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The Dean Trust, Ardwick
Post Construction Sustainability Review Report
MA459-MEP-RPT-003

February 2021

PROJECT
The Dean Trust Ardwick School.

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Contents

1.0 Introduction2

2.0 Executive Summary3

3.0 Energy and Sustainability Strategy4

4.0 Environmental Assessment6

4.1 Management 7

4.2 Health & Wellbeing..... 11

4.3 Energy 14

4.4 Transport 15

4.5 Water 16

4.6 Materials 17

4.7 Waste..... 18

4.8 Land use and ecology 19

4.9 Pollution 20

1.0 Introduction

TB+A as the project's Building Services consultants and registered BREEAM assessors have been appointed to undertake a post construction review, of the project's environmental performance.

The existing Dean Trust Academy was a 1200 place School in Ardwick, Manchester comprising of ground plus 2No storeys, providing standard curricula facilities including an attached sports hall and external pitches.

The Project consisted of extensions to increase the number of student places by 150 to 1350 and an increase in dining facilities for an additional 120 students.

The extension to the existing School occurred in two locations, to construct the new teaching "wing" and additional dining space respectively. Internal refurbishment was also carried out to two existing classrooms to create a new food-technology classroom. The servicing of the new spaces followed the strategy of the existing, in terms of using and extending existing systems. Similarly, the new buildings' form and fabric was in keeping with existing.

Despite this, significant focus was given to the areas where the principles of Sustainable Development and energy/resource conservation could be made.

Planning Requirements

The planning permission for the development, states:

(Condition 5) The development hereby approved shall undergo an Uncertified Sustainability Review to demonstrate the achievement of a BREEAM rating of at least 'very good'. A post construction Sustainability Review document demonstrating achievement of a BREEAM rating of at least 'very good' shall be submitted to and approved in writing by the City Council as local planning authority within 6 months of the buildings hereby approved is first occupied. The Sustainability Review document will provide evidence once the buildings have been erected that they have been built in accordance with the relevant BREEAM criteria based on the current appropriate BRE manual and has incorporated feasibility measures to minimise the environmental impact and energy use.

This report aims to address the Sustainability Review and identify the actions that were carried out during construction, in line with preconstruction plans.



Figure 1 - Dean Trust Academy, Ardwick including new extensions.

2.0 Executive Summary

Given the nature for the project (extension that increases the building area by a relatively small proportion) a formal certified BREEAM process was not progressed. However the BREEAM preassessment was used to review on an interim basis, the progress of the project.

The initial preassessment achieved a score of 56.21% which was equivalent to a 'Very Good' rating, which would satisfy the client requirements and produce a building which exceeds elements of the current building regulations.

Following further review, additional credits were identified to improve the score and cementing the probability of attaining a 'Very Good' rating.

Notwithstanding the BREEAM evaluation the key merits and achievement of the delivered project works in relation to Environmental Sustainability, include

- + Energy conservation - focus on the building envelope (form and fabric).
 - o Generous daylighting in extensions (teaching extension following the design of the original building that achieved robust daylighting, and "views-out" standards.
 - o Early appointment of a specialist to advise on air-tightness and carry out testing to validate the construction.
- + Energy efficiency measures
 - o High efficacy LED lighting and presence control
 - o Energy metering to quantify demands, local within the building.
 - o Mixed-mode ventilation solution, allowing passive ventilation when able to meet internal comfort requirements.
- + Improvements to the existing Building's performance including
 - o Review and recommissioning of the BMS to optimise demand-led controllability and energy efficiency.
 - o Review and remedials to door and window seals to optimise air tightness
 - o Repairs to pipework thermal insulation throughout existing plant area.

Table 1 - BREEAM Summary

Criteria	Weighted Score
Management	7.85%
Health & Wellbeing	10.11%
Energy	3.80%
Transport	6.66%
Water	4.37%
Materials	7.49%
Waste	2.01%
Land Use & Ecology	6.00%
Pollution	8.00%
Total BREEAM Score	56.33%

3.0 Energy and Sustainability Strategy

3.1 Design Based on Robust Energy Principles

At the outset of the project, the Energy Strategy for the School, was proposed on a hierarchy of considerations, (consistent with a waste hierarchy - “Reduce, Reuse, Recycle”), that prioritised the reduction of energy consumption, over other low carbon measures.

An Energy Hierarchy prioritises conservation, to reduce the overall demand for fuel & power, making environmental & economic sense to emphasise energy conservation to minimise energy demand, and only subsequently consider energy management, heat recovery and LZC measures.

Once the overall demand has been minimised, only then are the options for energy delivery analysed, through the use of renewables or low carbon technologies.

This logical Energy Hierarchy is often referred to as a “lean, mean, green” approach.

The lean, mean, green strategy applies throughout the School and the specific solutions have been analysed and are summarised below.

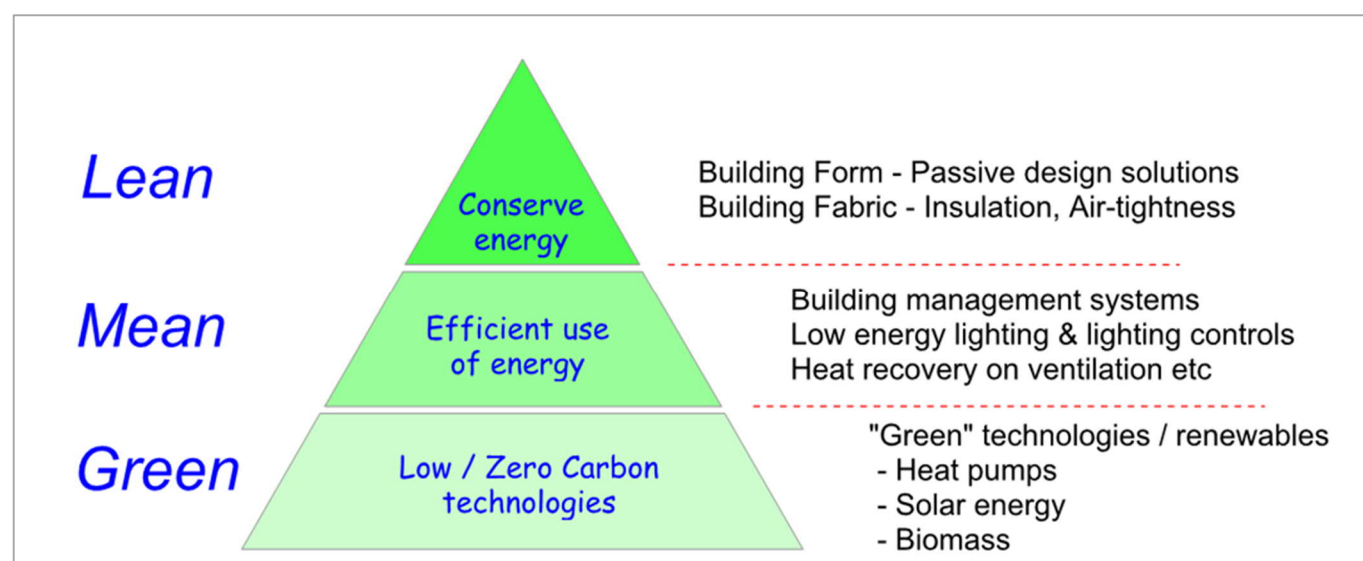


Figure 2 - Energy Hierarchy for the School

3.2 Summary of Energy Measures for the School.

The following summarise the measures carried out within the project, discussed against initial aims.

3.2.1 –Energy Conservation Measures – “Lean Solutions”

Improving airtightness.

Though not required under Building Regulations Approved Document L2B¹ (due to size of the extensions being less than 25% of the existing building), the project team chose to implement a process to test the building air tightness performance. Stroma, were employed to provide specialist advice through the construction project to provide recommendations for minimise air permeability and carry out testing on the completed extension. A test result of 6.85m³/hr/m²@50Pa was achieved.

Improving thermal insulation.

Wall, roof, floor & glazing provide ‘U’ values, significantly better than *Building Regulation* standards. The following summarises the U Values within the scheme

Table 2 - Summary of Building fabric thermal performance.

Building Element	Recommended Performance (W/ m ² K)	
New build elements	Wall	0.15
	Floor	0.25
	Roof	<0.12
	Glazing	<1.5 (overall incl. frame)
Glazing solar properties	Solar control glass on primary elevations, G value: 0.4	

Low water demand appliances.

Specification of the sanitary-ware was considered to limit water usage. Limited numbers of appliances were installed in the proposed works as the new occupied spaces rely on the existing sanitary facilities of the school.

¹ Approved Document L2B, *Conservation of fuel and power, for existing buildings other than dwellings*.

Improving pipe/duct thermal insulation.

Insulation thickness to building services systems have been increased to better than *Building Regulations* and *British Standard* benchmarks.

3.2.2 Energy Efficiency Measures – “Mean”

Luminaire.

In occupied and circulation rooms, high efficacy luminaires have been utilised providing a luminaire efficacy of >100 lumen/Watt.

Lighting Control.

Automatic presence detection provided to lighting in corridor. Manual “on” control in classrooms

Heating, Ventilation System Controls.

Heating and ventilation system are controlled via automatic, demand-led control. Ventilation systems in general classrooms operate on a air quality control to minimise fan power.

Ventilation plant.

The ventilation in technical rooms, where codes of practise recommend minimum air change rates, have bene provided with mechanical supply and extract with heat recovery.

In general teaching rooms, mixed mode ventilation is provided to, deliver mechanical ventilation when the conditions dictate that natural ventilation is inadequate.

Metering.

Provision of meters to aid the energy management of energy including all new lighting, power and heating circuits.

3.2.3 Low / Zero Carbon Energy Generation on site

The use of photovoltaics was considered as part of the project to supplement the existing PV utilised on site. However, this installation was not taken forward within the project due to results of the payback analysis carried out.

Other technologies were also discounted, following analysis, included;

- + Solar thermal system (very low HWS demand specifically within the new extensions which are in any case served from existing plant).
- + Heat Pumps / biomass (new extensions are served from existing boiler plant).

4.0 Environmental Assessment

The BREEAM UK New Construction 2018 scheme was used to evaluate the project. The planning requirement is for this project to achieve a BREEAM rating of 'Very Good' (i.e. a minimum of 55%).

SRL Technical Services completed a BREEAM pre-assessment, based on the information provided by the project team, and identified a target score of 55.49% (BREEAM 'Very Good')

The following sections illustrate the post-construction review of the Environmental Assessment, actions taken within the project and anticipated score (VERY GOOD) if a formal accredited BREAM process was executed in the project.

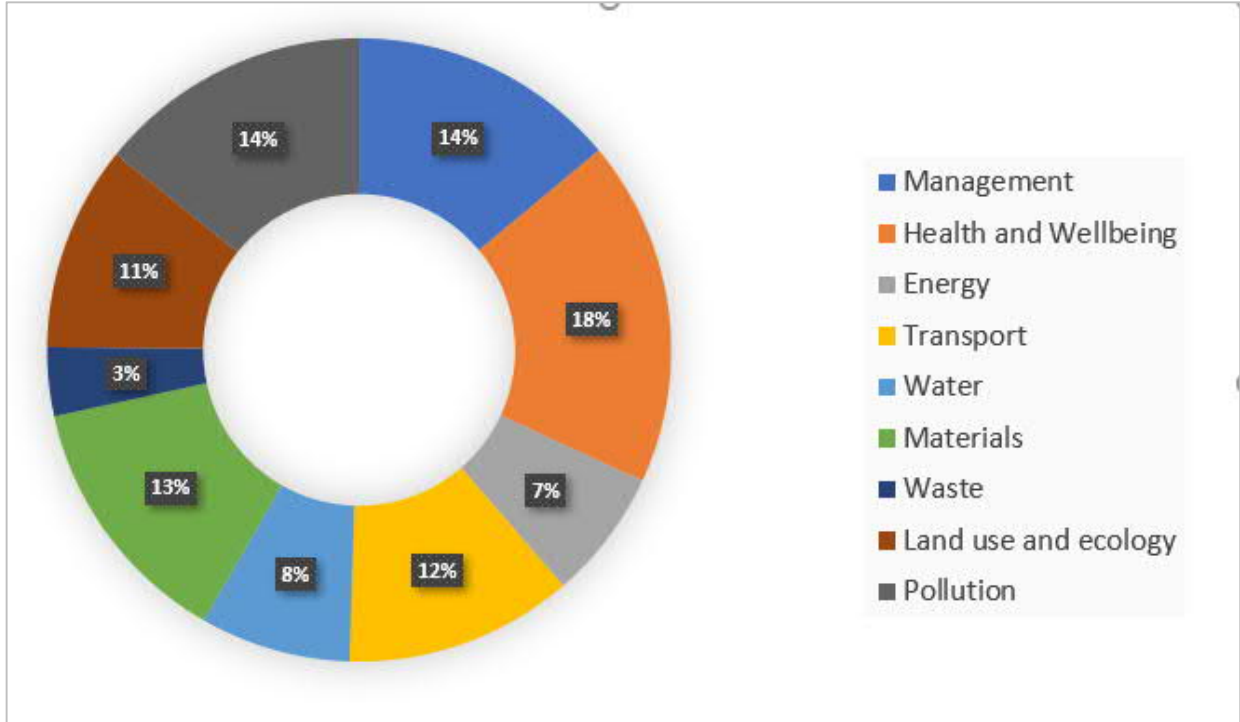


Figure 3 - Summary of credit contribution to pre-assessment carried out.

Table 3 - Summary of estimated BREEAM credits that would be achieve - post construction.

Credit	% contribution to Score
Man 01 Project Brief and Design	1.04%
Man 02 Life cycle costs and service life planning	1.05%
Man 03 Responsible Construction Practises	2.10%
Man 04 Commissioning and handover	2.10%
Man 05 Aftercare	1.57%
Hea 01 Visual comfort	3.89%
Hea 04 Thermal comfort	2.33%
Hea 05 Acoustic Performance	2.33%
Hea 06 Security	0.78%
Hea 07 Safe and healthy surroundings	0.78%
Ene 02 Energy Monitoring	1.52%
Ene 03 External Lighting	0.76%
Ene 08 Energy efficient equipment	1.52%
Tra 01 Transport assessment and travel plan	1.67%
Tra 02 Sustainable transport measures	5.00%
Wat 01 Water Consumption	2.63%
Wat 02 Water monitoring	0.88%
Wat 03 Water Leak Detection	0.88%
Mat 01 Environmental impacts from construction products	2.14%
Mat 02 Environmental impacts from construction products – Environmental Product Declarations (EPD)	1.07%
Mat 03 Responsible sourcing of construction products	3.21%
Mat 05 Designing for durability and resilience	1.07%
Wst 01 Construction waste management	0.67%
Wst 03 Operational waste	0.67%
Wst 05 Adaptation to climate change	0.67%
LE 01 Site Selection	1.00%
LE 04 Ecological change and enhancement	3.00%
LE 05 Long term ecology management and maintenance	2.00%
Pol 01 Impact of refrigerants	2.00%
Pol 02 Local air quality	1.33%
Pol 03 Flood and surface water management	3.33%
Pol 04 Reduction of night time light pollution	0.67%
Pol 05 Reduction of noise light pollution	0.67%
SCORE	56.33%

4.1 Management

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project.	Credits	% contribution to Score
Man 01 Project Brief and Design		Focused on the provision of an integrated design process and considering BREEAM performance targets early to influence decision-making and optimise building performance, while avoiding unnecessary costs			1.04%
	Project Delivery Planning	At Concept Design, the project team identified & defined the roles and responsibilities for each phase of project – RIBA stage 3 to 7. + End user requirements + Aims of the design and design strategy + Particular installation and construction requirements or limitations + Occupiers' budget and technical expertise in maintaining any proposed systems + Maintainability and adaptability of the proposals + Operational energy (see Ene 01 Reduction of energy use and carbon emissions) + Requirements for the production of project and end user documentation + Requirements for commissioning, training and aftercare support.	The project team developed the concept & scheme designs with constant dialogue with the client team to refine the design and incorporate their requirements. At each end-stage design reports were issued for client agreement, to address issues that included + Teaching requirements + design strategy + health & safety + Capital Cost + Maintenance and access + Running costs	2	
Man 02 Life cycle costs and service life planning					2.10%
	Component level life options appraisal	A component level LCC options appraisal developed by the end of Process RIBA Stage 4). The component level LCC includes (where present): + Envelope, e.g. cladding, windows, or roofing + Services, e.g. heat source, cooling source, or controls + Finishes, e.g. walls, floors or ceilings + External spaces, e.g. alternative hard landscaping, boundary protection.	The construction team developed a component level LCC options appraisal, to evaluate the options considered and focus the analysis on components which would benefit the most from the appraisal. The solution for the MEP services and external spaces were dictated to a large extent on the existing systems / materials on site (extension of existing to serve the new building areas). However other internal and building-fabric materials were assessed.	1	
	Capital cost reporting	Report the capital cost for the building in pounds per square metre of gross internal floor area (£k/m²).	The QS team provided full cost management throughout the project, including design and construction stages	1	

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project.	Credits	% contribution to Score
Man 03 Responsible Construction Practises					3.14%
	Environmental Management	All parties who at any stage manage the construction site (e.g. the principal contractor, the demolition contractor) operate an EMS covering their main operations	To minimise the environmental impact of their operations on their construction sites, Seddon Construction operate an independently certified environmental Management System complying with the requirements of ISO 14001.	1	
	Responsible Construction Management	The principal contractor evaluates the risks (on site and off site), plans and implements actions to minimise the identified risks, covering: + Vehicle movement + Pollution management + Tidiness + Health and Wellbeing + Security	Seddon Construction operated a site management policy to address the issues for responsible construction. Given the nature of the site, (live school, on a residential road with a primary school adjacent, it was essential that these issues were managed b the construction management team and coordinated with the School.	2	
	Monitoring of construction site impacts	Assign responsibility to an individual for monitoring, recording and reporting energy use, water consumption and transportation data (where measured) resulting from all on-site construction processes (and dedicated off-site manufacturing) throughout the build programme.	Seddon Construction's site manager carried out the role to gather the data for construction impacts.	1	
Man 04 Commissioning and handover					2.10%
	Commissioning & testing schedule and responsibilities	Prepare a schedule of commissioning and testing. The schedule identifies and includes a suitable timescale for commissioning and re-commissioning of all complex and non-complex building services and control systems and for testing and inspecting building fabric. The schedule identifies the appropriate standards for all commissioning activities to be conducted, where applicable, in accordance with: + Current Building Regulations + BSRIA guidelines + CIBSE guidelines	The works were carried out and certified in line with the specified commissioning schedules with the TB+A specifications. This included but not limited to + Systems cleaning and flushing to BSRIA codes + Testing / balancing to BSRIA/CIBSE codes. + Commissioning and witnessing. + Certification of systems + Client training.	1	
	Commissioning - design and preparation	During the design stage, an appropriate project team member, is appointed provided they are not involved in the general installation works for the building services systems, with responsibility for: + Undertaking design reviews and giving advice on suitability for ease of commissioning.	TB+A advised the project team in the commissioning requirements including the programme and standards.	1	

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project.	Credits	% contribution to Score
		+ Providing commissioning management input to construction programming and during installation stages. + Management of commissioning, performance testing and handover or post-handover stages.			
	Testing and inspecting building fabric	Complete post-construction testing and inspection to quality-assure the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths (this is through airtightness testing and a thermographic survey). Rectify any defects identified during post-construction testing and inspection prior to building handover and close out.	Seddon construction employed Stroma, to provide the construction stage inspection and testing of the building fabric and provide reports during each stage to inform the façade contractor on remedial works.	1	
	Handover	Prior to handover, develop two building user guides for the following users: + A non-technical user guide for distribution to the building occupiers. + A technical user guide for the premises facilities managers. Prepare training schedules for the following users: + A non-technical training schedule for the building occupiers. + A technical training schedule for the premises facilities managers.	Seddon Construction prepared the user guides, included within the Operating and Maintenance Manuals for the project. Prior to handover Seddons provided training to the format agreed with the School.	1	
Man 05 Aftercare					1.57%
	Aftercare support	Provide aftercare support to the building occupiers through having in place operational infrastructure and resources. This includes as a minimum: + Meeting between the aftercare support team and the building occupier or management team prior to initial occupation to: - o Introduce the aftercare support available - o Present key information about features of the building + On-site facilities management training including: - o a walkabout of the building - o introduction to and familiarisation with the building systems, their controls and how to operate them - o Provide initial aftercare support for at least the first month of building occupation, + Provide longer term aftercare support for occupiers for at least the first 12 months from occupation	Seddon Construction have and continue to provide aftercare support to the Trust	1	

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project.	Credits	% contribution to Score
		Establish operational infrastructure and resources to coordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months, once the building is substantially occupied. This facilitates analysis of discrepancies between actual and predicted performance, with a view to adjusting systems and user behaviours accordingly.			
	Commissioning – implementation	Complete the following commissioning activities over a minimum 12-month period, once the building becomes substantially occupied. Simple systems (naturally ventilated) - the aftercare team or facilities manager will: + Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback. + Identify deficiencies and areas in need of improvement. + Re-commission systems and incorporate any relevant revisions in operating procedures into the O&M manuals. +	Post occupancy recommissioning is being provided by the construction team in line with specified requirements.	1	
	Post Occupancy Evaluation	The client or building occupier commits to carry out a POE exercise one year after the building is occupied, to gain comprehensive in-use performance feedback criterion and identifies gaps between design intent and in-use performance. The aim is to highlight any improvements or interventions that need to be made and to inform operational processes.	Dean Trust have committed to carrying out POE of the works.	1	

4.2 Health & Wellbeing

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project / Evidence.	Credits	% contribution to Score
Hea 01 Visual comfort	Control of glare from sunlight	Identify areas at risk of glare using a glare control assessment. The glare control assessment also justifies any areas deemed not at risk of glare. Where risk has been identified within a relevant building area, a glare control strategy is used to design out the potential for glare. The glare control strategy does not increase energy consumption used for lighting. This is achieved by: + Maximising daylight levels in all weather, cloudy or sunny AND + Ensuring the use or location of shading does not conflict with the operation of lighting control systems.	EWA have confirmed the glare control strategy where there is a risk of glare including the identification of where internal blinds are required.	1	3.89%
	Daylight	Daylighting criteria have been met using the following: + The relevant building areas meet good practice daylight factors: + >80% area achieves an average DF of 2%	Teaching spaces in the new extension achieve a mean daylight factor of >2%	2	
	View out	95% of the floor area in 95% of spaces for each relevant building area provides an adequate view out (ie where relevant building areas are within 8m of an external wall which has a window or permanent opening, and the window or opening is ≥20% of the surrounding wall area)	EWA have confirmed that 95% of the floor area in 95% of spaces provide view out (ie within 8m of an external wall which has a window is ≥20% of the surrounding wall area)	1	
	Lighting levels, zoning and control.	Internal lighting in all relevant areas of the building is designed to provide illuminance (lux) levels and colouring rendering index in accordance with the SLL Code for Lighting 20121 and other relevant industry standard.	Areas used for teaching, purposes have lighting controls provided in accordance with CIBSE Lighting Guide 5 Manual lighting controls are easily accessible for the teacher while teaching and on entering or leaving the teaching space.	1	
Hea 04 Thermal comfort	Thermal Modelling	Thermal modelling has been carried out using software in accordance with CIBSE AM11 Building Energy and Performance Modelling. The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis. For smaller and more basic building designs with less complex heating or cooling systems, an alternative less complex means of analysis may be appropriate (such methodologies must still be in accordance with CIBSE AM11).	TB+A carried out thermal modelling for the extension works as part of the design stage.	1	2.33%
	Design for future thermal comfort	The thermal modelling demonstrates that the relevant requirements are achieved for a projected climate change environment. The project team demonstrates how the building has been adapted or designed to be easily adapted in future using passive design solutions in order to subsequently meet the requirements.	The passive design approach, supported with mixed-mode ventilation, provides a degree of adaptability, for likely climatic changes.	1	

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project / Evidence.	Credits	% contribution to Score
	Thermal zoning and controls	The thermal modelling analysis has informed the temperature control strategy for the building and its users. The strategy for proposed heating or cooling systems demonstrates that it has addressed the following: + Zones within the building, and how the building services could efficiently and appropriately heat or cool these areas. + The degree of occupant control required for these zones. This is based on discussions with the end user + How the proposed systems will interact with each other (where there is more than one system) and how this may affect the thermal comfort of the building occupants. + The need or otherwise for an accessible building user actuated manual override for any automatic systems.	The strategy for the zoning of heating and (passive) cooling systems are provided on a room by room basis with each occupied spaces, provided with a room controller that automatically provides control to the NVHR unit and allows occupant adjustment.	1	
Hea 05 Acoustic Performance		The building meets the appropriate acoustic performance standards and testing requirements defined in the relevant table below. These tables define criteria for the acoustic principles of:			2.33%
	Sound Insulation	Sound insulation - Achieve the performance standards set out in Section 1 of Building Bulletin 93: Acoustic design of schools: performance standards, February 2015 (BB93) relating to airborne sound insulation between spaces and impact sound insulation of floors.	Seddon Construction demonstrated to the satisfaction of the client, that the building meets the appropriate acoustic performance standards and testing requirements.	1	
	Indoor ambient noise level	Indoor ambient noise level - Achieve the indoor ambient noise level standards set out within Section 1 of BB93 for all room types.		1	
	Room acoustics	Room acoustics - A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the ANC Good Practice Guide, Acoustic testing of schools.		1	
Hea 06 Security	Security of site and building	A Suitably Qualified Security Specialist (SQSS) conducts an evidence-based Security needs assessment during or prior to Concept Design. The purpose of the assessment will be to identify attributes of the proposal, site and surroundings which may influence the approach to security for the development. The specialist develops a set of security controls and recommendations for incorporation into the proposals. Those controls and recommendations shall directly relate to the threats and assets identified in the preceding assessment. The controls and recommendations shall be incorporated into proposals and implemented in the as-built development. Any deviation from those controls and recommendations shall be justified and agreed with the SQSS.	At the outset of the project the project team sought the guidance from the School and their security advisers regarding the measures required for both extensions to the school. Access to the spaces provided under the Project are accessed from the existing School and within the existing bounds of the security lines.	1	0.78%

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project / Evidence.	Credits	% contribution to Score
Hea 07 Safe and healthy surroundings	Safe Access	Where external site areas form part of the assessed development the following apply: Dedicated and safe cycle paths are provided from the site entrance to any cycle storage, and connect to off-site cycle paths where applicable. Dedicated and safe footpaths are provided on and around the site providing suitable links for the following: + The site entrance to the building entrance + Car parks (where present) to the building entrance + The building to outdoor space + Connecting to off-site paths where applicable. Pedestrian drop-off areas are designed off, or adjoining to, the access road and should provide direct access to other footpaths. Where vehicle delivery access and drop-off areas form part of the assessed development, the following apply: Delivery areas are not accessed through general parking areas and do not cross or share the following: + pedestrian and cyclist paths + outside amenity areas accessible to building users and general public. There is a dedicated parking or waiting area for goods vehicles with appropriate separation from the manoeuvring area and staff and visitor car parking. Parking and turning areas are designed for simple manoeuvring according to the type of delivery vehicle likely to access the site, thus avoiding the need for repeated shunting		0	0.79%
		Outside space	There is an outside space providing building users with an external amenity area.	The extension was designed to minimise the impact on the existing external space (by elevating the building on columns)	1

4.3 Energy

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project / Evidence.	Credits	% contribution to Score
Ene 01 Reduction of energy use and carbon emissions		Calculate an Energy Performance Ratio for New Construction (EPR NC).			0.00%
Ene 02 Energy Monitoring	Sub-metering of end-use categories.	Install energy metering systems so that at least 90% of the estimated annual energy consumption of each fuel is assigned to the end-use categories (see Methodology). Meter the energy consumption in buildings according to the total useful floor area: + If the area is greater than 1,000m², by end-use category with an appropriate energy monitoring and management system. + If the area is less than 1,000m², use either: - o an energy monitoring and management system or - o separate accessible energy sub-meters with pulsed or other open protocol communication outputs, for future connection to an energy monitoring and management system (see Definitions). Building users can identify the energy consuming end uses, for example through labelling or data outputs.	Submetering was provided to monitor the end use loads of the extension including electricity metering via power and lighting distribution boards and heat metering for circuits extended from the existing gas-fired heating system.	1	1.52%
	Sub-metering of high energy load and tenancy areas	Monitor a significant majority of the energy supply with: + An accessible energy monitoring and management system for relevant function areas or departments in single occupancy buildings. + Separate accessible energy sub-meters with pulsed or other open protocol communication outputs for future connection to an energy monitoring and management system for: + Sub-meter per floor plate in large single occupancy or single-tenancy buildings with one homogeneous function.	The submetering provides the electricity consumption on a floor-plate basis for the extensions works.	1	
Ene 03 External Lighting	External lighting specified in accordance with relevant criteria	External light fittings within the construction zone with: + Average initial luminous efficacy of not less than 70 luminaire lumens per circuit Watt + Automatic control to prevent operation during daylight hours + Presence detection in areas of intermittent pedestrian traffic.	External lighting is provided with: + Luminaires with and efficacy of >70 lumens / Watt + Automatic control to prevent operation during daylight hours	1	0.76%
Ene 08 Energy efficient equipment	Significant contributors to unregulated energy consumption	IT-intensive operating areas + Specify a natural ventilation and cooling strategy as standard. Use forced ventilation only when the internal temperature exceeds 20°C and active cooling only when the internal temperature exceeds 22°C. + Specify a mechanism to achieve automatic power-down of equipment when not in use, including overnight. Domestic-scale appliances (individual and communal facilities) + Any white goods, available to purchase from the developer, must achieve the following ratings (or better) under the EU Energy Efficiency Labelling Scheme.	As all appliances were provided by the School, the Dean Trust committed to a meaningful reduction in the total annual unregulated energy consumption of the building, through their procurement.	2	1.52%

4.4 Transport

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project / Evidence.	Credits	% contribution to Score
Tra 01 Transport assessment and travel plan	Travel Plan	No later than Concept Design stage, undertake a site-specific transport assessment (or develop a travel statement) and draft travel plan, which can demonstrably be used to influence the site layout and built form. The site-specific travel assessment (or statement) shall cover as a minimum: + If relevant, travel patterns and attitudes of existing building or site users towards cycling, walking and public transport, to identify relevant constraints and opportunities. + Predicted travel patterns and transport impact of future building or site users. + Current local environment for pedestrians and cyclists, accounting for any age-related requirements of occupants and visitors. + Reporting of the number and type of existing accessible amenities, see Table 7.1, within 500m of the site. + Disabled access accounting for varying levels and types of disability, including visual impairment. + Calculation of the existing public transport Accessibility Index (AI), see Methodology. + Current facilities for cyclists. Following a transport assessment, develop a site-specific travel plan that provides a long term management strategy which encourages more sustainable travel. The travel plan includes measures to increase or improve more sustainable modes of transport and movement of people and goods during the building's operation see Methodology. If the occupier is known, involve them in the development of the travel plan. Demonstrate that the travel plan will be implemented and supported by the building's management in operation.	The Dean Trust prepared a travel plan which demonstrated the criteria achieved.	2	1.67%
Tra 02 Sustainable transport measures		Identify the sustainable transport measures Provide a public transport information system in a publicly accessible area, to allow building users access to up-to-date information on the available public transport and transport infrastructure. This may include signposting to public transport, cycling, walking infrastructure or local amenities. Set up a car sharing group or facility to facilitate and encourage building users to car share. Raise awareness of the sharing scheme with marketing and communication materials. Provide priority spaces for car sharers for at least 5% of the total car parking capacity for the development. Locate priority parking spaces nearest the development entrance used by the sharing scheme participants	DTA confirmed existing accessible amenities, within 500m of the site. - o Appropriate food outlet - o Access to cash - o Access to an outdoor open space - o Access to a recreation or leisure facility for fitness or sports - o Publicly available postal facility - o Community facility - o Over the counter services associated with a pharmacy - o Public sector GP surgery or general medical centre - o Childcare facility or school	6	5%

4.5 Water

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project / Evidence.	Credits	% contribution to Score
Wat 01 Water Consumption		This method uses the building's actual component specification and default usage patterns for the building type and its activity areas to determine water efficiency (measured in litres/person/day and m³/person/yr) for a building. The modelled output is compared with the output for a baseline component specification and the water demand saving determined as a percentage improvement. The percentage improvement determines the number of BREEAM credits achieved. The baseline component specification is equivalent to the water efficiency of industry standard components (see Table 8.3), steered by the minimum levels required by the Water Supply (Water Fittings) Regulations⁵ and Part G of the Building Regulations⁶ HM Government. The Building Regulations 2010: Part G Sanitation, hot water safety and water efficiency (2015 edition). 2015.	Credits based on predicted 40% reduction on baseline. The extensions rely on the existing buildings sanitary facilities and therefore the water demand within the bounds of the works is very low.	3	2.63%
Wat 02 Water monitoring	Water meter on the mains water supply to each building	Specify a water meter on the mains water supply to each building. This includes instances where water is supplied via a borehole or other private source. For water-consuming plant or building areas consuming 10% or more of the building's total water demand:	Water metering is provided within the existing building to monitor the incoming supply and significant water consuming demands.	1	0.88%
Wat 02 Water Leak Detection	To reduce the consumption of potable water through minimising wastage due to water leaks.	Install a leak detection system capable of detecting a major water leak The leak detection system is a permanent automated water leak detection system that alerts the building occupants to the leak	Water monitoring is provided within the existing building to monitor the incoming supply and significant water consuming demands.	1	1.75%

4.6 Materials

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project / Evidence.	Credits	% contribution to Score
Mat 01 Environmental impacts from construction products - (LCA)	To reduce the burden on the environment by recognising and encouraging measures to optimise construction product consumption efficiency	Carry out a building LCA on of the superstructure design using either the BREEAM Simplified Building LCA tool or an IMPACT Compliant LCA tool.	At the Stage 2 design, life cycle assessment of the superstructure were carried out to evaluate the appropriateness of materials chosen, where options were available including structural solution and building envelope	2	2.14%
Mat 02 Environmental impacts from construction products – Environmental Product Declarations (EPD)		Specify construction products with EPD that achieve a total EPD points score of at least 20.	Construction team worked to the secure the Declarations for purchased construction materials.	1	1.07%
Mat 03 Responsible sourcing of construction products		To determine the number of credits that are achieved for the Responsible Sourcing of Construction Products, the BREEAM tool and methodology to determine the number of credits achieved for the construction products specified or procured.	Construction team confirmed RSM points achieved	3	3.21%
Mat 05 Designing for durability and resilience	Protecting vulnerable parts of the building from damage and exposed parts of the building from material degradation	In areas of higher risk, suitable durability and protection measures to vulnerable parts of the building can include: + Bollards, barriers or raised kerbs to delivery and vehicle drop-off areas + Robust external wall construction, up to 2m high + Corridor walls specified to Severe Duty (SD) as per BS 5234-22 + Protection rails to walls of corridors + Kick plates or impact protection (e.g. trolleys) on doors + Hard-wearing and easily washable floor finishes in heavily used circulation areas (i.e. main entrance, corridors, public areas etc.) + Door stoppers to prevent door handles damaging walls + Designing out the risk without the need for additional materials specification to protect vulnerable areas.	The EWA design developed finishes to suit the given criteria.	1	1.07%

4.7 Waste

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project / Evidence.	Credits	% contribution to Score
Wst 01 Construction waste management	To reduce construction waste by encouraging reuse, recovery and best practice waste management practices to minimise waste going to landfill.	Complete a pre-demolition audit of any existing buildings, structures or hard surfaces being considered for demolition. This must be used to determine whether refurbishment or reuse is feasible and, in the case of demolition, to maximise the recovery of material for subsequent high grade or value applications.	An audit was carried out by Seddon, with regards to the primary demolitions areas , namely the car park excavations, soft landscape to dining extension and existing cladding to be removed by extensions.	1	0.67%
Wst 03 Operational waste	To encourage the recycling of operational waste through the provision of dedicated storage facilities and space.	Provide a dedicated space for the segregation and storage of operational recyclable waste generated. The space is: + Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams + Accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors + Of a capacity appropriate to the building type, size, number of units (if relevant) and predicted volumes of waste that will arise from daily or weekly operational activities and occupancy rates. For consistent and large amounts of operational waste generated, provide: + Static waste compactors or balers; situated in a service area or dedicated waste management space + Vessels for composting suitable organic waste OR adequate spaces for storing segregated food waste and compostable organic material for collection and delivery to an alternative composting facility + A water outlet provided adjacent to or within the facility for cleaning and hygiene purposes where organic waste is to be stored or composted on site	Trust have confirmed that dedicated space for the segregation and storage of operational recyclable waste generated.	1	0.67%
Wst 05 Adaptation to climate change	To minimise the future need of carrying out works to adapt the building to take account of more extreme weather changes resulting from climate change and changing weather patterns.	Conduct a climate change adaptation strategy appraisal using a systematic risk assessment to identify the impact of expected extreme weather conditions arising from climate change on the building over its projected life cycle. The assessment covers the installation of building services and renewable systems, as well as structural and fabric resilience aspects Develop recommendations or solutions based on the climate change adaptation strategy appraisal, before or during Concept Design, that aim to mitigate the identified impact. Provide an update during Technical Design demonstrating how the recommendations or solutions proposed	A review of materials was carried out with regard to the options for climate change	1	0.67%

4.8 Land use and ecology

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project / Evidence.	Credits	% contribution to Score
LE 01 Site Selection	To encourage the use of previously occupied or contaminated land and avoid land which has not been previously disturbed.	At least 75% of the proposed development is on previously occupied land A contaminated land professional undertakes a site investigation, risk assessment and appraisal, which deems that land within the development footprint to be affected by contamination.	The site of the school had been previously built on. Furthermore, remedial works were carried out to construct the car park which was occupied by contaminated spoil from previous works.	1	1.00%
LE 04 Ecological change and enhancement	To enhance ecological value of the area associated with the site in support of local, regional and national priorities.	Criteria include + Managing negative impacts on ecology (prerequisite) + Ecological enhancement + Change and enhancement of ecology	Seddon Construction confirmed that measures have been implemented to manage and maintain ecology throughout the project. DTA confirmed that a landscape and Ecology Management Plan, or equivalent, has been developed.	2	3.00%
LE 05 Long term ecology management and maintenance	To secure ongoing monitoring, management and maintenance of the site and its habitats and ecological features, to ensure intended outcomes are realised for the long term.	Criteria include + Statutory obligations, planning and site implementation (prerequisite) + Management and maintenance throughout the project + Landscape and ecology management plan	DTA confirmed that measures have been implemented to manage and maintain ecology throughout the project. DTA confirmed that a landscape and Ecology Management Plan, or equivalent, has been developed.	2	3.00%

4.9 Pollution

Credit	Assessment Criteria	Overview of Credit Design Requirements	Specific Measure Undertaken on the Project / Evidence.	Credits	% contribution to Score
Pol 01 Impact of refrigerants	To reduce the level of greenhouse gas emissions from the leakage of refrigerants	No refrigerant use within the installed plant or systems	No refrigerants were installed within the project.	2	2.00%
Pol 02 Local air quality	To contribute to a reduction in local air pollution through the use of low emission combustion appliances	Emissions from all installed combustion plant that provide space heating and domestic hot water do not exceed the levels 24mg/kWh	The project utilise the existing high efficiency modulating condensing boilers for heat generation.	2	1.33%
Pol 03 Flood and surface water management	To avoid, reduce and delay the discharge of rainfall to public sewers and watercourses, thereby minimising the risk and impact of localised flooding.			5	3.33%
		Annual probability of flooding	DTA team confirmed flood risk criteria from assessment carried out..	2	
		Surface Water Run-off Rate		1	
		Surface Water Run-off Volume		1	
		Minimising watercourse pollution		1	
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, thereby reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties.	The external lighting strategy has been designed in compliance with Table 2 of the Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 2011(229). All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00. If safety or security lighting is provided and will be used between 23:00 and 07:00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP guidance notes. Illuminated advertisements are designed in compliance with ILP PLG05 The Brightness of Illuminated Advertisements	The given BREEAM criteria was complied with in the development and installation of the lighting solutions.	1	0.67%
Pol 04 Reduction of noise pollution	To reduce the likelihood of noise arising from fixed installations on the new development affecting nearby noise - sensitive buildings.	Where there are noise-sensitive areas within the assessed building or noise-sensitive areas within 800 m radius of the assessed site, a noise impact assessment compliant with BS 4142:2014(231) is commissioned. Noise levels must be measured or determined for: + Existing background noise levels: + Noise rating level from the assessed building. The noise level from the assessed building, as measured in the locality of the nearest or most exposed noise-sensitive development, must be at least 5dB lower than the background noise throughout the day and night. If the noise sources from the assessed building are greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with the criterion.	The existing extensions do not, make more onerous, the existing noise level on the site.	1	0.67%

