March 15

Energy & Sustainability Statement

Hampstead School, London Borough of Camden

Wates Construction Limited

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Turley Sustainability

Executive Summary

This Energy and Sustainability Statement has been prepared by Turley Sustainability on behalf of Wates Construction Limited in support of a full planning application for the redevelopment of Hampstead School in the London Borough of Camden.

This report sets out the measures proposed by the development in response to national and local sustainability priorities and policies.

Delivering Sustainable Development

The proposals aim to improve the available facilities and deliver modern 21st century learning environments which enhance the overall energy and sustainability performance of the school. The development will improve the efficiency of the available space utilising the existing school site.

The proposals include the demolition of the existing 1960's block (Building 6) and outbuildings to the rear of the site, retaining the schools frontage buildings and erecting a three storey detached building between the frontage buildings and the ring building footprint and a new sports hall behind this with the remaining area being utilised for new sports pitches and hard and soft landscaping.

Energy and Carbon

The development aims to deliver energy efficient and low carbon new school buildings in accordance with the energy hierarchy whilst balancing functionality, technical and site constraints and project viability.

Lean

The energy consumption of the new buildings are to be minimised through a range of measures including optimising building fabric, increased air tightness, use of low energy lighting and effective controls, metering and monitoring systems. Cooling demand has also been minimised in accordance with the cooling hierarchy. Dynamic simulation modelling of the new buildings completed to date has found significant challenges in meeting the Part L 2013 Target Emission Rate (TER) through energy efficiency measures alone, with a very low space heating demand and the majority of carbon emissions associated with hot water and electricity consumption.

In the context it is proposed that compliance with the part L 2013 for the new buildings will be set as a target for the detailed design of the new buildings in accordance with the energy hierarchy.

Clean

The London Heat Map identifies the site is not within an area of opportunity for district heating and there are no existing or planned heating networks in proximity of the site. The feasibility of combined heat and power plant (CHP) has also been discounted due to the proposed retention of existing high efficiency centralised gas boiler plant which have only recently been installed within the existing Building 5 and is able to meet the hot water and space heating demands of the main new teaching building.

Green

The proposals to retain the existing centralised heating system precludes the viable installation of any low carbon or renewable heat technologies and to deliver further on-site carbon reductions the installation of roof mounted **Solar Photovoltaic (PV)** is considered most suitable at this stage.

Whilst the buildings orientation is sub-optimum the new buildings are able to accommodate an estimated 350m^2 of Solar PV installed on suitable roof space of the new school buildings. This on-site renewable energy generation is estimated to further reduce regulated carbon emissions and help the new buildings achieve an overall **15%** reduction in regulated carbon emissions above the Part L 2013 baseline.

In addition following discussions with the Council's sustainability officer improvements to the existing Building 3 are to be considered which could contribute to further reducing the total energy usage and associated total carbon emissions of the school following redevelopment.

Overall the development proposals are estimated to result in a total regulated and unregulated carbon emission reduction of **35%** when considering all buildings. The new buildings are estimated to achieve a greater than **60%** reduction in total carbon emissions compared with the existing school buildings which are to be demolished.

BREEAM

The new school buildings are targeting a **BREEAM Very Good** rating as a certified and verified commitment to more environmentally sustainable development.

This recognises that the BREEAM standard has recently been revised in 2014 which has 'raised the bar' in meeting higher BREEAM ratings as well as reflecting the specific challenges the site and project faces in balancing the requirements of the Education Funding Authority, available capital budget and delivery process which creates a number of barriers to credit scoring and achieving a higher rating.

The projects target BREEAM performance is equivalent to the top 25% of all non-domestic buildings in the UK and the applicant aims to optimise credit scoring where possible through the detailed design and construction stages.

Water efficiency

The new buildings water consumption is to be reduced in operation through a range of water efficient fittings and metering. The project is targeting a **40% improvement** over equivalent baseline building water consumption.

Sustainable use of materials

The **environmental impact of materials** will be minimised through specification in accordance with the Green Guide to specification. Construction and operational waste impacts will be reduced through a **Construction Resource Management Plan** prepared prior to construction to encourage re-use and recycling in accordance with the **waste hierarchy** in combination with an effective long term operational waste management strategy including provision of suitable **recycling** facilities

Flooding

The site is located in an area of **low flood risk** and proposals include the use of **Sustainable Drainage** systems including onsite attenuation to manage surface water runoff which will reduce the sites surface water discharge rate by 50% and have no adverse impacts on flood risk elsewhere.

Adapting to climate change

A number of measures have been considered as part of the new school buildings design to improve **climate change resilience** in addition to minimising flood risk. These include orientation to reduce excessive solar gain and facilitate natural ventilation; glazing to facilitates natural daylighting but prevent excessive overheating and Translucent blinds to reduce risk of glare in occupied spaces.

Green Infrastructure and Biodiversity

The enhancement of the schools ground level **green infrastructure** has been prioritised which will also provide a high quality valued amenity resource for staff and pupils. The existing site is considered to be of **low ecological value** and proposals aim to improve biodiversity through the landscape design and planting including use of native trees and shrubs.

Travel

This site is in close proximity to existing public transport links and will include provision of safe and secure **cycle parking facilities** to promote **sustainable travel.**

The proposed development will deliver a well-designed and resource efficient new school which will achieve a substantial reduction in total carbon emissions and appropriately balances environmental, social and economic drivers with local sustainability priorities of Camden.

Contents

This **Energy and Sustainability Statement** has been prepared by **Turley Sustainability** on behalf of **Wates Construction Limited** for the redevelopment of **Hampstead School** in the **London Borough of Camden**

Client
Wates Construction Ltd

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18 March 2015

Wates aims to deliver **sustainable, energy efficient** and **low carbon new school buildings** that balance **project viability** and **site constraints** with the **needs of the school, Education Funding Authority** and local **sustainability priorities** of **Camden**

1. Introduction

This Energy and Sustainability Statement has been prepared to communicate how sustainability measures have been integrated into the redevelopment of Hampstead School in the London Borough of Camden.

This report has been structured to demonstrate how the proposed development meets the policies of the National Planning Policy Framework (NPPF) and local policies of the London Borough of Camden Council and the Greater London Authority.

1.1 Site and Surroundings

The application site, Hampstead School covers approximately 2 hectares and is an 11-18 years local authority maintained school and sixth form.

Figure 1 - Site Boundary

The existing site comprises of a number of individual buildings: three frontage buildings which are locally listed, a centrally located ring building also referred to as the 'doughnut' and a number of smaller single and two storey outbuildings located to the very rear and southern boundaries of the site.

The site is not located within a conservation area and the north and east boundaries of the site border the London Borough of Barnet.

1.2 Building Schedule

The table below shows the existing and proposed building schedule clearly showing those buildings which will be demolished and details of the new buildings proposed for the site.

Table 1: Site building schedule

Existing and New Buildings	Floor Area (m^2)	
	Existing	Proposed
Building 1 & 4	2,039	2,039
Building 2	2,643	2,643
Building 3	1,076	1,076
Building 5	178	178
Building 6	6,331	-
Building 7	128	-
Old House & Mobiles	150	-
New Teaching Building	-	4,191
New Sports Building	-	1,120
Total	**12,545**	**11,247**

1.3 Proposed Development

The applicant is seeking full planning permission for re-development of Hampstead School to improve the current facilities.

The proposal is to demolish the existing Building 6 and outbuildings to the rear of the frontage buildings and erect, a new three storey detached

teaching building and a new sports hall as well as landscaping the remaining area including new sports areas with hard and soft landscaping.

The description of development is:

'Erection of 3 storey school building and sports hall and alterations to soft and hard landscaping following demolition of an existing school building.'

Full details of the proposed development are provided within the Design and Access statement and Planning Statement that accompanies the outline planning application.

2. Policy Context

This section of the report provides an overview of the relevant policy and guidance regarding sustainability and energy planning for new non-domestic development from a national and local perspective.

2.1 UK Sustainable Development Strategy

In 2005, the Government published an updated strategy for implementing sustainable development across the UK.

This strategy acts as an overarching document from which a range of specific policies and legislation was derived. Although published in 2005, the strategy has taken a recently renewed focus in light of the Government's definition of Sustainable Development in the NPPF.

One of the key aims of this strategy is to recognise the threats of climate change and ensure that the UK develops a strategy to mitigate and adapt to this phenomenon.

The document established five key principles that will underpin the national sustainable development strategy:

1. Living within Environmental Limits;

2. Ensuring a Strong, Healthy and Just Society;

3. Achieving a Sustainable Economy;

4. Promoting Good Governance; and

5. Using sound science responsibly.

The strategy will be implemented at a national level through the development of more specific strategies at a Government department or sector level.

With regards to planning and the built environment, this document set the basis for the development of plans and policies that promote development that mitigates and adapts to climate change.

2.2 Climate Change Act

The Climate Change Act (2008) sets a legally binding target for reducing UK CO_2 emissions by least 80% on 1990 levels by 2050.

It established the Committee on Climate Change, which is responsible for setting binding interim carbon budgets for the Government over successive five year periods. The first three carbon budgets were announced in the Budget 2009, resulting in an interim target of a 34% reduction in CO_2 equivalent emissions on 1990 levels by 2020.

2.3 UK Carbon Plan

In 2011, the Government published an updated Carbon Plan setting out how the UK will achieve decarbonisation and make the transition to a low carbon economy. It sets this objective within a framework of mitigating and adapting to climate change and maintaining energy security in a way that minimises costs and maximises benefits to the economy.

With regards to development, the Carbon Plan presents the Government's approach to promoting the delivery of low carbon, resilient and adaptive buildings and enabling sustainable transportation as positively contributing to these national carbon reduction targets.

2.4 Building Regulations

Whilst not planning policy, the Building Regulations, and specifically Approved Documents Part L; Conservation of Fuel and Power, are relevant as they determine the energy efficiency and carbon emission standards required by new buildings.

The primary mechanism for reducing carbon emissions in new development is progressive changes to Part L aiming to deliver zero carbon buildings by 2019.

Part L of the Regulations now require new non-residential buildings to deliver an aggregate 9% reduction in carbon emissions compared to equivalent 2010 Part L standards. This change aims to strike a balance between the commitment to reducing carbon emissions and improving energy efficiency and ensuring that the overall effect of regulation upon consumers and businesses does not stifle growth.

The Government has stated that the construction industry will continue to have flexibility in how they meet carbon reduction targets, however, the emphasis of these changes is on using a fabric first approach and this is reinforced through the improvements in minimum values for fabric energy efficiency.

2.5 National Planning Policy Framework (NPPF)

Following its publication on 27 March 2012, national planning policy is now provided by the NPPF which sets out the government's planning policies for England and how these are expected to be applied.

The Government has made clear its expectation that the planning system should positively embrace well-conceived development to deliver the growth necessary to create inclusive and mixed communities.

The NPPF states clearly that in order to deliver sustainable development, the planning system must perform three distinct roles, aligned to the three pillars of sustainability, which must not be taken in isolation and should be pursued jointly:

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; and by identifying and coordinating development requirements, including the provision of infrastructure;

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 that reflect the community's needs and support its health, social and cultural well-being; and

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.

2.5.1 Demonstrating Sustainable Development

Paragraph 6 of the NPPF states that:

"The purpose of the planning system is to contribute to the achievement of sustainable development. The policies in paragraphs 18 to 219, taken as a whole, constitute the Government's view of what sustainable development in England means in practice for the planning system".

The policies referred to in Paragraph 6 of the NPPF have been divided into 13 themes;

1. **Building a Strong Competitive Economy**
2. **Ensuring the Vitality of Town Centres**
3. **Supporting a prosperous rural economy**
4. **Promoting sustainable transport**
5. **Supporting high quality communications infrastructure**
6. **Delivering a wide choice of high quality homes**
7. **Requiring good design**
8. **Promoting healthy communities**
9. **Protecting Green Belt Land**
10. **Meeting the challenge of climate change, flooding and coastal change**
11. **Conserving and enhancing the natural environment**
12. **Conserving and enhancing the historic environment**

13. **Facilitating the sustainable use of minerals**

Should a proposed development demonstrate that it is supporting the relevant policies of the NPPF then it is deemed to be 'Sustainable Development'.

2.6 National Planning Policy Guidance

In March 2014 the Government released the updated National Planning Policy Guidance (the Guidance). The Guidance provides information to local authorities on how to implement the policies of the NPPF and approach specific policy aims.

The guidance sets out how local authorities should include polices that protect the local environment and strategies to mitigate and adapt to climate change. It reiterates that local authorities should set sustainability policies for new development that are line with the Government's Zero Carbon Buildings Policy and nationally described standards. It supports developments of good design that are functional and adaptable for the future.

Additionally, the guidance states that the evidence base should show how the policies have been tested for their impact on the viability of development.

2.7 The London Plan (2011) and Draft Further Alterations (2014)

The adopted London Plan (2011) is part of the development plan in London. Local Plans must be 'in general conformity' with the policies of the London Plan. The London Plan is considered an expression of national policy for Greater London, tailored to meet local circumstances and to respond to the opportunities to achieve sustainable development.

In March 2015 the Mayor published (adopted) the Further Alterations to the London Plan.

The Plan sets out a specific range of policies to underpin London's response to climate change; however, the delivery of sustainable development and combatting climate change is integrated throughout the plan. Some of the key energy and sustainability policies that form part of London's response to climate change include:

Policy 5.1 Climate Change Mitigation – Seeks to achieve an overall reduction in London's carbon dioxide emissions of 60% (below 1990 levels) by 2025.

Policy 5.2 Minimising carbon dioxide emissions – Requires development to make the fullest contribution to minimising carbon dioxide emissions in accordance with the energy hierarchy and sets a target for reduction of regulated carbon emissions to zero carbon by 2019.

All major developments should provide a detailed Energy Assessment including details on the proposed reduction of carbon dioxide emissions through design, decentralised energy and on site renewables.

Policy 5.3 – Sustainable Design and Construction – Requires development to demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process.

Policy 5.7 Renewable Energy – States that major development should provide a reduction in expected carbon dioxide emissions through the use of on-site renewable energy generation, where feasible.

Policy 5.13 – Sustainable Urban Drainage – Requires development to utilise Sustainable Urban Drainage systems (SUDs) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible.

Policy 5.15 – Water Use and Supplies – Requires development to minimise the use of mains water by incorporating water saving measures and equipment.

2.8 GLA Supplementary Planning Documents

There are a number of documents which support the London Plan. These include supplementary planning documents, supplementary planning guidance and may be used as a material

consideration in the determination of a planning application. Relevant energy and sustainability documents are outlined as follows:

2.8.1 Sustainable Design and Construction Supplementary Planning Guidance

The GLA Supplementary Planning Guidance (SPG) confirms the Mayor's intention to avoid complexity and extra costs for developers to adopt a flat carbon emissions reduction target across both residential and non-domestic buildings of 35% above Part L of the Building Regulations 2013.

Though the revised target is deemed to be broadly equivalent to the 40 per cent target beyond Part L 2010 of the Building Regulations for domestic development (as specified in Policy 5.2 of the London Plan), it is recognised that for schools this is equivalent to 44% above Part L 2010.

On this basis the SPG acknowledges that some building types will find it harder to achieve the 35% reduction and that where the target cannot be met on site that sufficient evidence is provided to demonstrate that this is the case.

2.8.2 Energy Planning Guidance on preparing energy assessments

Published in September 2013 this updated guidance from the GLA relates to the 2013 changes to Part L of the Building Regulations.

The purpose of an energy assessment is to demonstrate that climate change mitigation measures comply with London Plan energy policies, including the energy hierarchy, and that applicant's commitments in terms of CO_2 savings and measures proposed.

The document provides guidance on the content of an energy assessment but states also that each application is considered on its merits, taking into account the individual characteristics of the development.

It advises that a suitable energy assessment should accompany planning applications in accordance with the latest GLA energy planning guidance and include tables to clearly demonstrate the estimated CO_2 emissions of development and savings at each stage of the energy hierarchy.

2.9 The Local Development Plan

The Local Plan for the London Borough of Camden is made up of the adopted Core Strategy and Development Policies documents.

- **Camden Core Strategy (2010)**
- **Camden Development Policies (2010)**

The Core Strategy and Development Policy documents set out the strategic vision and policies covering development in Camden until 2025.

Camden Council is reviewing its main planning policies and is consulting on a draft 'Local Plan' which when finalised will replace the current Core Strategy and Camden Development Policies documents as the basis for planning decisions and future development in the borough.

2.9.1 Camden Core Strategy and Development Policies

The Core Strategy and Development Policies documents adopted in 2010 are the main decision tools for making planning decisions in the Borough.

The following policies relate to sustainable development.

Policy CS13 Tackling climate change through promoting higher environmental standards – This policy requires that all developments take measures to minimise the effects of, and adapt to, climate change throughout the construction and occupation stages and is separated into four parts:

- Reducing the effects of and adapting to climate change;
- Local energy generation;
- Water and surface water flooding;
- Carbon reduction measures.

All development is encouraged to meet the highest feasible environmental standards that are financially viable during construction and occupation through measures such as:

- Minimising the need to travel by car.
- Minimising carbon emissions by following the energy hierarchy.
- Design which minimises the effects of Climate Change.
- Considering the use of local energy generation and networks where these are technically and commercially feasible.

The policy states that the Council will have regard to the cost of installing measures to tackle climate change.

Additionally, the policy requires development to incorporate efficient water and foul water infrastructure, avoid harm to the water environment, water quality or drainage systems and mitigate local surface water and downstream flooding.

Policy DP22 Promoting sustainable design and construction – This policy requires that all developments incorporate sustainable design and construction measures.

The council encourages non-domestic developments above 500m^2 to achieve BREEAM 'Very Good' by 2013 and 'Excellent' by 2016.

New developments should consider incorporating design measures such as summer shading and planting; limiting water run-off; reducing water consumption and reducing air pollution.

Policy DP23 Water – The Council requires development to reduce their water consumption through efficiency measures such as low flow fixtures and fittings; limiting the amount and rate of run-off and reducing the pressure placed on the combined storm water and sewer network.

2.9.2 Camden Planning Guidance 3 - Sustainability SPD

The Camden Planning Guidance 3 supplementary planning document (SPD) supports the policies in the Core Strategy and the Development Policies documents and was last updated in September 2013. It sets out guidance for new sustainable development under a number of headings below.

Energy and Carbon

The Council encourages all new developments to be designed to minimise carbon dioxide emissions by being as energy efficient as is feasible and viable.

New developments are encouraged to consider energy efficient ventilation and cooling methods have been considered before installing mechanical cooling, air conditioning units.

Where the new London Plan carbon reduction target in policy 5.2 cannot be met onsite, the Council may accept flexibility in the provision of measures elsewhere in the borough or a financial contribution which will be used to secure delivery of carbon reduction measures.

BREEAM

The council encourages non-residential development over 500m^2 to be assessed against the requirements of BREEAM. Citing development should achieve a Very Good standard by 2013 and Excellent by 2016.

The Council notes that buildings that achieve high BREEAM ratings generally use less energy, consume less water and have lower running costs than those designed to building regulations alone.

Water efficiency

The Council encourages all development to be designed to be water efficient by minimising water use and maximising the re-use of water. Suggested measures to consider include:

- Installation of efficient water fittings and plumbing;
- Assessment of the performance of water minimisation measures used against the water category in BREEAM;
- Consideration of grey water recycling in developments over 1,000m^2.

- Provision of water butts for buildings with gardens or landscaped areas that require regular maintenance.

Sustainable use of materials

This section encourages developments to be sustainable: through the choice of appropriate materials which will assist in minimising energy needs both during construction and occupation periods and by making efficient use of resources through the use of recycled and renewable building materials.

The guidance provides five key measures developments should consider to limit the environmental impact of developments:

- Managing existing resources.
- Specifying materials using the Building Research Establishment's Green Guide to Specification.
- Ensuring that materials are responsibly source.
- Minimising the harmful effects of some materials on human health.
- Ensuring that specified materials are robust and sensitive to the building type and age.

Adapting to climate change

Climate Change is likely to mean warmer, wetter winters with more intense rainfall and local flooding events. It will also bring hotter drier summers which will potentially increase the number of days the borough experiences very poor air quality and increase the demand for our open space, water and the use of electricity for mechanical cooling.

All development is therefore expected to consider the impact of climate change and be designed to cope with the anticipated conditions and consider:

- Provision of shading.
- Appropriate levels of glazing.
- Water cooling.
- Natural ventilation.
- Sustainable Drainage Systems.
- Green space.

Flooding

Many areas of Camden are considered to be at risk of surface water flooding and developments are required to prevent or provide mitigation against flooding and manage drainage and surface water.

Biodiversity

Development is encouraged to minimise its environmental impact and enhance site biodiversity wherever possible.

The Council use a 'five-point approach' to planning decisions for biodiversity, based on the five following principles – information, avoidance, mitigation, compensation and new benefits.

2.10 Pre-application consultation

A pre-application meeting was held with the Council on 20th February in order to discuss the sustainability strategy for the proposed development and related issues.

Subsequent communication has been had with the Council's sustainability officer and a briefing was prepared and submitted to the Council dated 10th March 2015 in advance of the planning application outlining the proposed approach in the context of the projects specific constraints and opportunities.

The general approach was agreed in principle by the sustainability officer subject to the provision of relevant supporting information with the planning application including:

- Targeting optimum energy efficiency performance from the new buildings
- Provision of a plan to show the heat pipe connections from the existing plant room to the new buildings.
- Provision of a roof plan showing the indicative location of any Solar PV systems.

- Consideration of energy efficiency measures within existing (retained) school buildings.
- Details of the key challenges to securing a higher BREEAM rating.

2.11 Review of Sustainability Policy and Implications

There are consistent themes emerging from the review of national and local sustainability policy which are considered relevant to this application.

At a regional and local level the Climate Change policies of the London Plan, which are supported by the adopted Camden Core Strategy, highlight the need to reduce energy and carbon emissions, consider low carbon and renewable energy and provide sustainable design and construction.

The GLA Supplementary Planning Guidance confirms that some buildings will face considerable difficulties in meeting the London Plan 35% carbon reduction target above Part L 2014 and flexibility is needed where justification is provided by the applicant.

Pre-application discussions with the Council's sustainability officer agreed in principle that the scheme faced a number of challenges in meeting London Plan targets and that a suitable approach to sustainability was needed that balanced economic, social and environmental issues whilst also supporting Camden's local sustainability priorities.

In this context The proposed development is supportive of the sustainable development objectives of the Council and has developed an Energy and Sustainability Strategy that responds positively to local sustainability policies, the London Plan and the latest national guidance.

3. Sustainability at Hampstead School

This chapter summarises the approach and specific measures proposed by Wates to deliver a sustainable, energy efficient and low carbon re-development of the Hampstead School.

The purpose of the planning system is to contribute to the achievement of sustainable development and the scheme presents proposals that balance economic, social and environmental benefits, giving due consideration to each of these sustainability pillars.

This section aims to provide sufficient information to advise the Council of the strategy and approach to sustainability as appropriate to the latest stage of design and planning application under the following headings in line with the Camden Sustainability SPD:

3.1 Energy and Carbon

3.2 BREEAM

3.3 Water Efficiency

3.4 Sustainable Use of Materials

3.5 Green Infrastructure

3.6 Flooding

3.7 Adapting to Climate Change

3.8 Biodiversity

This structure aims to clearly demonstrate that the new school buildings support the objectives of the London Plan, adopted Core Strategy and the sustainability priorities of the London Borough of Camden.

3.1 Energy and Carbon

One of the main challenges facing London, both now and in the future, is managing the impact of climate change which will cause the UK to become warmer, winters will become wetter, and summers will become drier. Adapting to this changing climate will significantly impact on the design, construction, location, cost and operation of buildings in the next few decades.

As identified by the London Plan the latest UK climate projections suggests that by the 2020's London could see an increase in summer mean temperature of 1.5 Degrees Celsius, a decrease in mean summer rainfall of six per cent and an increase in mean winter rainfall of six per cent, all from a 1961– 1990 baseline.

In line with the London Plan energy hierarchy the proposed development has adopted a 'fabric first' approach to reducing carbon emissions which is considered best practice and is the critical first step in the delivery of low carbon and sustainable buildings.

School buildings have a unique space heating and energy demand profile with almost no demand over a weekend or during school holidays and peak usage during the daytime Monday-Friday. This energy profile presents constraints to the technical implementation of a number of sustainable design measures including low carbon and renewable heat and power options and limits the savings made through fabric improvements.

3.1.1 Reduce the Demand for Energy (Lean)

Heating Demand Reduction

Reducing the demand for heat and power through a well-constructed and insulated building fabric and energy efficient services is recognised as the first step in minimising carbon emissions from new development.

The design of the new school buildings has given consideration to a number of passive design measures, reflecting the guidance set out in the council's Sustainability SPD, and includes:

- Orientation of the building as far as practicable without compromising layout or connectivity to maximise passive solar gains and adapt to a changing climate.
- Minimisation of the building footprint through a compact design to reduce the impact upon the site and retain open space.
- Targeting low air leakage and fabric u-values which exceed the minimum Part L Building Regulations requirements.

Table 2: Target U-values and air permeability

Building Element	Part L Max	Hampstead School
	U-value (W/m^{2}k)	
Walls	0.35	0.19
Roof	0.25	0.16
Floor	0.25	0.25
Windows	2.2	1.9
Air Permeability	≤10m3/m2/hr @50pa	≤5m3/m2/hr @50pa

The value and benefit of further improvements in fabric U-values is dependent on the amount of energy consumed in space heating demand of the new buildings.

The exact specification and thermal performance of construction materials will be confirmed during final detailed design development and as such the values presented in the table above are indicative of the proposed performance specification at the planning application stage.

Additional 'active' energy efficiency measures can further enhance the energy efficiency of the development and reduce carbon emissions. Measures to be considered further include:

- Comprehensive metering strategy interfaced with Building Management System (BMS);
- On demand mixed mode ventilation, with 80% heat recovery;
- Zoned temperature controls for simple occupant control of different spaces to condition the environment with minimal interaction.

The school currently has an existing centralised boiler plant located within Building 5 within the centre of the site and which services the majority of existing buildings. This high efficiency gas condensing boiler plant was only very recently installed by the School (November 2013) and a condition survey has found its performance and efficiency to meet latest efficiency standards subject to some minor works to pumps and valves.

It is proposed to re-use this existing centralised boiler plant to continue to meet the energy needs of the existing buildings and proposed new main teaching building. This is considered to be the most sustainable and cost effective solution to heating the new teaching building, sustainably re-using existing equipment and minimising waste.

The final passive and active measures implemented are to be determined as part of the final detailed design and specification.

Cooling Demand Reduction

In accordance with the council's Sustainability SPD the development aims to minimise the need for cooling through a range of design measures including:

- Fabric thermal efficiency, low energy lighting and daylighting optimisation to minimise internal heat generation.
- Prioritising passive natural ventilation where possible.
- Reduced heat gains from the sun by utilising solar control glazing.
- Passive cooling during the night time with purge ventilation.
- Management of overheating risks through provision of internal shading devices.

The design of the school will ensure that solar gain limits are not exceeded and that the risk of future need for cooling is minimised. Modelling suggests that no active cooling will be needed for the new school buildings in accordance with the cooling hierarchy (See Section 3.1.3)

Challenges

The latest dynamic simulation modelling undertaken by the projects mechanical and electrical engineers at the planning stage (see Appendix) has found that with the target U-values and air permeability set out in Table 2 space heating of the building accounts for approximately 10% of regulated energy use and just 7% of the new buildings carbon emissions. This means further enhancements in fabric and any associated reductions in space heating represents diminishing returns and will not result in a significant reduction in carbon emissions.

This means that the new school buildings are facing a real challenge in just achieving Part L 2013 compliance through fabric and energy efficiency measures alone, particularly given space heating consumption is estimated to account for such a small fraction of the building's regulated carbon footprint.

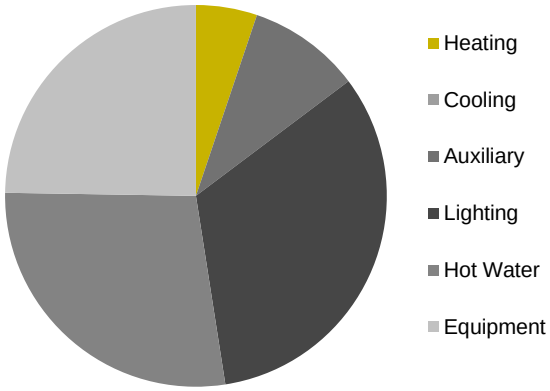


Figure 2: breakdown of new buildings energy use

It is proposed that the design and dynamic simulation modelling for the new school buildings will be further refined as part of the detailed design process post planning and that the project will target achieving the Part L 2013 Target Emission Rate (TER) through energy efficiency measures alone in accordance with the London Plan energy hierarchy provided this is technically feasible and viable.

Improvements to Existing Buildings

Following discussions with the Council's sustainability officer and in recognition of the challenges faced by the new buildings the project is proposing a number of improvements to existing school building No3 to further reduce energy and carbon emissions of the school as a whole.

As part of the development Wates is proposing to undertake some refurbishment and improvement works to the schools existing building 3. These works provide the potential opportunity to further reduce energy consumption and associated carbon emissions of the existing school estate (See Section 3.2.1).

3.1.2 Supply Energy Efficiently (Clean)

Decentralised Energy Opportunities

The development has considered opportunities for the use of Decentralised Energy including connectivity to existing or planned district heating networks

A review of the London Heat Map shows that there are no existing district heating networks in close proximity of the development site and the site is not identified within an area of opportunity on the London Heat Map (see Figure 3).

Figure 3 - London Heat Map

The nearest potential area for decentralised energy lies in the neighbouring London Borough of Barnet and it is therefore not considered feasible to connect the new school buildings to an existing district heating network.

Combined Heat and Power (CHP)

CHP is based on the use of a generator which converts fuel to electricity and waste heat which can be captured and used to heat buildings.

CHP is best suited to buildings where there is a large base heating load consistently throughout the year to allow the engines to run continuously. The installation of CHP at the Hampstead school is constrained by:

- Buildings with high thermal efficiency which substantially reduces the energy demand for space heating.
- There are no significant base loads such as an existing swimming pool to provide a large enough, continuous heat demand to ensure continuous running of the CHP plant.
- The unique heat demand profile of schools which are only open 5 days a week and are closed for a significant portion of the year for school holidays.

Additionally the school's existing gas boilers were replaced in November 2013 and a condition survey undertaken as part of the project has found the new high efficiency boilers to be in excellent condition and it is planned to continue to use them to heat the existing buildings and new main teaching building. However, the low space heating demand of the sports hall building however means this will likely need to be serviced by new gas fired heating plant located within a ground floor internal plantroom.

Future Proofing for District Heating

While it is currently not feasible to connect the proposed development to an existing district heating network it is proposed the new school building will be connected to the existing centralised boiler plant located in Building 5 within the centre of the site.

This lends itself to enabling the site for connection to an off-site heat network in the future should it be feasible and viable. Wates is committed to supporting 'future-proofing' of the Hampstead school where it is considered appropriate and practical to do so. In this context a number of items have been considered at the planning application stage including:

- Use of centralised boiler plant supplying existing buildings and new teaching building.

- The installation of a low temperature hot water heating system suitable for allowing future district heating connection and supply.
- Potential for future connection of plate heat exchanger
- Location of centralised boiler plant in Building 5 which is accessible for off-site heat connection.

3.1.3 Summary of Energy Demand

Existing School Buildings

An assessment of the existing school buildings energy consumption has been made based on the most recent Display Energy Certificate (DEC) data for the existing buildings (see Appendix). Table 3 below shows the energy demand of the existing buildings.

Table 3: Energy demand of existing buildings

Building	Energy use (kWh/yr)		Carbon (tCO_2/yr)
	Fossil Fuel	Elec	
Building 1 & 4	311,967	120,301	130
Building 2	404,379	155,937	168
Building 3	164,628	63,484	69
Building 5	27,234	10,502	11
Building 6	968,643	373,529	403
Building 7	19,584	7,552	8
Old House & Mobiles	22,950	8,850	10
Total	**1,919,385**	**740,155**	**798,728**

This shows the existing school buildings energy consumption is dominated by fossil fuel consumption for space heating and hot water with existing carbon emission of **798tCO2/yr.** The planned demolition of Building 6 and 7 along with the old house and mobiles is estimated to reduce total carbon emissions by approximately **420tCO_2/yr**.

Proposed New School Buildings

The proposed new school buildings are designed to deliver energy efficient, functional and adaptive learning environments. Table 4 below provides a summary breakdown of the estimated energy use and carbon emissions of the new teaching and sports hall buildings based on the latest Part L 2013 modelling.

Table 4 - Energy demand of new buildings

Building	Energy use (kWh/yr)		Carbon (tCO_2/yr)
	Teaching Building	Sports Hall	
Heating	32,899	8,792	9
Cooling	0	0	0
Auxiliary	25,272	6,754	17
Lighting	86,628	23,150	57
Hot Water	176,022	47,040	48
Regulated Total	**320,821**	**85,736**	**131**
Equipment[1]	65,380	17,472	43
Total	**386,201**	**103,208**	**174**

The proposed new school buildings energy use profile represents a significant shift from the existing estate with electricity use accounting for the greatest proportion of these new buildings carbon emissions.

[1] Energy used by equipment does not count towards regulated energy total for calculating emissions under Part L.

3.1.4 Use Renewable Energy (Green)

The next step in reducing the regulated carbon emissions of the new school buildings is the consideration of low carbon and renewable energy technologies. The use of a number of low carbon and renewable energy technologies as part of the proposed development is not considered feasible or appropriate:

- *The use of wind turbines in dense urban locations has been proven to be unsuitable due to the disturbance of wind around urban structures.*
- *There are no watercourses on or near site precluding micro hydroelectric generation.*
- *The use of onsite CHP has already been determined as unsuitable due to low seasonal heating demand and recent installation of existing high efficiency gas boilers which are able to meet the heating and hot water demands of main teaching building with greatest heating demand.*
- *Due to the retention of the existing gas boilers and periodic nature of hot water usage which is at its lowest in the summer months and minimal space for hot water storage limits the practical application of Solar Thermal Hot Water.*

The table below sets out the feasibility and viability of the remaining possible renewable energy technologies considered for this site compared against the estimated new buildings energy baseline.

Table 5: LZC suitability assessment

LZC	Potential suitability at Hampstead School		Indicative annual FIT/RHI income	£/tonne lifetime carbon saved	Payback (Years)
Solar PV	Solar PV systems generate electricity and are feasible on roof spaces which are orientated within 30 degrees of south which are wither pitched or flat. The proposed new buildings have suitable available roof spaces for a Solar PV system.		£3,955	£98	6
Biomass Heating	Biomass boilers can provide hot water and space heating and is suitable for new developments. As Camden is in an Air Quality Management and Smoke Control Area the appropriate certificates would need to be obtained to enable installation.		£12,502	£106	22
Heat Pump Systems	Heat pumps provide low grade heat best suited to new energy efficient buildings. Ground Source Heat Pumps (GSHP) require sufficient external space for horizontal loops or vertical boreholes and would encounter practical installation problems with phasing of demolition and construction. Air Source Heat Pumps (ASHP) require significantly less space however evidence suggests that operational coefficient of performance can actually result in increases in carbon emissions and energy costs compared to high efficiency gas systems	GSHP	£27,630	£268	17
		ASHP	£7,939	£583	25

On this basis the most suitable renewable energy technology for the new school buildings is considered to be Solar Photovoltaics (PV) installed to suitable roof space of the new school buildings providing a low carbon and renewable source of electricity.

The amount of Solar PV that can be installed on the new buildings is constrained by the buildings orientation and slope as well as associated roof furniture and necessary allowances for ease of maintenance access and safe working arrangements (see Appendix).

At this stage it is estimated that a system in the region of **350m^2** can be accommodated facing within 30 degrees of south on the proposed new school buildings roof space.

This is estimated to deliver annual regulated carbon savings in the region of **19 tonnes** and collectively result in a **15%** saving over the baseline new buildings Target Emission Rate.

The area of PV is indicative for the purposes of the planning application and subject to further detailed design work and dynamic simulation modelling. A final roof plan is to be provided showing the exact layout of solar PV will be provided prior to the Council prior to construction.

3.1.5 Embodied Carbon

In addition to the improved operational efficiency presented by the new buildings, the embodied impacts of construction materials and processes are also considered given their increased significance in this project which includes the demolition of the existing in-situ reinforced concrete ring building.

The existing buildings due for demolition re estimated to have a combined embodied carbon value of approximately 2,200 tonnes of carbon.

In line with the commitment to meeting the BREEAM Very Good standard and targeted credits a pre-demolition audit will be carried out and included within the Resource Management Plan for the project to maximise the recovery of material from demolition for reuse and recycling in accordance with the waste hierarchy.

On the basis of the above, 80% of demolition waste will be diverted from landfill for applications as a result of reuse or recycling of the key materials.

The re-use and recycling of materials is estimated to lead to a carbon saving of approximately 1,750 tonnes of carbon.

This demonstrates that the operational energy and carbon savings to be delivered through the proposed development will mitigate the embodied carbon impact of the demolished building 6 within 2 years of operation.

3.2 Energy Strategy Summary

Fabric and building services energy efficiency measures in combination with renewable Solar PV is estimated to achieve a collective **15%** reduction in regulated CO_2 emissions over the 2013 Part L Target Emission Rate (TER) by the new school buildings. Overall the proposed development is estimated to result in a significant total carbon emission reduction of **35%** compared with existing carbon emissions of all school buildings and a **65%** reduction when compared with the buildings to be demolished.

The table below summarises the proposed developments estimated regulated and total carbon emissions anticipated at each stage of the energy hierarchy at the planning application stage.

Table 6: Estimated carbon dioxide emissions after each stage of the Energy Hierarchy

Scenario	Carbon		
	Regulated (tCO_2/yr)	Unregulated	Total (tCO_2/yr)
Existing school buildings to be demolished (DEC Baseline)	-	-	403
Part L 2013 (TER)	131	43	174
Latest Dynamic Modelling Estimate	146	43	189
Demand Reduction Target (Lean)	131	43	174
Energy Efficiency (Clean)	131	43	174
Renewable Energy (Green)	112	43	155

The table below summarises the estimated regulated carbon savings achieved at each stage of the energy hierarchy in comparison with the existing buildings to be demolished and the Part L 2013 baseline.

Table 7: Estimated carbon dioxide savings from each stage of the Energy Hierarchy

Element	Regulated carbon			Total carbon		
	(tCO2/yr)	(tCO2/yr saved)	(%)	(tCO_2/yr)	(tCO2/yr saved)	(%)
Existing School (DEC Baseline)	-	-	-	403	-	-
Part L 2013 TER	131	0	-	174	229	57%
Latest Dynamic Modelling BER Estimate	146	-15	-11%	189	-15	53%
Demand Reduction Target	131	0	0%	174	0	57%
Savings from Renewable Energy	112	19	15%	155	19	62%
Total Savings	**112**	**19**	**15%**	**155**	**248**	**62%**

3.2.1 Potential existing building improvements

As part of the development Wates will be carrying out some improvement works to the existing Building 3.

As part of this works there is the potential opportunity to try and improve energy efficiency and further reduce carbon emissions. At the planning application stage a number of possible measure are being considered including:

- Replacement of the existing lighting with new high efficiency fittings and control to reduce electrical energy consumption.
- Installation of new thermostatic controls and zoning mechanisms to minimise heating demand and provide a more comfortable internal environment.
- Installation of new pipework insulation to reduce heating losses.

The table below provides an estimate of the potential additional energy and carbon savings that might be able to be achieved through the works being considered for Building 3.

Table 8: Building 3 potential carbon savings

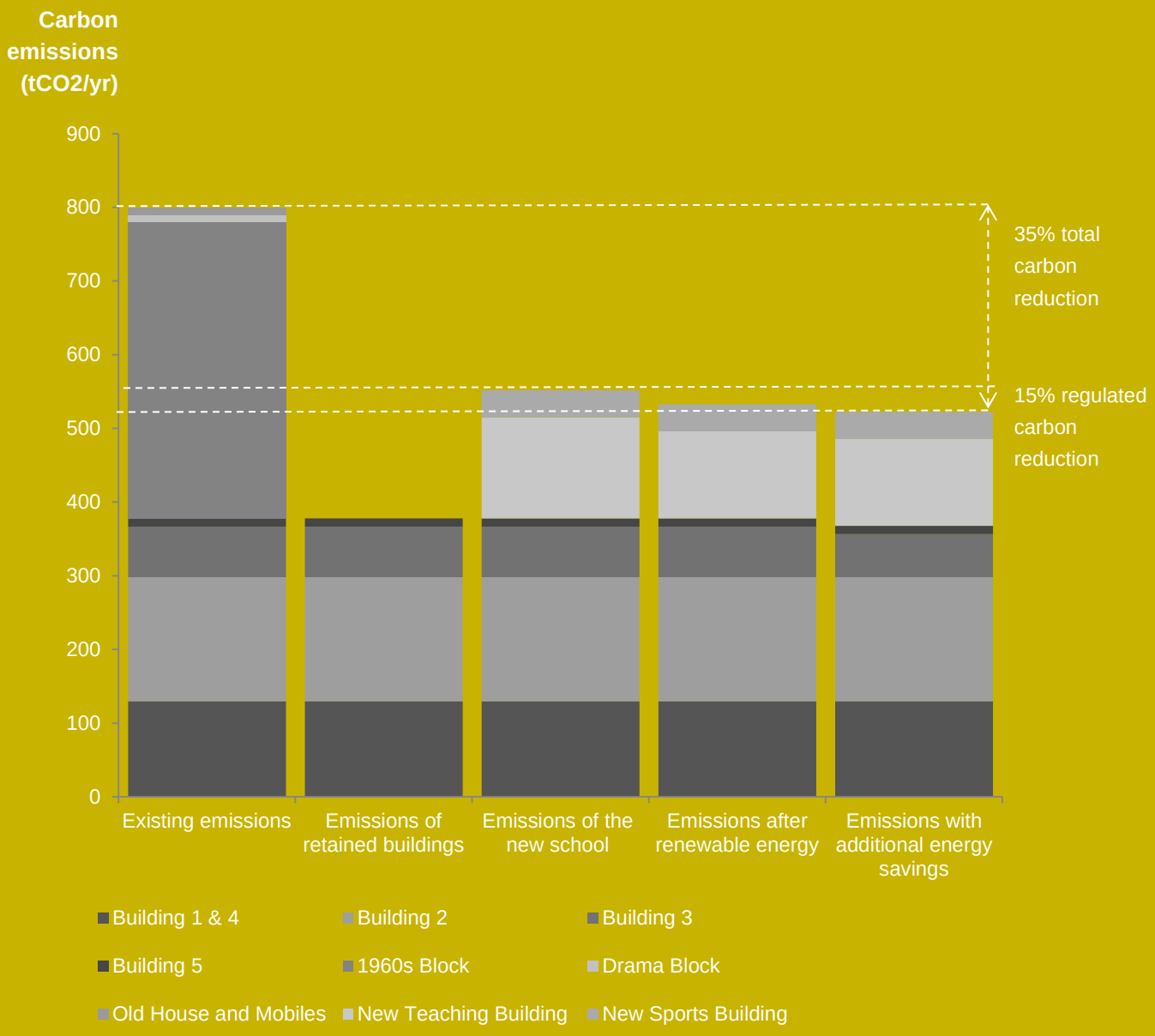
Scenario	Total carbon emission	
	(tCO_2/yr)	(%)
Existing Building 3	69	-
Potential savings from Lighting Improvements	62	10%
Potential savings from Heating controls and pipework insulation	58	15%

It is estimated at the planning application stage that the proposed energy efficiency measures could potentially save a further **11 tonnes** of carbon annually as part of the proposed development.

The exact measures to be undertaken are subject to further evaluation as part of the detailed design process for the works to be undertaken at Building 3 and a summary of the final proposed works for Building 3 impacting energy and carbon emissions will be provided to the Council prior to construction.

What is the carbon impact of the development at Hampstead School?

The graph below illustrates the estimated operational carbon impacts of the proposed development compared with the existing school buildings and regulated carbon reduction of new buildings.



3.2 BREEAM

BREEAM is recognised as the UK's foremost environmental assessment method and sets best practice standards in sustainable building design, construction and operation and is the Council's preferred metric for assessing the sustainability of new non-residential development with an expectation in **Core Strategy Policy DP22** that development achieves 'Very Good' as a minimum.

The practical application of BREEAM requires developments to achieve a number of minimum standards (mandatory credits) as well as an overall percentage score for any given rating.

Wates is committed to the sustainable design and construction of the proposed development and will aim to achieve a **BREEAM Very Good** rating under the most recent New Construction 2014 version of the BREEAM, demonstrating advanced good practice and sustainability performance in line with the top 25% of buildings in the UK.

In addition to the target rating, the development seeks where possible for certain credits to achieve standards of sustainability associated with the highest BREEAM certification level (Outstanding). This is targeted on the following BREEAM credits:

- **Responsible Construction Practices** – A CCS score between 35 and 39;
- **Commissioning and Handover –** Provision of a Building User Guide for occupants;
- **Aftercare -** Seasonal commissioning of simple and complex systems quarterly during the first twelve months of occupation AND **exemplary level** provision for data collection and monitoring for the first three years;
- **Energy Monitoring –** Sub-metering of major energy consuming systems such as space heating, domestic hot water, lighting and small power.
- **Water Consumption –** a minimum 25% reduction in water consumption over a baseline for school buildings;
- **Water Monitoring –** Mains water metering to each building;
- **Responsible Sourcing of Materials-** Use of legally harvested and traded timber throughout the project;
- **Construction Waste Management-** Compliant Construction Resource Management Plan (CRMP) will be produced and the relevant benchmarks of performance met;
- **Operational Waste –** Dedicated space for storage and segregation of recyclable waste.
- **Mitigating Ecological Impact -** There is minimal impact upon the ecological value of the site.

A PTAL report for the site also confirms excellent public transport links as would be expected within the Greater London Area. The proposals are therefore likely to perform well against the Transport section criteria.

Though the targeted BREEAM credits (including those above) must be reviewed throughout the detailed design and construction phases a pre-assessment has been carried out during the early stages of the project to incorporate BREEAM into the design process and help to improve the overall sustainability of the proposals.

3.2.1 Credit scoring constraints

As part of the pre-assessment process, a number of credits were identified that could not be achieved for various reasons including the stage of the project at which points Wates became involved.

In May 2014 BRE launched the next iteration of the BREEAM standard which includes a number of new credit items and more difficult requirements as part of the update to the assessment methodology.

Additionally, there are a number of specific EFA Performance in Use (PIU) targets which must take precedence and in some instances do not align with the requirements of the related BREEAM credits.

A award of a number of credits are precluded as a result of the above and act as technical constraints to the project from achieving a BREEAM rating of Excellent. Detailed justification is provided on a credit by credit basis as follows:

- **Man 01 Stakeholder Consultation (Project Delivery):** requires the client, building occupier, design team and contractor to contribute to the decision making process for the project including, as a minimum, meeting at RIBA Stage 2 to agree roles and responsibilities during each phase of the project (to cover certain themes). The project team also have to demonstrate how the discussions have influenced the Project Brief. This would need to have been started by the EFA during the feasibility stage and it would be challenging to demonstrate how the discussions influenced the brief as this is set by the EFA from the start of the project.

- **Man 01 Stakeholder Consultation (Third Party):** requires the community to be consulted on various aspects of the project before the end of RIBA Stage 2. The consultation must cover certain themes (which go above and beyond statutory consultation) and must be carried out by an independent third party. This would need to have been started by the EFA during feasibility stage (including the independent party) and cannot be achieved retrospectively.

- **Man 01 Sustainability Champion (BREEAM AP) (Design) and (Monitoring Progress):** Although Wates have appointed a BREEAM AP to advise on BREEAM, the AP appointment was not made by the EFA at Stage 2 and therefore this credit is not achievable.

- **Man 02 Elemental Life Cycle Cost (LCC):** these credits require a LCC analysis and design option appraisal to be carried out at RIBA Stage 2 (in line with particular standards). This was not undertaken by the EFA at feasibility stage and cannot be achieved retrospectively. Wates' team are investigating the potential to achieve one credit for the Component Level LCC Plan as part of RIBA Stage 4 however this is also an extensive piece of work.

- **Hea 02 Ventilation:** for mixed-mode ventilation systems, this credit requires intakes to be over 20m away from sources of external pollution e.g. car parks, roads etc. The site layout precludes this credit from being achieved.

- **Hea 06 Safe Access:** this is a detailed credit relating to the access arrangements for the site and is rarely achieved, especially on existing sites. This credit requires dedicated cycle paths to all cycle storage on the site, separate delivery and general parking areas and access etc. The proposed site layout precludes this credit from being achieved.

- **Ene 04 Passive Design (Passive design analysis) and (Free cooling):** these credits require a formal passive design analysis to be undertaken at RIBA Stage 2 to identify opportunities for passive design and free cooling solutions to be incorporated into the design. Although passive design measures and free cooling are proposed, no formal analysis was undertaken at Stage 2 so this credit is not achievable. This would need to have been started by the EFA at feasibility stage and cannot be achieved retrospectively.

- **Mat 06 Material Efficiency:** this credit requires opportunities and measures to optimise the use of materials at all stages of the project to be identified and implemented throughout the project, starting at the Brief stage. This would need to have been started by the EFA as part of feasibility and cannot be started later so is not achievable.

- **Wst 05 Adaptation to Climate Change:** this credit requires a climate change adaptation strategy appraisal reviewing structural and fabric resilience to be undertaken before the end of Stage 2. This would need to have been started by the EFA as part of feasibility and cannot be started later so is not achievable.

- **LE 01 Contaminated Land:** this credit is achieved where the site is deemed to be significantly contaminated (i.e. remediation is required in order for the development to take

place) and remediation measures are carried out. As no significant contamination is expected on the site, this credit is not achievable.

The total percentage value of all these credits is estimated as equivalent to over 10% of the BREEAM credit scoring and represents a significant barrier to the project achieving a higher rating.

Table 8: Building 3 potential carbon savings

BREEAM Performance	Planning credit scoring
Base Target	57.05
Optimum Target	64.43

A copy of the projects latest BREEAM 2014 pre-assessment completed by the projects BREEAM Assessors Method Consulting outlining the specific targeted credits is included in Appendix 1 of this report.

Wates aim to exceed the minimum score required for BREEAM Very Good as a certified and verified commitment to environmental sustainability.

3.3 Water Efficiency

Potable water is an increasingly important natural resource and the conservation of water is becoming a more influential sustainability metric as recognised by Core Strategy Policy DP23 which requires development to reduce water consumption through the installation of water efficiency measures.

In response to the requirements of the Core Strategy policy the development proposes to reduce water consumption through the following measures:

- Dual flush WCs.
- Flow regulators on showers and taps.
- Sanitary supply shut off.
- Spray taps.
- Installation of new water meters and sub-meters as appropriate to enable accurate measurement and monitoring of water use.
- Leak detection on the mains water supply to ensure that any leaks are rectified as soon as possible.

As part of the projects BREEAM target rating the new school buildings are targeting a 40% reduction in water consumption over equivalent baseline building water use.

The final specification of water saving measures will be defined as part of the detailed design of the building and the final water use and savings achieved will be calculated as part of the evidence for water credits in the BREEAM assessment.

3.4 Sustainable Use of Materials

The proposed development will aim to use environmentally benign materials to provide high levels of insulation, maximising cost effective carbon savings

A Construction Management Plan (CRMP) has been developed to ensure the use of measures to prioritise the reduction, reuse and recycling of construction waste and minimise the amount of waste sent to landfill.

The waste generated on site will be stored in designated areas, before removal by a waste management company. Where space allows waste will be segregated on site or alternatively will be removed for off-site segregation and disposal. There is a diversion of waste from landfill target of at least 97% for the site.

Consideration will be given to the pre-fabrication of certain elements; such as the structural flooring, steelwork and M&E services. Packaging will be minimised and where possible removed by suppliers for re-use elsewhere. These measures will help to minimise the generation of waste on site.

The management of any waste storage areas controlled by Wates will also ensure that collection times are scheduled during the day to minimise disruption to the school and its neighbours.

Recycled aggregates will be used in non-structural applications on site where possible to improve performance of materials against the Green Guide to Specification A and A+ ratings as outlined in the Camden Sustainability SPD.

Insulation materials containing substances known to contribute to stratospheric ozone depletion or with the potential to contribute to global warming will not be used.

3.5 Green Infrastructure

The use of green/brown roofs has been considered and whilst potentially technically feasible would add a substantial further cost to the development and impacts on the structural design of new buildings.

It is considered that the enhancement of the schools ground level green infrastructure as detailed in the landscape strategy accompanying the planning application should be prioritised which will also provide a high quality valued amenity resource for recreational and educational purposes for the students.

3.6 Flooding

A Flood Risk Assessment (FRA) has been carried out by Curtins to determine the risk of flooding on site in accordance with national and local guidance and as part of the developments commitment to sustainable surface water management.

The site is located within Flood Zone 1 and therefore has a low risk of fluvial and tidal flooding and considered to have a low probability of suffering from any form of flooding and proved to not increase the probability of flood risk elsewhere.

A sustainable drainage strategy has been prepared for the development through the use of appropriate Sustainable Drainage Systems and targeting 50% attenuation of the undeveloped site's surface water run-off at peak times.

Surface water will discharge into the existing drainage network via a surface water flow restrictor and attenuation system consisting of over underground attenuation tanks and pipework.

The proposed surface water drainage scheme has been designed to take into account a 1 in 100 year storm event inclusive of a 20% allowance for Climate Change and will reduce the sites surface water discharge rate by 50%.

Full details can be found within the FRA and drainage strategy which accompany the planning application.

3.7 Adapting to Climate Change

Policy CS13 expects developments to be designed to consider the anticipated changes to the climate, especially developments vulnerable to heat and in those locations susceptible to surface water flooding. It requires development to be resilient to climate change by ensuring schemes include appropriate adaptation measures.

Measures included within the design proposals to ensure the new school buildings can cope with anticipated future weather conditions include:

- Building orientation to reduce excessive solar gain and facilitate natural ventilation as far as possible within site constraints;
- An appropriate level of glazing to facilitates natural daylighting but prevent excessive overheating;
- Translucent blinds utilised to prevent disabling glare in occupied spaces and convert direct sunlight into useful diffused sunlight;
- Design to enable natural ventilation and the removal of heat using fresh air;
- Areas of planting to reduce surface water run-off;
- Use of water efficient fixtures and fittings to reduce the demand for water.

3.8 Biodiversity

Both national policy and local planning policy recognises the importance of conserving and enhancing the natural environment and providing net gains in biodiversity where possible.

The habitats recorded within the site are of limited ecological value being common and widespread and containing a low diversity of plant species. The majority of the site comprises amenity grassland, buildings and hard standing.

The ecologist has noted that the potential for nesting birds should be taken into account when programming demolition and any required vegetation removal.

As part of the new scheme proposals habitat enhancements are recommended to increase the site's potential to support biodiversity. These may include:

- Use of native trees and shrubs within the landscape design;
- The installation of nest and roost boxes for birds and bats.

Further details can be found with the Desk Study and Extended Phase 1 Habitat Survey undertaken by Jacobs and the proposed landscaping plans which accompany the planning application.

The re-development of the **Hampstead School** will deliver **sustainable** and **functional low carbon learning environments** that balances **environmental, social** and **economic** drivers

Appendix 1: BREEAM Pre-assessment

Hampstead School, Camden PSBP

BREEAM New Construction 2014

Design Stage Pre-Assessment

Based on the BREEAM New Construction 2014 Design Stage Criteria (Issue 2.0)

Education Buildings (Schools)

Revision P2, 5 March 2015

BRE Reference Number: TBC

BREEAM Pre-Assessment Summary

BREEAM, the UK's Building Research Establishment's Environmental Assessment Method, is used to rate the environmental performance of new or existing buildings, as designed and constructed and/or in operation. A BREEAM rating of 'Pass', 'Good', 'Very Good', 'Excellent' or 'Outstanding' can be awarded where sufficient credits have been gained on the basis of meeting environmental performance criteria in each of the categories: Management, Health and Wellbeing, Energy, Transport, Water, Materials, Waste, Land Use and Ecology, Pollution and Innovation.

This pre-assessment has been carried out based on the BREEAM 2014 New Construction Design Stage Criteria for Education buildings. This scheme is applicable to new build projects. In addition to a range of standard issues assessed for all building types, this also includes requirements specific to Education buildings which have been included in the pre-assessment.

Please note that this pre-assessment includes a summary of the requirements for each credit but the BREEAM Technical Manual should be referred to for full details.

Scoring and mandatory requirements

BREEAM requires the achievement of a minimum percentage score in order to achieve a particular rating. This is determined through achieving credits which are assigned to issues under each of the sections noted above. These sections are all weighted differently so credits in different sections equate to a different percentage score to those in other sections. The percentage contribution of each credit to the final score is noted at the end of each section in the following pages.

In addition to the achievement of a minimum score, BREEAM also contains mandatory credits/requirements which MUST be achieved in order to obtain a particular rating. If these are not achieved, the required rating cannot be obtained regardless of the percentage score achieved. In BREEAM 2014, there are also 'pre-requisites' which do not carry a score, but must be achieved in order to award a credit and/or rating. Where a pre-requisite or mandatory credit is present, this is clearly highlighted in the main summary spreadsheet below.

The following table shows the mandatory credits and requirements for the project and indicates whether these have been met in the targets below. Please note that sufficient evidence will need to be provided to demonstrate that each of these requirements is achieved.

Credit Title	Summary of mandatory requirements	Rating level (based on targets)
Man 03 Responsible Construction Practices.	CCS scores of 25-34 (one credit) or 35-39 (two credits).	Outstanding
Man 04 Commissioning and Handover	A Building User Guide is produced	Outsanding
Man 05 Aftercare	Seasonal Commissioning	Outstanding
Ene 01 Reduction of Energy Use and Carbon Emissions	Minimum Energy Performance Ratio (EPR) calculations	Very Good
Ene 02 Energy Monitoring	Sub-metering of major energy consuming systems	Outstanding
Wat 01 Water Consumption	Efficiency of building's domestic water consuming components	Outstanding
Wat 02 Water Monitoring	A water meter on the mains supply to each building.	Outstanding
Mat 03 Responsible Sourcing of Materials	All timber used on the project is 'legally harvested and traded timber'.	Outstanding
Wst 01 Construction Waste Management	A compliant Construction Resource Management Plan (CRMP) is produced and the relevant resource efficiency and/or diversion from landfill benchmarks are met.	Outstanding
Wst 03 Operational Waste	A compliant dedicated space for storage and segregating recyclable waste is provided.	Outstanding
LE 03 Mitigating Ecological Impact	The change in ecological value of the site is no less than minus nine i.e. a minimal change.	Outstanding

Hampstead School

Design Stage Pre-Assessment Summary

MINIMUM BREEAM RATING REQUIRED: Very Good. This equates to a score of 55% and requires the achievement of certain mandatory credits.

It should be noted that until sufficient evidence is provided by the project team to the BREEAM Assessor to demonstrate that the full requirements have been met, none of these scores can be assumed to have been achieved, but remain as targets until the assessor confirms otherwise.

Base Target	This column shows the minimum credits anticipated to be achieved for the development. This column gives a score of 57.05% which is a BREEAM rating of Very Good.
Optimum Target	This column shows which credits could potentially be gained for the development, although the feasibility of achieving some of these credits will require further investigation by the project team. This column gives a score of 64.43% which is a rating of Very Good.

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
MANAGEMENT							
Man 01	**Project Brief and Design**			**To recognise and encourage an integrated design process that optimises building performance**			
Project brief and design							
Stakeholder Consultation (Project Delivery) (1-3)	1	0	0	Credit awarded where, prior to completion of the RIBA Stage 2 (Concept Design), the client, building occupier, design team and contractor contribute to the decision making process for the project. As a minimum this includes meeting to identify and define their roles, responsibilities and contributions during each phase of the project. Show that consideration was given to all topics as listed in the guidance (requirements 2a-g). The project team should demonstrate how the project delivery stakeholder contributions and outcomes of the consultation process have influenced or changed the Initial Project Brief, including if appropriate, the Project Execution Plan, Communication Strategy, and the Concept Design.	It was agreed (meeting 04.03.15) that this would not be targeted as it can be difficult to evidence how the early stage discussions of roles and responsibilities have influenced the Project Brief, which is set from the start of the project. In addition, the project is now past RIBA Stage 2 and this cannot be achieved retrospectively. Credit not targeted.	-	-
Stakeholder Consultation (Third Party) (4-7)	1	0	0	Credit awarded where, prior to completion of the RIBA Stage 2 (Concept Design), all relevant third party stakeholders have been consulted by the design team on the minimum consultation content. Refer to the guidance for full details. The project must demonstrate how the stakeholder contributions and outcomes of the consultation exercise have influenced or changed the Initial Project Brief and Concept Design. Prior to completion of RIBA Stage 4 (Technical Design), consultation feedback must be given to, and received by, all relevant parties. Note that for schools, the Consultation exercise must use a method carried out by a independent party.	It was agreed (meeting 04.03.15) that this credit would not be targeted. Public consultation is being undertaken; however, no third party facilitator or methodology is being used so this is not achievable. Credit not targeted.	-	-
Sustainability Champion (BREEAM AP) (Design) (8-10)	1	0	0	Credit awarded where a Sustainability Champion is appointed to facilitate the setting and achievement of BREEAM performance target(s) for the project during project preparation and brief stages (RIBA Stage 1). There should be a contractual agreement of BREEAM performance targets between the client and design team by RIBA Stage 2 (Concept Design). To achieve this credit at the interim (design) assessment stage, the agreed BREEAM performance target(s) must be demonstrably achieved by the project design. This is demonstrated via the BREEAM Assessor's design stage assessment report.	Credit assumed to be unachievable. A BREEAM AP would need to have been appointed before the end of RIBA Stage 2 to achieve this. Wates to confirm.	Wates	RIBA Stage 1/2

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Sustainability Champion (BREEAM AP) (Monitoring Progress) (11-12)	1	0	0	If the previous credit (criteria 8, 9 and 10) have been achieved, credit awarded where the Sustainability Champion is appointed to monitor progress against the agreed BREEAM performance target(s) throughout the design process, and formally reports progress to the client and design team. The Sustainability Champion must attend key project/design team meetings during the design stages (RIBA Stages 2, 3 & 4), reporting during, and prior to, completion of each stage, as a minimum.	Credit assumed to be unachievable. This is dependent on the above credit. Wates to confirm.	Wates	RIBA Stage 2/3/4
Man 02	**Life cycle cost and service life planning**			**To deliver whole life value from investment and promote economic sustainability by recognising and encouraging the use of life cycle costing and service life planning to improve design, specification and through-life maintenance and operation.**			
Elemental Life Cycle Cost (LCC) (1-2)	2	0	0	Two credits awarded where an Elemental LCC analysis and design option appraisal is carried out in line with 'Standardized method of life cycle costing for construction procurement' PD 156865:2008, at RIBA Stage 2. The LCC analysis must show an outline LCC based on buildings basic structure and envelope, a range of options and based on multiple cash flow scenarios (e.g. 20, 30, 50+ years) It must also show the fabric and servicing strategy, outlining services component and fit-out options over a 15yr period in an 'elemental LCC Plan'.	This would not normally be targeted on Wates PSBP projects.	Wates	RIBA Stage 2
Component Level LCC Plan (3-4)	1	0	0	Credit awarded where a component LCC plan is developed to include envelope, services, finishes and external spaces, where present, before the end of RIBA Stage 4. Demonstrate how the component level LCC plan has influenced building and systems design/specifications to minimise life cycle costs and maximise critical value.	This would not normally be targeted on Wates PSBP projects.	Wates	Before end of RIBA Stage 4
Capital Cost Reporting (5)	1	1	1	Credit awarded where the project team reports the predicted capital cost for the building in £k/m2. At the design stage, this can be awarded based on confirmation of the predicted cost, and a client commitment to provide the information on the final cost at the end of the project.	This is normally targeted on Wates PSBP projects. This would require a commitment from the Client to provide the relevant cost information at the appropriate stage.	Client / Wates	Before end of RIBA Stage 4
Man 03	**Responsible Construction Practices**			**To recognise and encourage construction sites which are managed in an environmentally and socially considerate, responsible and accountable manner.**	**Mandatory minimum requirement: One credit for Excellent and two credits for Outstanding for Considerate Construction.**		
Pre-requisite	0	Y	Y	**All timber and timber based products used in the project must be "Legally harvested and traded timber".**	This is normally targeted on Wates PSBP projects.	Wates	RIBA Stages 4/5/6 - include in tender
Environmental Management (1-2)	1	1	1	Credit awarded where the principal contractor operates an EMS covering main operations. The EMS must be either third party certified to ISO14001/EMAS standard, or structured in compliance with BS 8555 2003, having reached phase four of implementation stage. The principal contractor must implement best practice pollution prevention policies on site, in line with PPG 6.	This is normally targeted on Wates PSBP projects.	Wates	RIBA Stages 4/5/6 - include in tender

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Sustainability Champion (BREEAM AP/BRE SSM) (Construction) (3-5)	1	0	0	Credit awarded when a Sustainability Champion is appointed to monitor the project to ensure compliance with performance/process criteria and BREEAM targets during Construction, Handover and Close Out stages (RIBA stages 5 and 6). Defined BREEAM performance targets form a requirement of the principal contractors contract. BREEAM related targets must be demonstrably achieved via BREEAM Assessor's final post-construction stage assessment report. Note that to achieve this, the Sustainability Champion must be site based or visit the site regularly to carry out spot checks, with sufficient frequency. They will attend regular progress meetings and report progress against the BREEAM targets.	This would not normally be targeted on Wates PSBP projects.	Wates	RIBA Stages 5/6/7
Considerate Construction (6)	2	2	2	Credit awarded where the principal contractor has used an independently assessed 'compliant' organisational, local or national considerate construction scheme. One credit awarded where a CCS score of 25-34 is achieved with 5 in each section. Two credits awarded where the score is between 35-39 with 7 in each section.	It was agreed (meeting 04.03.15) that two credits plus the innovation credit would be targeted. This requires a CCS score of 40 or above with at least 7 in each section.	Wates	RIBA Stages 4/5/6 - include in tender
Monitoring of Construction Site Impacts (Utility Consumption) (7-13)	1	1	1	Responsibility for monitoring all on-site energy use and potable water consumption from construction processes (and dedicated off-site monitoring) should be assigned to an individual. Monitor and record principal and sub-contractor potable water consumption (m^3) and energy consumption (kWh/litres of fuel) used by construction plant, equipment (fixed and mobile) and site accommodation. Report the CO_2 emissions (total $kgCO_2$/project value) and total net potable water consumption (m^3) from construction processes.	This is normally targeted on Wates PSBP projects.	Wates	RIBA Stages 4/5/6 - include in tender
Monitoring of Construction Site Impacts (Transport) (7, 14-16)	1	1	1	Responsibility should be assigned to an individual to monitor and record transport movements and impacts data from delivery of the majority of construction materials to, and waste from, site. Transport, intermediate storage and distribution of materials from factory gate to building site to be included as minimum. The scope of monitoring must cover materials used in major building elements, groundworks and landscaping materials. Transport of waste groups, outlined in projects WMP, from construction gate to waste disposal processing/recovery centre gate included as minimum. Report separately for materials and waste, the total fuel consumption (litres) and total CO_2 emissions ($kgCO_2$ eq), plus distance travelled (km).	It was agreed (meeting 04.03.15) that this would be targeted. Wates agreed to implement the relevant on-site monitoring and report appropriately.	Wates	RIBA Stages 4/5/6 - include in tender

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Man 04	**Commissioning and Handover**			**To encourage a properly planned handover and commissioning process that reflects the needs of the building occupants.**	**Mandatory minimum requirement: Criterion 9 (Building User Guide) for Excellent and Outstanding.**		
Commissioning and Testing Schedule and Responsibilities (1-4)	1	1	1	Credit awarded where there is a schedule of commissioning, identifying a suitable timescale for commissioning and re-commissioning of all complex and non-complex building services, control systems and building fabric. All commissioning activities should be in accordance with current Building Regulations, BSRIA and CIBSE guidelines and/or other appropriate standards where applicable. Commissioning of BMS, where specified, should cover criteria in guidance notes. An appropriate project team member(s) should be appointed to monitor and programme pre-commissioning, commissioning and, where necessary, re-commissioning activities on behalf of the client. The principal contractor should account for the commissioning programme, responsibilities and criteria within their budget and programme of works, allowing for time to complete activities prior to handover.	This is normally targeted on Wates PSBP projects.	Wates / M&E	Before end of RIBA Stage 6
Commissioning Building Services (5)	1	1	1	Credit awarded where the commissioning criteria above have been achieved and when a specialist commissioning manager is appointed by the client/principal contractor during RIBA Stage 4 for buildings with complex building services and systems. Responsibility should cover: 1. Undertaking design reviews and giving advice on suitability for ease of commissioning. 2. Providing commissioning management input to construction programming and during installation stages. 3. Management of commissioning, performance testing and handover/post hand-over stages. Where there are simple building services, this role can be carried out by an appropriate project team member (see criterion 3 above), provided they are not involved in the general installation works for the building services system(s).	This is normally targeted on Wates PSBP projects.	Wates / M&E	Before end of RIBA Stage 4
Testing and Inspecting Building Fabric (6-8)	1	0	0	Credit awarded where the commissioning and testing schedule and responsibilities credit above is achieved, and a post construction thermographic survey and airtightness testing and inspection is completed to assure the quality of the building fabric, including insulation continuity, avoidance of thermal bridging and air leakage paths. Defects identified through testing must be rectified prior to building handover and close out. All testing must be carried out by a Suitably Qualified Professional, in line with the relevant standard.	This would not normally be targeted on Wates PSBP projects.	Wates	Before end of RIBA Stage 6
Handover (9-10)	0	Y	Y	**Pre-requisite:** A Building User Guide is developed prior to handover, for distribution to building occupiers and premises managers, covering all functions and uses of the building.	This is normally targeted on Wates PSBP projects.	Wates	Before end of RIBA Stage 6
	1	1	1	A training schedule is prepared for building occupiers/premises managers, timed appropriately around handover and proposed occupation plans, which includes the following content as a minimum: a) The building's design intent. b) The available aftercare provision and aftercare team main contact(s), including any scheduled seasonal commissioning and post-occupancy evaluation. c) Introduction to, and demonstration of, installed systems and key features, particularly building management systems, controls and their interfaces. d) Introduction to the BUG and other relevant building documentation (see guidance). e) Maintenance requirements, including any maintenance contracts and regimes in place.	This is normally targeted on Wates PSBP projects.	Wates	Before end of RIBA Stage 6

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Man 05	**Aftercare**			**To provide post-handover aftercare to the building owner/occupants during the first year of occupation to ensure the building operates and adapts, where relevant, in accordance with the design intent and operational demands.**	**Mandatory minimum requirement: One credit (Seasonal Commissioning) for Excellent and Outstanding.**		
Aftercare Support (1-2)	1	1	1	Credit awarded where there is operational infrastructure and resources in place to provide aftercare support to all the building occupiers which includes minimum short term (meetings, walkabouts, training and on site attendance for four weeks) and long term support (e.g. helpline, nominated person for 12 months) criteria. In addition, there is operational infrastructure and resources in place to collect and monitor energy and water consumption data for at least 12 months after occupation, in order to analyse discrepancies between actual and predicted performance, with a view to adjusting systems and/or user behaviour.	It was agreed (meeting 04.03.15) that this would be targeted. This will require a commitment from the school to collect and analyse energy and water consumption data for the first three years after occupation (to also include the exemplary level credit).	Client / Wates	Before end of RIBA Stage 6
Seasonal Commissioning (3)	1	1	1	**Complex systems - Specialist commissioning manager (over a minimum 12 month period after occupation)** a. Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling/ventilation equipment in mid-summer, and under part load conditions (spring/autumn); b. Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy; c. Interviews with building occupants (where they are affected by the complex services); Recommissioning of systems (following any work needed to serve revised loads), and incorporating any revisions in operating procedures into the O&M manuals. **Simple systems (naturally ventilated) - external consultant/ facilities manager** a. Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback; take all reasonable steps to recommission systems following the review to take account of deficiencies identified and incorporate any relevant revisions in operating procedures into the O&M manuals.	This is normally targeted on Wates PSBP projects.	Wates / M&E	Before end of RIBA Stage 4
Post Occupancy Evaluation (4-5)	1	0	0	The client makes a commitment to carry out a Post Occupancy Evaluation (POE) one year after building occupation, to gain building performance feedback. The POE should be carried out by an independent party. It should include the following: a review of the design intent and construction process, feedback from building users on the design and environmental conditions of the building, sustainability performance. See guidance notes for full list of what should be included. The client makes a commitment to carry out the appropriate dissemination of information on the building's post occupancy performance in order to share any good practice and lessons learned, and inform changes in user behaviour, building operational processes and procedures, and system controls. Refer to the compliance notes for a definition of appropriate dissemination, this also provides advice on appropriate dissemination where the building or building information is commercially or security sensitive.	It was agreed (meeting 04.03.15) that this credit would not be targeted. The POE must be undertaken by an independent third party which is likely to incur an additional fee. It was agreed that Wates' KPI reporting required as part of the framework would not be sufficient as this does not use a third party facilitator. Credit not targeted.	-	-
Sub-Total	**21**	**11**	**11**	**One management credit equals 0.57%**			
Weighted Sub-Total	**12**	**6.29**	**6.29**				

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
HEALTH & WELLBEING							
Hea 01	**Visual comfort**			**To ensure daylighting and occupant controls are considered at the design stage to ensure best practice visual performance and comfort for building occupants.**			
Glare Control (1-2)	1	0	1	Credit awarded when the potential for disabling glare has been designed out of all relevant building areas either through building layout (e.g. low eaves) or building design (e.g. brise soleil, bioclimatic design). The glare control strategy avoids increasing lighting energy consumption by maximising daylight levels whilst avoiding disabling glare. System should not inhibit daylight entering the space under cloudy conditions, and the location of shading should not conflict with operating lighting controls.	It was agreed (meeting 04.03.15) that this would only be targeted in the optimum at this stage as an aspirational target for the project to achieve. It was agreed that this would be reviewed as the project progresses.	Wates / Arch	RIBA Stage 3/4 - include in tender
Daylighting (3)	2	2	2	Two credits awarded where calculations have been carried out which demonstrate that at least 80% of floor area in occupied spaces is adequately daylit. Note: For all education buildings, where the Education Funding Agency daylighting criteria have been achieved for all relevant rooms within the building, two credits can be awarded by default. Evidence would need to be provided that the EFA requirements have been met. An additional Innovation credit available - see below	This is normally targeted on Wates PSBP projects.	Wates	RIBA Stage 3/4 - include in tender
View Out (4-6)	1	0	0	Credit awarded when 95% of floor space within relevant building areas (inc. workstations, close work areas or areas where a view out is deemed beneficial to occupants of the space) are within 7m of a wall which has a window or permanent opening that provides an adequate view out. The window/opening must be equal to, or greater than, 20% of the surrounding wall area. Where the room depth is greater than the 7m requirement, compliance is only possible where the % of window/opening is ≥ the values in table 1.0 of BS 8206.	The current plans indicate that some internal rooms are included in the design so this has been left out of the targets as a precaution, but could be reviewed as the design progresses.	Arch	RIBA Stage 2
Internal and External Lighting Levels, Zoning and Control (7-13)	1	1	1	Credit awarded where high frequency ballasts are fitted to all fluorescent and compact fluorescent lamps. AND All internal and external lighting is designed to provide illuminance levels appropriate to tasks undertaken, recommended by SLL Code for Lighting 2012, CIBSE LG 7 or other relevant industry standard for internal lighting, and BS 5489-1:2013 and BS EN 12464-2:2014 for external lighting. AND Lighting must be appropriately zoned and allow for occupant control. Areas used for teaching, seminar or lecture purposes must have controls specified in accordance with CIBSE LG5. Manual lighting controls should be easily accessible for the teacher whilst teaching and on entering/leaving the teaching space.	This is normally targeted on Wates PSBP projects.	M&E	RIBA Stage 3/4 - include in tender

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Hea 02	**Indoor air quality**			**To recognise and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes.**			
Indoor Air Quality Plan (1)	1	1	1	Credit awarded where an Indoor Air Quality (IAQ) plan has been produced, with the objective of facilitating a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during occupation of the building. The indoor air quality plan must consider the following: a. Removal of contaminant sources b. Dilution and control of contaminant sources c. Procedures for pre-occupancy flush out d. Third party testing and analysis e. Maintaining indoor air quality in-use	It was agreed (meeting 04.03.15) that this would be targeted. The M&E agreed to produce the IAQ plan.	M&E	RIBA Stage 2
Ventilation (2-5)	1	0	0	Credit awarded where the building has been designed to minimise the concentration and recirculation of pollutants in the building by providing fresh air in to the building in accordance with relevant standards for ventilation. **1. In air-conditioned and mixed-mode buildings/spaces:** The building's air intakes and exhausts are over 10m apart and intakes are over 20m from sources of external pollution. OR The location of the building's air intakes and exhausts, in relation to each other and external sources of pollution, is designed in accordance with BS EN 13779:2007 Annex A2. **2. In naturally-ventilated buildings/spaces**: openable windows/ventilators are over 10m from sources of external pollution. Where present, HVAC systems must incorporate suitable filtration to minimise external air pollution, in line with BS EN 13779:2007. Areas of the building subject to large and unpredictable/variable occupancy patterns should have CO_2 or air quality sensors specified and meet the detailed requirements relating to natural or mechanically ventilated spaces.	This would not normally be targeted on Wates PSBP projects.	M&E	RIBA Stage 2
Volatile Organic Compounds (Emission levels) (6-7)	1	1	1	Credit awarded where all decorative paints and varnishes specified meet the criteria in the EU Directive 2004/42/CE ('Paints Directive'). At least five of the other seven remaining product categories meet the testing requirements and emission level criteria for Volatile Organic Compound (VOC) emissions.	It was agreed (meeting 04.03.15) that this would be targeted. The team felt that, although this would limit procurement options for finishing products, it would be good to target particularly for an Education project such as this.	Wates / Arch	RIBA Stage4
Volatile Organic Compounds (Testing) (8-12)	1	0	0	Credit awarded where formaldehyde and total volatile organic compound (TVOC) concentrations meet the required standards and are measured via post construction (but pre-occupation) testing in accordance with the relevant standards, and reported using the BRE scoring tool.	It was agreed (meeting 04.03.15) that this would not be targeted. It was agreed that this could be reviewed as the project progresses, particularly as the credit above is targeted. Credit not currently targeted.	Wates	RIBA Stage 4

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Adaptability - Potential for Natural Ventilation (13-14)	1	0	0	Credit awarded when the ventilation strategy is flexible and adaptable to potential occupant needs and climatic scenarios, and the design shows that occupied spaces are capable of providing fresh air entirely via natural ventilation. Either, room depths are designed in accordance with CIBSE AM10, and the openable window area in each occupied space is 5% of GIFA of that floor plate. OR The natural ventilation strategy provides adequate cross flow of air to maintain required thermal comfort/ventilation rates. Demonstrated using design tool types recommended by CIBSE AM10 or ClassVent. For strategies that do not rely on openable windows, or with occupied spaces greater than 15m, the design must demonstrate that the strategy can provide an adequate cross flow of air, in line with BB101. The natural ventilation strategy should provide at least two levels of user-control on fresh air supply. Any opening mechanisms must be easily accessible, and avoid draughts.	It was agreed (meeting 04.03.15) that this would not be targeted as some internal rooms are included in the design. These spaces do not have the potential to be fully naturally ventilated so this credit is currently not achievable. Credit not targeted.	-	-
Hea 03	**Safe Containment in Laboratories**			**To recognise and encourage a healthy internal environment through the safe containment and removal of pollutants.**			
Laboratory Containment Devices and Containment Areas (1-3)	1	1	1	Credit awarded where an objective risk assessment of proposed laboratory facilities has been carried out prior to the end of RIBA Stage 3 (Developed Design) considering potential risks in the design. Where containment devices (i.e. fume cupboards) are specified, they are manufactured and installed in accordance with the relevant standards. For Schools with labs and fume cupboards for subjects up to and including A-level this is BB 88, Fume cupboards in schools. Note that aspects of BS 7989 and BS 14175 may be relevant to some installations. Where ducted containment devices are specified, the appropriate discharge velocity is achieved in accordance with the National Annex of BS EN 14175-2.	It was agreed (meeting 04.03.15) that this would be targeted. It was noted that this is likely to require new equipment to be specified in order to ensure that the relevant standards are met.	Wates / Client	RIBA Stage 3
Hea 04	**Thermal Comfort**			**To ensure that appropriate thermal comfort levels are achieved through design, and controls are selected to maintain a thermally comfortable environment for occupants within the building.**			
Thermal Modelling (1-4)	1	1	1	Credit awarded when thermal modelling has been carried out using software in accordance with CIBSE AM11, and provides full dynamic thermal analysis. ClassCool can be used for schools with a straightforward servicing strategy. The modelling should show the building design and services strategy can deliver thermal comfort levels in occupied spaces as follows: a) **In air-conditioned buildings**: Summer and Winter operative temperature ranges in accordance with the criteria set out in BB101. b) **Naturally ventilated/free running buildings:** Winter operative temperature ranges in accordance with BB101 AND the building is designed to limit the risk of overheating in accordance with CIBSE TM52. For air-conditioned buildings, the PMV and PPD indices should be provided as evidence.	It was agreed (meeting 04.03.15) that this would be targeted. It was noted that dynamic thermal modelling is being undertaken to investigate the risk of overheating.	M&E	RIBA Stage 2
Adaptability - For a projected climate change scenario (5-8)	1	1	1	Credit awarded when the Hea 04 Thermal modelling credit has been achieved, and the thermal modelling demonstrates that the building design and services strategy can deliver the same thermal comfort levels in occupied spaces under a projected climate change environment. Where thermal comfort criteria are not met for the projected climate change environment, the project team should demonstrate how the building has been adapted, or is adaptable in future using passive design solutions to achieve above criteria. For air-conditioned buildings, the PMV and PPD indices are reported, based on the modelling.	It was agreed (meeting 04.03.15) that this would be targeted and the thermal model will be run against a projected future climate change scenario.	M&E	RIBA Stage 2

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Thermal Zoning and Controls (9-11)	1	1	1	Credit awarded when the Hea 04 Thermal modelling credit has been achieved, and the thermal modelling analysis has informed the temperature control strategy for the building and its users. The strategy for proposed heating/cooling system(s) demonstrates that it has addressed the following: a. Zones within the building and how the building services could efficiently and appropriately heat or cool these areas. b. The degree of occupant control required for these zones based on discussions with the end user. c. How proposed systems will interact with each other and how this may affect thermal comfort of building users. d. The need or otherwise for an accessible building user actuated manual override for any automatic systems.	This is normally targeted on Wates PSBP projects.	M&E	RIBA Stage 2
Hea 05	**Acoustic performance**			**To ensure the buildings' acoustic performance including sound insulation meet the appropriate standards for its purpose.**			
Acoustic Performance (1)	3	3	3	Credits awarded where a programme of pre-completion acoustic testing is carried out by a compliant test body to ensure the relevant building areas meet the appropriate acoustic performance standards and testing requirements. First credit: Sound Insulation -Achieve performance standards set out in Section 2 of the Acoustic Performance Standards for the Priority Schools Building Programme (APS) relating to airborne and impact sound insulation of walls and floors. Second credit: Internal Ambient Noise Levels - Achieve the ambient noise standards in Section 2 of the APS for all room types. For roofs with a mass per unit less than 150km/m^2 or roofs with glazing/rooflights, calculations using laboratory data with 'heavy' rain noise excitation as defined in BS EN ISO 140-183 are required for teaching/learning spaces to demonstrate that the reverberant sound pressure level in these rooms are not more than 20 dB above the appropriate limits presented within Section 2 of APS. Third credit - Reverberation - Where teaching and study spaces achieve the requirements relating to reverberation in table 5 in Section 2 of the APS. Open plan teaching spaces achieve the performance standards relating to speech transmission index in Section 2.8 of the APS, and corridor and stairwells that give direct access to teaching/study spaces achieve the performance requirements for sound absorption.	It was agreed (meeting 04.03.15) that three credits would be targeted. The team noted that compliance with the APS is required as part of the Project Brief.	Aco	RIBA Stage 2/3/4 - include in tender
Hea 06	**Safety and security**			**To recognise and encourage effective measures that promote safe and secure use and access to and from the building.**			
Safe Access (1-10)	1	0	0	Credit awarded where the site is designed to allow for safe access for pedestrians and cyclists. Level of detail is comprehensive - refer to compliance notes for details. Points to consider include: cycle paths and footpaths connecting to any off site paths, drop off areas to be located off/adjoining access road with direct access to footpath, road raised to pavement level at crossings, lighting in line with BS 5489-1:2013. Where delivery access areas and drop off areas exist: delivery areas are not directly accessed through general parking areas and do not cross or share pedestrian and cyclist routes and other outside amenity areas, provide a separate parking/waiting area for goods vehicles, ensure parking/turning areas are designed for simple manoeuvring and provide a dedicated space for refuse skips and pallets, away from delivery areas and staff/visitor parking.	This would not normally be targeted on Wates PSBP projects.	LA	RIBA Stage 2/3

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Security of Site and Building (11-13)	1	0	0	Credit awarded where an evidence-based Security Needs Assessment (SNA) is conducted by a Suitably Qualified Security Specialist (SQSS) by the end of RIBA Stage 2. The SQSS develops a set of recommendations or solutions during or prior to RIBA Stage 2 which aim to ensure that the design of buildings, public and private car parks and public or amenity space are planned, designed and specified to address the issues identified in the SNA. The recommendations from the SQSS are implemented. Any deviations from the recommendations will need to be justified, documented and agreed in advance with a SQSS.	It was agreed (meeting 04.03.15) that this would not be targeted as a Security Needs Assessment has not been undertaken at Stage 2. Credit not targeted.	-	-
Sub-Total	**19**	**12**	**13**	**One health & wellbeing credit equals 0.79%**			
Weighted Sub-Total	**15**	**9.47**	**10.26**				
ENERGY							
Ene 01	**Reduction of Energy use and Carbon Emissions**			**To recognise and encourage buildings designed to minimise operational energy demand, consumption and CO_2 emissions.**	**Mandatory minimum requirements: Five credits for Excellent and eight credits for Outstanding.**		
Energy Performance (1)	12	3	7	Up to 12 credits can be awarded where there is an improvement in the building operational related CO_2 emissions. The number of credits is based on the Energy Performance Ratio for New Constructions (using the BREEAM calculator).	It was agreed (meeting 04.03.15) that three credits would be targeted in the base based on the Building Regulations compliant BRUKL provided. The optimum target is based on the London Plan compliant BRUKL provided.	M&E	RIBA Stage 3-4
Ene 02	**Energy monitoring**			**To recognise and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption.**	**Mandatory minimum requirements: One credit (sub-metering of major energy consuming systems) for Very Good, Excellent and Outstanding.**		
Sub-metering of Major energy Consuming Systems (1-4)	1	1	1	Credit awarded where energy metering systems are installed that enable 90% of the estimated annual energy consumption of each fuel to be assigned to the various end-use categories of energy consuming systems. This includes the following: Space heating; Domestic Hot Water; Humidification; Cooling; Ventilation; Pumps; Lighting; Small power; Renewable or low carbon systems (separately); Controls and other major energy-consuming systems/plant. The energy consuming systems in buildings with a total useful floor area >1000m^2 are metered using an appropriate energy monitoring and management system. Smaller buildings are metered either with an energy monitoring and management system or separate accessible sub-meters with pulsed outputs or other open protocol communication output to enable future connection to energy monitoring system. The end energy consuming use should be identifiable to the building user, for example through labelling or data outputs.	This is mandatory to achieve a Very Good rating so this is targeted.	M&E	RIBA Stage 2/3/4 - include in tender
Sub-metering of High Energy Load and Tenancy Areas (5)	1	0	0	Credit awarded where an accessible energy monitoring and management system or separate accessible energy sub-meters with pulsed outputs or other protocol communication outputs which enable future connection to an energy monitoring and management system, are provided, covering a significant majority of the energy supply to all relevant function areas or departments within the building/unit.	This would not normally be targeted on Wates PSBP projects.	M&E	RIBA Stage 2/3/4 - include in tender

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Ene 03	**External Lighting**			**To recognise and encourage the specification of energy-efficient light fittings for external areas of the development.**			
External lighting (1-3)	1	1	1	Credit awarded by default where the building has been designed to operate without external lighting. OR Credit awarded where the average initial luminous efficacy of the external light fittings within the construction zone is not less than 60 luminaire lumens per circuit Watt. All external light fittings should be automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic.	This is normally targeted on Wates PSBP projects.	M&E	RIBA Stage 2/3/4 - include in tender
Ene 04	**Low Carbon Design**			**To encourage the adoption of design measures, which reduce building energy consumption and associated carbon emissions and minimise reliance on active building services systems.**			
Passive Design (Passive Design analysis) (1-3)	1	0	0	Credit awarded when Hea 04 Thermal comfort has been achieved; and the design team conduct an analysis of building design/development by RIBA Stage 2, to identify opportunities for passive design solutions to reduce energy consuming services. Additionally the building should use passive design measures to reduce the total heating, cooling, mechanical ventilation and lighting loads and energy consumption in line with the findings of the passive design analysis and the analysis should demonstrate a reduction in the total energy demand as a result (as a guide, passive design measures should contribute at least 5% of total energy demand).	It was agreed (meeting 04.03.15) that this would not be targeted. Although passive design measures are being incorporated as part of the design, no formal passive design analysis was undertaken at Stage 2 so this is not achievable. Credit not targeted.	-	-
Passive Design (Free cooling) (4-6)	1	0	0	Credit awarded where the Ene 04 passive design analysis credit is achieved, and the passive design analysis includes an analysis of free cooling and identifies opportunities for the implementation of free cooling solutions. These include: night-time cooling, ground coupled air cooling, displacement ventilation (not linked to any active cooling mechanism), ground water cooling, surface water cooling, evaporative cooling (direct of indirect), desiccant dehumidification and evaporative cooling using waste heat, and absorption cooling using waste heat. The building uses any of the free cooling strategies listed, i.e. does not use active cooling. Note: The free cooling criteria apply to ICT areas in schools.	It was agreed (meeting 04.03.15) that this would not be targeted as this is dependent on achieving the above credit. It was noted however that the current proposal includes night purging as a free cooling strategy. Credit not targeted.	-	-
Low and Zero Carbon Technologies (LZC Feasibility Study) (7-8)	1	0	1	Credit awarded when an energy specialist conducts a feasibility study by the end of RIBA Stage 2, to establish the most appropriate recognised local (on-site or near-site) LZC energy sources for the development. A local LZC energy technology/technologies must be specified for the building/development in line with the recommendations of this feasibility study, and this results in a meaningful reduction in regulated CO_2 emissions (as a guide, this should be at least 5%).	It was agreed (meeting 04.03.15) that this would only be targeted in the optimum at this stage pending further review. LZC technologies (e.g. PV) are being considered for the project but it is not clear if a formal LZC feasibility study has been/will be carried out. This will be reviewed as the project progresses.	Wates / M&E	RIBA Stage 2

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Ene 06	**Energy Efficient Transport Systems**			**To recognise and encourage the specification of energy efficient transportation systems.**			
Energy Consumption (1)	1	0	0	Where either lifts, escalators or moving walks (transportation types) are specified, credit awarded where: a) An analysis of the transportation demand and usage patterns for the building has been carried out to determine the optimum number and size of lifts (including counter-balancing ratio), escalators and/or moving walks. b) The energy consumption has been estimated in accordance with ISO BS EN 25745 Part 2 - Lifts and/or Part 3 - Escalators and Travelling Walkways for one of the following: i) At least two types of system (for each transportation type required); OR ii) An arrangement of systems (e.g. for lifts, hydraulic, traction, machine room-less lift (MRL)); OR iii) A system strategy which is 'fit for purpose'. c) The use of regeneration drives should be considered, where it produces an energy saving greater than the additional standby energy used to support the drives (typically for lifts with high travel and intensity use). d) The transportation system with the lowest energy consumption is specified.	It was agreed (meeting 04.03.15) that this would not be targeted as it can often be challenging to undertake a realistic analysis of transportation demand and usage patterns if the lift will only be used by maintenance staff and wheelchair users. Credit not targeted.	-	-
Energy Efficient Features (2-6)	2	0	0	Where the Ene 06 energy consumption credit has been achieved, credit awarded where: For lifts, the following three energy-efficient features are specified: 1. The lifts operate in a stand-by condition during off-peak periods. For example the power side of the lift controller and other operating equipment such as lift car lighting, user displays and ventilation fans switch off when the lift has been idle for a prescribed length of time. 2. The lift car lighting and display lighting provides an average lamp efficacy, (across all fittings in the car) of > 55 lamp lumens/circuit Watt and lighting switches off after the lift has been idle for a prescribed length of time. 3. The lift uses a drive controller capable of variable-speed, variable-voltage, and variable-frequency (VVVF) control of the drive motor. 4. Regeneration drives are specified where they are shown to save energy. For escalators and/or moving walks, each escalator and/or moving walk complies with at least one of the following: 1. It is fitted with a load sensing device that synchronises motor output to passenger demand through a variable speed drive; OR 2. It is fitted with a passenger sensing device for automated operation (auto walk), so the escalator operates in stand-by mode when there is no passenger demand.	It was agreed (meeting 04.03.15) that these credits would not be targeted as they are dependent on achieving the above credit. Credit not targeted.	-	-
Ene 08	**Energy Efficient Equipment**			**To recognise and encourage procurement of energy efficient equipment to ensure optimum performance and energy savings in operation.**			
Energy Efficient Equipment (1-3)	2	0	2	Credit awarded where the building's unregulated energy consuming loads are identified and their contribution to the total annual unregulated energy consumption of the building is estimated, assuming a typical/standard specification. Identify which of the following systems/process that will be responsible for a significant proportion of total annual unregulated energy demand of the building and demonstrate a meaningful reduction in energy demand. Small power, plug in equipment; swimming pool; communal laundry facilities with commercial sized appliances; data centre; IT intensive operating area; residential areas with domestic scale appliances; kitchen and catering equipment.	It was agreed (meeting 04.03.15) that this would only be targeted in the optimum target pending further review. Depending on which function is considered to be the most energy consuming in the building, this could be achievable; however, achieving the requirements for some of the functions can be challenging. This will be reviewed as the design progresses.	Client / Wates / M&E	RIBA Stage 2/3
Sub-Total	**23**	**5**	**12**	**One energy credit equals 0.65%**			
Weighted Sub-Total	**15**	**3.26**	**7.83**				

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
TRANSPORT							
Tra 01	**Public Transport Accessibility**			**To recognise and encourage development in proximity of good public transport networks, thereby helping to reduce transport-related pollution and congestion.**			
Accessibility Index (1-2)	3	3	3	Up to 3 credits are available where the public transport Accessibility Index (AI) for the assessed building is calculated based on the mode of transport, frequency of services and distance from building entrance to accessible public transport nodes. Where a development is unable to achieve any of the available credits using the AI, one credit is achieved when the building occupier provides, or commits to providing a dedicated bus service to and from the building relating to shift patterns.	This is based on the PTAL rating for the site which confirms an Accessibility Index of 11.38. This achieves three credits.	-	RIBA Stage 1/2
Tra 02	**Proximity to Amenities**			**To encourage and reward a building location that facilitates easy access to local services and so reduces the environmental, social and economic impacts resulting from multiple or extended building user journeys, including transport related emissions and traffic congestion.**			
Proximity to Amenities (1)	1	1	1	Credit is awarded where the building is located within 500m, via a safe pedestrian route, of 3 local amenities likely to be frequently required by the occupants. This should include at least 2 of the 3 core amenities: Appropriate food outlet, access to cash, and access to a recreation/leisure facility for fitness/sports, plus one other amenity. This can be either a core amenity, or one of the following additional amenities: Publicly available posting facilities, community facility; over-the-counter pharmacy; access to an outdoor open space (public or private and suitably sized and accessible to building users). Note: Pre-School and School developments are 'Building Type 2'.	This is site specific and should be reviewed. Assumed achievable. Arch to check.	Arch	RIBA Stage 1-2
Tra 03	**Cyclist Facilities**			**To encourage building users to cycle, so promoting exercise and helping reduce congestion and emissions, by ensuring adequate provision of cyclist facilities,**			
Cycle Storage (1)	1	0	0	Credit awarded where compliant cycle storage facilities are provided. This would require 1 space per 10 staff and pupils/students in total.	It was agreed (meeting 04.03.15) that this would not be targeted as no new cycle storage is being installed as part of the project. Credit not targeted.	-	-
Cyclist Facilities (2-3)	1	0	0	If the first Tra 03 credit has been achieved above, one credit can be awarded where at least two types of the following compliant cyclist facilities have been provided; Showers; Changing facilities; Lockers or Drying Spaces. Note: for School buildings, shower provision is for staff only and set at a rate of 1 shower per 10 cycle storage spaces provided.	It was agreed (meeting 04.03.15) that this would not be targeted as it is dependent on achieving the above credit. Credit not targeted.	-	-

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Tra 05	**Travel Plan**			**To recognise the consideration given to accommodating a range of travel options for building users, thereby encouraging the reduction of user reliance on forms of travel that have the highest environmental impact.**			
Travel plan (1-4)	1	1	1	Credit awarded where the development of a travel plan and site specific travel assessment or statement has been undertaken (involving occupier, if known) to ensure the travel plan is structured to meet the needs of the particular site and covers the following (as a minimum): the existing patterns and opinions of occupiers cycling and walking to the site/building, to identify issues; the travel patterns and transport impact of future building users; the current environment and facilities of walkers/cyclists; the current public transport and disabled access to the site (accounting for varying levels of disability and visual impairment). The travel plan should include a package of measure to encourage the use of sustainable modes of transport and the movement of people and goods during the buildings operation and use. The occupier must confirm that the plan will be implemented post-construction.	This is normally targeted on Wates PSBP projects.	Wates / Client	RIBA Stage 1/2
Sub-Total	**7**	**5**	**5**	**One transport credit equals 1.29%**			
Weighted Sub-Total	**9**	**6.43**	**6.43**				
WATER							
Wat 01	**Water Consumption**			**To reduce the consumption of potable water for sanitary use in new buildings from all sources through the use of water efficient components and water recycling systems.**	**Mandatory minimum requirement: One credit for Good, Very Good and Excellent. Two credits for Outstanding.**		
Water Consumption (1-5)	5	3	3	Up to five credits are awarded, determined by an assessment of the efficiency of the buildings domestic water consuming components, where the water consumption (l/person/day) is compared against a baseline performance. The efficiency of the following 'domestic scale' components should be included: WCs, urinals, taps (wash hand basins, kitchen taps/waste disposal unit where specified), showers, baths, dishwashers and washing machines (domestic/commercial/industrial sized). Where a greywater and/or rainwater system is specified, its yield (l/person/day) should be used to off-set non potable water demand from components that would otherwise be supplied using potable water. Any greywater systems should be specified and installed in compliance with BS 8525-1:2010 Greywater Systems - Part 1 Code of Practice. Any rainwater systems should be specified and installed in compliance with BS 8515:2009+A1:2013 Rainwater Harvesting Systems - Code of Practice.	Based on similar Wates projects, it is assumed that three credits will be targeted. This is achievable with careful specification of low water consuming components.	Arch / M&E	RIBA Stage 3/4
Wat 02	**Water Monitoring**			**To ensure water consumption can be monitored and managed and therefore encourage reductions in water consumption.**	**Mandatory minimum requirement: Criterion 1 (water meter on mains supply) for Good, Very Good, Excellent and Outstanding.**		
Pre-requisite (1)	**0**	Y	Y	**Mandatory pre-requisite - A water meter is specified on the mains water supply to each building, including where water is supplied via a borehole or other private source.**	This will be achieved as it is mandatory.	M&E	RIBA Stage 3/4
Water Monitoring (2-4)	1	1	1	Credit awarded where water consuming plant or building areas, consuming 10% or more of the buildings total water demand, should be fitted with either; easily accessible sub meters or have water monitoring equipment integral to the plant or area. Each main and sub meter should have a pulsed output or other open protocol communication output enabling connection to a Building Management System (BMS) for monitoring consumption. If the site has an existing BMS managed by the same occupier/owner, the pulsed/digital water meter(s) for the new building should be connected to existing BMS.	This is normally targeted on Wates PSBP projects.		

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Wat 03	**Water Leak Detection**			**To reduce the impact of water leaks that may otherwise go undetected.**			
Leak Detection System (1)	1	1	1	Credit awarded where a leak detection system, capable of detecting a major leak on the mains supply within the building and between the building and the utilities water meter, is installed. It must be a permanent automated water leak detection system capable of alerting occupants to a leak OR an in-built automated diagnostic procedure for detecting leaks. It must be programmable by the occupier, avoid false alarms and be capable of identifying different flow/leakage rates. Activation should occur when flow through the meter is at a rate above a pre-set maximum over a pre-set period of time.	This is normally targeted on Wates PSBP projects.	M&E	RIBA Stage 3/4 - include in tender
Flow Control Devices (2)	1	1	1	Credit awarded where flow control devices that regulate the supply of water to each WC area/facility according to demand are installed (and therefore minimise water leaks and wastage from sanitary fittings). An example of a flow control device is a presence detector and controller (i.e. PIR linked to a solenoid valve).	This is normally targeted on Wates PSBP projects.	M&E	RIBA Stage 3/4 - include in tender
Wat 04	**Water efficient equipment**			**To reduce unregulated water consumption by encouraging specification of water efficient equipment.**			
Water Efficient Equipment (1-2)	1	1	1	Credit awarded when the project team identify the building's unregulated water demands that could be realistically mitigated or reduced (e.g. for irrigation, vehicle wash plant/equipment). The project team should then identify the system(s) or processes to reduce the unregulated water demand of the development and its operation, and demonstrate through either good practice design or specification a meaningful reduction in the total water demand of the building.	This is normally targeted on Wates PSBP projects.	Arch	RIBA Stage 3/4 - include in tender
Sub-Total	**9**	**7**	**7**	**One water credit equals 0.78%**			
Weighted Sub-Total	**7**	**5.44**	**5.44**				
MATERIALS							
Mat 01	**Life cycle impacts**			**To recognise and encourage the use of construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building. An additional Innovation credit is available - see below.**			
Materials life cycle impacts (1-3)	6	3	4	Up to six credits are awarded, determined by the Green Guide to Specification ratings for the external walls, windows, roof, upper floor slabs, internal walls and floor finishing elements of the build. Materials with an Environmental Product Declaration (EPD) may enable scores to be further enhanced.	It was agreed (meeting 04.03.15) that three credits would be targeted as a minimum at this stage, with an aspiration to achieve more pending further review. It was noted that these targets are an estimate until checked so it is advised that this is reviewed ASAP as the design progresses.	Arch	RIBA Stage 2/3/4
Mat 02	**Hard landscaping and boundary protection**			**To recognise and encourage the specification of materials for boundary protection and external hard surfaces that have a low environmental impact, taking account of the full life cycle of materials used.**			
Hard landscaping and boundary protection (1)	1	0	0	Credit awarded where at least 80% of external hard landscaping and 80% of boundary protection specifications achieve an A or A+ rating, as defined by the Green Guide to Specification.	Sometimes this is not achieved on Wates PSBP projects. Suggest this is reviewed. This will also depend on the red line boundary for the assessment as any existing reused in situ material automatically achieves an A+ rating.	LA	RIBA Stage 3/4

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Mat 03	**Responsible sourcing of materials**			**To recognise and encourage the specification of responsibly sourced materials for key building elements. An additional Innovation credit is available - see below.**	**Mandatory minimum requirement: All timber used on the project is 'Legally harvested and traded timber' for Pass, Good, Very Good, Excellent and Outstanding.**		
Pre-requisite (1)	0	Y	Y	**Pre-requisite - All timber used on the project is 'Legally harvested and traded timber'**	This is mandatory to achieve any BREEAM rating.	Wates	RIBA Stage 3/4 - include in tender
Sustainable Procurement Plan (2)	1	1	1	Credit awarded where the principal contractor sources materials for the project in accordance with a documented sustainable procurement plan.	It was agreed (meeting 04.03.15) that this would be targeted.	Wates	RIBA Stage 3/4 - include in tender
Responsible sourcing of materials (3)	3	1	1	Up to 3 credits can be awarded where the applicable building and hard landscaping materials, in applicable locations, are responsibly sourced in accordance with the BREEAM methodology. Applicable materials categories include: Timber/timber-based products; concrete/cementitious; metal; stone/aggregate; clay-based; gypsum; glass; plastic, polymer, resin, paint, chemicals and bituminous; animal fibre/skin, cellulose fibre; other. Responsible sourcing accreditations include PEFC, FSC, ISO 14001 and BES 6001. 1 credit where 18% of available points are achieved (2 credits for 36%, and 3 credits for 54%).	One credit is targeted on other projects.	Wates / Arch	RIBA Stage 3/4 - include in tender
Mat 04	**Insulation**			**To recognise and encourage the use of thermal insulation which has a low embodied environmental impact relative to its thermal properties**			
Embodied impact (2-4)	1	1	1	Any new insulation specified for use within the following building elements must be assessed: 1. External walls 2. Ground floor 3. Roof 4. Building services Credit awarded where the insulation index for the building fabric and services insulation is the same as or greater than 2.5, calculated using the volume of insulation, the thermal conductivity and the Green Guide rating.	This is normally targeted on Wates PSBP projects. Note: this also includes insulation used for the building services.	Arch / M&E	RIBA Stage 3/4 - include in tender

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Mat 05	**Designing for Durability and Resilience**			**To recognise and encourage adequate protection of exposed elements of the building and landscape, therefore minimising the frequency of replacement and maximising materials optimisation.**			
Designing for durability and resilience (1-2)	1	1	1	Credit awarded where the following is demonstrated: Protecting vulnerable parts of the building from damage: The building incorporates suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements. This must include, but is not limited to: a) Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares. b) Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen area. c) Protection against, or prevention from, any potential vehicular collision where vehicle parking and manoeuvring occurs within 1m of the external building facade for all car parking areas and 2m for all delivery area. Protecting exposed parts of the building from material degradation: The relevant building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors (a full list of environmental factors is provided in the guidance).	It was agreed (meeting 04.03.15) that this would be targeted. It was noted that, for BREEAM 2014, this requires measures to mitigate the effects of environmental degradation to be specified in addition to physical robustness/durability measures. The protection measures required will need to be reviewed as the design progresses.	Arch	RIBA Stage 2/3/4 - include in tender
Mat 06	**Material Efficiency**			**To recognise and encourage measures to optimise material efficiency in order to minimise environmental impact of material use and waste.**			
Material Efficiency (1)	1	0	0	Credit awarded when opportunities and measures to optimise the use of materials in building design, procurement, construction, maintenance and end of life have been identified, investigated and implemented by the design/construction team as appropriate in consultation with the relevant parties at each of the following RIBA stages: 1. Preparation and Brief 2. Concept Design 3. Development Design 4. Technical Design 5. Construction	It was agreed (meeting 04.03.15) that this would not be targeted as it requires early stage action and it not achievable retrospectively. Credit not targeted.	-	-
Sub-Total	**14**	**7**	**8**	**One materials credit equals 0.96%**			
Weighted Sub-Total	**13.5**	**6.75**	**7.71**				

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
WASTE							
Wst 01	**Construction waste management**			**To promote resource efficiency via the effective management and reduction of construction waste. An additional exemplary credit is available - see Innovation section below for details.**	**Mandatory minimum requirement: One credit for Outstanding.**		
Construction resource efficiency (1-3)	3	2	2	Up to three credits awarded where a Resource Management Plan (RMP) has been developed covering the non-hazardous waste related to onsite construction and dedicated offsite manufacture or fabrication (including demolition and excavation waste) generated by the building's design and construction. Where construction waste related to on-site construction and off-site manufacture/fabrication (excluding demolition and excavation waste) meets or is lower than the benchmarks as follows (per 100m2 GIFA): One credit = 13.3m3 / 11.1 tonnes, Two credits = 7.5m3 / 6.5 tonnes, Three credits = 3.4m3 / 3.2 tonnes. Dedicated off-site manufacturing or fabrication is defined as the production of a component or material that is carried out in an off-site manufacturing or processing facility that has been specifically set up for the development project. Where existing buildings on the site will be demolished a pre-demolition audit of any existing buildings, structures or hard surfaces is completed to determine if refurbishment/reuse is feasible and, if not, to maximise the recovery of material from demolition for subsequent high-grade/value applications. The audit must be referenced in the RMP and cover: 1. Identification of the key refurbishment/demolition materials. 2. Potential applications and any related issues for the reuse and recycling of the key refurbishment and demolition materials in accordance with the waste hierarchy.	Two credits normally targeted on Wates PSBP projects. This is in line with the targets for similar projects. Demolition is included as part of the project so a pre-demolition audit will be required.	Wates	RIBA Stage 2/3/4 - include in tender
Diversion of resources from landfill (4-5)	1	1	1	One credit awarded where 70% by volume/80% by tonnage of non-hazardous construction waste and 80% by volume/90% by tonnage of non-hazardous demolition waste generated by the development will be diverted from landfill and reused or recycled. Materials should be sorted into separate key waste groups, according to the waste streams generated by the scope of the works, either on or off-site.	This is normally targeted on Wates PSBP projects.	Wates	RIBA Stage 2/3/4 - include in tender
Wst 02	**Recycled aggregates**			**To recognise and encourage the use of recycled and secondary aggregates, thereby reducing the demand for virgin material and optimising material efficiency in construction. An additional exemplary credit is available - see Innovation section below for details.**			
Recycled aggregates (1-3)	1	0	0	Credit awarded where at least 25% (by weight or volume) of the total high grade aggregate used on site comprises recycled or secondary aggregates. The recycled and/or secondary aggregates are EITHER: 1. Construction, demolition and excavation waste obtained onsite or offsite OR 2. Secondary aggregates obtained from a non-construction post-consumer industrial by-product source. In addition the specification of minimum levels of recycled aggregates applying to different applications is required, see compliance notes.	It was agreed (meeting 04.03.15) that this would not be targeted as it can be challenging to source appropriate high grade recycled aggregate. Credit not targeted.	-	-

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Wst 03	**Operational waste**			**To recognise and encourage the provision of dedicated storage facilities for a building's operational-related recyclable waste streams, so that this waste is diverted from landfill or incineration.**	**Mandatory minimum requirement: One credit for Excellent and Outstanding.**		
Operational waste (1-2)	1	1	1	Credit awarded where there is dedicated space(s) to cater for the segregation and storage of operational recyclable waste volumes generated by the assessed building. The space must be a) clearly labelled, b) accessible to building occupants for the deposit of materials and collections; c) of a capacity appropriate to the building type, size, number of units and predicted volumes of waste. Where appropriate, the following facilities are provided as part of its waste management strategy a) Static waste compactor(s) or baler(s); b) Vessel(s) for composting suitable organic waste OR adequate space(s) for storing segregated food waste and compostable organic material prior to collection and delivery to an alternative composting facility; c) Where organic waste is to be stored/composted on site, a water outlet is provided adjacent to or within the facility for cleaning and hygiene purposes.	This is normally targeted on Wates PSBP projects.	Arch / Client	RIBA Stage 2/3/4
Wst 05	**Adaptation to Climate Change**			**To recognise and encourage measures taken to mitigate the impact of extreme weather conditions arising from climate change over the lifespan of the building. Exemplary Credit Available.**			
Adaptation to Climate Change (Structural and Fabric resilience) (1)	1	0	0	Credit awarded when a climate change adaptation strategy appraisal is conducted for structural and fabric resilience by the end of RIBA Stage 2, in accordance with the following approach: Carry out a systematic risk assessment (specific to structural and fabric resilience) to identify and evaluate the impact of the expected increase in extreme weather conditions arising from climate change on the building over the projected life-cycle of the building, and where feasible mitigate against these impacts. The assessment should cover the following stages: 1. Hazard Identification 2. Hazard assessment 3. Risk estimation 4. Risk Evaluation 5. Risk Management	It was agreed (meeting 04.03.15) that this would not be targeted as it requires early stage action and it not achievable retrospectively. Credit not targeted.	-	-
Wst 06	**Functional Adaptability**			**To recognise and encourage measures taken to accommodate future changes of use of the building over its lifespan.**			
Functional Adaptability (1-2)	1	0	1	Credit awarded when a building specific functional adaptation strategy study is conducted by the client and design team by RIBA Stage 2, which includes recommendations for measures to be incorporated to facilitate future adaption, including: a. Ability for major refurbishment, including replacing the façade. b. Design for ease of replacement of all major plant within the life of the building e.g. panels in floors/ walls that can be removed without affecting the structure, providing lifting beams and hoists. c. Adaptability of the internal environment to accommodate changes in working practices. d. Adaptability of the internal physical space and external shell to accommodate change in use. e. Local services accessibility, such as local power, data etc. Functional adaptation measures have been implemented by the end of RIBA Stage 4 in accordance with the functional adaptation strategy where practical and cost effective.	It was agreed (meeting 04.03.15) that this would be targeted in the optimum target as an aspirational target for the team to achieve. This requires early stage action and cannot be achieved retrospectively; however, it was thought that some documentation would be available from the earlier stages which could be formalised into a report.	Wates / Arch / M&E	RIBA Stage 2
Sub-Total	**8**	**4**	**5**	**One waste credit equals 1.06%**			
Weighted Sub-Total	**8.5**	**4.25**	**5.31**				

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
LAND USE & ECOLOGY							
LE 01	**Site selection**			**To encourage the use of previously developed and/or contaminated land and avoid land which has not been previously disturbed**			
Previously Occupied Land (1)	1	1	1	Credit awarded where at least 75% of the footprint of the proposed development (including temporary site works) has been previously occupied by industrial, commercial or domestic buildings or fixed surface infrastructure.	It was agreed (meeting 04.03.15) that this would be targeted. 100% of the footprint of the new development is on previously developed land (i.e. existing hardstanding).	Arch	RIBA Stage 1
Contaminated Land (2-3)	1	0	0	Credit awarded where a contaminated land specialist's site investigation, risk assessment and appraisal has deemed the land within the site to be affected by contamination. The degree of contamination, sources/types of contamination and remediation options must be identified. There must be a commitment from the client or contractor that all remediation will be in line with the remediation strategy and implementation plan as recommended by the contaminated land specialist. Adequate remediation of contamination must have taken place prior to development to achieve this credit.	It was agreed (meeting 04.03.15) that no significant contamination is expected so this credit is not achievable. Credit not targeted.	-	-
LE 02	**Ecological value and protection of ecological features**			**To encourage development on land that already has limited value to wildlife and to protect existing ecological features from substantial damage during site preparation and completion of construction works.**			
Ecological value of site (1)	1	1	1	Credit awarded where land within the construction zone is defined as 'land of low ecological value' using either: The BREEAM checklist for defining land of low ecological value OR A Suitably Qualified Ecologist (SQE) who has identified the land as being of 'low ecological value' within an ecological assessment report, based on a site survey.	It was agreed (meeting 04.03.15) that this would be targeted. The team agreed that the site is likely to fall under the definition of 'land of low ecological value'. It was noted that the Phase 1 habitat survey report suggests this could be achieved.	Eco / Wates / LA	RIBA Stage 2-3 & before any site works commence
Protection of Ecological Features (2-3)	1	0	0	Credit awarded where all existing features of ecological value within and surrounding the construction zone and site boundary area are adequately protected from damage during clearance, site preparation and construction activities in line with BS42020: 2013. In all cases, the principal contractor is required to construct ecological protection prior to any preliminary site construction or preparation works (e.g. clearing of the site or erection of temporary site facilities).	It was agreed (meeting 04.03.15) that this would not be targeted as a precaution at this stage. Credit not targeted.	-	-
LE 03	**Minimising Impact on existing Site Ecology**			**To minimise the impact of a building development on existing site ecology.**	**Mandatory minimum requirements: One credit for Very Good, Excellent and Outstanding.**		
Change in Ecological Value (1-2)	2	2	2	One credit is awarded where the change in the site's existing ecological value, as a result of development, is between 0 and -9. Two credits are awarded where there is no negative change in the site's existing ecological value, as a result of development. Credits can be awarded with or without the appointment of an ecologist.	It was agreed (meeting 04.03.15) that two credits would be targeted for an increase in ecological value as a result of the development. Calculations will need to be undertaken to confirm this. It was noted that some new trees are being planted and some native species could be incorporated into the general planting areas.	Eco / Wates / LA	RIBA Stage 2-3 & before any site works commence

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
LE 04	**Enhancing site ecology**			**To recognise and encourage actions taken to maintain and enhance the ecological value of the site as a result of development.**			
Ecologist's Report and Recommendations (1-3)	1	1	1	One credit is awarded where the Client or project representative has appointed a Suitably Qualified Ecologist (SQE) by the end of RIBA Stage 1 to advise on enhancing the ecological value of the site. The SQE has provided an ecology report with appropriate recommendations for the enhancement of the site's ecology at RIBA Stage 2, based on a site survey/visit. Early stage advice and recommendations of the ecology report for the enhancement of site ecology have been, or will be, implemented in the final design and build. **APPOINTMENT OF SQE BY RIBA STAGE 1** **ECOLOGICAL SURVEY TO BE UNDERTAKEN DURING RIBA STAGE 2**	It was agreed (meeting 04.03.15) that this would be targeted but would be subject to further cost review as a suitably qualified ecologist would need to be appointed. An ecology survey of the site has already been undertaken.	Wates	RIBA Stage 1 & before any site works commence
Increase in Ecological Value (4-6)	1	0	0	The LE 04 Ecologist's report and recommendations credit above has been achieved. The recommendations of the ecology report for the enhancement of site ecology have been implemented, and the SQE confirms that this will result in an increase in ecological value of the site of 6 or more.	It was agreed (meeting 04.03.15) that this would not be targeted as this high level of ecological enhancement is not expected to be achieved. Credit not targeted.	-	-
LE05	**Long term impact on biodiversity**			**To minimise the long term impact of the development on the site and the surrounding area's biodiversity.**			
Long Term Impact on Biodiversity (1-3)	2	2	2	To achieve any of the two available credits, a Suitably Qualified Ecologist (SQE) should be appointed prior to commencement of activities onsite and they should confirm that all relevant UK and EU legislation relating to the protection and enhancement of ecology has been complied with during the design and construction process. A landscape and habitat management plan, appropriate to the site, should be produced covering at least the first five years after project completion in accordance with BS 42020:2013 Section 11.1. This is to be handed over to the building owner/occupants for use by the grounds maintenance staff. One credit is awarded where, in addition to the above, two of the 'additional measures' in the BREEAM guidance have been met. Two credits are awarded where four of the 'additional measures' in the BREEAM guidance have been met. These include the option for the design team to set up a partnership with a local group that has wildlife expertise and the group should provide advice early in the design process regarding: protecting and/or providing habitat for species of local importance on the site; ensuring the design is in keeping with the local environment; ongoing advice to the educational establishment.	It was agreed (meeting 04.03.15) that these credits would be targeted but would be subject to further cost review as a suitably qualified ecologist would need to be appointed. A 5 year landscape and habitat management plan written in accordance with BS 42020:2013 Section 11.1 would also need to be produced, as well as the additional on site measures.	Wates	RIBA Stage 2/3 & before any site works commence
Sub-Total	**10**	**7**	**7**	**One land use and ecology credit equals 1%**			
Weighted Sub-Total	**10**	**7.00**	**7.00**				

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
POLLUTION							
Pol 01	**Impact of Refrigerants**			**To reduce the level of greenhouse gas emissions arising from the leakage of refrigerants from the building.**			
Pre-requisite	0	-	-	Where there are refrigerants specified within the installed plant/systems: All systems (with electric compressors) must comply with the requirements of BS EN 378:2008 (parts 2 and 3) and where refrigeration systems containing ammonia are installed, the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice.	It is assumed that there will be refrigerants within the installed building services and systems. Where refrigerants are specified, these credits are considered challenging so these are not targeted. Suggest this is reviewed.	M&E	RIBA Stage 2/3
Impact of Refrigerants (1-7)	3	0	0	One credit is awarded where the systems using refrigerants have Direct Effect Life Cycle CO_2 equivalent emissions of 1000kgCO_{2e}/kW cooling capacity. Two credits are awarded where the systems using refrigerants have Direct Effect Life Cycle CO_2 equivalent emissions of 100kgCO_{2e}/kW cooling capacity OR refrigerants have a GWP of <10. An additional credit is awarded where there is a compliant leak detection system, capable of automatically isolating and containing the remaining refrigerant(s) charge. A system with an automatic shutdown and pump down of refrigerants would comply with this. All three credits awarded where the building is designed in such a way that it avoids the need for refrigerant containing building services, and therefore no 'refrigerant using' building services or systems will be specified for the fit out.			
Pol 02	**NO_x Emissions**			**To contribute to a reduction in national NO_x emission levels through the use of low emission heat sources in the building.**			
NO_x Emissions (1)	3	3	3	One credit is awarded where the dry NOx emissions from plant installed to meet delivered heating and water demand are ≤100 mg/kWh (at 0% excess O_2), or two credits where they are ≤70 mg/kWh (at 0% excess O_2), or three credits where they are ≤40 mg/kWh (at 0% excess O_2). Report the direct and indirect NOx emissions in mg/kWh and energy consumption in kWh/m2/yr arising from systems installed to meet the building's space heating, cooling and hot water demands	It is assumed that these credits will be targeted, but the existing boilers would need to be checked.	M&E	RIBA Stage 2/3

Credit Title	CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
	Credits Available	Base Target	Optimum Target				
Pol 03	**Surface water run-off**			**To avoid, reduce and delay the discharge of rainfall to public sewers and watercourses, therefore minimising the risk of localised flooding on and off site, watercourse pollution and other environmental damage.**			
Flood Resilience (1-3)	2	2	2	One credit is awarded where the assessed development is located in a zone defined as having a medium or high annual probability of flooding and is not in a functional floodplain AND the ground level of the building, car parking and access is 600mm above the design flood level for the site's location. OR, where final building and site design reflects recommendations made by appropriate consultant, in accordance with BS 8533: 2011. Two credits are awarded where the assessed development is located in a zone defined as having a low annual probability of flooding and there is a low risk of flooding from all sources: fluvial, tidal, surface water, groundwater, sewers, reservoirs, canals and other artificial sources. All current and future sources of flooding must be taken into account.	A Flood Risk Assessment will be required to confirm low risk of flooding from all sources to achieve two credits. Wates/Curtins to confirm if this will be undertaken.	CE / Wates	RIBA Stage 2/3/4
Surface Water Run Off (4-14)	0	Y	Y	Pre-requisite: An appropriate consultant is appointed to demonstrate compliance with the following:	It was agreed (meeting 04.03.15) that this will be achieved.	Wates	RIBA Stage 2/3/5
	2	1	1	One credit is awarded where surface water drainage measures are specified to ensure the peak run-off rate is no greater post-development than it was pre-development, in line with 1 year and 100 year return period events, and relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place. A second credit is awarded where flooding of property will not occur in the event of local drainage system failure. In addition the drainage strategy must meet certain other requirements from one of two options detailed in the BREEAM guidance. Maintenance agreements should be in put place for the ownership, operation and maintenance of specified SUDs. All calculations must include an allowance for climate change, in accordance with current best practice guidelines.	It was agreed (meeting 04.03.15) that one credit would be targeted at this stage. The detailed requirements will need to be reviewed as the project progresses. It was noted that the drainage strategy is yet to be agreed.	CE / Wates	RIBA Stage 2/3/4
Minimising Watercourse Pollution (15-22)	1	0	0	Credit awarded where there is no discharge from the developed site for rainfall up to 5mm, and where effective on site treatment has been specified in areas that could be a source of watercourse pollution. SUDs, permeable surfaces or infiltration trenches are acceptable for low risk areas. Oil/ petrol interceptors are required for higher risk areas and all systems must be in line with PPG3 and the SUDS manual, and with PPG13 for vehicle wash areas. OR, where this is not possible, a suitably qualified professional should design the system so that the intent of the credit is met as far as possible. Containment should be fitted to drainage system when chemical/liquid gas storage is on site. A comprehensive up-to-date drainage plan should be made available for building/site occupiers.	It was agreed (meeting 04.03.15) that this would not be targeted at this stage. Once the drainage strategy has been agreed, this can be reviewed, particularly with regards to the 5mm requirement.	CE / Wates	RIBA Stage 2/3/4
Pol 04	**Reduction of night time light pollution**			**To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimised, reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties.**			
Reduction of Night Time Light Pollution (1-5)	1	1	1	Credit awarded where the external lighting design is in compliance with the Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 2011 and all external lighting (except security lighting) can be automatically switched off between 2300-0700. If safety or security lighting is provided and will be used between these hours, this part of the lighting system complies with the lower levels of lighting in Table 2 of the ILP's guidance notes. Illuminated advertisements must be designed in accordance with ILE Technical Report 5 - The Brightness of Illuminated Advertisements.	This is normally targeted on Wates PSBP projects.	M&E	RIBA Stage 2/3/4

Credit Title		CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
		Credits Available	Base Target	Optimum Target				
Pol 05		**Reduction of Noise Pollution**			**To reduce the likelihood of noise arising from fixed installations on the new development affecting nearby noise-sensitive buildings.**			
Reduction of Noise Pollution (1-5)		1	1	1	Credit awarded where there are, or will be, no noise-sensitive areas/buildings within 800m of the or the development, OR: A noise impact assessment is carried out by suitably qualified acoustic consultant in compliance with BS 7445, and measures: a) Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed building b) The rating noise level resulting from the new-noise source. The noise levels from the proposed development, when measured at the nearest/most exposed noise sensitive development, should have a difference no greater than +5dB during the day (0700hrs to 2300hrs) and +3dB at night (2300hrs to 0700) compared to background noise levels. Where changes in noise level exceed this, measures should be installed to attenuate noise at its source in order to comply with these levels.	This is normally targeted on Wates PSBP projects. The plant will need to comply with the limits set to achieve compliance.	Wates / Aco / M&E	RIBA Stage 2/3
Sub-Total		**13**	**8**	**8**	**One pollution credit equals 0.77%**			
Weighted Sub-Total		**10**	**6.15**	**6.15**				
INNOVATION CREDITS/EXEMPLARY LEVEL CREDITS - A maximum of 10 credits are available in aggregate from any combination of the following:								
Man 03	**Responsible Construction Practices (17)**	1	1	1	Credit awarded where the CCS score achieved is 40 or above with 7 in each section.	It was agreed (meeting 04.03.15) that this would be targeted. See notes above under Man 03 Considerate Construction.	Wates	RIBA Stage 3/4
Man 05	**Aftercare (6)**	1	1	1	Credit awarded where there is operational infrastructure and resources in place to co-ordinate the following at quarterly intervals for the first 3 years after occupation: a. Collect the occupant satisfaction, energy consumption and water consumption data. b. Analyse 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. Set 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.	It was agreed (meeting 04.03.15) that this would be targeted. See notes above under Man 05 Aftercare.	Wates / Client	RIBA Stage 3/5
Hea 01	**Visual Comfort (14)**	1	0	0	Credit awarded where at least 80% of the floor area in occupied spaces has an average daylight factor of 3% , or a minimum point daylight factor of 1.2%, in multi-storey buildings OR an average daylight factor of 4%, or a minimum point daylight factor of 1.6% in single-storey buildings.	Credit not targeted.	-	RIBA Stage 2/3
Hea 02	**Indoor Air Quality (15-20)**	2	0	0	All decorative paints and varnishes specified meet the criteria in EU Directive 2004/42/EC, and all seven remaining product categories meet the relevant testing requirements and emission levels. Two credits awarded where the formaldehyde emission levels for the seven remaining categories have been measured and are less than 0.01mg/m^3 air in accordance with the approved standards. One credit is awarded where levels and lower than 0.06mg/m^3 air.	Credits not targeted.	-	RIBA Stage 2/3

Credit Title		CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
		Credits Available	Base Target	Optimum Target				
Ene 01	**Reduction of Energy Use and Carbon Emissions (2-4)**	5	0	0	Five credits awarded where the building is 'carbon negative' in terms of its modelled operational energy consumption. (Inc. regulated and unregulated energy) Up to four credits awarded if the EPR_{NC} of 0.9 and has zero net CO_2 emissions. In addition, an equivalent % of the building's modelled 'regulated' operational energy consumption, is generated by carbon neutral on-site, near-site or 'accredited external' sources and used to meet energy demand from 'unregulated ' building systems or processes. The equivalent % translate into credits as follows: 4 credits = 80%, 3 credits = 50%, 2 credits = 20%, 1 credit = 10%	Credits not targeted.	-	RIBA Stage 3/4
Wat 01	**Water Consumption (1-6)**	1	0	0	Credit awarded where a 65% improvement over baseline building water consumption is achieved.	Credit not targeted.	-	RIBA Stage 3/4
Mat 01	**Life Cycle Impacts (4-8)**	2	0	0	One credit is awarded where the building achieves at least two points in addition to the total points required to achieve maximum credits under Mat 01. Two credits awarded where an IMPACT compliant software tool (or equivalent) is used to measure the environmental impact of the building. The design team demonstrate how the use of this software has benefited the building in terms of measuring and reducing its environmental impact. The BIM model from the software is submitted to the BRE.	Credits not targeted.	-	RIBA Stage 3/4
Mat 03	**Responsible Sourcing of Materials (4)**	1	0	0	Credit awarded where at least 70% of the available responsible sourcing points have been achieved.	Credit not targeted.	-	RIBA Stage 3/4
Wst 01	**Construction Waste Management (6-8)**	1	0	0	Credit awarded where the non-hazardous construction waste generated by the building's design and construction is no greater than $1.6m^3$ or 1.9 tonnes per $100m^2$ GIFA AND the percentage of non hazardous construction and demolition waste (if relevant) diverted from landfill meets or exceeds 85% by volume/90% by tonnage (non-demolition). 85% by volume/95% by tonnage (demolition) and 95% by volume/95% by tonnage (excavation). All key waste groups are identified for diversion from landfill in the pre-construction stage RMP.	Credit not targeted.	-	RIBA Stage 2/3/4
Wst 02	**Recycled Aggregates (4-6)**	1	0	0	Credit awarded where the total amount of recycled and/or secondary aggregate specified is greater than 35% (by weight or volume) of the total high-grade aggregate specified for the project. To contribute to the total amount, the percentage of high-grade aggregate specified per application (where present) that is recycled and/or secondary aggregate, must meet the exemplary minimum levels (by weight or volume), as defined in the table within the guidance. Recycled and secondary aggregate must travel less than 30km by road transport.	Credit not targeted.	-	RIBA Stage 3/4
Wst 05	**Responding to Adaptation to Climate Change (2)**	1	0	0	Credit can be awarded where the Wst 05 credit has been achieved, and where a certain level of credits are achieved under: Hea 04; Ene 01; Ene 04; Wat 01; Mat 05 and Pol 03.	Credit not targeted.	-	RIBA Stage 2-4

Credit Title		CREDITS			Summary of Requirements (refer to the BREEAM Guidance Notes for the full credit requirements)	Comments/ Actions	Actionee	Stage for consideration
		Credits Available	Base Target	Optimum Target				
Inn 01	Special Innovative Feature (2)	10	0	0	Up to ten credits are awarded if a successful application is made to the BRE to have any particular building feature, technology, system or process that can be shown to improve the sustainability performance of a building's design, construction, operation, maintenance or demolition and which is recognised as 'innovative'. Further credits are available if more than one application is successful.	Credits not targeted.	-	RIBA Stage 1-7
Sub-Total		**10**	**2**	**2**	**One Innovation credit = 1%. A maximum of 10% can be awarded in this section.**			

TOTALS

Base Target	**57.05**
Optimum Target	**64.43**
Total required for 'Pass'	**30**
Total Required for 'Good'	**45**
Total required for 'Very Good'	**55**
Total required for 'Excellent'	**70**
Total required for 'Outstanding'	**85**
Mandatory Requirements Met?	**TBC**

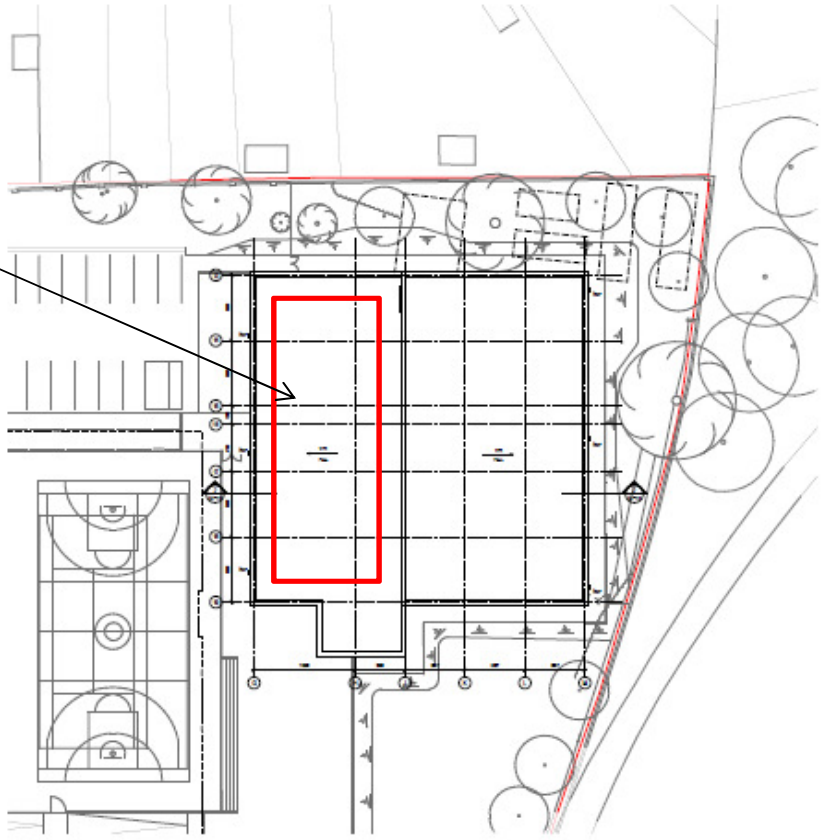
PROJECT TEAM KEY:

Wates = Contractor
Arch = Architect
M&E = M&E engineers
SE = Structural & Civil engineers
LA = Landscape Architect
Eco = Ecologist
Aco = Acoustician
AP = BREEAM Accredited Professional (Natasha Fox, Method Consulting LLP)
BREEAM ASSESSOR/AP (Method): Method Consulting LLP (Natasha Fox, Emily Newell)

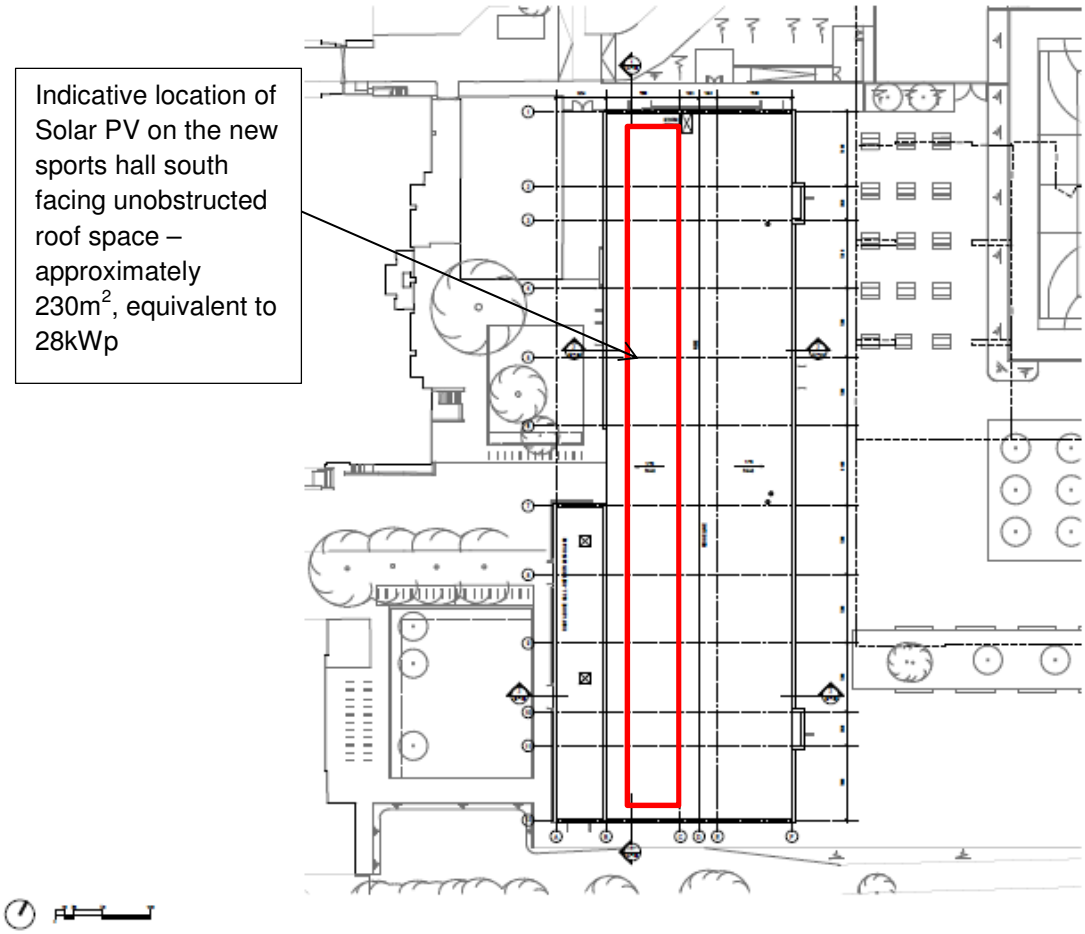
Completed by: ERN Date: 05/03/15
Checked by: ERN Date: 05/03/15

Appendix 2: Solar PV Roof Layout

Indicative location of Solar PV on the new sports hall south facing unobstructed roof space – approximately 120m^2, equivalent to 15kWp.



Indicative location of Solar PV on the new sports hall south facing unobstructed roof space – approximately 230m^2, equivalent to 28kWp



Appendix 3: Existing Building 6 DEC

Display Energy Certificate

How efficiently is this building being used?

HM Government

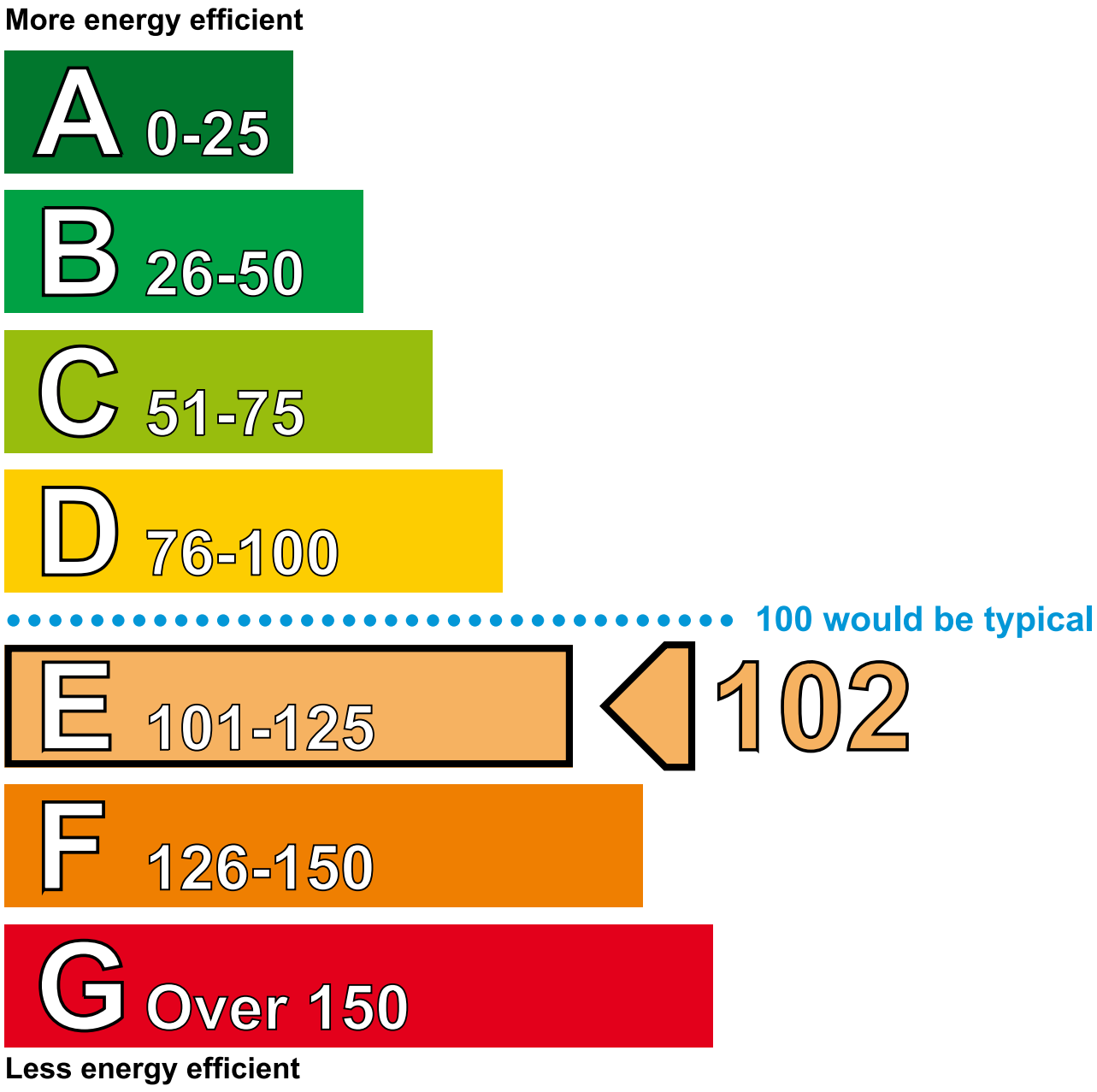
NEW BLOCK
Hampstead School
Westbere Road
LONDON
NW2 3RT

Certificate Reference Number:
0297-0355-7310-9300-4443

This certificate indicates how much energy is being used to operate this building. The operational rating is based on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

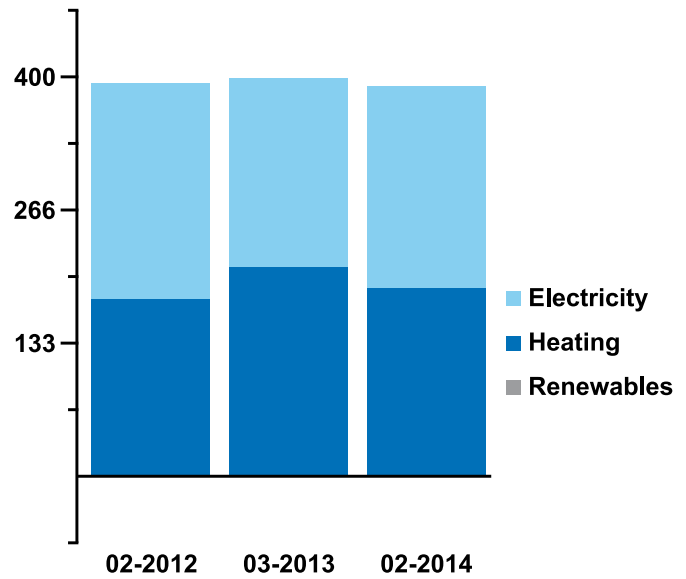
Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.



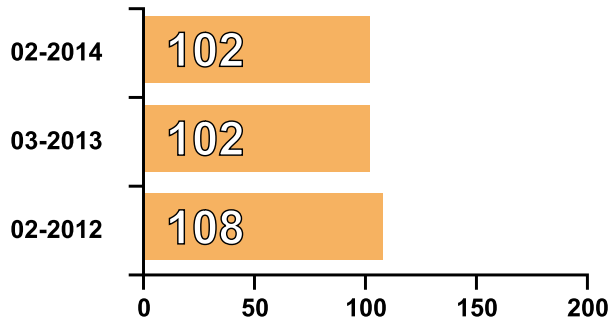
Total CO_2 Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO_2.



Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods.



Technical Information

This tells you technical information about how energy is used in this building. Consumption data based on actual meter readings.

Main heating fuel: Natural Gas
Building environment: Heating and Natural Ventilation
Total useful floor area (m^2): 6334.9
Asset Rating: Not available

	Heating	Electricity
Annual Energy Use (kWh/m^2/year)	153	59
Typical Energy Use (kWh/m^2/year)	164	53
Energy from renewables	0%	0%

Administrative Information

This is a Display Energy Certificate as defined in SI 2007/991 as amended.

Assessment Software:	DCLG, ORCalc, v3.6.2
Property Reference:	477323350004
Assessor Name:	Daniel Smith
Assessor Number:	QUID300155
Accreditation Scheme:	Quidos Limited
Employer/Trading Name:	Greenfish Consulting (JCML Consultancy Ltd)
Employer/Trading Address:	177 Silverdale Rd, Tunbridge Wells TN4 9HT
Issue Date:	01-05-2014
Nominated Date:	28-02-2014
Valid Until:	27-02-2015
Related Party Disclosure:	Not related to the occupier.

Recommendations for improving the energy efficiency of the building are contained in the accompanying Advisory Report.

Appendix 4: Planning BRUKL Output

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Hampstead PartL

As designed

Date: Mon Oct 13 17:16:00 2014

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.1

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.1

BRUKL compliance check version: v5.2.b.1

Owner Details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Criterion 1: The calculated CO_2 emission rate for the building should not exceed the target

The building does not comply with England Building Regulations Part L 2013

1.1	CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	24.6
1.2	Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	24.6
1.3	Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	27.4
1.4	Are emissions from the building less than or equal to the target?	BER > TER
1.5	Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and the building services should achieve reasonable overall standards of energy efficiency

Values which do not meet standards in the 2013 Non-Domestic Building Services Compliance Guide are displayed in red.

2.a Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.19	0.19	0K000000:Surf[1]
Floor	0.25	0.25	0.25	0K000000:Surf[0]
Roof	0.25	0.16	0.16	0M000000:Surf[1]
Windows***, roof windows, and rooflights	2.2	1.9	1.9	0S000002:Surf[2]
Personnel doors	2.2	2.2	2.2	SP000000:Surf[24]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]
$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* There might be more than one surface where the maximum U-value occurs.
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
*** Display windows and similar glazing are excluded from the U-value check.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
$m^3/(h.m^2)$ at 50 Pa	10	5

2.b Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- Radiator Heating Natural Vent

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.96	-	0.2	0	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- UF Heating Mech Vent (local units)

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.96	-	0.2	0	0.7
Standard value	0.91*	N/A	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

3- Radiator Heating Dirty Extract

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.96	-	0.2	0	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

4- Radiator Heating Hybrid Vent Vent (local units)

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.96	-	0.2	0	0.7
Standard value	0.91*	N/A	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

5- Radiator Heating Sports Extract

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.96	-	0.2	0	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

6- Radiator Heating Hybrid Vent Vent (local units)

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.96	-	0.2	0	0.7
Standard value	0.91*	N/A	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

"No HWS in project, or hot water is provided by HVAC system"

1- CHECK2-CHP

	CHPQA quality index	CHP electrical efficiency
This building	0	0
Standard value	Not provided	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	**Zone**	**Standard**
0 - WC 01	0.4	-	-	-	-	-	-	-	-	-	N/A
0 - WC 02	0.4	-	-	-	-	-	-	-	-	-	N/A
0 - WC 03	0.4	-	-	-	-	-	-	-	-	-	N/A
1 - WC 01	0.4	-	-	-	-	-	-	-	-	-	N/A
1 - WC 02	0.4	-	-	-	-	-	-	-	-	-	N/A
1 - WC 03	0.4	-	-	-	-	-	-	-	-	-	N/A
2 - WC 01	0.4	-	-	-	-	-	-	-	-	-	N/A
2 - WC 02	0.4	-	-	-	-	-	-	-	-	-	N/A
2 - WC 03	0.4	-	-	-	-	-	-	-	-	-	N/A
SPORTS_activity studio	0.8	-	-	-	-	-	-	-	-	-	N/A
SPORTS_activity store	0.8	-	-	-	-	-	-	-	-	-	N/A
SPORTS_sports hall	0.8	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			
	Luminaire	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
0 - KITCHEN/SERVERY	-	58	-	3420
0 - PLANT	45	-	-	62
0 - STAIRS	-	66	-	161
0 - DINING	-	57	-	2271
0 - CIRCULATION 01	-	61	-	592
0 - CLEANER STORE	106	-	-	6
0 - WC 01	-	134	-	36
0 - WC 02	-	65	-	503
0 - STAIRS 02	-	67	-	132
0 - STAFF SOCIAL	42	-	-	966
0 - STORE 01	59	-	-	19

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
0 - OFFICE 01	61	-	-	131
0 - MAIN HALL	42	-	-	3141
0 - CIRCULATION 02	-	64	-	275
0 - MUSIC CLASSROOM 01	42	-	-	663
0 - MUSIC CLASSROOM 02	42	-	-	663
0 - STORE 02	73	-	-	12
0 - WC 03	-	112	-	54
0 - STORE 03	97	-	-	6
0 - STORE 04	94	-	-	7
0 - MUSIC PRACTICE 01	61	-	-	93
0 - MUSIC PRACTICE 02	63	-	-	87
0 - CIRCULATION 03	-	75	-	205
0 - MUSIC PRACTICE 03	64	-	-	79
0 - MUSIC PRACTICE 04	66	-	-	74
0 - MUSIC PRACTICE 05	60	-	-	104
0 - MUSIC PRACTICE 06	51	-	-	176
0 - STORE 05	118	-	-	21
0 - STORE 06	119	-	-	21
0 - DRAMA STUDIO	47	-	-	977
0 - MUSIC PRACTICE 07	62	-	-	89
0 - MUSIC PRACTICE 08	62	-	-	90
0 - MUSIC PRACTICE 09	62	-	-	89
0 - STAIRS 03	-	67	-	159
0 - MUSIC CLASSROOM 03	42	-	-	628
1 - CLASSROOM 01	42	-	-	628
1 - CLASSROOM 02	42	-	-	616
1 - CLASSROOM 03	42	-	-	590
1 - CLASSROOM 04	42	-	-	590
1 - CLASSROOM 05	42	-	-	590
1 - CLASSROOM 06	42	-	-	590
1 - CLASSROOM 07	42	-	-	590
1 - CLASSROOM 08	42	-	-	601
1 - CLASSROOM 09	42	-	-	590
1 - CLASSROOM 10	42	-	-	590
1 - CLASSROOM 11	42	-	-	601
1 - CLASSROOM 12	42	-	-	616
1 - WC 01	-	65	-	497
1 - WC 02	-	130	-	38
1 - STORE 01	120	-	-	5
1 - CIRCULATION 01	-	61	-	1244
1 - STORE 02	120	-	-	4
1 - STORE 03	120	-	-	4
1 - STAFF WORK ROOM	51	-	-	290

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
1 - STAIRS 01	-	67	-	159
1 - STAIRS 02	-	62	-	257
1 - STAIRS 03	-	67	-	159
1 - STAFF WORK 02	49	-	-	397
1 - SMALL GROUP	57	-	-	117
1 - WC 03	-	117	-	49
1 - OFFICE	62	-	-	118
1 - STORE 04	120	-	-	5
2 - LAB 01	41	-	-	883
2 - LAB 02	41	-	-	883
2 - LAB 03	41	-	-	875
2 - LAB 04	41	-	-	872
2 - LAB 05	41	-	-	878
2 - LAB 06	41	-	-	888
2 - LAB 07	41	-	-	956
2 - LAB 08	41	-	-	1157
2 - LAB 09	41	-	-	968
2 - LAB 10	41	-	-	883
2 - LAB 11	41	-	-	940
2 - STAIRS 01	-	67	-	152
2 - STAIRS 03	-	67	-	152
2 - STAFF WORK ROOM	45	-	-	472
2 - SERVER	52	-	-	29
2 - CHEMICAL STORE	66	-	-	13
2 - WC 01	-	65	-	486
2 - STAIRS 02	-	62	-	257
2 - WC 02	-	134	-	36
2 - STORE 01	108	-	-	6
2 - WC 03	-	130	-	38
2 - CIRCULATION 01	-	61	-	1190
2 - RISER	118	-	-	5
1 - STORE 05	92	-	-	16
1 - REPROGRAPHICS	47	-	-	397
2 - STORE 02	113	-	-	5
2 - STORE 03	119	-	-	4
SPORTS_activity studio	-	59	-	2439
SPORTS_ex store	77	-	-	70
SPORTS_activity store	-	94	-	273
SPORTS_pe store	55	-	-	231
SPORTS_exam store	79	-	-	63
SPORTS_wc	-	174	-	46
SPORTS_sports hall	-	61	-	9668
SPORTS_pupil changing	-	88	-	216

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
SPORTS_pupil changing	-	87	-	222
SPORTS_store	54	-	-	294
SPORTS_clnrs store	120	-	-	32
SPORTS_office / recep	79	-	-	152
SPORTS_incoming services	110	-	-	34
SPORTS_community entrance	-	158	-	43
SPORTS_other pupils wc	-	126	-	78
SPORTS_staff change	-	183	-	21
SPORTS_staff change	-	193	-	19
SPORTS_community store	112	-	-	35
SPORTS_other pupil wcs	-	126	-	78
SPORTS_corridor	-	112	-	307

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0 - DINING	N/A	N/A
0 - STAFF SOCIAL	NO (-60.7%)	NO
0 - OFFICE 01	NO (-69.8%)	NO
0 - MAIN HALL	NO (-88.1%)	NO
0 - MUSIC CLASSROOM 01	NO (-51.6%)	NO
0 - MUSIC CLASSROOM 02	NO (-40.9%)	NO
0 - MUSIC PRACTICE 01	N/A	N/A
0 - MUSIC PRACTICE 02	N/A	N/A
0 - MUSIC PRACTICE 03	N/A	N/A
0 - MUSIC PRACTICE 04	N/A	N/A
0 - MUSIC PRACTICE 05	N/A	N/A
0 - MUSIC PRACTICE 06	NO (-54.4%)	NO
0 - DRAMA STUDIO	NO (-79.5%)	NO
0 - MUSIC PRACTICE 07	NO (-65.8%)	NO
0 - MUSIC PRACTICE 08	NO (-66.1%)	NO
0 - MUSIC PRACTICE 09	NO (-65.9%)	NO
0 - MUSIC CLASSROOM 03	NO (-60.1%)	NO
1 - CLASSROOM 01	NO (-71%)	NO
1 - CLASSROOM 02	NO (-69.2%)	NO
1 - CLASSROOM 03	NO (-37.7%)	NO
1 - CLASSROOM 04	NO (-37.8%)	NO
1 - CLASSROOM 05	NO (-34.4%)	NO
1 - CLASSROOM 06	NO (-33.9%)	NO
1 - CLASSROOM 07	NO (-33.9%)	NO
1 - CLASSROOM 08	NO (-35%)	NO
1 - CLASSROOM 09	NO (-33.7%)	NO
1 - CLASSROOM 10	NO (-33.7%)	NO
1 - CLASSROOM 11	NO (-56.2%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
1 - CLASSROOM 12	NO (-69.1%)	NO
1 - STAFF WORK ROOM	N/A	N/A
1 - STAFF WORK 02	N/A	N/A
1 - SMALL GROUP	N/A	N/A
1 - OFFICE	N/A	N/A
2 - LAB 01	NO (-63.6%)	NO
2 - LAB 02	NO (-37.2%)	NO
2 - LAB 03	NO (-47.4%)	NO
2 - LAB 04	NO (-36.5%)	NO
2 - LAB 05	NO (-64.1%)	NO
2 - LAB 06	NO (-73.6%)	NO
2 - LAB 07	NO (-38.5%)	NO
2 - LAB 08	NO (-34.8%)	NO
2 - LAB 09	NO (-39%)	NO
2 - LAB 10	NO (-33.3%)	NO
2 - LAB 11	NO (-75.3%)	NO
2 - STAFF WORK ROOM	NO (-43%)	NO
1 - REPROGRAPHICS	N/A	N/A
SPORTS_activity studio	NO (-49.9%)	NO
SPORTS_activity store	N/A	N/A
SPORTS_sports hall	N/A	N/A
SPORTS_office / recep	N/A	N/A

Criterion 4: The performance of the building, as built, should be consistent with the BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m^2]	5369.4	5369.4
External area [m^2]	8535.7	8535.7
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	5	4
Average conductance [W/K]	2320.95	3053.1
Average U-value [W/m^2K]	0.27	0.36
Alpha value* [%]	10	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Inst.: Hospitals and Care Homes
	C2 Residential Inst.: Residential schools
	C2 Residential Inst.: Universities and colleges
	C2A Secure Residential Inst.
	Residential spaces
	D1 Non-residential Inst.: Community/Day Centre
	D1 Non-residential Inst.: Libraries, Museums, and Galleries
100	**D1 Non-residential Inst.: Education**
	D1 Non-residential Inst.: Primary Health Care Building
	D1 Non-residential Inst.: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs and Theatres
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others - Stand alone utility block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	7.86	24.18
Cooling	0	0
Auxiliary	6.03	5.23
Lighting	20.67	10.17
Hot water	56.52	53.74
Equipment*	15.96	15.96
TOTAL**	**91.07**	**93.31**

* Energy used by equipment does not count towards the total for calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	25.52	75.52
Primary energy* [kWh/m^2]	158.43	141.14
Total emissions [kg/m^2]	27.4	24.6

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	12.2	0	3.8	0	6.4	0.9	0	0.96	0
	Notional	74	0	23.8	0	7.1	0.86	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	2.7	0	0.8	0	9.2	0.9	0	0.96	0
	Notional	16.5	0	5.3	0	8.4	0.86	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	33	0	10.2	0	1.7	0.9	0	0.96	0
	Notional	49.2	0	15.8	0	1	0.86	0	----	----
[ST] Central heating using water: floor heating, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	24.4	0	7.5	0	3.2	0.9	0	0.96	0
	Notional	112.2	0	36.1	0	3.7	0.86	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	203.9	0	62.8	0	8.8	0.9	0	0.96	0
	Notional	337.7	0	108.8	0	6.3	0.86	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	15.2	0	4.7	0	13.5	0.9	0	0.96	0
	Notional	68.6	0	21.1	0	9.2	0.91	0	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type

Key Features

The BCO can give particular attention to items with specifications that are better than typically expected.

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.19	0K000000:Surf[1]
Floor	0.2	0.25	0K000000:Surf[0]
Roof	0.15	0.16	0M000000:Surf[1]
Windows, roof windows, and rooflights	1.5	1.9	0S000002:Surf[2]
Personnel doors	1.5	2.2	SP000000:Surf[24]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	5

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