for the hours of operation from 08.30 to 16.00.
- Useful Daylight Illuminance (UDI-a) of between 100-3000 lux will be achieved for an average of 80% of the time over the working plane within a space That is to say that the level of illuminance provided below 100 Lux (UDI-s) and above 3000 Lux (UDI-e) will occur for no more than 20% of the time.

The CBDM report also identifies the strategies used for glare control. Internal lighting shall be designed to complement daylighting with fittings and circuiting arranged to minimize energy consumption. **(HEA 01)**

2. Indoor Air quality and Thermal Comfort

The building has been designed to make full use of natural ventilation, designed to ensure the internal CO₂ concentration does not exceed 1,500ppm for more than 20 consecutive minutes each day.

Each classroom shall be fitted with an NVHR system that allows single-sided, natural ventilation in deep plan spaces whilst making the most of internal heat gains to achieve thermal comfort criteria. This system allows buildings with limited facade and roof space to be naturally ventilated. Its low-energy mixing fans mitigate cold draughts in winter and provide a supply air boost in summer. The system is fitted with external and internal temperature sensors and an intelligent controller, which monitors conditions to create an ideal working environment.



Natural Mode

- Damper opens
- Single sided ventilation
- Works with other openings in the space



Summer Mode

- Damper opens fully
- Air delivered to rear of the space
- Natural exhaust through the units
- Night cooling



Winter Mixing

- Draught mitigation strategy
- Mixes warm room air with fresh external air
- Natural exhaust through the unit

3. Overheating

The school has been designed to comply with CIBSE TM52, requiring a more detailed analysis of overheating in buildings compared to the building regulations or CIBSE AM11 (**HEA 04**). The building has been assessed for 3 criterion:

- The first criterion sets a limit for the number of hours that the operative temperature can exceed the threshold comfort temperature (upper limit of the range of comfort temperature) by 1°K or more during the occupied hours of a typical non-heating season (1st May to 30th September).
- The second criterion deals with the severity of overheating within any one day, which can be as important as its frequency, the level of which is a function of both temperature rise and its duration. This criterion sets a daily limit for acceptability.
- The third criterion sets an absolute maximum daily temperature for a room, beyond which the level of overheating is unacceptable.

Each class room shall have independent controls to alleviate overheating issues. (**HEA 04**)

4. Acoustics

The school has been designed to comply with the baseline acoustic design for the PSBP as well as BB93. (**HEA 05**)

In order to reduce the likelihood of noise complaints and to ensure a high quality development is created, the development will be aiming to achieve airborne sound insulation values that will improve upon the performance standards outlined within the Building Regulations Part E standards.

Construction traffic will be minimised by restricting deliveries and arrival times in order to manage potential impacts on existing and future occupants. Work will be limited to appropriate hours to be agreed with the Council, and suppressors will be used to reduce noise from machinery in line with the Considerate Constructor's Scheme.

- 3.3.2 The design team will take all practical steps when selecting and specifying materials to ensure that the potential risk of airborne pollutants released are kept to a minimum. The following items will be carefully considered.
- Volatile Organic Compounds (VOCs) - Released from many synthetic materials, furnishing and chemical products. Many VOCs are respiratory irritants.
 - Carbon Monoxide - Problems arise with poorly maintained equipment and when chimneys or flues are blocked, or if there is not sufficient ventilation to supply air to the appliance or where air intakes are located too close to roads or areas used for car parking.
 - Fine Particles - less than 10µm in diameter can cause irritation and respiratory problems.

In order to combat these potential issues, the design team is aware that specified materials should not contain or emit toxic chemicals, for example: natural materials and low solvent finishing products and furnishings. These products are rated highly in the Green Guide and will be rewarded in the BREEAM Materials Category. In addition excellent ventilation is vital during construction, to aid the removal of chemicals. Designing for and managing internal air quality will benefit the health of building occupiers.

- 3.3.3 Furthermore, the school shall comply with the Performance In Use targets as identified in the following FOS performance standards:
- **PS51** Indoor Air Quality
 - **PS52** Acoustics
 - **PS53** Lighting Quality
 - **PS54** Internal Air Temperature

3.4 Energy

Energy	
Aim: To conserve energy and maximise the use of energy efficiency techniques.	
5.	How has the building been designed to minimise CO ₂ emissions associated with their operational energy consumption?
6.	How has the development been designed to optimise the use of the energy from the sun, natural daylighting and controlled natural ventilation?
7.	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).
8.	Have renewable energy sources or decentralised energy been considered for this development and if so, how would they be incorporated within the development?

2.4.1 The school has been designed to minimize CO₂ emissions in the following ways:

- The school employs energy efficiency measures to reduce carbon dioxide emissions by 11.9%. These include:
 - LED Lighting with automatic controls
 - Improved U-Values in excess of Building Regulations
 - Improved air tightness compared to building regulations
 - Hybrid natural / mechanical ventilation
 - Demand controlled mechanical ventilation
- The school shall have a PV array to generate a further 8.47% carbon dioxide emission reduction.

The table below summarises the carbon dioxide emission reductions achieved:

	Carbon dioxide emissions	
	(Tonnes CO ₂ per annum)	%
Baseline: Building Regulations 2013 Part L Compliant Development	26.99	100.00%
Carbon Dioxide emissions offset from energy efficiency	3.21	11.90%
Carbon Dioxide emissions offset from renewable energy	2.29	8.47%
Carbon dioxide emissions of the occupied building	21.49	79.62%

For further information, refer to the BSD Renewables and Energy Statement.

The project aims to achieve 5 credits for the **ENE 01** in the BREEAM scheme:

Energy & CO2 emissions		
	Actual	Notional
Heating + cooling demand (MJ/m ²)	44.93	43.47
Primary Energy (kWh/m ²)	64.1	73.21
Total Emissions (kg/m ²)	11.1	12.6
Overall EPR _{NC} :		0.3251
BREEAM Credits:		5

The contractor shall provide ongoing support and feedback after occupation of the school to ensure energy consumption and carbon dioxide emissions are as per the design; these are defined as the following Performance Standards:

- **PS47** Energy and Utilities Management Plan
- **PS48** Operating Efficiently
- **PS49** Energy & Utilities Consumption Monitoring
- **PS50** Energy Efficiency Assistance

The contractor shall also undertake a detailed commissioning process by engaging a commissioning specialist for both the initial commission and for seasoning commissioning for the following year. (**MAN 04, MAN 05**). The commissioning procedure will ensure all equipment is operating a maximum efficiency throughout the year.

All significant energy uses throughout the school shall be metered and linked to the BMS system, enabling occupants to take appropriate remedial action should energy consumption exceed expectations. (**ENE 02**)

2.4.3 The school employs a variety of mechanisms to optimize the energy from the sun, natural daylight and controlled natural ventilation as detailed in the 'Health and Wellbeing' section of this report.

2.4.4 The school shall install a new solar photovoltaic array, providing a decentralized source of renewable energy. Other technologies are considered in greater detail in the BSD Energy and Renewables Report. (**ENE 04**)

2.4.5 The school employs a variety of mechanisms to as efficient use of energy as possible, as detailed in the table below:

Solar Gain	The school has been designed to limit solar gains in the summer months to prevent overheating and glare. This offsets a significant cooling and lighting load.
Natural Daylighting	Climate based daylight modeling has been undertaken on each classroom to maximise natural daylighting available
Natural Ventilation	NVHR has been installed to each classroom to provide controlled natural ventilation
Thermal Mass	The school shall use its thermal mass to achieve night cooling in conjunction with the NVHR; the slab will be cooled in summer months by circulating air across it without compromising security.
Insulation	The school shall be constructed from materials that exceed the thermal properties as indicated in the Building Regulation Part L2A
Green and Brown Roofs	A green roof shall be installed to the roof of the school, with specialist mounts used for the PV installation that both prevent shading and decrease the local temperature, increasing their efficiency
Green Walls and Living Walls	The school employs a green roof for rainwater attenuation and biodiversity.
Landscaping and Energy Efficiency	The PV array has been designed so that it will not be overshadowed by the existing or proposed landscaping; however the small footprint of the building prohibits further landscaping / energy efficiency coordination.
Energy Efficient Appliances	Energy efficient appliance will be used throughout
Water Consumption	Flow limiting valves shall be installed to all water outlets
Sustainable Drainage Systems	A SUDS system is proposed - refer to the Campbell Reith Surface Water Management Plan for further details
Permeable Surfaces	Permeable Surfaces are proposed for the school - refer to the Campbell Reith Surface Water Management Plan for further details

3.5 Transport

Transport
Aim: To reduce the need to travel through appropriately located development. 9. 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? 10. How have public transport networks been considered in terms of the location of the development and proximity to local amenities? 11. How have deliveries and the maneuvering of delivery vehicles been considered?

Sustainable transport links are central to the sustainability debate. They provide a positive contribution to environmental, societal and economic sustainability of the places they serve.

As such, the school seeks to target a minimum of 6 credits in the BREEAM scheme across the issues of **TRA 01, TRA 02, TRA 03** and **TRA 05**.

3.5.1 Modes of transport to the school site have been assessed in detail in the MLM Transport Assessment, which highlights the following:

- The existing temporary school site is located outside of the school catchment area; thereby increasing car based trips compared to the proposed Site which is located in the catchment area thereby maximising opportunities to travel to the school by sustainable modes.
- The School is served by public transport with bus stops located immediately outside the Playing Field's Upper Woodcote Road access. However, public transport is generally not a main form of travel for young school children attending the school, particularly as most pupils live within the school catchment area and can walk to/from the Site. However, buses and rail services do offer opportunities for staff to travel to and from the School.
- The proposed improvements to the highway and access as part of the proposals will go towards ensuring that the existing excellent accident record continues.

- The existing site access junction with Upper Woodcote Road is to be improved with a formal access junction with dedicated footways coming into the Site, widening the access road from 3.9m to 4.8m to facilitate two-way vehicle flows.
- The internal Playing Fields car park will also be remodelled to improve vehicle and pedestrian circulation. The rearranged car park layout can comfortably cater for 30 vehicles although ample space around the circulation route can accommodate more informal parking.
- Access to the new school Site is taken via the playing fields car park with a dedicated footway route through to the School to the pedestrian access on the eastern boundary of the Site.
- It should be noted that when the new School Site opens in September 2018 the school is expected to be only two thirds full (280 pupils). The School will monitor their traffic management system as part of their School Travel Plan and make adjustments/improvements as necessary. A managed quick drop-off facility within the staff car park is also proposed for the AM drop-off period to expedite parent vehicles passing through the Playing Fields car park.
- The proposed school will be served by 20 staff car parking spaces including 2 disabled parking space in accordance with RBC parking standards and based on predicted requirements from the School. Cycle parking provision will consist of 30 covered and secure spaces for pupils and 10 for staff which can be increased as demand dictates.
- Waste collection and deliveries are expected to be restricted between 09:00 to 15:00 to avoid the beginning and end of the school day. Refuse and service deliveries to the school will use the Playing Field car park area adjacent to the Site. Vehicular access into the Site via the staff car park will be possible for maintenance and fire tender vehicles. School trip small coaches/minibuses can pick up from within the Playing Field car park but larger coaches may need to collect/drop-off from Upper Woodcote Road where pupils will be escorted between the school buildings and coach/buses by staff.
- The numbers of vehicle trips predicted to be attracted by the fully occupied proposed school (420 pupils) have been assessed using recent parent/pupil and staff travel surveys. This recorded their

existing main travel modes to the temporary Gosbrook Rd school site and their main future travel mode for the proposed Site. This showed the current 76.5% of pupil trips being by car for the Gosbrook Road site being reduced to 23.4% for proposed Site at the Playing Fields. This equates to 129 pupil car trips to Gosbrook Road for a 168 pupil roll reduced to 99 pupil car trips to the Playing Fields for a 420 pupil roll; 30 less pupil car trips despite the large pupil increase.

- The School will continue to operate a Travel Plan as part of the Reading Borough Council School Travel Plan Programme but will be updated to reflect the new School Site location. This will continue and encourage further sustainable modes of transport to/from the school.
- Overall it has been demonstrated that there are no transport or highways reasons to prevent the Heights Primary School relocating to a new school facility at the Mapledurham Playing Fields, Upper Woodcote Road for 420 pupils.

3.5.2 A new Travel Plan for the school is proposed and will be managed by a nominated Travel Plan Coordinator (TPC) who will:

- Provide the main travel plan contact for all staff, parents and students;
- Provide a principal point of contact for RBC;
- Liaise with RBC;
- Keep up-to-date information on transport choices for display in communal areas;
- Monitor travel patterns on a regular basis ensuring initiatives adopted are meeting requirements; and
- Arrange first occupation travel surveys and subsequent travel surveys.

3.5.3 The TPC will implement Travel Plan Initiatives, which are summarized as follows (but can be reviewed in detail in the MLM Travel Plan):

- Improve Information and Awareness
- Encourage Walking and Cycling in conjunction with the school
- Work closely with RBC and bus and rail companies to promote the use of public transport.
- Promote use of Alternative Modes of Transport and Car Sharing
- Develop Personalised Travel Planning for Staff

3.6 Water

Water
Aim: To improve efficiency in the use of water, conserve water resources and minimise vulnerability to flooding. 12. How will the development incorporate the use of water saving devices to achieve a maximum consumption of 5.5 cubic metres per year per person for office developments? (Or the most appropriate benchmark for other types of development). 13. Will the development and access to and from it such as roads and paths be located away from areas of potential flooding? 14. How will the development incorporate harvesting and re-use of rainwater?

Water is essential for life; vital for health and wellbeing, and for agriculture, fisheries, industry and transportation. Increasing demand and more frequent and extreme droughts and floods put more pressure than ever on water efficiency and usage. The construction of The Heights Primary Free School puts enormous emphasis on using water only where essential; ensuring that storm events do not cause damage to the locale or overload the local water systems and using what water is naturally available on site is put to the best use.

3.6.1 The school aims to achieve a minimum of 3 credits for the **WAT 01** credit, which relates to a 40% annual saving in water consumption. The school comprises WC blocks and a kitchen, so the targeted improvements are as follows:

- The WCs shall have an effective flush volume of 4 litres
- Wash hand basin taps shall have flow limiters installed, limiting the maximum flow rate to 4.5 litres / minutes
- Kitchen sink taps shall have flow limiters installed, limiting the maximum flow rate to 7.3 litres / minutes

The school also aims to achieve maximum credits for the **WAT 02**, **WAT 03** and **WAT 04** credits, therefore the following water saving measures have been employed:

- A water meter, linked to the BMS, shall be installed to the incoming mains supply, with a secondary meter installed for leak detection.
- A water meter, linked to the BMS, shall be installed on the supply to the Kitchen.
- A solenoid valve shall be installed to each WC area to prevent minor leaks.

3.6.2 Flooding to the school and its environs has been considered in detail in the Campbell Reith Flood Risk Scoping Study, but the report findings can be summarized as:

- The site is located in Flood Zone 1 and it is at a LOW risk of fluvial flooding.
- The site has a LOW risk of surface water flooding except for the eastern boundary which is at HIGH risk of surface water flooding.
- The site has less than 25% chance of groundwater flooding and is considered at a LOW risk.
- There are no surface water sewers in the vicinity of the site.
- There are no artificial sources in the vicinity of the site.
- There are no particular flood risk constraints imposed on the site.

3.6.3 Rainwater harvesting and reuse on the school site has been considered in detail in the Campbell Reith Surface Water Management Plan, but the report findings can be summarized as:

- The surface water runoff generated by the proposed development will be contained within the site using Sustainable Drainage Systems (SuDS).
- The development will use SuDS in the form of permeable surfacing and cellular storage. This will comprise:
 - Pervious Paving
 - Infiltration Structures
 - Green Roofs
- Surface water runoff from the development will infiltrate into the ground assuming that ground conditions are suitable for infiltration methods. It is recommended that a site investigation is undertaken to determine infiltration rates, ground water level and contamination.

3.7 Materials

Materials
Aim: To retain local character and promote the use of materials with a low environmental impact. 15. How will the selected materials help retain local character, ensure long life and ensure a low environmental impact? 16. What consideration has been given to reusing materials in-situ, responsibly sourcing materials and re-using existing structures?

Materials have an impact on the environment in a range of different ways and at different times during their life cycles. The extraction, transportation and manufacturing of raw material consumes energy and produces carbon. Conversely, when a material is reused or recycled the wider environmental impact of the material is significantly reduced.

The school is aiming to achieve at least 11 of the 14 available credits for sustainable use of construction materials in the Materials section of the BREEAM assessment.

- 3.7.1 In accordance with the guidance set out in the Reading Borough Council Sustainable Design and Construction SPG (2014), the Building Research Establishment (BRE) Green Guide will be used to assess the building materials. As part of this, materials are rated from 'A' to 'E', with the rating reflecting the Life Cycle of the materials in question.
- 3.7.2 In accordance with the Reading Borough Council Sustainable Design and Construction SPG, new materials required in the development will be sourced where possible to ensure that environmentally friendly and low embodied energy materials are used. Where possible, "A+/A" rated materials and element construction will be sourced to enable the development to be as environmentally friendly as possible.
- 3.7.3 Preference will be given to the use of local materials and suppliers where viable. This will be considered as part of the detailed design and construction process.
- 3.7.4 Where possible, materials will be sourced from a supplier who are covered by

an accredited environmental management system (EMS) such as ISO 14001 or BS8555 at extraction and process stages. This will ensure that the environmental impacts of the materials have been measured and minimised where possible in the products manufacture. Similarly, recycled materials will be utilized wherever possible to minimise the amount of raw material that would need to be obtained, and also to reduce waste.

- 3.7.5 Timber used on the site, including timber used in the construction phase, such as hoarding, fencing and scaffolding, will be sourced from sustainable sources (e.g. PEFC and FSC) where possible. The use of recycled materials (e.g. crushed concrete from waste used for hard-standing) has zero embodied energy impact, other than that expended in their processing or transport.
- 3.7.6 Material from the demolition of the existing buildings on site will not re-used as this will not be practicable and the quantity of demolition will be too minor to justify the reuse or recycling off-site. A comprehensive Site Waste Management Plan will address the potential for recycling construction related waste on site through implementing effective and site suitable practices in accordance with the waste hierarchy set out in the Reading Borough Council Sustainable Design and Construction SPG; reduce, reuse, recycle, disposal.
- 3.7.7 In addition, the development will be designed to withstand the long term impact from high pedestrian traffic, vehicular and other activities, which will further satisfy BREEAM.
- 3.7.8 It is likely that the main contractor will have an environmental materials policy, used for sourcing of construction materials however this will be confirmed during the BREEAM design stage. The source of the materials has not yet been specified, however local materials will be optimised where it is economically feasible to do so.

3.8 Waste

Waste
Aim: To minimise the production of waste and maximise re-use and recycling. 17. 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? 18. How will the development make the maximum use of construction, demolition waste and recycled materials? 19. How will provision be made for the storage and recycling of waste for all users of the site?

The Waste Hierarchy is a method that should be employed whenever life cycle impacts are considered for any consumable; schools are the perfect environment for educating the next generation in the fundamentals of sustainable living. The hierarchy is employed via the BREEAM scheme and is implemented in the design and operation of the school.

The Waste Hierarchy



3.8.1 As the site is currently undeveloped, there is no scope to re-use existing materials on site.

Construction site waste typically comprises 50% of non-domestic waste. As such, great emphasis is put on monitoring the impacts throughout the construction process by the contractor. Water use, energy use and CO₂ emissions from site related activities being recorded, with appropriate targets set for their reduction, and monitored through the site waste management plan (SWMP). The contractor will also conform to best practice principle in respect to air (dust) pollution from the site and all site timber will be re-used, recycled or responsibly sourced.

Site environmental targets will be monitored as part of the contractor's scheme.

3.8.2 Construction Waste

Construction waste is a key element to be considered in achieving a reduction in all waste and has been considered as part of this proposed development in accordance with Reading Borough Council Core Strategy Policies.

It is estimated that some 40% of all waste is construction related. It has also been shown on a number of construction sites that as soon as the issue of waste starts to be addressed, significant improvements follow quickly across the site. There are two key elements to be considered:

- Appropriate construction methods and effective management;
- Re-use/recycling of materials on site.

The amount of waste materials arising from construction can be reduced by introducing regular audits to monitor and control site activities more closely, for example reviewing materials ordering and site practices to prevent damage and cross-contamination. Attention to the quantity of materials purchased and the way that these are offloaded, labelled and stored, can significantly reduce the amount of materials wasted. Wherever possible, the use of packaging and non-returnable pallets should be avoided, or they should be recycled or reused.

A Site Waste Management Plan (SWMP) will be produced to ensure compliance with legislation, and will address any additional areas required by BREEAM. The SWMP ensures that waste is reduced by specifying and purchasing only what is needed for the project. The Site Waste Management Plan (SWMP) will result in various benefits for the development, which include:

- Better control of risks relating to the materials and waste on the site;
- 'Good housekeeping' of waste and improved site safety;

- Demonstrating compliance with the legislative framework;
- A mechanism for demonstrating how waste is managed and minimised and how associated costs are controlled;
- A tool to aid compliance with various environmental management systems e.g. ISO14001;
- Compliance with contractual requirements from public and private sector clients; and
- A system to help make cost savings by better managing the supply chain of materials, and their storage, handling, recovery and eventual disposal.

Recycling of materials from the construction waste stream can provide valuable construction materials and relieves the existing pressure on landfill sites. By maximising the value extracted from these materials, and extending their life in this way, the demand for such materials from new sources is reduced and there is likely to be a long-term beneficial impact on the conservation of mineral resources such as primary aggregate materials.



The main contractor will be required to segregate materials prior to transportation to recycling centres. The strategy is to separate materials into waste bins for the following:

- Concrete
- Timber
- Glass
- Plasterboard
- General waste

Special waste such as oils or paint will be managed separately using appropriate COSHH bins.

The main contractor will track what waste has been produced using their devised waste stream schedule and minimise residual waste where possible.

A specialist HSE licensed waste management company will be responsible for transferring waste from out bins to applicable, separate contractors for further

processing and deliver to their waste transfer station. The waste management company will be responsible for maintaining appropriate records i.e. waste transfer and waste management notes.

As set out in BREEAM the team will ensure that during the construction phase, the amount of non-hazardous construction waste generated on site by the development is the same as, or better than good or best practice levels. This will be rewarded by BREEAM Issue **WST 01**.

3.8.3 Commercial Waste

In pursuance of BREEAM credit **WST 03**, adequate internal storage containers for recycling will be provided within the building to encourage sustainable recycling habits by the occupants.



External storage for waste and recycling will be provided for the development. Space for external waste storage will also be provided to work with the Reading Borough Council's waste collection service.

Building User Guides will also be provided to the occupants of the new dwellings and commercial unit which will provide advice and information on the most effective means and methods to recycle and minimise waste

Composting is not considered to be a viable option for this site, given the available space within the site boundary and the practicality of composting waste produced by the scheme.

Provision will be made for a cigarette butt bins to be located outside the building as all internal areas of the building will be non-smoking.

3.9 Land Use and Ecology

Land Use and Ecology
Aim: To retain, protect and enhance wildlife habitats and natural features. 20. 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? 21. What consideration has been given to not using previously undeveloped land? 22. What consideration has been given to the removal of contamination from the land?

Increasing populations, climate change, pollution and development put immense strain on ecosystems and natural infrastructure and resources. It is therefore essential to develop knowledge-based & sustainable management strategies to accommodate the challenges presented. The development at The Heights Primary Free School looks to create a new education facility for ultimately over 400 pupils whilst enhancing the site ecology and natural features.

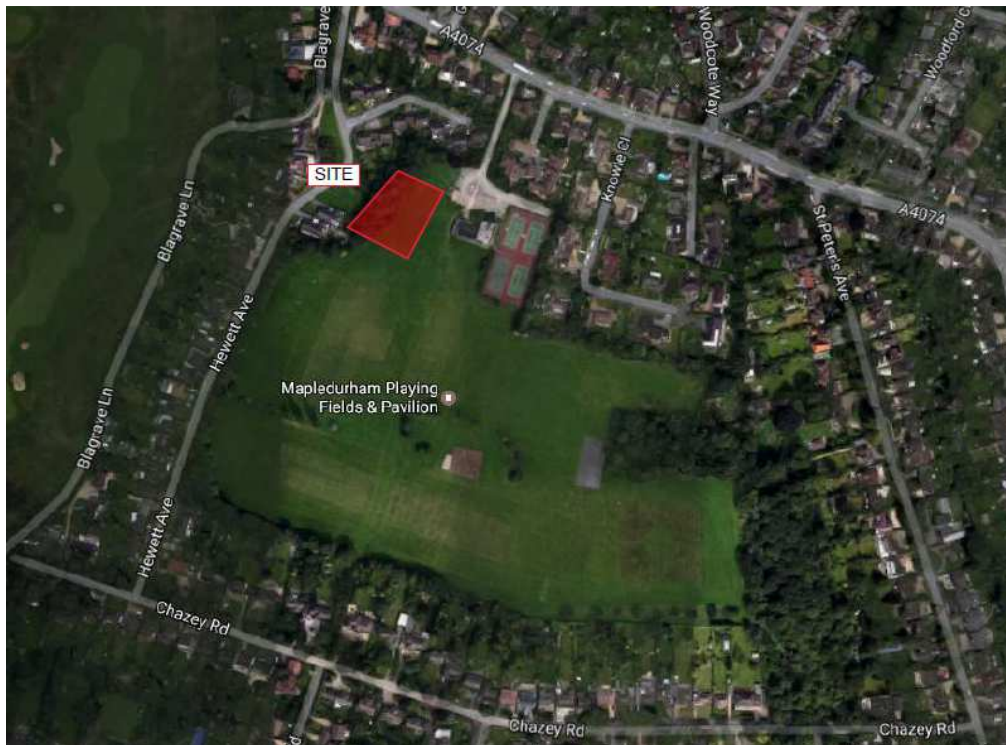
3.9.1 The school aims to achieve a minimum of 8 out of a maximum of 10 credits for the Land Use and Ecology Issues in the BREEAM scheme

3.9.2 The existing wildlife habitats and natural features have been assessed in detail in the Campbell Reith Preliminary Ecological Appraisal, which concludes the following:

- The Phase 1 Habitat Survey confirmed that the majority of the Site is amenity grassland with an area of broad-leaved woodland to the west. A small area of bare ground is located within the north eastern corner, forming part of the existing car park.
- The trees within the site boundary were considered to have negligible potential for bat roosts therefore no further survey is required.
- The broad-leaved woodland has potential to support nesting birds. It is recommended that the removal of this vegetation is undertaken outside of nesting bird season (March – August). If this is not feasible then an experienced ecologist should assist during the vegetation removal to ensure no birds are harmed.

- There was no sign of badger activity within the site boundary. A badger sett was identified in the ADAS 2016 PEA towards the far east of the Mapledurham Playing Fields. A tool-box talk is recommended prior to construction to reduce risk of potential harm to badgers.
- No sign of fox activity were recorded during the survey however it is possible that wild mammals use the site. A tool-box talk is recommended prior to the construction of the proposed development.
- The proposed development will require the loss of amenity grassland and a portion of the broad-leaved woodland, the impact of this development is not considered significant in terms of ecology due to the common nature of these habitats on Mapledurham Playing Fields and within the local area. The removal of this habitat will be mitigated for in the landscape design.
- The following recommendations are provided to mitigate the loss of habitat and disturbance to protected species on site:
 - Installation of 3 bat boxes;
 - Installation of 3 bird boxes;
 - Native species planting;
 - Replacement woodland planting;
 - Adoption of a green roof;
 - Removal of vegetation outside of nesting bird season (March – August);
 - Sensitive lighting regime to not cause light spill onto surrounding ecological features.

3.9.3 The Mapledurham Playing Fields is a large, open area of public open space in the north of the Borough and at its fringes are rear gardens and trees and woodlands; the site itself is located on existing playing fields, as indicated below.



5no. sites have been reviewed by the Education Funding Agency and public consultation was requested to determine the final location at Mapledurham Playing fields. All 5 sites presented the unavoidable option of developing on undeveloped land.

3.9.3 The environmental and geotechnical site investigation report by RPS draws the following conclusions with regards to contaminants:

- Contaminants of concern were not recorded within soil samples analysed from beneath the site at concentrations in excess of adopted AC. The potential risk to human health receptors from these concentrations of contaminants of concern is therefore considered to be **LOW**.
- Groundwater was not encountered within monitoring wells installed as part of the intrusive works, screened across the Boyn Hill Gravel Member and White Chalk Subgroup to depths of up to 10.00m bgl and an assessment of the contamination status of groundwater beneath the site could not be made. However, contaminants of concern were not recorded within soils sampled from beneath the site at concentrations considered to represent a significant risk to groundwater receptors. The significant thickness of variably permeable unsaturated zone beneath the site is also considered to offer a significant degree of

protection against the downward migration of potential contaminants of concern toward groundwater receptors.

Based on the available information, the potential risk to groundwater receptors from concentrations of contaminants of concern detected beneath the site is considered to be **LOW**.

- Based on ground gas monitoring undertaken on site as part of the current investigation CIRIA CS1 is applicable to the site, whereby ground gas protection measures are not required for new buildings. The risk posed by ground gas to human health receptors and infrastructure is therefore considered to be **LOW**.

3.10 Pollution

Pollution
Aim: To minimise damage to the environment through air, ground/surface water, land, noise or light pollution. 23. What measures have been incorporated to ensure that noise and light pollution plus pollution transported through surface water runoff will be minimised throughout the development? 24. What measures have been incorporated to ensure that light pollution will be minimised throughout the development? 25. What consideration has been given to reducing refrigerants and minimising nitrogen oxide emissions? 26. How has the development been sited to minimise the impact of flooding. 27. How has the design considered the use of sustainable drainage systems (SUDS) and how will they be incorporated within the development?

Pollution can take many forms; air, water, light, noise and soil and decreases quality of life and resource for anything it affects. As such, minimizing pollution (or mitigating the effects entirely) is the best possible course of action for any new development. The Heights Primary Free School looks to provide additional amenity with increasing pollution.

3.10.1 The development at Mapledurham Playing Fields is highly sensitive with regards to pollution of all sorts. As such, a variety of studies have been undertaken to assess the likely impacts.

3.10.2 The Noise Assessment, undertaken on behalf of Campbell Reith, draws the following conclusions:

- The additional traffic movements caused by the development of the proposed school are predicted to result in a negligible increase in noise levels for existing properties alongside the existing highway network.
- Along the Access Road, a negligible increase in noise levels has been predicted over the daytime assessment period, although a medium

increase in noise levels may be perceived during peak hours at those properties either side of the Access Road.

- The noise from activity in the proposed play areas would raise the existing ambient noise levels by up to 8 dB in some gardens during school break times, although the predicted noise levels would not exceed the guideline external noise criteria.
- The internal noise criteria, assuming the residents' windows would be open, would, however, be slightly exceeded. The L_{Amax} noise levels due to activity noise are similar to the measured L_{Amax} noise levels of the existing noise climate. It should be noted however that the activity noise would only occur for up to two hours per day and would occur during the periods of least sensitivity to noise (i.e. mid to late morning and in the afternoon). It can therefore be concluded that the activity noise levels from the external play areas are unlikely to result in any significant noise impacts for existing noise sensitive receptors.

3.10.3 The Air Quality Assessment, undertaken on behalf of Campbell Reith, draws the following conclusions:

- During the operation phase, the BREEZE ROADS modelling calculations have predicted that NO₂, PM₁₀ and PM_{2.5} concentrations in both 2018 (initial opening year) and 2023 (year the school reaches maximum capacity) will have a negligible impact on all existing receptors and will also not exceed the NAQO's at any of the proposed development receptors; therefore, mitigation is not required.
- Additionally, it has been identified that any traffic associated with the development will not adversely affect air quality in the local area.
- In terms of the construction phase, the estimated risk associated with the proposed development, assuming that recommended the mitigation measures are put in place is negligible.

3.10.4 No refrigerants are proposed to be used on the scheme.

3.10.5 It is the intention to provide new low NO_x gas boilers and CHP plant. The gas boilers will be low NO_x (<40mg/kwh) helping to minimise harmful emissions and to reduce the negative impact on local air quality. All boiler flues will be discharged at roof level to insure they do not impact on local air quality.

- 3.10.6 The proposed development will aim to reduce the Carbon Dioxide (CO₂). Photovoltaic panels have been specified to reduce CO₂ and provide electricity for the site. Further details please refer to energy statement.

Linking to a district heating system was investigated; however there are no district heating networks within a viable distance of the proposed development. This is reviewed in more detail in the Energy and Renewables Statement.

- 3.10.7 Light Pollution has been identified to be of particular concern to the Council and to adjacent residents, therefore BSD have undertaken a full lighting design to demonstrate how the development can provide amenity and minimize environmental impacts simultaneously. The lighting design takes into account the following:
- Safe and secure lighting to be provided to the MUGA pitch, cycle storage area, car parks and lighting.
 - These shall be time switched controlled so that during nocturnal hours, lights are dimmed to a minimum level (in line with the Ecological Appraisal)
 - Lighting is designed so that an absolute minimum of light is spilled on to adjacent sensitive habitats.

Refer to the BSD external lighting drawing and associated lighting reports for further details.

- 3.10.8 Initial environment agency data, combined with site survey data, indicates that the site is not expected to be considered as contaminated – there are no reported incidences of pollution on the site.



Environment agency – pollution map

The environment agency pollution maps show that the site is not situated on, or adjacent to any historical landfill sites which may have caused pollution incidences.

3.10.9 The building materials within the proposed development will all meet the following criteria:

- Use traditional and/or long-established materials that do not emit pollutants;
- Use materials that are stable, durable and appropriate;
- Do not use materials that contain heavy metals, biocides or known toxins such as lead or asbestos;
- Make sure that mineral and other fibres are completely encapsulated;
- Use low or nil-formaldehyde-emitting materials;
- Minimise the use of paints, using organic, water-based or mineral paints wherever practicable;
- Avoid timber preservatives; and
- Avoid harmful cleaning agents, solvents and smoke from open fires.

3.11 Innovation

Innovation
Aim: To recognise innovation in the field of sustainability. 28. What consideration has been given to innovative sustainability measures in terms of a procurement strategy, design feature, management process or technological development?

The School aims to achieve 1 additional BREEAM credit for innovation by employing additional infrastructure and resources for at least 3 years after building occupation for:

- a. Collection of occupant satisfaction, energy consumption and water consumption data.
- b. Analysis of the data to check the building is performing as expected and make any necessary adjustments to systems controls or to inform building user behaviours.
- c. Setting targets for reducing water and energy consumption and monitor progress towards these.
- d. Feedback any 'lessons learned' to the design team and developer for use in future projects.
- e. Provision of the actual annual building energy, water consumption and occupant satisfaction data to BRE.

3.12 Economic Sustainability

3.12.1 In accordance with the NPPF, the economic sustainability of the proposed development has been considered. The economic opportunities arising from the proposed development have been identified as follows:

- Construction – Will create employment and supply opportunities to local businesses;
- Training – Opportunities for local work force to receive training during site construction;
- The provision of an increased labour supply to the benefit of existing local businesses and supporting economic growth in the district.

3.12.2 Local Employment & Businesses

The construction of the proposed development will create work opportunities for the local population. Where possible, the development will utilise the local labour force and local businesses throughout the construction programme as well as providing training, where practicable.

The proposed development will result in employment opportunities for local people. Furthermore, it is expected to complement and enhance existing economic activity in the local area. The development will also be expected to provide employment in the form of catering, hospitality, cleaning and maintenance requirements.

3.12.3 Local Sourcing of Resources

When selecting materials for the development, preference will be given to the use of locally sourced materials and local suppliers where viable. This will benefit the local economy as well as having environmental benefits through reducing transportation requirements. This will be addressed and considered in more detail during the detailed design stage.

3.13 SUSTAINABLE CONSTRUCTION

- 3.13.1 All of the Mayor's Essential and Preferred Standards will be met through the developments registration and compliance with the Considerate Constructors Scheme (CCS). This commitment is rewarded by the BREEAM Issue MAN 2.
- 3.13.2 As part of the overall management of the site contractors will be required to sign up to the considerate contractors scheme and will aim to achieve a score exceeding well beyond best practice.
- 3.13.3 The considerate contractor's scheme is a notional voluntary scheme, which is adopted by participating construction companies and everyone involved on the construction site. The scheme aims to assist and encourage contractors to carry out their operations in a safe and considerate manner, with due regard and causing minimum disturbance to local residents, businesses, passing pedestrians and road users.
- 3.13.4 The scheme looks at the various aspects of construction work and sets appropriate standards. It covers 8 categories relevant during the construction phase of the project:
- Considerate
 - Environment
 - Cleanliness
 - Accountable
 - Good neighbour
 - Respectful
 - Safe
 - Responsible
- 3.13.5 All sites registered with the Scheme are monitored by an experienced industry professional to assess their performance against the eight points of the Code of Considerate Practice.
- 3.13.6 Good air quality is important for our environment. Most air pollution arising from construction is associated with dust particles. Other forms of air pollution come from energy use arising from site activities and transport to and from the site. Dust management for development will be implemented according to BRE guidance, meeting best practice standards. Measures include damping down the site along with dust sheets and covering waste receptacles. Provision will be made to ensure that areas occupied by contractors are kept in a clean and tidy condition.

These measures are targeted in BREEAM Issue MAN 3 and meet the Preferred Standard.

- 3.13.7 The design team has also made the commitment to monitor, report, and set targets, to reduce water consumption from site activities and adopt best practice policies in respect of water pollution on site (ground and surface). Construction noise can have a significant effect on the environment and on the quality of life enjoyed by individuals and communities. Construction should not create unacceptable levels of disturbance.
- 3.13.8 The contractor will therefore ensure that neighbouring businesses are able to continue their day-to-day activities without significant disruption. They will liaise with neighbouring businesses and the local residents to ensure that noisy works are carried out at appropriate times agreed by all parties. A contact telephone number will be established so that residents can raise any concerns.
- 3.13.9 It is likely that the main contractor will provide an environmental materials policy, used for sourcing of construction materials and will have to operate an Environmental Management System. All these items are rewarded by BREEAM Issue MAN 3.
- 3.13.10 Construction waste has been discussed in the previous Section on Waste. The development is committed to the sustainable specification and procurement of materials and resources as discussed in Section 3.8 – Materials.

3.14 BUILDING QUALITY

3.14.1 Accessibility & Building Regulations Part M

3.14.2 All floors will have level access and doors in line with Building Regulations Part M so that the development is largely deemed 'accessible to all'

3.14.3 Level access walking routes (which will be clearly signed) will be provided from the main access to the site, to the proposed development entrance. Accessible WC's are provided with hand rails etc.

3.14.4 Level access will be provided from the entrance to the facility. Lifts (appropriately sized for wheelchair users) will also be provided to access the upper floors.

4.0 SUMMARY

From this Sustainable Design and Construction Statement, it is clear that the proposed development is of a high standard of design. The new development will achieve a BREEAM “EXCELLENT” Rating.

The sustainability strategy focuses on the implementation of sustainable systems for energy, water, waste management and recycling and the use and choice of materials. Much attention has been drawn to reducing the environmental impact during operational life of the development with good energy and water consumption savings achieved.

The energy performance will be 20.38% better than building regulations and Water consumption will be reduced substantially by using water saving devices.

The scheme has incorporated best practice design principles with regards to noise pollution and the recommendations of the appointed professionals have been adopted, in addition, the building has been designed to minimise air pollution over its lifetime.

In summary, the proposed development includes the following key commitments relating to sustainability:

- The target reduction in regulated CO2 emissions over the Building Regulations Part L (2013) baseline will be 20.38% in accordance with the Reading Borough Council planning policy;
- The proposed new development will target the BREEAM ‘EXCELLENT’ certification;
- Water efficiency measures and devices will be installed in the building to target a maximum daily water usage reduction of 40% compared to a standard new school building;
- Recycling facilities will be provided for commercial and construction related waste;
- The site benefits from good connections to a range of surrounding transport services;
- The development will be designed to meet applicable Building Regulation Part M requirements;
- The proposed development includes the provision of dedicated cycle storage area, reducing the need to use public transport or drive.
- Sound insulation values are to be improved on Building Regulations Part E;
- Where practical, building materials will be sourced locally to reduce transportation pollution and support the local economy. All timber will be

purchased from responsible forest sources. Materials will be selected based on their environmental impact, with preference given to high rated materials from the BRE Green Guide to Specification where possible; and

- Construction impacts will be minimised and monitored where possible.
- The development shall be as environmentally and ecologically sensitive as possible.

The proposed development responds as positively as practical for a building of this type to Reading Borough Council's Core Strategy policies in an integrated way to deliver a modern educational building.

In conclusion, the proposed development has successfully met all of the criteria referred to in the SPG Sustainable Design and Construction. Where a standard has not been met a justification has been provided. The design team has considered the sites potential environmental impacts and this report details how those impacts will be managed and mitigated.

APPENDIX 1 -BREEAM- PRE ASSESSMENT