

Highgate School Science Block

Sustainability Statement and
whole life carbon

Prepared for Highgate School
July 2022

High-performing partnership
Higher performing buildings

Highgate School Science Block

PROJECT NO

LL0078

REPORT

Sustainability Statement & Whole Life Carbon

PREPARED FOR

Highgate School

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Partner

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This report is prepared for and signed off by: -

Company	Highgate School
Name	
Role	
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Signature	

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1.0 Introduction

Troup Bywaters + Anders has been commissioned to carry out a draft Sustainability statement and whole life carbon report for the proposed refurbishment and minor extension of Highgate School Science Block. This document is to be used as an informative Sustainability statement for the school board for subsequent submission of the planning application to London Borough of Haringey.

The existing Science Block was built within the 1920's and originally consisted of 3 floors (Ground-Second). In 2006 a third floor was added to contain further classrooms and office areas. The project seeks to completely refurbish the brick building with minor extensions to classroom areas and a new stairwell.

This report provides a brief overview of the applicable national and local policies that need to be met by this development as defined by the Haringey Council's Local Plan Strategic Policies Chapter 4: An Environmentally Sustainable Future.

The project is undertaking a BREEAM Assessment to assess and enhance the sustainability of the proposed refurbishment works. The project has been registered under the BREEAM UK Non-domestic Refurbishment and Fitout scheme.

The aspiration is to achieve BREEAM “Excellent” (>70%) or BREEAM “Very Good” (>55%) as a minimum. Haringey Council's Local Plan Strategic Policies 2013Policy SP4 requires all new non-residential developments to achieve a BREEAM rating ‘Very Good’ (or equivalent), although developments should aim to achieve ‘Excellent’ where achievable.

The initial pre-assessment was carried out with the project team in May 2022 and a BREEAM Pre-Assessment report confirming the agreed target and responsibilities was issued to the project stakeholders. Please refer to document “LL0078-RPT-BPA-001-A1” for the details of the Pre-Assessment.

2.0 Applicable Regional and local policy review

Policy Overview

The NPPF, London Plan and local policy require developments to meet the highest standards of sustainable design, including the conservation of energy and water; ensuring designs make the most of natural systems; and the conserving and enhancing the natural environment. London Plan Policy S12 requires all new developments to eb zero carbon, achieving a minimum 35 per cent carbon reduction on site beyond Part L 2013 of the Building Regulations. Haringey Development Management Document Policy DM21 requires developments to consider, implement and demonstrate sustainable design, layout and construction techniques.

The council expects the highest possible sustainability standards are achieved on-site. A Sustainability Assessment needs to be submitted as part of the planning application demonstrating it complies with policy.

Policy SP4 requires all new non-residential developments to achieve a BREEAM rating ‘Very Good’ (or equivalent), although developments should aim to achieve ‘Excellent’ where achievable.

In line with Policy DM21, materials should have high environmental performance ratings. The GLA's Sustainable Design and Construction SPD states the natural, non-toxic, high in their recycled content, low embodied energy materials should be considered and specified through the BRE Green Guide where possible.

London Plan Policy G6 and Local Plan Policy DM21 require proposals to manage impacts on biodiversity and aim to secure a biodiversity net gain.

3.0 Approach

The approach adopted in this Sustainability Statement is to review national policies and site- specific requirements in relation to sustainable development and use this to establish a ‘sustainability framework’ for development for the science block refurbishment works that achieves both over- arching national sustainability goals and site-specific objectives. The sustainability objectives and framework are discussed in detail in sections 3.1 -3.8

Section 4 of this report addressing the approach to whole life carbon reduction.

3.1 BREEAM Pre-Assessment

As part of the commitment to Sustainable development a BREEAM Refurbishment and Fitout 2014 Pre-Assessment workshop was held with the design team in May 2022 to ascertain both the Client and design teams' approach to the Sustainability. The project has been registered for full certification with BRE.

Scope of BREEAM assessment

The BREEAM UK Non-domestic Refurbishment and Fit-out 2014 scheme provides a modular set of criteria that are applied depending upon the scope of works for a project type. This BREEAM assessment covers Parts 1-4 scope of works which is defined as:

- + Part 1: Fabric and Structure – included
- + Part 2: Core Services – included
- + Part 3: Local Services - included
- + Part 4: Interior Design - included

This BREEAM assessment covers the “secondary fit-out / existing building re-fit” scope of works over Design Stage (DS) and Post-Construction Stage (PCS). The building type is ‘**Education – Secondary school**’.

The initial pre-assessment was carried out with the project team as follows:

Party	Role	Date
Troup Bywaters + Anders	M+E	11/05/22
Ed Toovey Architects	Architect	12/05/22
Gardiner & Theobald	Project Manager / Cost consultant	
Price + Myers	Structural consultant	
Troup Bywaters + Anders	Sustainability	

The pre-assessment scores have been based on the following scoring scenarios:

Scenario 1: BREEAM V. Good- Issues within current scope - credits that have been agreed to be included and shall require no additional appointments/ costs.

Scenario 2: BREEAM Excellent - All the above plus credits that require substantial additional cost or further investigation by the design team.

On this basis, the following estimated scores are considered achievable under each scenario.

Scenario	Score	BREEAM Rating
Scenario 1	67.5%	V.Good rating (≥ 55%)
Scenario 2	77.79%	Excellent rating (≥ 70%)

The aspiration is to achieve BREEAM “Excellent” (>70%) or BREEAM “Very Good” (>55%) as a minimum. Haringey Council's Local Plan Strategic Policies 2013Policy SP4 requires all new non-residential developments to achieve a BREEAM rating ‘Very Good’ (or equivalent), although developments should aim to achieve ‘Excellent’ where achievable.

Please refer to document “LL0078-RPT-BPA-001-A02” for the details of the Pre-Assessment which is submitted as part of the overall Planning submission.

In addition to facilitate the sustainable aspirations a BREEAM Advisory Professional (AP) has been appointed to attend regular design team meeting to support the various design disciplines to ensure that all sustainable options are reviewed.

3.2 Energy Strategy

The refurbishment of Highgate School Science Block would initially reduce the buildings regulated carbon emissions by 19.1% compared to the existing configuration requirement. This would be achieved through a ‘fabric first’ approach, where passive systems

reduce building loads, before they are served by active building services. These include, the improvement of glazing, use of energy efficient HVAC and lighting systems.

On top of this improvement a range of low and zero carbon technology options have been considered, as per GLA guidance. There are no local heat networks and the use of CHP has been deemed unfeasible because it does not have a consistent enough heating and hot water demand to meet the criteria for an efficient running CHP system. The majority of the renewable technology options on the market have been deemed unfeasible due to site restraints or economic reasons. These include biomass, ground source heat pumps or fuel cells.

Solar hot water would be able to provide considerable savings currently, however this system must be linked to a consistent hot water demand throughout the year. This is unlikely to be the case during school holidays.

Photovoltaic panels (PV) is a simple solution in terms of installation however it does not provide significant carbon emissions reductions.

The use of an electric Air Source Heat Pump (ASHP) would avoid the use of fossil fuels for heating purposes and will cut carbon emissions by 22% if compared to a conventional gas boiler.

It is recommended that this technology is incorporated into the project design, avoiding the use of onsite fossil fuels and achieving a total carbon emissions savings of 40%.

Refurbished building	Regulated carbon emissions	
	(Tonnes CO ₂ per annum)	Savings (%)
Baseline: Existing building	119.9	-
After energy demand reduction	97.0	19.1
After heat network / CHP	N/a	-
After renewables - ASHP	71.76	40.1

Table 1 – Energy hierarchy

3.3 Water Management and Flooding

The Council requires all development in Haringey to be water efficient during construction and operation and to reduce all forms of flood risk.

3.3.1 Reducing Water demand

The method used to establish performance will be based around the BREEAM 2014 Refurbishment and fit out 'Water' section. The Wat01 credit section is used by the GLA to set minimum standards for water efficiency in the new London Plan Policy SI5 item C, which requires a minimum of 1 no. Wat01 credit to be achieved.

3.3.2 Flood risk Assessment

Price and Myers have been appointed to undertake a Flood Risk Assessment and Surface Water Drainage Strategy Report. The report concludes that the proposed development is in flood Zone 1, which is designated as an area with very low to low risk of flooding. The site is located within the Haringey council's Critical Drainage Area (CDA Group 4_062); however, the specific site is at low risk of flooding from all sources, including surface water, groundwater, public sewers or reservoirs. Therefore, the proposed development has an acceptable flood risk within the terms and requirements of the NPPF.

3.3.3 Sustainable Drainage (SuDS)

It is not expected that the amount of surface water discharged at present from the site will increase as a result of the development works. Hence the site drainage will be designed to maintain the current situation.

3.4 Reducing Waste and Supporting the Circular Economy

The Council supports the objectives of sustainable waste management set out by the Government in PPS10 Planning for Sustainable Waste Management and the Mayor's London Plan Policy SI 7.

3.4.1 Pre-demolition audit

Demolition and strip out of the existing building elements will be carefully carried out, and any elements or materials that are deemed not feasible to be re-used in the new development will be appropriately recycled or re-used off-site where possible, in accordance with a pre-demolition audit carried out by Kanect.

Design teams have been consulted to review the schedule of materials and comment as to how they might be re-used or re-purposed and what quantity approximately, with a view to circular economy principles.

3.4.2 Construction Waste Management

After assessment of the pre-demolition audit for the existing building and identification of opportunities for reuse of in- situ materials, the Proposed Development is aiming to support the low-waste approach by setting resource efficiency targets for management of site waste and diversion of waste from landfill in line with BREEAM Waste credits Wst 01.

To support the above, the principal contractor will be required to record their waste throughout the construction of the Proposed Development, as part of a Resource Management Plan (RMP) or a Site Waste Management Plan (SWMP). The contractor will be required to periodically review their waste performance against the targets, and report back on progress as part of the BREEAM assessment process.

3.4.3 Operational Waste Management

A Waste Management Strategy has been provided as part of this application submission, which will set out the site wide strategies in respect of managing site waste. Please refer to that document for full details of the operational waste management strategy.

The operational waste strategy will meet the requirements of the BREEAM RFO Wst03 credit section for the provision of an accessible and appropriately sized waste store, which caters to recyclable waste streams in addition to the general waste generated from the site.

3.5 Materials

3.5.1 Sustainable Procurement of Materials

A drive to ensure sustainable procurement is integrated into project delivery. It is important to set out the key factors influencing sustainable procurement early in the project design process, to ensure that specifications and documentation can capture the requirements and intent.

The sustainable procurement approach for the proposed Development will incorporate the following key actions:

- + Create a Sustainable Procurement Plan (SPP), which is informed by the developing design and creates a framework for reporting successful implementation.
- + Include a requirement for selecting materials with EPDs, as much as possible.
- + Ensure that a principal contractor is employed who has their own internal SPP and can support the WLC and sustainability aims of the development.

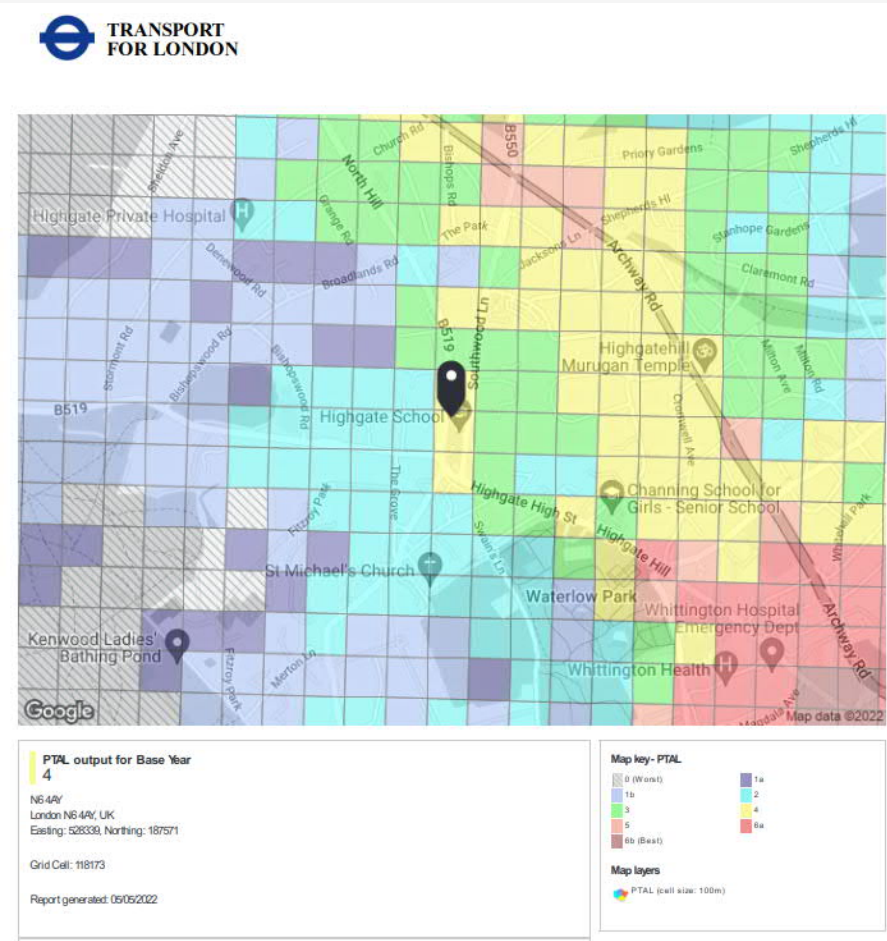
Third-party responsible sourcing certifications will be required to support the overall approach to sustainable procurement. The BREEAM RFO 2014 Mat03 credit section incentivises this and provides a framework for ensuing that key materials are verified as responsibly sourced. As part of this, 100% of site timber must be responsibly sourced; no BREEAM rating can be achieved where this is not evidenced in full for both timbers used in the built asset and temporary timber used in construction, so by committing to a BREEAM certificate the development is also committing to upholding this standard.

3.6 Transport

3.6.1 Promoting sustainable travel options

A Transport Statement and outline travel plan have been commissioned by Highgate school and shall accompany this application. Please refer to that application document for further information on the development transport strategy.

The site is very well connected by public transport, as verified by Transport for London's connectivity measure 'PTAL' (Public Transport Accessibility Level) which rates it as 4 on their scale of 0 (worst) to 6b (best).



The current proposal meets and exceeds the BREEAM requirements for TRA01 Accessibility Index, TRA02, Proximity to amenities.

3.7 Biodiversity and ecology

Promotion of urban greening and ecological enhancement are considered very important to a development which aims to achieve high levels of sustainability. The project is targeting all available credits under the Ecology section of BREEAM RFO 2014 namely LE02, Protection of Ecological features; LE04 Ecologist report and recommendations implementation and LE05 considering long term impact on biodiversity, which are heavily weighted and contribute significantly to the successful achievement of the higher BREEAM certification levels.

ARBTECH have been appointed to undertake Biodiversity surveys and report which will be part of this planning application.

4.0 Whole Life Carbon

4.1 Operational Carbon

Operational carbon includes the carbon emissions associated with:

- + Regulated energy use, which is normally assessed under building regulations (i.e. based on the National Calculation) including heating, cooling, ventilation, lighting and domestic hot water
- + Unregulated energy use, which include plug loads (e.g. computers, printers, lab equipment), server rooms, lifts, etc.

Real operational energy and associated carbon emissions is difficult to predict with accuracy since it depends upon many factors, including:

- + Occupancy profiles
- + Weather conditions
- + Flexibility on heating and cooling setpoints
- + Final selection of equipment and diversity of use

For the Highgate School Science Block, operational carbon emissions are expected to range between 30-36 kgCO₂/m² per year

4.2 Embodied carbon

As the operational carbon of a building decreases, due to the continuously falling carbon intensity of the national grid, highly efficient systems, and renewable energy supply; carbon emissions associated with building materials used for construction, replacement, maintenance, and disassembly during its lifetime will become the majority of a new building's carbon emissions.

As part of the Highgate School Science Block Refurbishment and Extension, TB+A will calculate the embodied carbon emissions arising from new materials procured and used during construction. The key areas of consideration will be building fabric and structure, building services, interior fittings, and hard landscaping.

Our appointment will provide a proactive assessment of the embodied carbon across the RIBA design stages to drive low carbon design. Our work will start with an indicative carbon footprint of the Highgate School Science Block at RIBA Stage 3 utilising the BREEAM Refurbishment and Fit-out 2014 method to provide design recommendations, and strategic procurement advice using the relevant industry guidelines provided by LETI, RIBA, and the UKGBC.

LCA is a technique for assessing the potential environmental impacts of a product, building or service. Whole Life-cycle Carbon (WLC) is assessed using LCA. LCAs involve cradle-to-grave analysis and provides comprehensive evaluations of upstream and downstream factors for several environmental emissions.

A Life Cycle Assessment (LCA) will be undertaken using the BREEAM compliant tool, OneClick LCA. The results will be presented using the metrics of global warming potential (with the following additional indicators included in the appendix: acidification, eutrophication, ozone depletion potential, and the formation of ozone of lower atmosphere).

This LCA is based on a set of shared rigorous standards to ensure the most accurate and impactful recommendations and solutions are put forward. Below are, guidelines and tools we reference in the work:

- + All LCA work is undertaken using software compliant with BS EN 15978, ISO 21931-1 & ISO 21929-1.
- + Materials will be based on their Environmental Product Declarations (EPD) where possible.
- + If not, the use of the Bath ICE Database, Gabi, Ecoinvent, UK Government data, and LCA software proprietary databases will be used.
- + Data will be sourced from the BIM model, bill of quantities, and hand measurements where required.
- + CO₂e is the universal unit in which global warming impacts will be reported.
- + Commentary is always provided against the highest carbon emitters on the project and ways to reduce these.

Conclusion

The Refurbishment of the Science block is part of a wider site wide sustainability strategy. The project has been registered with BRE and is undertaking a BREEAM Assessment for the proposed refurbishment and extension works. The BREEAM Pre-Assessment outcomes show that BREEAM V. Good is achievable within the current scope of works. All the minimum standard for BREEAM Excellent are currently achievable and a road map has been provided to aim for BREEAM Excellent, which required further review and consideration.

While strategies for biodiversity net gain and sustainable transport solutions are being address as part of the wider site wide strategies, at the building level , there is greater focus on reducing whole life carbon by undertaking embodied life cycle assessment and retaining existing building elements.

Appendix 1-Standard Limitations for Building Reviews

1. Scope of inspection

TB+A is not responsible for and shall have no liability as a result of or in connection with any events occurring after preparing the report and/or any other matters of which TB+A was not aware when preparing the report.

All comments relating to the condition of the building services are made on a purely visual inspection of visible and readily accessible parts of the system/building, without any destructive or exploratory investigations.

Accessible voids in the property e.g. riser ducts, floor voids and suspended ceilings, etc., can only be inspected at random and where practical without disturbing building occupants.

Identification or inspection of asbestos or deleterious materials are excluded and we would recommend a specialist is engaged to obtain assurance in this respect.

All building fabric and structural form of the property is outside the scope of our expertise and inspection.

Any comments within the report with regard to compliance of the Building Services with current and statutory legislation, is to be taken as a guide and is based on the inspection undertaken. Nothing in this report is a guarantee of compliance with legislation. Where we have identified that there may be contraventions, the comments of the appropriate authority should be sought to assess the scope of remedial work or corrective measures needed to meet requirements.

2. Building services operation

The inspection is visual in nature and excludes specific tests to establish operational status and as such, no assurance can be given that these are free from operational defect. Only the visual condition and state of repair of visible and accessible parts of each system will be assessed and recommendations made for testing or recommissioning, at extra cost, where needed to determine operational condition.

Similarly water quality in closed systems where applicable is assessed from available records, which will be requested and reviewed. The prevailing water quality, condition of internal surfaces of pipework and equipment can only be established by intrusive analysis which would be by a specialist organisation, separately from this report.

3. Suitability of the Property

We are not responsible for commenting on or advising on the suitability for any use, fitness for purpose and performance of the Property and such commentary and advice is outside the scope of the Appointment. The client must therefore ensure that your legal advisors ascertain assurances in this respect, including planning permissions, approvals, permitted uses, limitations etc.

Your legal advisors should advise on whether the Property and or its use, complies with statutes and local byelaws and is not subject to any outstanding enforcement orders or other such notices or proposals

4. Ground conditions and environmental matters

We will not be investigating/reporting on ground conditions and environmental matters in any respect.

5. Budget costs

Any indication of cost is approximate only and relative to the anticipated costs of replacement or repair of a particular piece of building services equipment – it is given as an opinion without detailed measurement or consideration as to how the relevant price of equipment may be packaged and procured in the marketplace. The Client must test such costs by specifying the work in detail and obtaining competitive quotations from appropriate contractors and an exercise of this nature is outside the scope of this Appointment

Appendix 2 – BREEAM Design Stage Scoresheet

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